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SCOPED HYDROGEOLOGICAL ASSESSMENT

PROPOSED RESIDENTIAL SUBDIVISION

316 Grange Road
Guelph, Ontario

SUBMITTED TO:
1001232683 Ontario Inc.
275 Hanlon Creek Blvd., Unit 2
Guelph, Ontario
N1C 0A1

ATTENTION:
Mr. Joe Harris

FILE NO.: 2791H-1v1 **/** October 23, 2026

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1.0 INTRODUCTION

Chung & Vander Doelen Engineering Ltd. (CVD) has been retained by 1001232683 Ontario Inc. (the "Client") to provide a scoped hydrogeological assessment in support of the proposed development of a residential subdivision located at 316 Grange Road in Guelph, Ontario (the "Property" or "Site").

It is understood that the 2.67± ha site will be redeveloped into a residential subdivision that will consist of multiple townhouses blocks as well as separate lots. It is proposed that each building will include a full basement extending to approximately 2.6± m below finished grade (see Drawing C400, Appendix B). The development will also include two internal roadways connecting the subdivision to Grange Road in the south and Marks Avenue to the east. A park space (Block 24) is planned in the southeast corner of the subdivision. It is assumed that the subdivision will be fully municipally serviced. The current site plan (Stantec, October 15, 2026) and grading plan (Crozier, October 23, 2026) are included in Appendix B.

The purpose of this investigation is to evaluate existing hydrogeological conditions at the Site in support the proposed development summarized above. As such, the overall objectives of the hydrogeological investigation are as follows:

- To characterize the overall hydrogeologic setting (including shallow subsoil and groundwater conditions) using data from the current and previous investigations, with primary emphasis on the near surface hydrogeologic setting.
- Provide an evaluation of the general water table zone characteristics including hydraulic conductivity of the aquifer, assessment of the water table, and general groundwater flow direction.
- Assess potential impacts from the development to existing nearby groundwater receptors, such as private wells and groundwater dependent natural heritage features.
- Provide a pre-development water balance estimate and comment on potential Low Impact Development (LID) mitigation measures.
- Comment on potential groundwater control needs to support construction.

A geotechnical report was previously completed by V.A. Wood (Guelph) Inc. in May 2021, and a draft hydrogeological report was previously prepared by R.J. Burnside & Associated Ltd. ("Burnside") in May 2022 for the previous landowners (Lunor Group Inc.). Additionally, a Phase I Environmental Site Assessment (ESA) report was completed by Premier Environmental Services ("Premier") in April 19, 2024. The findings of these reports will be considered in the current assessment, and the background hydrogeological descriptions provided by Burnside will be summarized in this report.

It should be noted that multiple discrepancies were identified in the V.A. Wood (2021) groundwater level readings and surveyed monitoring well elevations. This includes:

- Conflicting ground surface elevations between V.A. Wood borehole logs and the V.A. Wood groundwater elevation table included in the Burnside hydrogeological report (i.e. for Boreholes 2 and 7).
- Ground surface elevations for boreholes and monitoring wells reported in the V.A. Wood geotechnical report differing significantly from those surveyed by CVD.
- Groundwater level readings exceeding the maximum depth of well (i.e., well BH 2).

As a result of these discrepancies, this report will utilize the CVD resurveyed elevations, and present groundwater data solely recorded by CVD from October 2025 to October 2026.

This assessment is meant to be read in conjunction with the CVD Geotechnical Investigation Report (October 2026) which provides a more in-depth analysis of the underlying soil and bedrock conditions, and overall constructability of the Site.

2.0 INVESTIGATION SCOPE

2.1 Background Information and Nearby Natural Heritage Features

As shown in Figure 1A, Appendix C, 2.67± ha site is situated the eastern portion of Guelph, on the northern side of Grange Road. The property is located approximately 15± to 85± m east of Hadati Creek, and 850± m north of Clythe Creek. Eramosa River is located approximately 1.2± km south of the Site and Speed River is found 2.3± km west of the property.

As shown in Figures 1A and 1B, the subject property does not include any natural heritage features, with the west-adjacent Hadati Creek being the nearest watercourse / natural feature.

With the exception of an abandoned residential dwelling and partially demolished barn located in the southeast corner of the site, the majority of the property is currently undeveloped. Most of this land consists of a former farm field, existing since at least 1955 (Premier, 2024), alongside occasional overgrown areas with denser tree cover, notably along the border of the site. The northeastern most corner of the property contains the paved cul-de-sac of Kemp Crescent.

There is an approximately 4± m gradient in topography across the site, with elevations generally decreasing toward the south and west. CVD surveyed test pit and monitoring well ground surface elevations varied from 329.59 to 332.57 mASL.

2.2 Previous and Current Field Investigations

Under the initial geotechnical investigation carried out by V.A. Wood Inc. (“Wood”) in April 2021, seven (7) boreholes, designated as Boreholes 1 to 7, were advanced to depths between 4.50 and 6.30 m below ground surface (mbgs). Six (6) shallow monitoring wells were installed beside the boreholes, labelled wells BH 1, 2, and 4 to 6. All Wood borehole/monitoring well logs are included in Appendix F.

As part of the current investigation, four (4) test pits, labelled Test Pits 1 to 4, were advanced to depths between 4.85 and 6.70 m below ground surface (mbgs) on October 16, 2025, to investigate the subsurface conditions at the site and complete in-situ Guelph Permeameter testing. The CVD test pit logs are included on Enclosures 1 to 4 (Appendix G). Furthermore, two additional surficial test pits, labelled TP 5 and 6, as shown on Figure 1, were excavated in order to measure topsoil thickness.

A Phase I Environmental Site Assessment (ESA) was also completed at the Site by Premier Environmental Services Inc. (“Premier”) on April 19, 2024. During their investigation, Premier did not identify any actual environmental concerns relating to the Site; however, the identified the suspected presence of an above-ground storage tank (AST) in the basement of the residential house based on the fill and vent pipes located on the west wall, the suspected presence of an underground storage tank (UST) in the front yard of the residential house, and the presence of a

septic system located in the back yard of the residential house.

Furthermore, CVD also completed a Phase I ESA (November 3, 2025) for the property and did not identify any actual or potential sources of contamination on the Site or the surrounding properties that would be considered an environmental liability to the Site. It should also be noted that no Certificate of Property Use (CPU) exists for the Site.

2.3 Water Level Monitoring and Groundwater Sampling

During the current investigation, CVD obtained six (6) rounds of water level readings from all six (6) existing monitoring wells (labelled BH 1, 2, and 4 to 7) between October 17, 2025, and October 13, 2026. The groundwater measurements for each monitoring well are shown in Table 1, included in Appendix C. Each monitoring well was redeveloped developed using Waterra™ polyethylene tubing, foot-valve and hand pumps.

Furthermore, to provide a more comprehensive summary of groundwater conditions at the Site, six (6) Van Essen DI801 10 m TD-Diver automated data loggers were installed at wells BH 1, 2, and 4 to 7 as well as one (1) Baro-Diver. The data loggers provide continuous measurements (1-hour intervals) during the entire water table monitoring period. The purpose of the Baro-Diver was to compensate for atmospheric noise and pressure at the ground surface.

In addition to the original two (2) single well response tests (SWRT) completed by Burnside on wells BH 4 and 7, CVD completed two (2) further SWRTs on wells BH 1 and 5 in order to verify the results and provide a more accurate estimate of the hydraulic conductivity (K) (or permeability) of the saturated aquifer subsoil strata, and to assist in providing more accurate infiltration rates. The hydraulic conductivities were calculated through the AquiferTest software utilizing the Bouwer and Rice method. The results of the tests are graphically presented in Appendix D, and a summary of the data is also included in Table 1.

3.0 SITE CHARACTERIZATION

3.1 Geological and Hydrogeological Conditions

According to publicly available geological mapping from the Ontario Geological Survey (2010) (MRD228), the Site is located within the physiographic region of the Guelph Drumlin Field. The Guelph Drumlin Field is characterized by frequent drumlins which are aligned in a northwesterly / southeasterly direction. In terms of on-Site physiographic landforms, most of the Site appears to be comprised of drumlinized till plains with the exception of the southeasternmost corner of the property which is mapped exclusively as a drumlin.

As shown on Figure 2 which presents the Quaternary geology of the Site (MRD128Rev), the property is underlain by sandy and silty glacial till deposits. It is likely that this glacial till corresponds to the Wentworth Till unit.

Based on information gathered from CVD's geotechnical investigation, in general, 50 to 450 mm of surficial topsoil was underlain by interlayered loose to very dense fine-grained soil layers (Borehole 6 and Test Pits 1 and 2), ranging from sand and silt to fine sand, and a generally compact to dense gravelly sand to sand and gravel deposit (Boreholes 5 and 7, and Test Pits 1 to 3). These deposits extended to depths between 0.75 and 3.60 mbgs. Occasional to frequent cobbles and occasional boulders were observed within the sand and gravel layers. These soils are further underlain by generally compact to very dense sand and silt to silty sand till deposits, containing occasional to frequent cobbles and occasional boulders, which typically extended to the borehole / test pit termination depths.

Probable bedrock was contacted in all seven boreholes at depths between 4.60± and 6.30± mbgs; however, no rock coring was performed to confirm these findings. Overall, these findings are consistent with the available geological mapping.

Paleozoic geological mapping (MRD219), as illustrated in Figure 3, shows that the property is located within the Guelph Formation of the Lockport Group which is part of the Middle Silurian period. The bedrock of the Guelph Formation is primarily comprised of tan to brown dolostone bedrock. This is corroborated by nearby municipal well records and private water supply well records which identify dolostone bedrock (see Appendix D).

Figure 9 provides a conceptual hydrogeological site model showing the encountered shallow geological conditions on-Site, the groundwater table, the estimated depth bedrock, and the hydrogeological conditions of the nearest wellfield located on Metcalfe Street (municipal wells Park #1 and Park #2).

3.2 Water Table Depth and Configuration

During the groundwater monitoring period between October 17, 2025, and October 10, 2026, the water table was measured at all six (6) existing monitoring wells (labelled BH 1, 2, and 4 to 7) to vary from 2.57 to 5.55 mbgs, corresponding to elevations between 324.26 to 328.56 mASL. It should be noted that well BH 2 was dry on all occasions except for January 21 and April 1, 2026.

Based on this collected data, it is interpreted that groundwater is generally found perched within the silty sand to sand and silt till. This is evidenced by the notable seasonal variations in groundwater levels at each well which range up to a maximum of 2.01 m.

It should also be noted that unstabilized free water was encountered during CVD's geotechnical investigation at Test Pit 3 at approximately 3.1± mbgs roughly one hour upon completion, corresponding to an elevation of 326.5± mASL. This observation suggests that the presence of occasional saturated granular pockets/layers of more permeable soil may exist across the site.

As shown in Figures 7a and 7b, included in Appendix C, the interpreted shallow groundwater flow direction is southerly. Furthermore, as shown in Figure 8, it is likely that this groundwater ultimately flows towards Hadati Creek.

It should be noted that calculation of the on-Site vertical hydraulic gradient (VHG) is not possible due to the lack of on-Site nested wells. However, based on the presence of the hydraulically tight sand and silt to silty sand till soils which underly the site, and based on their very low infiltration rates, as evidenced by the completed in-situ Guelph Permeameter testing, it is likely that the overall VHG on-Site is downwards (negative), indicating a groundwater recharge zone. This is also supported by presence of significant groundwater recharge areas located directly south of the Site (see Figure 4)

Based on the results of the CVD and previously completed Burnside SWRTs, hydraulic conductivities for the predominant sand and silt till unit varied from 3.9×10^{-7} and 3.3×10^{-6} m/s. Additionally, through in-situ Guelph Permeameter (GP) testing, the field saturated hydraulic conductivity of the sand and silt till was calculated between 6×10^{-7} m/s to 1×10^{-6} m/s which perfectly matches the range calculated from the SWRT. A GP test was also conducted on the sand and gravel unit and was calculated at 4×10^{-4} m/s.

3.3 Groundwater Control Assessment

It is understood that each unit will include a full basement extending to approximately 2.6± m below finished grade. As such, according to the marked-up General Grading Plan provided by Crozier (October 23, 2026), the U/S of basements will range in elevations between 327.4± to 335.9± mASL from the south to the north across the Site, respectively (see Appendix B). In comparison, groundwater level measurements collected by CVD based on April 2026 water levels, which generally represent high groundwater conditions, place the water table between approximately 325± mASL to 329± mASL from the south to the north, respectively (see Figure 7b). Based on this data, the underside of basements of the proposed structures are at least 1.5 to 2.0± metres or greater above the water table, and as such, will not require any temporary construction dewatering to facilitate construction.

Based on the above, CVD is of the opinion that:

- Temporary construction dewatering is not anticipated for the construction of proposed buildings. Similarly, based on the General Servicing Plan (Crozier, October 23, 2026), also included in Appendix B, no notable temporary construction dewatering is expected to support installation of site servicing.
- The proposed grading and basement elevations are reasonable and are expected to satisfy the requirements stipulated by the City of Guelph Development Engineering Manual (October 2023), finished basement floor elevations should be located at a minimum of approximately 0.5 m above the seasonal high groundwater table.

Should the design of the proposed development change, CVD should be notified in order to assess the changes, and update the conclusions provided in this section, if necessary.

3.4 Groundwater Quality

Burnside completed preliminary groundwater sampling on July 12, 2021, at wells BH 4 and BH 7 and submitted the samples to an accredited laboratory for analyses of general water quality (pH, hardness, and conductivity), basic ions (including chloride and nitrate) and selected metals. Based on the results of this testing, the groundwater samples exceeded the provincial Water Quality Objectives (PWQO) standards for total phosphorus at monitoring well BH 4 with a concentration of 0.14 mg/L compared to the PWQO of 0.03 mg/L. All other parameters satisfy PWQO standards.

It should be noted that since no notable temporary construction dewatering and subsequent discharge are expected, and since the properties will be municipally serviced, the elevated parameters are not anticipated to adversely affect the development, and no further groundwater quality testing is considered necessary at this time from a hydrogeological perspective at this time.

3.5 Source Water Protection and Groundwater Use

Nearby Municipal Water Supply Wells

The nearest municipal water supply wells include municipal wells ‘Park #1’ and ‘Park #2’, located approximately 2.0± km west of the Site at 183 Metcalfe Street, and municipal well ‘Clythe Creek’, situated approximately 1.4± km east of the Site on Watson Road North. It should be noted that municipal well ‘Clythe Creek’ is currently inactive, and as such, emphasis will be placed on the Metcalfe Street wells instead.

According to the publicly accessible Ontario Well Records, the Metcalfe Street wellfield includes two water supply wells (well records No. 6700855 and 6700858), both of which are screened (open hole) in dolostone bedrock. The Park #1 well (6700855) is screened in dolostone and has a bottom depth of 57.0± mbgs (187 ft) while the Park #2 Well (No. 6700858) is also screened in dolostone bedrock and has a bottom depth of 47.5± mbgs (156 ft).

The approximate geology of these municipal wells are shown on Figure 9, which provides a conceptual hydrogeological site model between the municipal wellfield and the subject lands of this study. The well records for municipal wells Park #1 and Park #2 are both included in Appendix H.

Source Water Protection

The Grand River Source Protection Plan (updated February 2022) has established four Wellhead Protection Areas (A, B, C & D); WHPA-A for the immediate 100-m zone around each municipal well and WHPA-B to D based on modelled groundwater 'times of travel' to each well (or wellfield), varying between 2, 5, and 25-years, respectively. In addition, relative groundwater 'vulnerability' to contamination scores (on an increasing scale from 1 to 10) have been established for all lands within the WHPAs.

As shown in Figure 4, according to data provided on the GRCA-Web GIS application the property is located within the WHPA-B zone of Guelph municipal wells 'Park #1' and 'Park #2', and has a vulnerability score of 8 to 10. WHPA-B denotes an area in which horizontal groundwater travel time to the well is 2 years or less. The property is located outside of the Tier 2 significant groundwater recharge area.

Notwithstanding the higher wellhead vulnerability of the Site, considering that the on-Site subsoils primarily consist of very low permeability sand and silt till, likely sitting on bedrock, and in view of the fact that no notable temporary construction dewatering activities are expected, no significant threat to the municipal aquifers are expected. The low vulnerability is due to the presence of the Tavistock and/or Lower Maryhill Tills which are silt and clay rich at the surface, resulting in slow groundwater recharge.

Private Water Supply Wells

Burnside identified thirty-one (31) domestic water supply wells within 500 m of the Site, ranging in depth between 7.3 m to 200 m; however, it is unknown if these wells are still in use, considering that most of the area surrounding the site is municipally serviced. Furthermore, it is unlikely that the minimal expected temporary construction dewatering will have any effect on the supply of these wells.

Nearby Groundwater Receptors

Nearby groundwater receptors (surface water features) include Hadati Creek, 15± to 85± m east of the property, and Clythe Creek, situated 850± m north of the Site. The low to negligible anticipated temporary construction dewatering needs described in Section 3.3 are not expected to have any noticeable impact on these surface water features.

4.0 WATER BALANCE ASSESSMENT

4.1 Preliminary Water Balance Assessment

Pre-Development Water Budget

Precipitation ultimately becomes split into three 'water budget' components: evapotranspiration, runoff, and recharge, with the latter two often referred to together as 'the water balance' (i.e., the remainder after evapotranspiration is removed). Groundwater recharge rates will vary at a given site based on the permeability of the surficial deposits but will also depend on topography and type of vegetative cover. Most of the subject property has been historically agricultural, likely with different types of crops depending on the year.

A pre-development water balance for the property has been estimated using the Water Balance Method (WBM) of Thornthwaite and Mather (1957), a method cited in the MECP document "Stormwater Management Planning and Design Manual" (March 2003) to estimate evapotranspiration. The calculations utilize the 1991-2020 'Climate Normals', the most up-to-date climate data, from the closest weather station, Station Kitchener/Waterloo (gives an annual precipitation rate of 850.7 mm/yr) and considers a combination of cultivated land use with moderately deep-rooted crops, woodland and wetland areas, and impervious surfaces. Using these conditions, the subject Site has an average evapotranspiration rate of about 63.8% (or 543.2 mm/yr) and remaining 'water balance' of about 36.2% (307.5 mm/yr) is estimated.

The 2003 MECP document also provides a methodology for estimating the proportions of the water balance that ultimately become runoff vs. recharge, based on applicable infiltration factors for soil, vegetative cover, and topography.

The overall water balance and water budget calculations are included in Appendix E. In summary, the pre-development average annual water budget for the 2.67± ha property is as follows:

A) Pervious, Fields of 1.95± ha

Precipitation	851 mm/yr	16,589 m^3/yr
Evapotranspiration	543 mm/yr	10,592 m^3/yr
Water Balance	308 mm/yr	5,997 m^3/yr
Recharge	**154 mm/yr**	**2,998 m^3/yr**
Runoff	154 mm/yr	2,998 m^3/yr

B) Pervious, Woodlands & Wetlands of 0.58± ha

Precipitation	851 mm/yr	4,934 m^3/yr
Evapotranspiration	543 mm/yr	3,150 m^3/yr
Water Balance	308 mm/yr	1,784 m^3/yr
Recharge	**185 mm/yr**	**1,070 m^3/yr**
Runoff	123 mm/yr	713 m^3/yr

C) Impervious, Rooftops & Pavement to Pervious Areas of 0.14± ha

Precipitation	851 mm/yr	1,191 m^3/yr
Evapotranspiration	85 mm/yr	119 m^3/yr
Water Balance	766 mm/yr	1,072 m^3/yr
Recharge	**153 mm/yr**	**214 m^3/yr**

Runoff	613 mm/yr	858 m^3/yr

As such, the target recharge quantity for matching in post-development is estimated at 4,283 m3/yr.

Post-Development Water Budget Without Mitigation Measures

A post-development water budget assessment was also completed based on the Site plan included in Appendix B and information provided by C.F. Crozier & Associates Inc.

In summary, the post-development average annual water budget for the approximately 2.67± ha property is as follows:

A) Pervious, Landscaped of 0.87± ha

Precipitation	851 mm/yr	7,359 m^3/yr
Evapotranspiration	543 mm/yr	4,698 m^3/yr
Water Balance	308 mm/yr	2,660 m^3/yr
Recharge	**154 mm/yr**	**1,330 m^3/yr**
Runoff	154 mm/yr	1,330 m^3/yr

B) Impervious Rooftops to Pervious Landscaped Areas (via downspout disconnection) of 0.44± ha

Precipitation	851 mm/yr	3,743 m^3/yr
Evapotranspiration	598 mm/yr	2,629 m^3/yr
Water Balance	253 mm/yr	1,114 m^3/yr
Recharge	**127 mm/yr**	**557 m^3/yr**
Runoff	127 mm/yr	557 m^3/yr

C) Impervious to Storm Sewer System of 1.37± ha

Precipitation	851 mm/y	11,612 m^3/yr
Evapotranspiration	85 mm/yr	1,161 m^3/yr
Water Balance	766 mm/yr	10,451 m^3/yr
Recharge	**0 mm/yr**	**0 m^3/yr**
Runoff	766 mm/yr	10,451 m^3/yr

The post-development recharge quantity without mitigation measures is estimated at 1,887 m^3/yr.

As such, it is estimated that in post-development (without consideration of mitigation measures), there will be a recharge deficit of approximately 2,396 m^3/yr, which should be considered the target recharge volume of LID mitigation measures.

Considering that the water table is located 2.57 to 5.55 mbgs (October 2025 to October 2026), corresponding to elevations between 324.26 to 328.56 mASL, groundwater should not pose an issue to any planned Low Impact Development (LID) infiltration features. Scattered pockets of conductive sand and gravel do exist across the site, and if possible, should be prioritized as locations for infiltration.

Details on soil infiltration rates, soil conditions, and recommendations for enhanced infiltration are provided in CVD's concurrent geotechnical report dated October 21, 2026.

4.2 Proposed Stormwater Management Plan and LID Measures

Crozier completed a Functional Servicing And Preliminary Stormwater Management Report (FSR) (October 2026) to address post-development stormwater management and water balance mitigation measures. According to their plan, Crozier proposes the following:

- Stormwater runoff from rooftops and rear yards will be conveyed to LID features for infiltration to meet water balance targets.
- Stormwater runoff from the driveways and front yards of the proposed buildings will drain towards the existing Grange Road storm sewer system for minor events and the Grange Road right-of-way for major events, ultimately draining to Hadati Creek via the downstream water quantity facility.
- An OGS unit will be installed on-Site to ensure Enhanced (80%) total suspended solids (TSS) removal in conjunction with the existing downstream water quality facility that was designed for the development of the subject lands.
- Erosion control measures will be provided through the downstream water quality wetland facilities.

Based on the post-development recharge deficit of 2,396 m^3/yr, calculated by CVD in the previous section, Crozier calculated that approximately 60 m^3 of infiltration feature storage are required to meet the pre-development water budget. This volume was calculated assuming a till subgrade (infiltration rate of 10 mm/hr), and as such, is sufficiently conservative in nature.

According to the Site Servicing Plan (Crozier, October 23, 2026) included in Appendix B, Crozier proposes to construct an approximately 1.0 m wide by 0.5 m deep traditional infiltration gallery spanning most of the southwest and northwest boundaries of the property in the rear yard lots of the proposed buildings, as well as in the rear yard lots of Block 23.

Overall, based on Crozier's design, the proposed infiltration system is expected to provide a total annual infiltration volume of approximately 2,362 m^3, based on an 8 mm design storm event. This corresponds to approximately 98.6% of the target recharge.

As such, after reviewing Crozier's FSR, CVD considers the proposed stormwater management plans to be reasonable, and the proposed LID measures to sufficiently enhance groundwater recharge for the purposes of meeting water balance.

Review of On-Site Catchment Areas and Drainage

Figures FIG1 and FIG2 of Crozier's Functional Servicing And Preliminary Stormwater Management Report (FSR) (October 2026) are included in Appendix B and detail both the existing on-Site catchment areas as part of the existing drainage plan as well as those of the proposed post-development drainage plan.

It is reiterated that no natural features and areas exist on-Site, with Hadati Creek being adjacent to the southwest of the property. In review of the existing catchment areas on-Site, C102 (0.46 ha) and C103 (0.08 ha), as shown in Crozier Figure FIG1, current runoff drains southwesterly primarily towards an adjacent residential development, with a small portion towards Hadati Creek.

Post-development drainage proposed, as illustrated in Figure FIG2, directs the bulk of runoff towards catch basins and Grange Road.

5.0 CLOSING

This hydrogeological investigation report has been prepared for the exclusive use of the Client and their assigns for specific application to this project property.

The assessment was conducted in accordance with the verbal and written requests from the Client and generally accepted assessment practices. Performance of this assessment is intended to reduce, but not eliminate, uncertainty regarding the hydrogeological conditions encountered at the project Site, given reasonable limits of time and cost. No other warranty, expressed or implied, is made.

We trust this report is sufficient for your immediate requirements. If you have any questions, please do not hesitate to contact the undersigned.

Respectfully submitted,
CHUNG & VANDER DOELEN ENGINEERING LTD.



Yaroslav Chudin, P.Eng.
Project Hydrogeologist & Engineer

Digitally signed by:Peter Dao
Date:2026.10.23 16:11:42 -05:00



Peter Dao, M.Sc., P.Geo.
Manager, Environmental & Hydrogeology

6.0 REFERENCES

The following documents, maps, and other publications have been used in the preparation of this report:

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- Chung and Vander Doelen Engineering, "Phase I Environmental Site Assessment, 316 Grange Road, Guelph, Ontario", File No.: 2791 (November 3, 2025)
- C.F. Crozier & Associates Inc., "Functional Servicing and Preliminary Stormwater Management Report, 316 Grange Road, City of Guelph", File No. 2455-7660 (October 2026)
- Karrow, P.F., "Pleistocene geology of the Guelph area, southern Ontario", Map: 2153, Scale: 1 : 63360 (1968)
- Ontario Ministry of the Environment, Conservation and Parks (MECP) Water Well Records; https://www.ontario.ca/page/map-well-records (January 2026)
- Premier Environmental Service, "Phase I Environmental Site Assessment, 316 Grange Road, Guelph, ON", Project Number: 624012.CE Task 1 (April 19,2024)
- R.J. Burnside & Associates Limited, "316 Grange Road Hydrogeological Assessment", PTB124060.1000 (May 2022)
- Stantec Consulting Limited, "Draft Plan of Subdivision", Project No.: 161414698 (October 15, 2026)
- V.A. Wood (Guelph) Incorporated, "Geotechnical Investigation, Residential Development, Part of Lot 7, R.P. 53, Division 'C', 300 Grange Road, Guelph, Ontario", Ref. No. G4398-21-4 (May 2021).

APPENDIX A

Limitations of Report

STATEMENT OF LIMITATIONS

1. The work performed in this report was carried out in accordance with the Standard Terms of Conditions made part of our contract. The conclusions presented herein are based solely upon the scope of services and time and budgetary limitations described in our contract.

2. The report has been prepared in accordance with generally accepted hydrogeological study and/or engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

3. The services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the site which were unavailable for direct observation, reasonably beyond the control of CHUNG & VANDER DOELEN ENGINEERING LTD.

4. The objective of this report was to assess hydrogeological conditions at the site, within the context of our contract and hydrogeological assessment guidelines within the applicable jurisdiction. Evaluating compliance of past or future owners with applicable local, provincial and federal government laws and regulations was not included in our contract for services.

5. CHUNG & VANDER DOELEN ENGINEERING LTD. has relied in good faith on information and services provided by others while conducting the record search. We accept no responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omission, misinterpretation or fraudulent acts of the services used.

6. It should be noted that the observations and recommendations presented in this report are limited to the actual locations explored. The information presented in terms of the thickness and types of the subsoils encountered, groundwater levels, and chemical testing results, etc., are only applicable to the actual locations explored. Variations may be present between these locations. Should significant variation become apparent during later investigations, it may be necessary to reevaluate the findings of this report.

7. The conclusions of this report are based in part, on the information provided by others. The possibility remains that unexpected environmental conditions may be encountered at the site in locations not specifically investigated. Should such an event occur, CHUNG & VANDER DOELEN ENGINEERING LTD. must be notified in order that we may determine if modifications to our conclusions are necessary.



APPENDIX B

Selected Design Drawings



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

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The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.
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Key Map NTS.



Legal Description

Lot 7,
Registered Plan 53, Division C
City of Guelph,
County of Wellington

Information Required

Under Section 51(17) of the Planning Act,
R.S.O 1990 c.P 13 as Amended

a) - As Shown
b) - As Shown
c) - As Shown
d) - As Listed Below
e) - As Shown
f) - As Shown
g) - As Shown
h) - Municipal Water
i) - As Shown
j) - Municipal Sanitary and Storm Sewers
k) - None

Surveyor's Certificate

I hereby certify the boundaries of the subject lands and their relationship to the adjoining lands have been accurately and correctly shown.

Signed _____
Jamie Laws, O.L.S
Van Harten Surveying Inc.

Date _____

Owner's Certificate

I hereby authorize Stantec Consulting Ltd. to submit this Draft Plan of Subdivision on my behalf.

Signed _____
1001232683 Ontario Inc.

Date _____

Signed _____
Fabbian Homes Inc.

Date _____

Land Use Schedule

Lots/Blocks	Land Use	Area (ha)	Potential # of Units
Lots 1-2	Single Detached	0.137	2
Lots 3-12	Semi Detached	0.493	20
Blocks 13-23	Townhouse	1.263	60
Block 24	Park	0.109	
Blocks 25-26	0.3m Reserve	0.003	
Block 27	Road Widening	0.053	
Roads		0.610	
Total		2.668	82 Units

	ISSUED FOR DRAFT PLAN APPROVAL	JJ	EE	2026.10.15
1.	REVISED AS PER CITY COMMENTS	JJ	EE	2026.08.18
	ISSUED FOR PRE-CONSULTATION	JJ	EE	2026.02.13

Revision

File Name: 161414698_R-DP	By	Appd	YYYY.MM.DD
	Dwn.	Dsgn.	Chkd.
	JJ	JJ	EE	2025.10.02 YYYY.MM.DD

Permit-Seal

Client/Project
1001232683 ONTARIO INC.

316 GRANGE ROAD

GUELPH, ON

Title
DRAFT PLAN OF SUBDIVISION

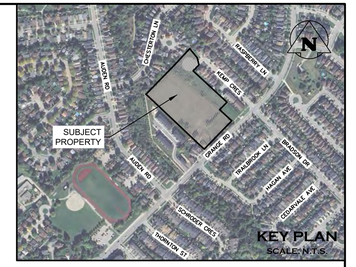
Owner
1001232683 ONTARIO INC.
275 Hanlon Creek Boulevard, Unit #2, Guelph, Ontario, N1C 0A1
Phone: (519) 824-0789 Fax: (519) 824-4189
Email: joe@geminihomes.ca

Applicant
MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
540 Bingemans Centre Drive, Suite 200, Kitchener, Ontario, N2B 3X9
Phone: (519) 576-3650 Fax: (519) 576-0121
Email: eelliott@mhbcplan.com

Project No. 161414698
Scale 1:400 (0 4 12 20m)
Revision 1
Sheet 1 of 1
Drawing No. DP-1

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ORIGINAL SHEET - ARCH D



LEGEND

- PROPERTY LINE
- EXISTING SWALE
- EXISTING FENCE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING SANITARY SEWER & MANHOLE
- EXISTING FIRE HYDRANT & GATE VALVE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED FIRE HYDRANT & GATE VALVE
- TREE PROTECTION ZONE
- PROPOSED INFILTRATION GALLERY
- PROPOSED 0.3m RESERVE

SCALE: 1:500

NOTES:
1. PROPOSED SANITARY AND STORM SEWERS TO BE INSTALLED WITH PVC SDR-35 PIPES.
2. PROPOSED SANITARY SERVICE CONNECTIONS TO BE INSTALLED WITH PVC SDR-26 PIPES.
3. PROPOSED WATERMAIN TO BE INSTALLED WITH PVC DR-18 PIPES.

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SURVEY NOTES:
SURVEY COMPLETED BY VAN HARTEN LAND SURVEYORS ENGINEERS.
(2026/JAN/05)
PROJECT #: 33990-24
DISTANCES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

CONSEPTUAL DRAFT PLAN NOTES:
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Town

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1	ISSUED FOR DRAFT PLAN APPLICATION	2026/10/23

Engineer: LICENSED PROFESSIONAL ENGINEER, J.T. BIERI, 100224731, 2026-10-23, PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER, J. KOEHLER, 100198747, 2026-10-23, PROVINCE OF ONTARIO

Project: 316 GRANGE ROAD
CITY OF GUELPH

Drawing: SITE SERVICING PLAN

CROZIER

Drawn By	Design By	Project
R.L.	C.M./R.L.	2455-7660
Check By	Check By	Drawing
J.B./J.K.	J.B./J.K.	C300

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KEMP CRESCENT

BRADSON DRIVE

GRANGE ROAD

HOLLY COURT

CHESTERTON LANE

MARKS AVENUE

HAGAN AVE

KEMP CRESCENT

MATCH EX. PAVEMENT

MATCH EX. SIDEWALK

SAN MH1
T/G 337.22

STM MH1
T/G 337.08

PR. RETAINING WALL TO BE 0.15m OFFSET FROM THE PROPERTY LINE

PR. RETAINING WALL PER MANUFACTURER DETAILS AND SPECIFICATIONS

STM MH6
T/G 333.70

SAN MH6
T/G 333.64

MATCH EX. CONCRETE SIDEWALK

LIMIT OF BOULEVARD REGRADING AND SODING

LIMIT OF EXISTING SIDEWALK REMOVAL

EX. CONCRETE SIDEWALK TO BE REMOVED

EX. SWALE ON NEIGHBOURING PROPERTY TO REMAIN

STM RYCB1
T/G 334.14

PR. STM DCB1
T/G 329.96

PR. PROPERTY LINE

PR. 0.3m RESERVE

CONTRACTOR TO REGRADE WITH MINIMUM 100mm TOPSOIL AND SOD MUNICIPAL BOULEVARD BETWEEN NEW PROPERTY LINE AND EXISTING TOP OF CURB ALONG THE STREET PAVEMENT

STM RYCB2
T/G 332.96

SAN MH2
T/G 333.78

SAN MH3
T/G 333.36

SAN MH4
T/G 331.19

SAN MH7
T/G 331.66

STM MH7
T/G 331.50

SAN MH8
T/G 329.19

MATCH EXISTING CURB

SAN MH5
T/G 329.04

STM MH5
T/G 329.07

STM MH3
T/G 333.31

STM MH4
T/G 331.05

STORMCEPTOR EF08
T/G 329.10

STM MH8
T/G 329.13

MATCH EXISTING CURB

STM RYCB3
T/G 330.62

STM RYCB4
T/G 330.19

STM RYCB5
T/G 329.72

STM RYCB6
T/G 328.99

LIMIT OF EXISTING SIDEWALK REMOVAL

LIMIT OF BOULEVARD REGRADING AND SODING

MATCH EX. CONCRETE SIDEWALK

PR. RETAINING WALL TO BE 0.15m OFFSET FROM THE PROPERTY LINE

PR. RETAINING WALL PER MANUFACTURER DETAILS AND SPECIFICATIONS

BH4 (327.77)

BH5 (329.69)

BH7 (328.43)

BH# (325.26)

BH# (326.27)

BH# (328.56)

TC 331.12
BC 330.97

TC 330.75
BC 330.60

TC 329.89
BC 329.74

TC 329.38
BC 329.23

TC 328.90
BC 328.75

TC 328.75
BC 328.60

TC 328.71
BC 328.56

PR. 35.00m CURB CUT

BLOCK 19 TOWNHOUSE 0.112 ha (6 UNITS)

BLOCK 20 TOWNHOUSE 0.112 ha (5 UNITS)

BLOCK 17 TOWNHOUSE 0.092 ha (4 UNITS)

BLOCK 18 TOWNHOUSE 0.117 ha (5 UNITS)

BLOCK 21 TOWNHOUSE 0.125 ha (5 UNITS)

BLOCK 13 TOWNHOUSE 0.135 ha (7 UNITS)

BLOCK 14 TOWNHOUSE 0.117 ha (6 UNITS)

BLOCK 15 TOWNHOUSE 0.125 ha (6 UNITS)

BLOCK 16 TOWNHOUSE 0.125 ha (6 UNITS)

BLOCK 25 TOWNHOUSE 0.112 ha (7 UNITS)

BLOCK 22 PARK 0.4 ha

BLOCK 24 PARK 0.1 ha

PART 7, 61R-22422

PART 3, 61R-22422

PART 2, 61R-11691

PART 4, 61R-11691

PART 1

PART 3

PART 2

PART 4

PART 1

UNIT 9

UNIT 10

UNIT 11

UNIT 12

UNIT 13

UNIT 14

DIVISION

REGISTERED PLAN 61M-175

REGISTERED PLAN 61M-174

REGISTERED PLAN 774

LOT 63

LOT 64

LOT 65

LOT 66

LOT 67

LOT 68

LOT 69

LOT 70

LOT 71

LOT 72

LOT 73

LOT 74

LOT 75

LOT 76

LOT 77

LOT 78

LOT 1

LOT 2

LOT 3

LOT 4

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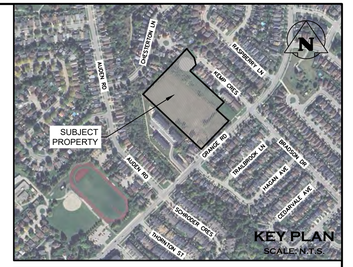
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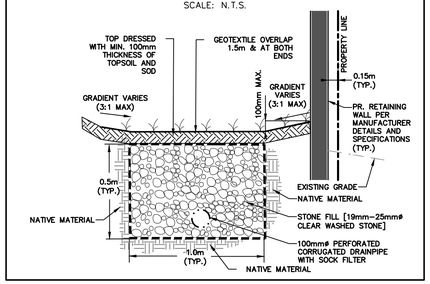
LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING SWALE
- EXISTING FENCE
- ×215.00 EXISTING GRADE
- ×215.00 PROPOSED GRADE
- ×215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- PROPOSED SLOPE (3:1 MAX.)
- PROPOSED CURB
- PROPOSED RETAINING WALL
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED OVERLAND FLOW DIRECTION
- EXISTING SINGLE / DOUBLE CATCHBASIN
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- EXISTING STORM MANHOLE
- PROPOSED STORM MANHOLE
- EXISTING SANITARY MANHOLE
- PROPOSED SANITARY MANHOLE
- TREE PROTECTION ZONE
- PROPOSED INFILTRATION GALLERY
- BH# (XXX.XX) BOREHOLE NUMBER & LOCATION GROUNDWATER ELEVATION PER CHUNG & VANDER DOELEN ENGINEERING LTD. APRIL 1, 2026
- NBW XXX.XX NORTH BOTTOM WALL ELEVATION
- TW XXX.XX TOP OF WALL ELEVATION
- SBW XXX.XX SOUTH BOTTOM WALL ELEVATION
- HT X.XX HEIGHT OF WALL

NOTES:
PROPOSED RETAINING WALLS SHOULD BE INSTALLED WITHIN PROPOSED DEVELOPMENT WITH MINIMUM 0.15m CLEARANCE FROM THE PROPERTY LINE.

TYPICAL INFILTRATION GALLERY

SCALE: N.T.S.



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SURVEY NOTES:
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(2026/JAN/05)
PROJECT #: 33990-24
DISTANCES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

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DESIGN ELEMENTS ARE BASED ON DRAFT PLAN BY MHBC, (JANUARY 20, 2026)

Town

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR PRE-SUBMISSION REVIEW	2026/02/13
1	ISSUED FOR DRAFT PLAN APPLICATION	2026/10/23

Engineer

LICENSED PROFESSIONAL ENGINEER
J.T. BIERI
100224731
OCT/23/2026
2455-7660
PROVINCE OF ONTARIO

Engineer

LICENSED PROFESSIONAL ENGINEER
J. KOEHLER
100198747
OCT/23/2026
PROVINCE OF ONTARIO

Project

316 GRANGE ROAD
CITY OF GUELPH

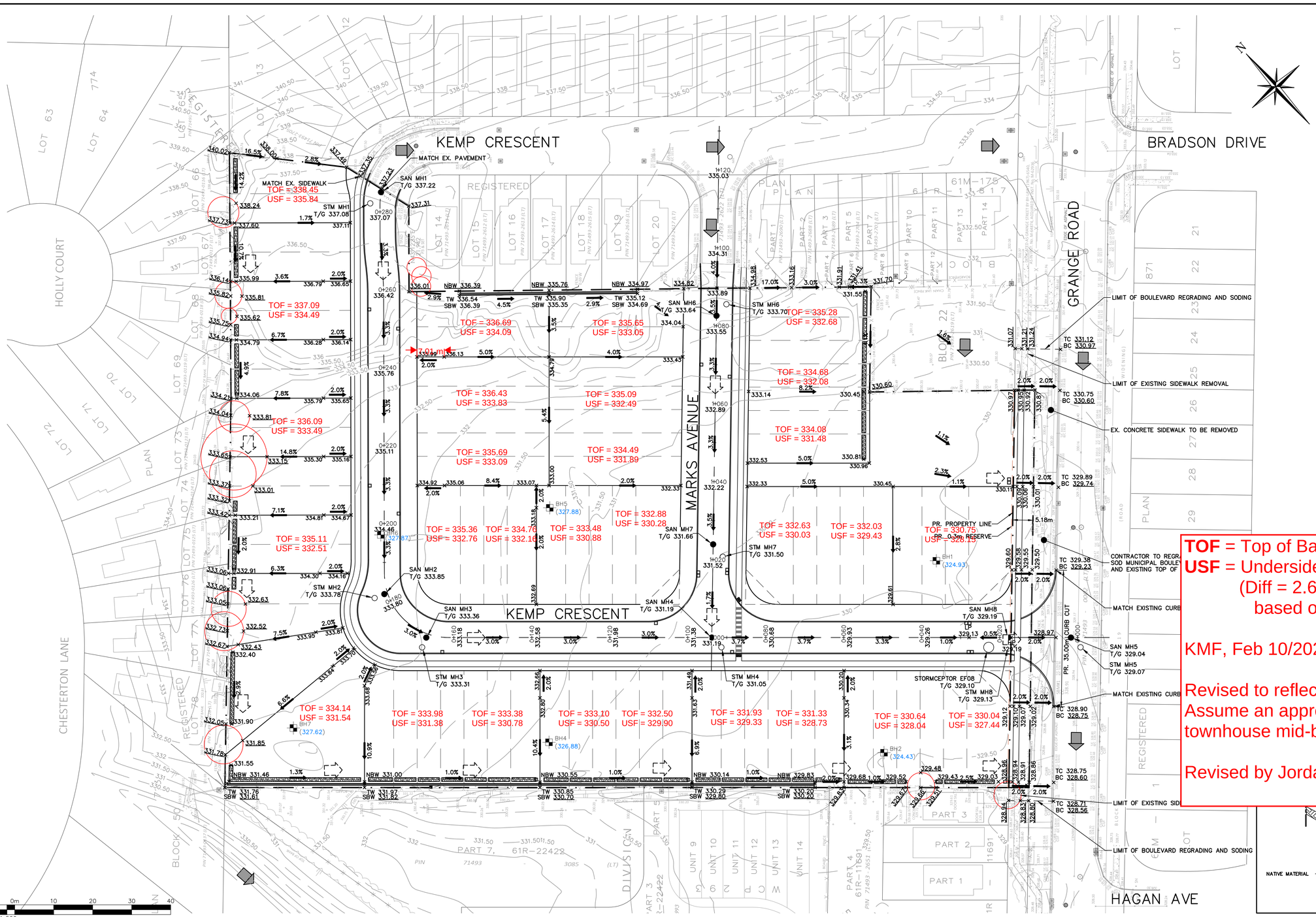
Drawing

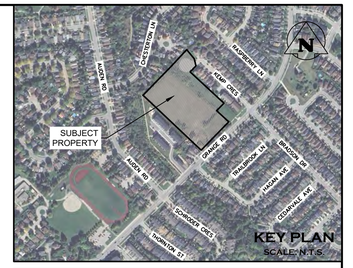
SITE GRADING PLAN

CROZIER

Drawn By	Design By	Project
R.L.	C.M./R.L.	2455-7660
Check By	Check By	Drawing
J.B./J.K.	J.B./J.K.	C400

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LEGEND

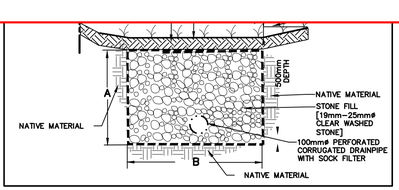
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- PROPOSED STORM MANHOLE
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- PROPOSED SANITARY MANHOLE
- TREE PROTECTION ZONE
- PROPOSED INFILTRATION GALLERY
- BH# (XXX.XX) BOREHOLE NUMBER & LOCATION GROUNDWATER ELEVATION

TOF = Top of Basement Foundation Elevation
USF = Underside of Basement Footing Elevation
(Diff = 2.60m from TOF to USF,
based on 8 ft foundation)

KMF, Feb 10/2026

Revised to reflect updated grading.
Assume an approximately 0.6 m step in each townhouse mid-block.

Revised by Jordan Bieri, October 8, 2026



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Town

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0	ISSUED FOR PRE-SUBMISSION REVIEW	2026/02/13
0A	ISSUED FOR COORDINATION	2026/09/22
0B	ISSUED FOR COORDINATION	2026/10/06

Engineer

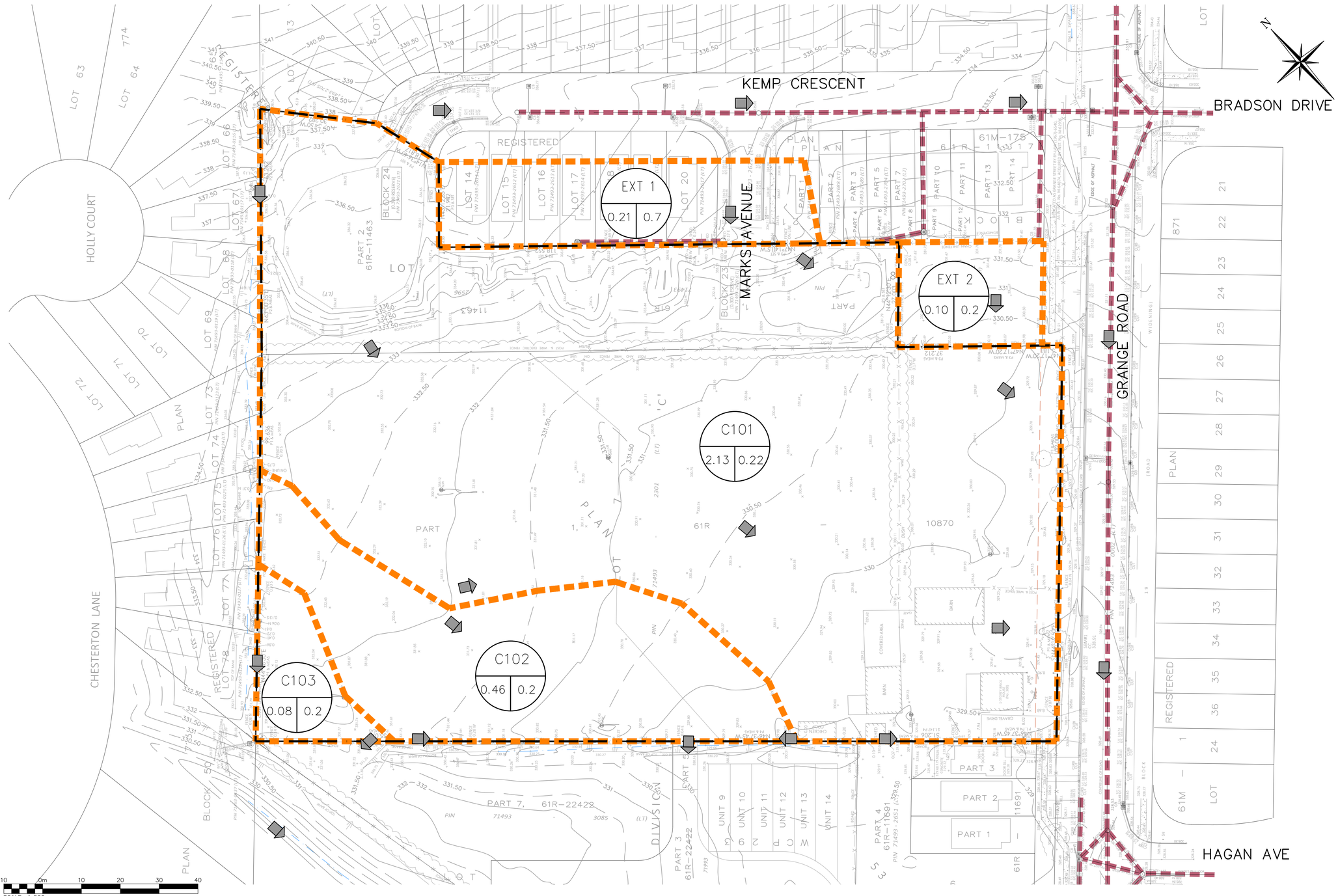
Engineer

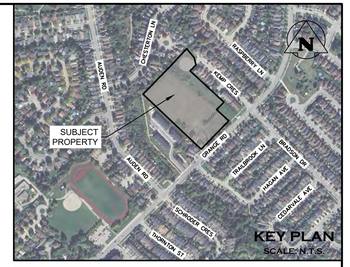
Project
316 GRANGE ROAD
CITY OF GUELPH

Drawing
SITE GRADING PLAN

CROZIER

Drawn By	Design By	Project
M.R./R.L.	M.R.	2455-7660
Check By	Check By	Drawing
J.B./J.K.	J.B./J.K.	C400





LEGEND

- PROPERTY LINE
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- EXISTING CONTOUR (1.0m)
- EXISTING FENCE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING OVERLAND FLOW DIRECTION
- EXISTING STORM DRAINAGE CATCHMENTS
- ID (A | RC) — CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

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Engineer: LICENSED PROFESSIONAL ENGINEER — J.T. BIERI — 100224731 — OCT/23/2026 — 2455-7660 — PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER — J. KOEHLER — 100198747 — OCT/23/2026 — PROVINCE OF ONTARIO

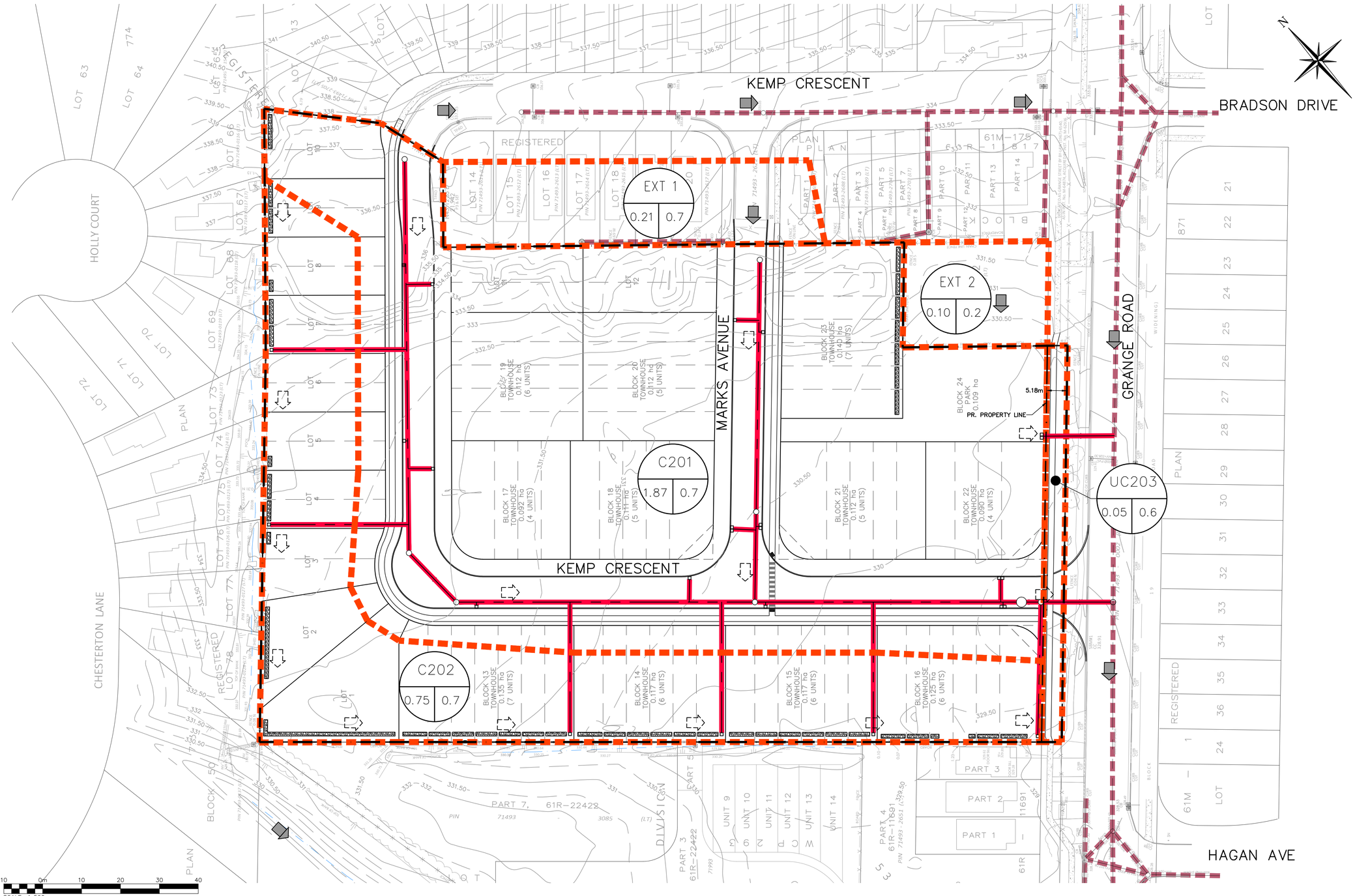
Project: 316 GRANGE ROAD, CITY OF GUELPH

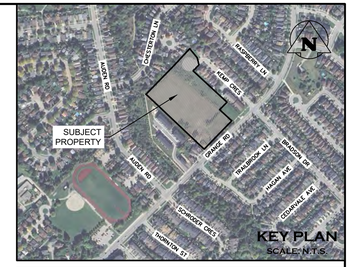
Drawing: PRE-DEVELOPMENT DRAINAGE PLAN

CROZIER

Drawn By	Design By	Project
R.L.	C.M./R.L.	2455-7660
Check By	Check By	Drawing
J.B./J.K.	J.B./J.K.	FIG1

C:\Users\rlogan.tw\DOCS\Crozier consulting engineers\2455-7660 - 316 grange road\project files\Civil_Sheets\detailed design\7660_FIG1.dwg, FIG1, 2026-10-23 15:08:55 AM, rlogan.tw





LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING FENCE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED OVERLAND FLOW DIRECTION
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- EXISTING STORM DRAINAGE CATCHMENTS
- ID / A | RC — CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

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4. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
6. DO NOT SCALE DRAWINGS.

LOCAL BENCHMARK:
ELEVATION ARE BASED ON ALUMINUM BENCHMARK PLATE SET ON THE SOUTHWEST WALL OF DWELLING NO. 290, GRANGE ROAD, 0.15 METERS FROM THE SOUTHERLY CORNER AND 0.5 METER ABOVE GROUND FACING AUDEN ROAD HAVING AN ELEVATION OF 330.245 METER.

SURVEY NOTES:
SURVEY COMPLETED BY VAN HARTEN LAND SURVEYORS ENGINEERS.
(2026/JAN/05)
PROJECT #: 33990-24
DISTANCES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

CONSEPTUAL DRAFT PLAN NOTES:
DESIGN ELEMENTS ARE BASED ON DRAFT PLAN BY MHBC, (JANUARY 20, 2026)

Town

No.	ISSUE	DATE: YYYY/MM/DD
0	ISSUED FOR PRE-SUBMISSION REVIEW	2026/02/13
1	ISSUED FOR DRAFT PLAN APPLICATION	2026/10/23

Engineer: LICENSED PROFESSIONAL ENGINEER — J.T. BIERI — 100224731 — 2026/10/23 — 2455-7660 — PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER — J. KOEHLER — 100198747 — 2026/10/23 — PROVINCE OF ONTARIO

Project: 316 GRANGE ROAD
CITY OF GUELPH

Drawing: POST-DEVELOPMENT DRAINAGE PLAN

CROZIER

Drawn By	R.L.	Design By	C.M./R.L.
Check By	J.B./J.K.	Check By	J.B./J.K.
Project	2455-7660		
Drawing	FIG2		

C:\Users\mpan.ke\DOCUMENTS\crozier consulting engineers\2455-7660 - 316 grange road\project files\Civil_Sheets\detailed design\7660_FIG2.dwg, FIG2, 2026-10-23 10:09:07 AM, mpan.ke

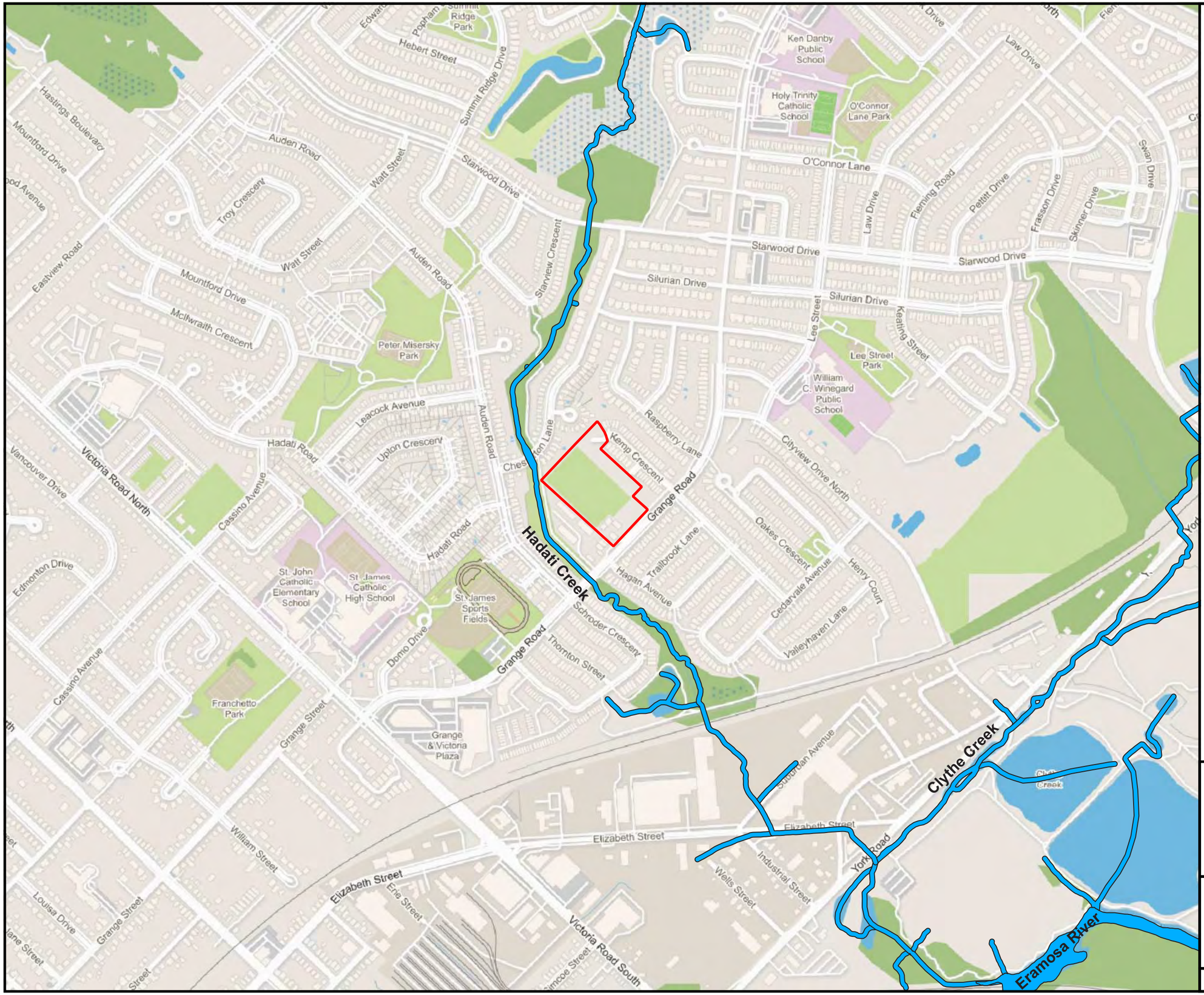
APPENDIX C

Tables and Figures

Table 1 - Summary of Water Levels, Elevations and Fluctuations
316 Grange Road, Guelph

Monitoring Well	Ground Elevation (mASL)	Top Pipe Elevation (mASL)	Sound (mbgs)	Stickup (m)	Hydraulic Conductivity (m/s)	Water Level (mbgs)						Water Elevation (mASL)						Fluctuation Relative to April 1, 2026 (m)					Maximum Recorded Groundwater Elevation (mASL)
						17-Oct-25	12-Jan-26	21-Jan-26	01-Apr-26	30-Jul-26	13-Oct-26	17-Oct-25	12-Jan-26	21-Jan-26	01-Apr-26	30-Jul-26	13-Oct-26	17-Oct-25	12-Jan-26	21-Jan-26	30-Jul-26	13-Oct-26	
BH 1	329.81	330.68	6.00	0.87	3.9×10^{-7}	5.55	5.15	4.88	**3.54**	5.22	5.40	324.26	324.66	324.93	**326.27**	324.59	324.41	-2.01	-1.60	-1.34	-1.67	-1.86	327.44
BH 2	329.65	330.57	5.45	0.91	-			5.22	**4.40**					324.43	**325.26**					-0.82			326.33
BH 4	330.34	331.30	4.48	0.97	3.3×10^{-6}*	4.33	3.84	3.46	**2.57**	3.75	4.09	326.00	326.49	326.88	**327.77**	326.58	326.24	-1.76	-1.27	-0.89	-1.19	-1.52	328.41
BH 5	331.08	331.92	6.05	0.85	8.6×10^{-7}	4.06	3.63	3.19		3.38	3.72	327.02	327.44	327.88		327.69	327.35						329.41
BH 6	332.14	332.96	5.28	0.82	-	4.96	4.68	4.27	**3.58**	4.43	4.73	327.18	327.46	327.87	**328.56**	327.71	327.41	-1.38	-1.10	-0.69	-0.85	-1.15	329.26
BH 7	331.78	332.61	6.07	0.84	1.6×10^{-6}*	5.03	4.64	4.16	**3.34**	4.51	4.84	326.74	327.13	327.62	**328.43**	327.26	326.93	-1.69	-1.30	-0.82	-1.17	-1.50	329.10

Notes:
1) All elevations referenced to geodetic survey by CVD.
2) **Bolded** elevations represent the maximum water table aquifer elevation at each monitoring well, measured throughout all seasons.
3) Negative water level indicates that water level is above ground.
4) : Monitoring well dry
5) Negative fluctuation indicates drop in water level relative to baseline.
6) *Calculated by R.J. Burnside & Associates Limited (May 2022)



LEGEND

- Site Boundary
- GRCA Watercourse

Map Source: Map data ©OpenStreetMap contributors
https://www.openstreetmap.org

©Grand River Conservation Authority - Watercourse Dataset. Made available under Grand River Conservation Authority's Open Data Licence v2.0.

N

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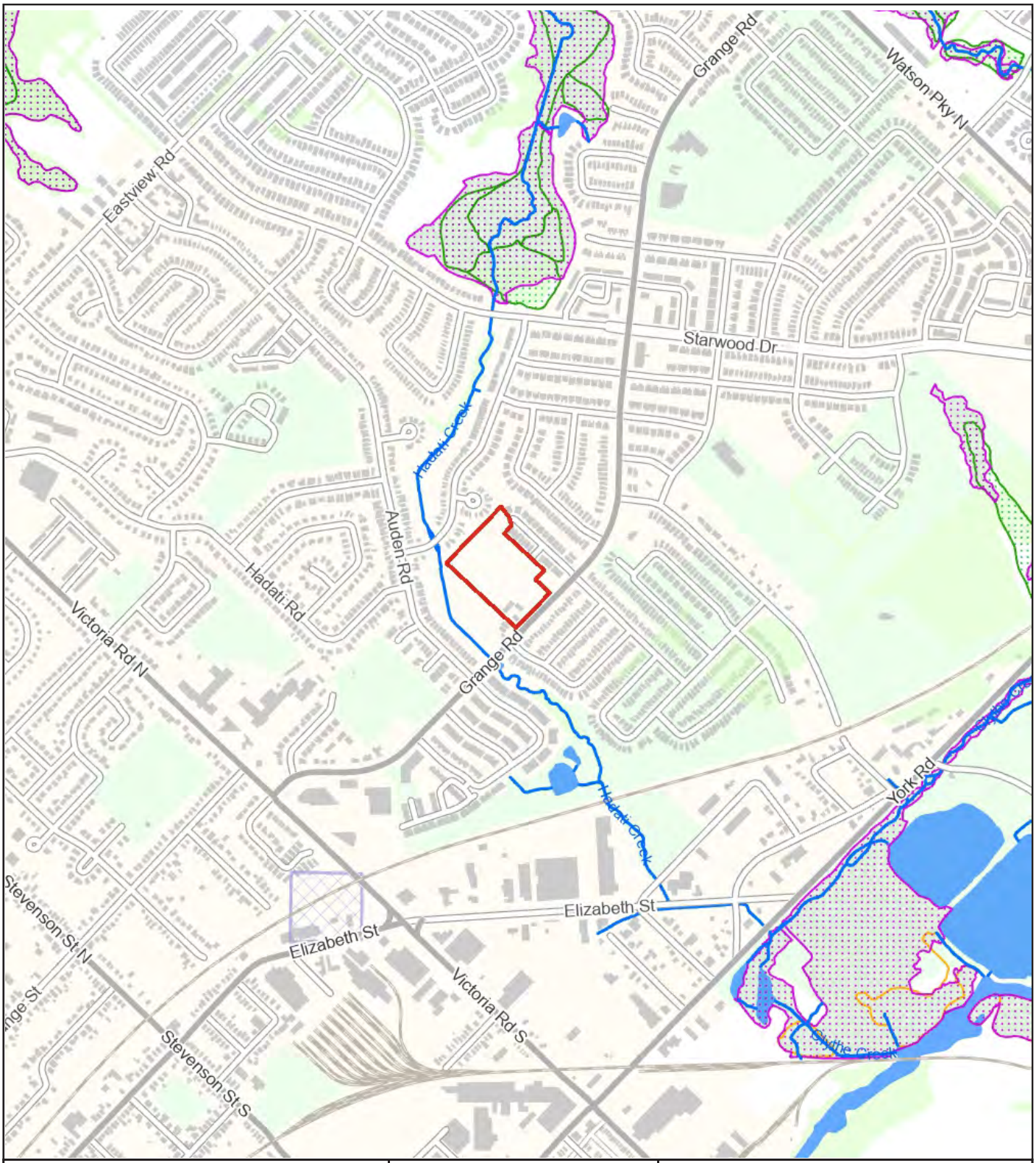
FIGURE 1A: SITE LOCATION MAP

Propsed Residential Subdivision

316 Grange Road
Guelph, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario, N2H 2E1
519-742-8979

Drawn By: NR	Date: Oct 2026	File No.: 2791H-1



LEGEND

Subject Development Property

- Regulated Watercourse (GRCA)
- Regulated Waterbody (GRCA)
- Wetland (MNRF)
  - Provincially Significant
  - Locally Significant
  - Unevaluated
- ANSI (ON)
- Wooded Area (MNRF)
- Wetland (GRCA)

Map Ref.: Grand River Conservation Authority; GRCA Web-GIS; Retrieved: July 30, 2025

N

0 m 250 500

Scale 1:15,000

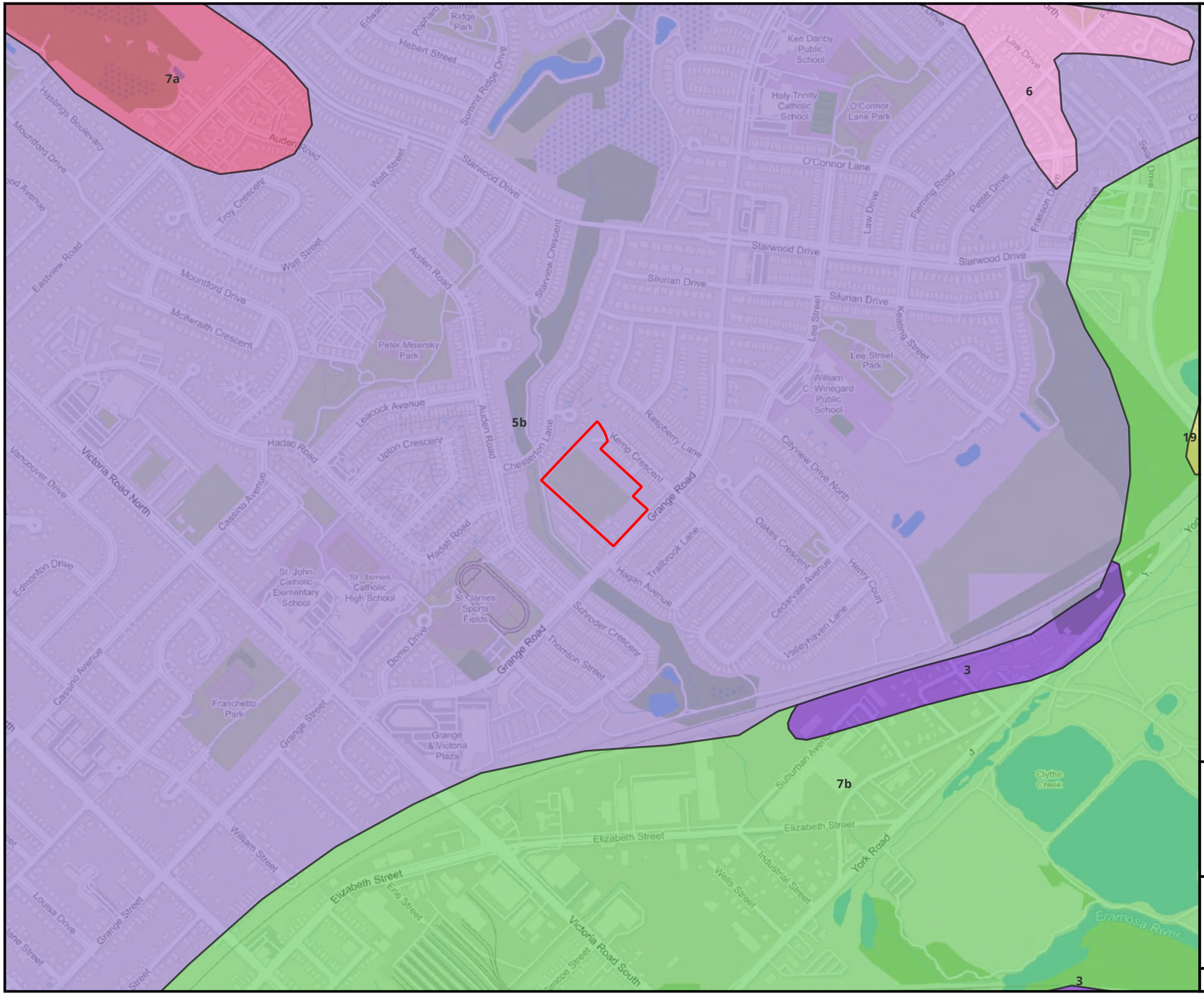
Figure 1b - Site Location & Natural Heritage Features

Scoped Hydrogeological Assessment
Proposed Residential Development

316 Grange Road, Guelph, ON

Drawn By: YC	Date: October 2026	File No. 2791H

CHUNG & VANDER DOELEN ENGINEERING LTD.
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KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979



LEGEND

Site Boundary

Surficial Geology

- 3 - Paleozoic Bedrock
- 5b - Glacial
  Till, sandy and silty
- 6 - Glaciofluvial (ice-contact)
  Sand, gravel
- 7a - Glaciofluvial (proglacial outwash)
  Sand, minor gravel
- 7b - Glaciofluvial (proglacial outwash)
  Gravel
- 19 - Fluvial (modern floodplain)
  Fine sand, silt, organics, muck

Map Source: Map data ©OpenStreetMap contributors
https://www.openstreetmap.org

Geological data - Ontario Geological Survey, Surficial Geology of Southern Ontario, 2010, Pub. No. MRD128-REV

N

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1:7,500

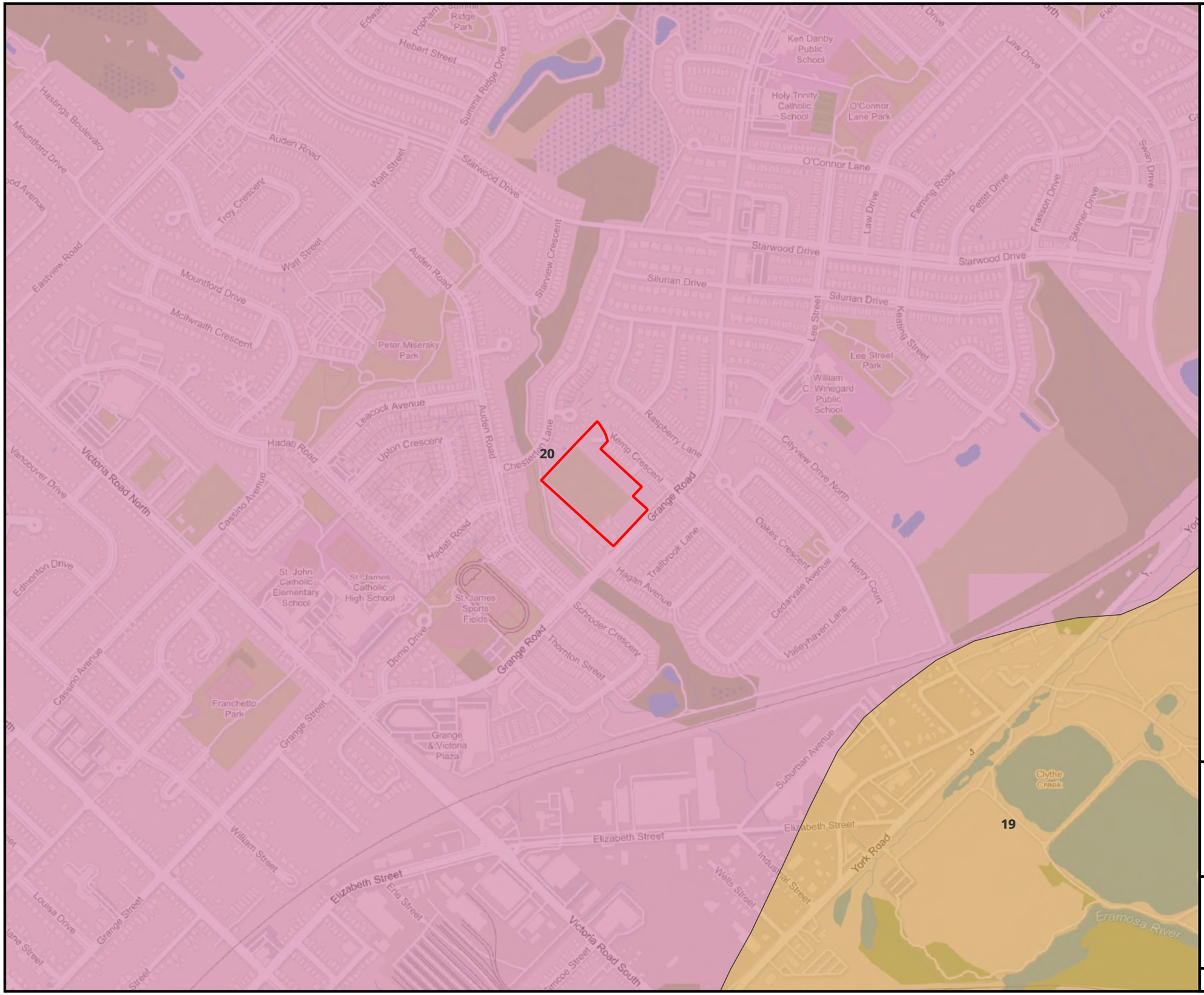
FIGURE 2: SURFICIAL GEOLOGY

Propsed Residential Subdivision

316 Grange Road
Guelph, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario, N2H 2E1
519-742-8979

Drawn By: NR	Date: Oct 2026	File No.: 2791H-1



LEGEND

Site Boundary

Bedrock Geology

19 - Amabel Formation dolostone

20 - Guelph Formation dolostone

Map Source: Map data ©OpenStreetMap contributors https://www.openstreetmap.org

Geological data - Ontario Geological Survey, Paelozoic Bedrock Geology, 2007, Pub. No. MRD219.

N

0 100 200 300 m

1:7,500

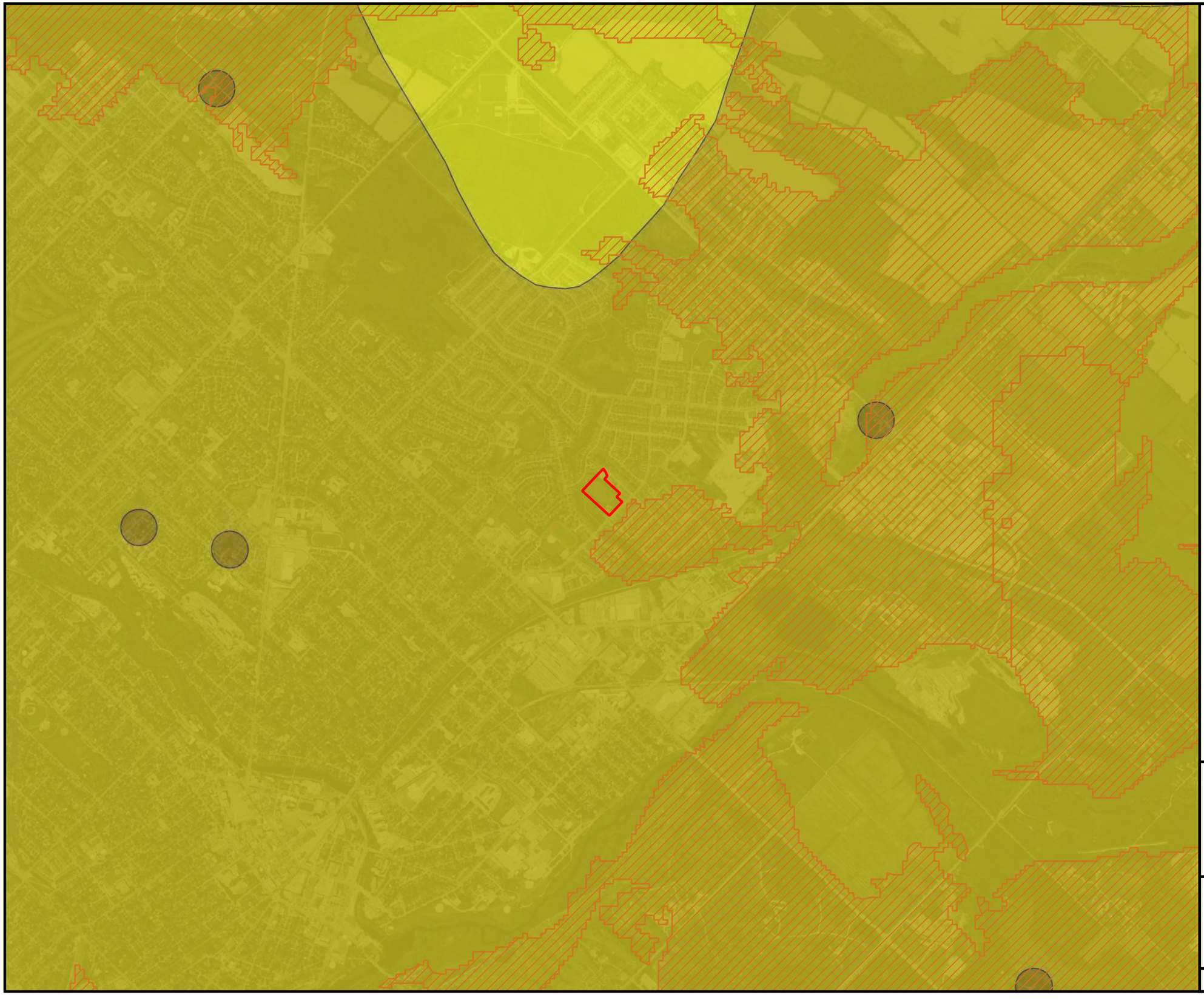
FIGURE 3: BEDROCK GEOLOGY

Propsed Residential Subdivision

316 Grange Road
Guelph, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario, N2H 2E1
519-742-8979

Drawn By: NR	Date: Oct 2026	File No.: 2791H-1



LEGEND

- Site Boundary
- Significant Groundwater Recharge Area

Wellhead Protection Area (WHPA)

- WHPA-A
- WHPA-B
- WHPA-C

Map Source: Microsoft® Bing™ Maps, ©Mapbox, ©Maxar

Hydrogeological data ©GRCA - Grand River Information Network https://data.grandriver.ca/

N

0 400 800 1,200 m

1:20,000

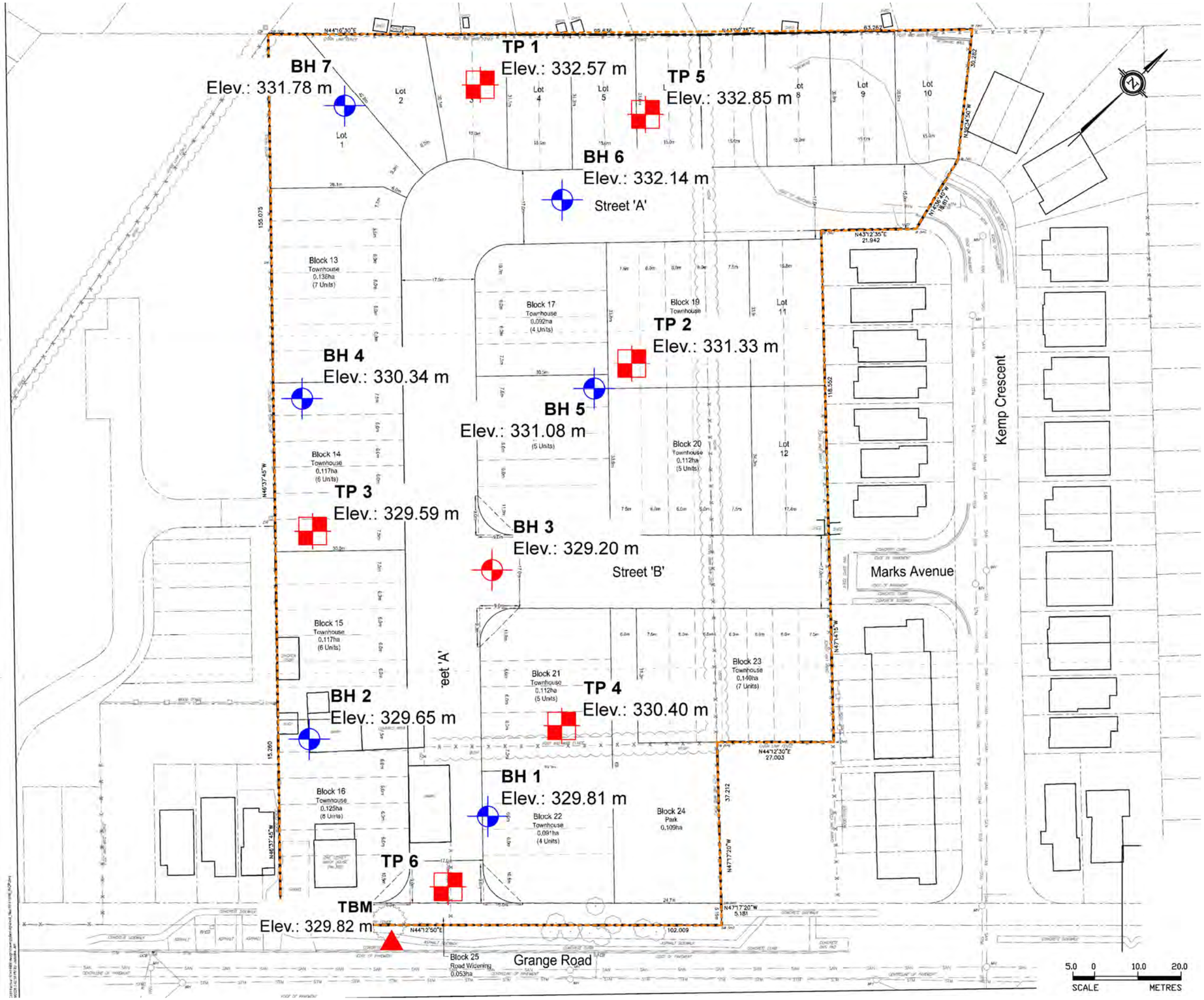
FIGURE 4: WATERSHED MAPPING

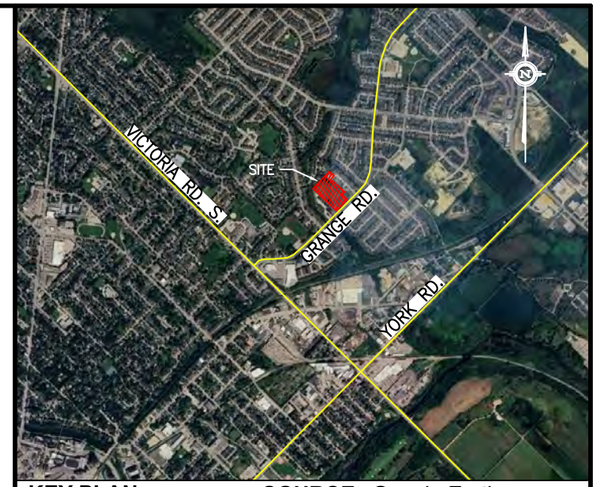
Propsed Residential Subdivision

316 Grange Road
Guelph, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario, N2H 2E1
519-742-8979

Drawn By: NR	Date: Oct 2026	File No.: 2791H-1





KEY PLAN **SOURCE:** Google Earth

LEGEND

- **TBM: Top of fire hydrant on northwest side of Grange Road, across from existing building at 291 Grange Road. Elev.: 329.82 m (Geodetic)**
- **V.A. Wood Borehole Location (2021)**
- **V.A. Wood Borehole and Monitoring Well Location (2021)**
- **CVD Test Pit Location (2025)**

Elev. Ref.: The borehole and monitoring well ground surface elevations were referenced to City of Guelph Benchmark No. 301 (Elev.: 330.245 m) by V.A. Wood. CVD test pit locations and associated ground surface elevations were surveyed using a Network RTK Global Navigation Satellite System (GNSS) Receiver. The survey data was collected using UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

DWG Ref.: Stantec; "Draft Plan of Submission"; Project No.: 161414698; Dwg. No.: DP-1; 02-2026

BOREHOLE AND TEST PIT LOCATION PLAN

Proposed Residential Sudivision

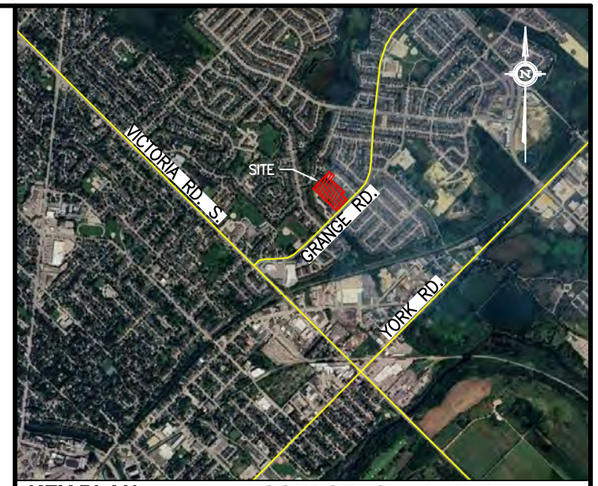
316 Grange Road
Guelph, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.

311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1 / 519-742-8979

Drawn By: JR	Date: January 2026	File No.: 2791
Checked By: YC	Scale: 1:900	Figure 5





KEY PLAN **SOURCE:** Google Earth

LEGEND

- **TBM: Top of fire hydrant on northwest side of Grange Road, across from existing building at 291 Grange Road. Elev.: 329.82 m (Geodetic)**
- **V.A. Wood Borehole Location (2021)**
- **V.A. Wood Borehole and Monitoring Well Location (2021)**
- **CVD Test Pit Location (2025)**
- **Approximate Site Boundary**

Elev. Ref.: The borehole and monitoring well ground surface elevations were referenced to City of Guelph Benchmark No. 301 (Elev.: 330.245 m) by V.A. Wood. CVD test pit locations and associated ground surface elevations were surveyed using a Network RTK Global Navgation Satellite System (GNSS) Receiver. The survey data was collected using UTM Zone 17N Projection, NAD83(CSRS)v7-2010 datum and Canada Geoid Model HT2_2010v70 (CGVD28).

IMG Ref.: Google Earth; January 2026

BOREHOLE AND TEST PIT LOCATION PLAN

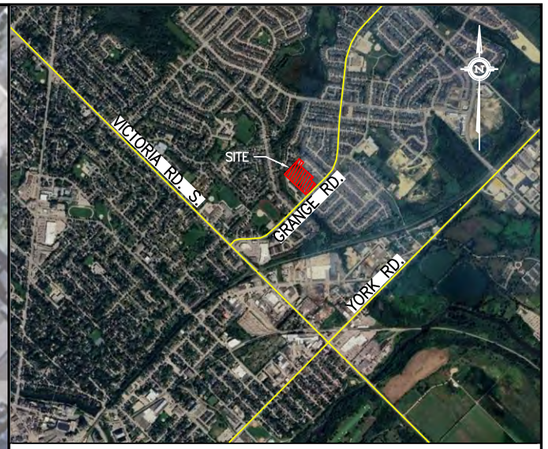
Proposed Residential Sudivision

316 Grange Road
Guelph, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 5E1 / 519-742-8979

Drawn By: JR	Date: January 2026	File No.: 2791
Checked By: YC	Scale: 1:900	Figure 6





LEGEND

- Approximate Site Boundary
- V.A. Wood Monitoring Well Location
- (324.93) Water Table Elevation (mASL)
- 325.00 Interpreted Groundwater Contour (mASL)
- Interpreted Shallow Groundwater Flow Direction
- Approximate Location of Hadati Creek

N

0 20 40 m

Scale 1:1,000

Image Ref.: Google Earth; Retrieved: January 2026

Figure 7a:
Water Table Interpretation (January 21, 2026)

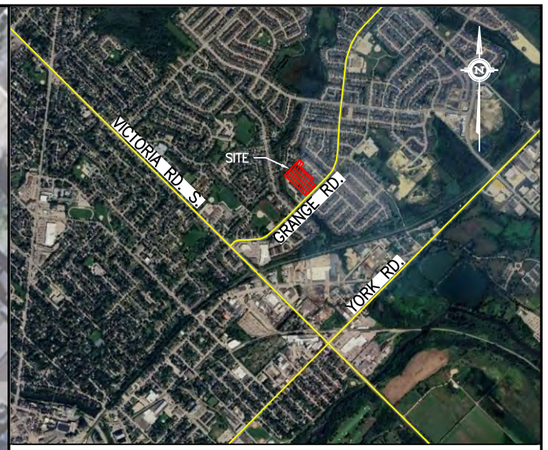
Scoped Hydrogeological Assessment
Proposed Residential Subdivision

316 Grange Road
Guelph, ON

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

Drawn By: YC	Date: January 2026	File No.: 2791H





LEGEND

- Approximate Site Boundary
- V.A. Wood Monitoring Well Location
- (324.93) Water Table Elevation (mASL)
- 325.00 Interpreted Groundwater Contour (mASL)
- Interpreted Shallow Groundwater Flow Direction
- Approximate Location of Hadati Creek

N

0 20 40 m

Scale 1:1,000

Image Ref.: Google Earth; Retrieved: January 2026

Figure 7b:
Water Table Interpretation (April 1, 2026)

Scoped Hydrogeological Assessment
Proposed Residential Subdivision

316 Grange Road
Guelph, ON

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Drawn By: YC	Date: October 2026	File No.: 2791H



LEGEND

- Approximate Site Boundary
- Metcalfe Street Wellfield Location (Wells Park #1 and Park #2)
- Interpreted General Shallow Groundwater Flow Direction

N

0 150 300 m

Scale 1:8,000

Image Reference: City of Guelph, "City of Guelph Map" GIS Locator , Retrieved: October 2026

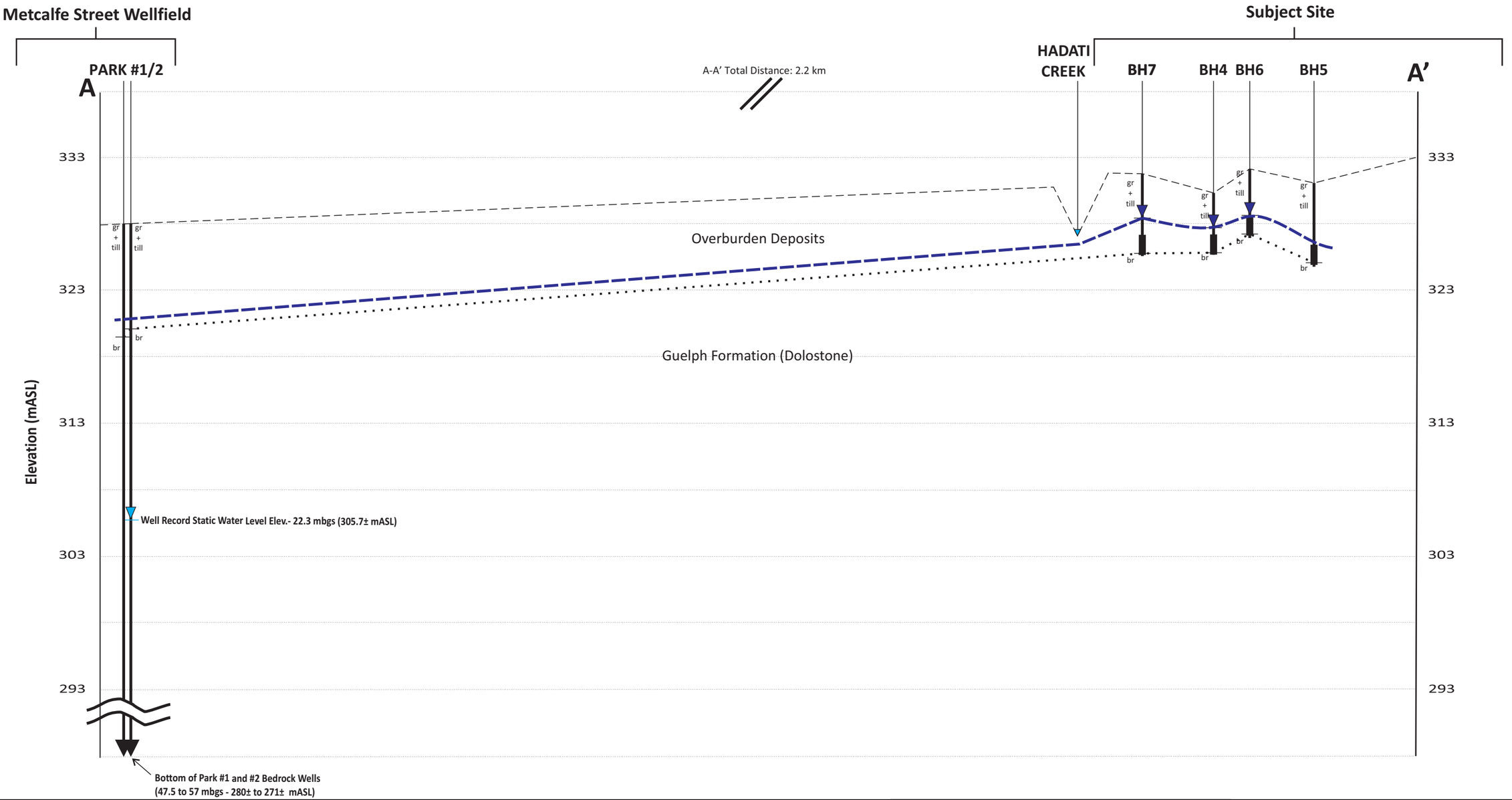
Figure 8:
Development Site & Metcalfe Street Wellfield

Scoped Hydrogeological Assessment
Proposed Residential Subdivision

316 Grange Road
Guelph, ON

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

Drawn By: YC	Date: October 2026	File No.: 2791H



LEGEND

Water Level Elevation
(aqua - 1946, blue - April 2026)

Well Screen

Soil Description

cl - clay	si - silt
gr - gravel	br - bedrock
snd - sand	

Scale Break

Notes

Well Data for Metcalfe Street Park #1 and Park #2 municipal wells from Ontario Well Records. Quaternary and bedrock data sourced from CVD borehole data, Ontario Well Records, and Ontario Geological Survey maps MRD128Rev and MRD219.

0 40 80 120 m

Horizontal Scale 1: 2,000

Vertical Scale 1:300 Vertical Exaggeration 6.67x

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 VICTORIA STREET NORTH
KITCHENER / ONTARIO / N2H 2E1 / 519-742-8979

Figure 9
Hydrogeologic Cross-Section A-A'

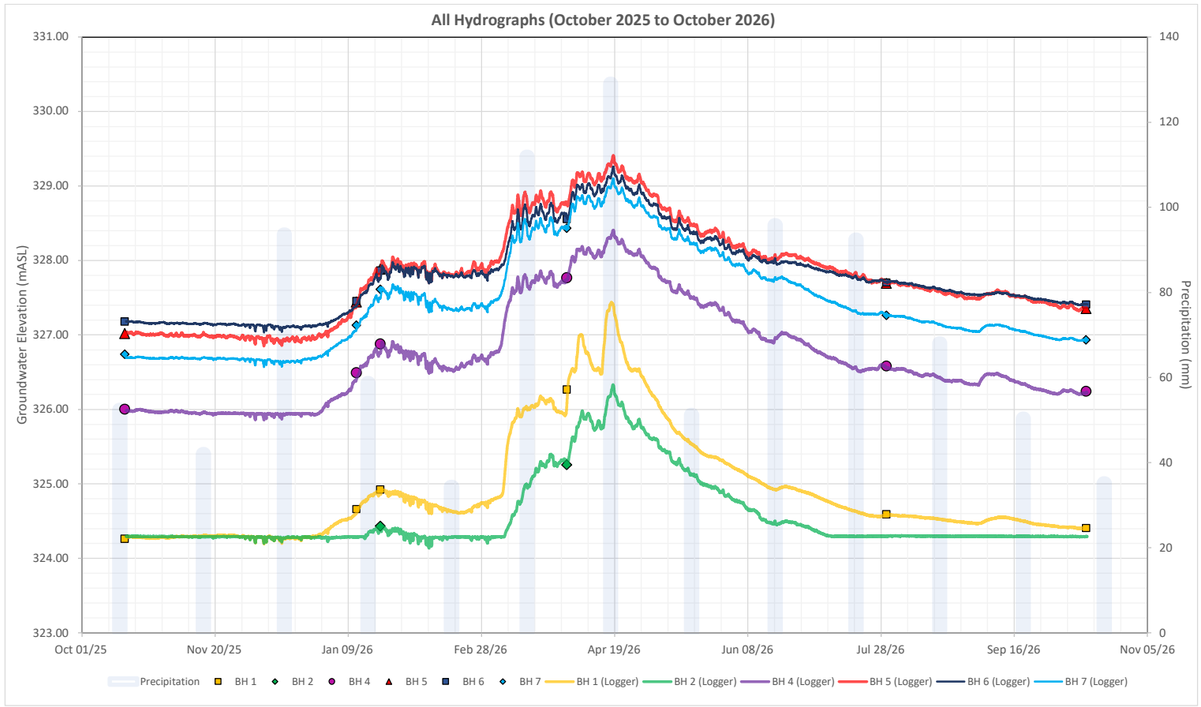
Development Site to Metcalfe Street Wellfield

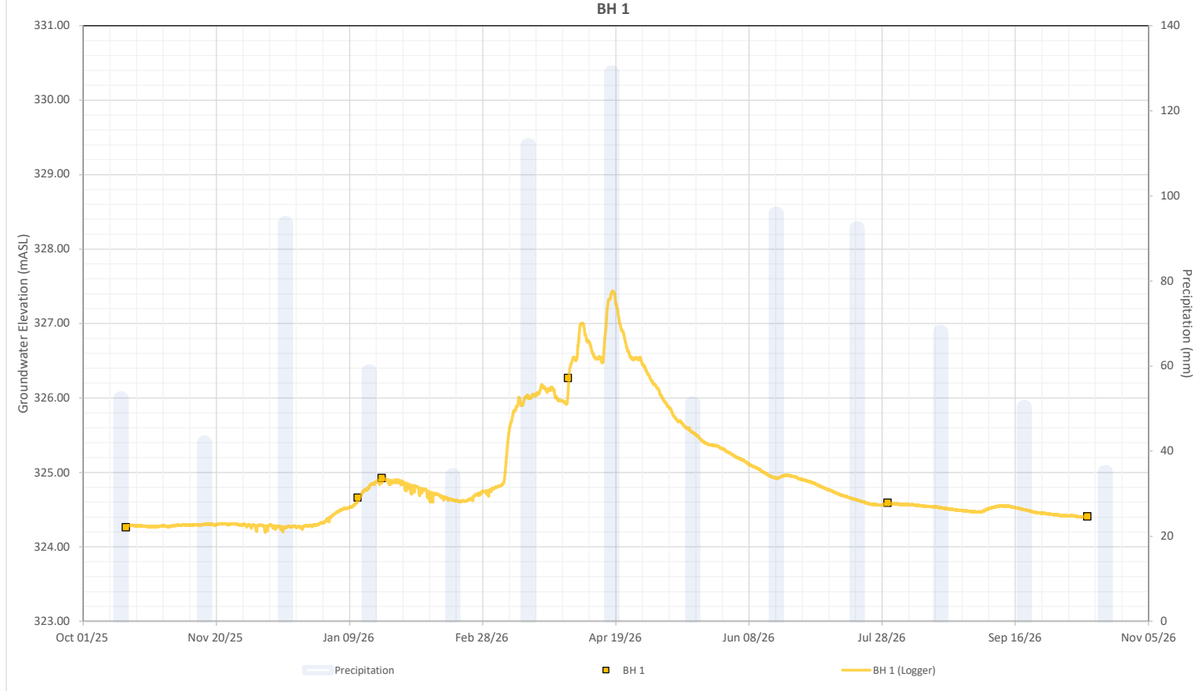
Scoped Hydrogeological Assessment
Residential Residential Subdivision

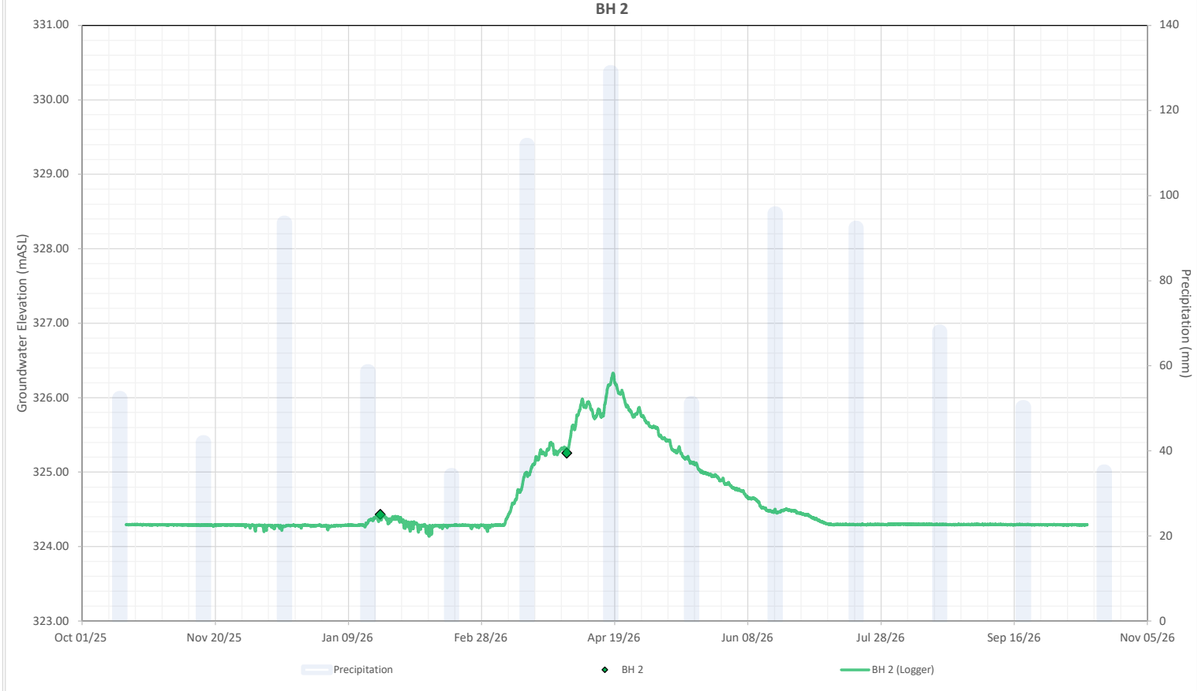
316 Grange Street
Guelph, Ontario

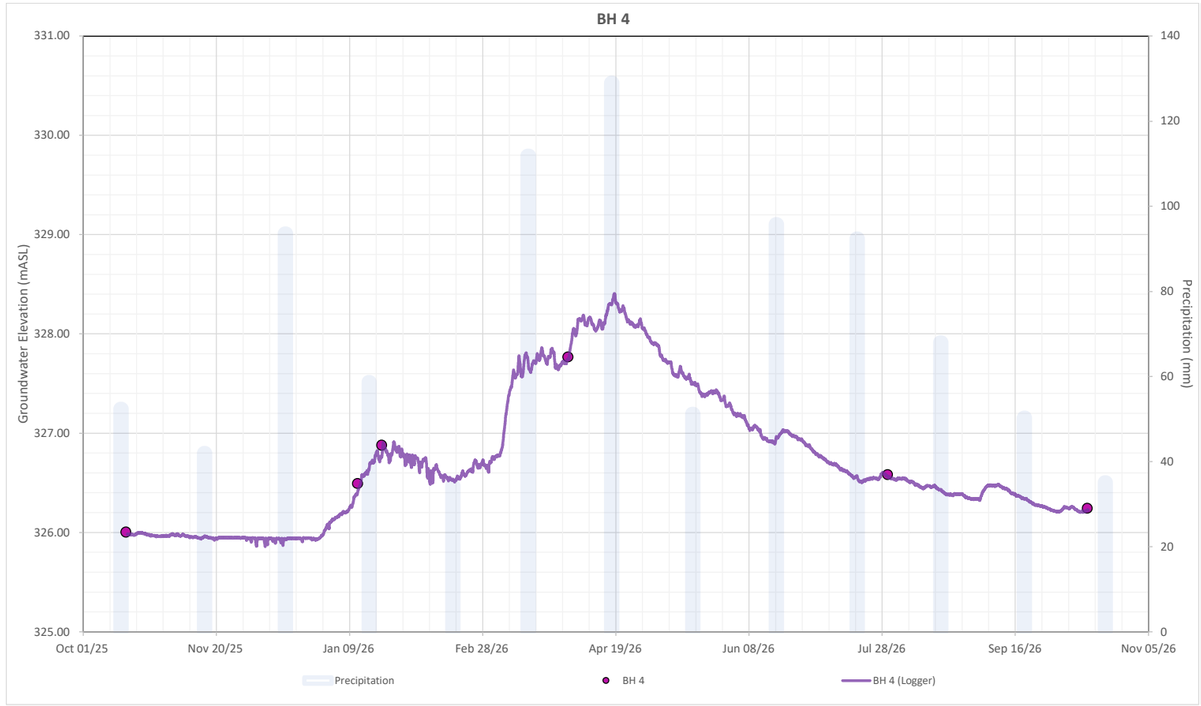
Drawn By: YC	Date: October 2026	File No.: 2791H

Figure 10a - Hydrographs
316 Grange Road, Guelph

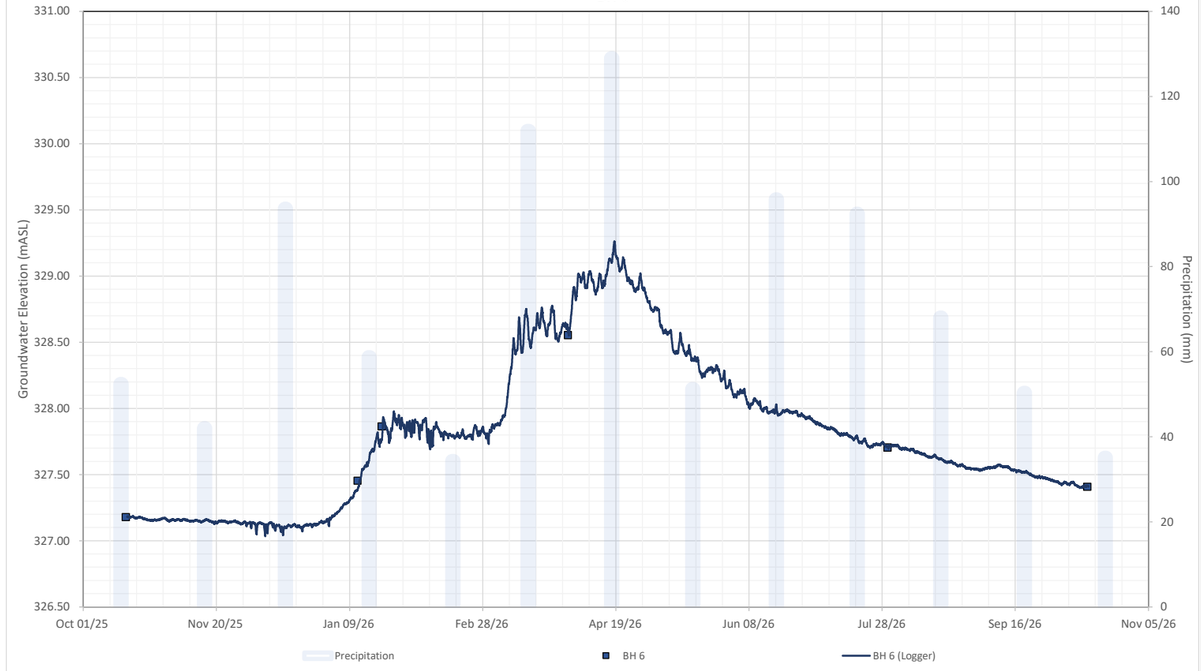


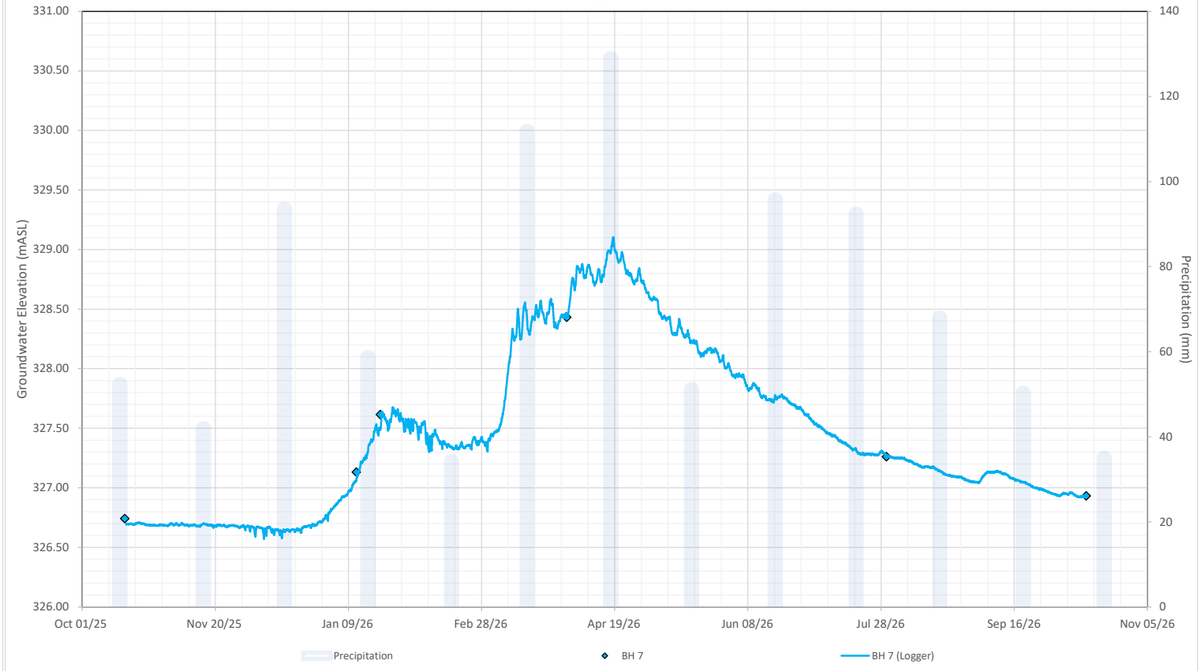





BH 4
Groundwater Elevation (mASL)
Precipitation (mm)
331.00
330.00
329.00
328.00
327.00
326.00
325.00
140
120
100
80
60
40
20
0
Oct 01/25
Nov 20/25
Jan 09/26
Feb 28/26
Apr 19/26
Jun 08/26
Jul 28/26
Sep 16/26
Nov 05/26
Precipitation
BH 4
BH 4 (Logger)


BH 5
Groundwater Elevation (mASL)
Precipitation (mm)
331.00
330.50
330.00
329.50
329.00
328.50
328.00
327.50
327.00
326.50
140
120
100
80
60
40
20
0
Oct 01/25
Nov 20/25
Jan 09/26
Feb 28/26
Apr 19/26
Jun 08/26
Jul 28/26
Sep 16/26
Nov 05/26
Precipitation
BH 5
BH 5 (Logger)


BH 6
Groundwater Elevation (mASL)
Precipitation (mm)
331.00
330.50
330.00
329.50
329.00
328.50
328.00
327.50
327.00
326.50
140
120
100
80
60
40
20
0
Oct 01/25
Nov 20/25
Jan 09/26
Feb 28/26
Apr 19/26
Jun 08/26
Jul 28/26
Sep 16/26
Nov 05/26
Precipitation
BH 6
BH 6 (Logger)


BH 7
Groundwater Elevation (mASL)
Precipitation (mm)
331.00
330.50
330.00
329.50
329.00
328.50
328.00
327.50
327.00
326.50
326.00
140
120
100
80
60
40
20
0
Oct 01/25
Nov 20/25
Jan 09/26
Feb 28/26
Apr 19/26
Jun 08/26
Jul 28/26
Sep 16/26
Nov 05/26
Precipitation
BH 7
BH 7 (Logger)



LEGEND

Site Boundary

Physiographic Landforms

- 3 - Spillways
- 6 - Till Plains (Drumlinized)
- 7 - Drumlins

Map Source: Map data ©OpenStreetMap contributors
https://www.openstreetmap.org

Geological data - Physiography of Southern Ontario, 2007, Pub. No. MRD228.

N

0 100 200 300 m

1:7,500

FIGURE 11: PHYSIOGRAPHIC LANDFORMS

Propsed Residential Subdivision

316 Grange Road
Guelph, Ontario

CHUNG & VANDER DOELEN ENGINEERING LTD.
311 Victoria Street North
Kitchener, Ontario, N2H 2E1
519-742-8979

Drawn By: NR	Date: Oct 2026	File No.: 2791H-1

APPENDIX D

Single Well Response Test Analysis Charts

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener / Ontario / N2H 5E1
519-742-8979

Response Test - Water Level Data and Analysis

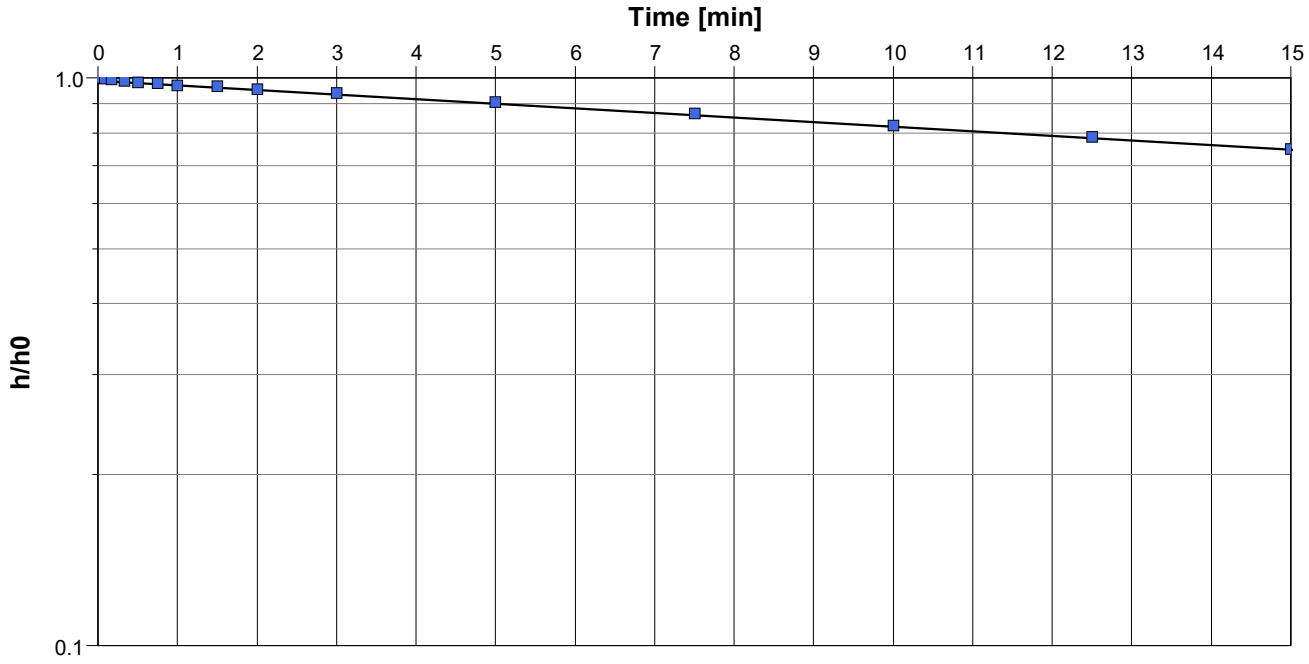
Project: Proposed Residential Subdivision

Number: 2791

Client: Gemini Homebuilders

Location: 316 Grange Road, Guelph, ON	Response Test: BH 1	
Test Conducted by: K.P.	Test Date: 2025-10-17	Aquifer Thickness: 3 m
Water level at t=0 [m]: 5.81	Static Water Level [m]: 5.55	Water level change at t=0 [m]: 0.27

	Time [min]	Water Level [m]	WL Change [m]
1	0	5.814	0.268
2	0.0833	5.813	0.267
3	0.1667	5.812	0.266
4	0.3333	5.811	0.265
5	0.5	5.809	0.263
6	0.75	5.808	0.262
7	1	5.806	0.26
8	1.5	5.805	0.259
9	2	5.802	0.256
10	3	5.798	0.252
11	5	5.789	0.243
12	7.5	5.778	0.232
13	10	5.767	0.221
14	12.5	5.757	0.211
15	15	5.747	0.201



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH 1	3.89×10^{-7}	

CHUNG & VANDER DOELEN
ENGINEERING LTD.
311 Victoria Street North
Kitchener / Ontario / N2H 5E1
519-742-8979

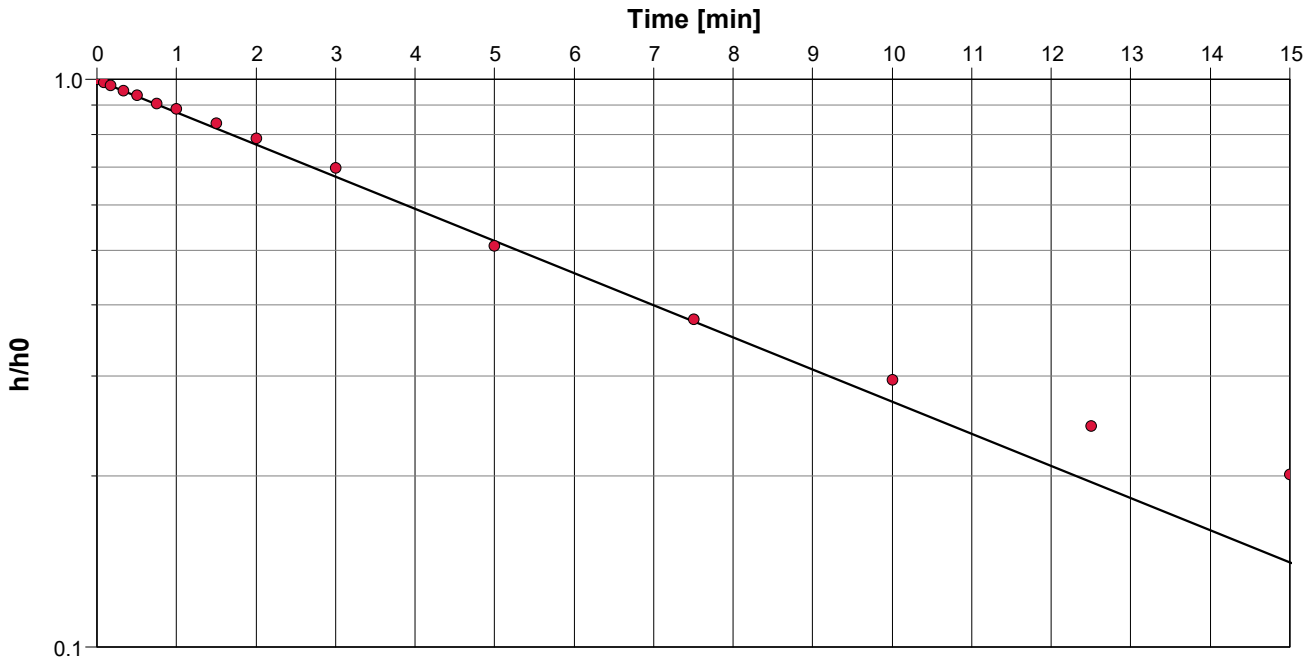
Project: Proposed Residential Subdivision

Number: 2791

Client: Gemini Homebuilders

Location: 316 Grange Road, Guelph, ON	Response Test: BH 5	
Test Conducted by: K.P.	Test Date: 2025-10-17	Aquifer Thickness: 3 m
Water level at t=0 [m]: 4.85	Static Water Level [m]: 4.06	Water level change at t=0 [m]: 0.79

	Time [min]	Water Level [m]	WL Change [m]
1	0	4.851	0.795
2	0.0833	4.841	0.785
3	0.1667	4.831	0.775
4	0.3333	4.816	0.76
5	0.5	4.801	0.745
6	0.75	4.776	0.72
7	1	4.761	0.705
8	1.5	4.721	0.665
9	2	4.681	0.625
10	3	4.611	0.555
11	5	4.461	0.405
12	7.5	4.356	0.30
13	10	4.291	0.235
14	12.5	4.251	0.195
15	15	4.216	0.16



Calculation using Bouwer & Rice

Observation Well	Hydraulic Conductivity [m/s]	
BH 5	8.59×10^{-7}	

APPENDIX E

Preliminary Water Balance Assessment

Water Budget Calculations

316 Grange Road, Guelph
CVD Engineering Ltd.
Project: 2791H-1
January 2026

Determination of Evapotranspiration and Water Balance Components - by Water Balance Method (WBM) (Thornthwaite & Mather, 1957)

Precipitation: Kitchener / Waterloo (1991-2020), Vegetation: Moderate Crops (grass) with Grass/Trees/Shrubs, Soil: Sand/Silt Loam and Sand and Gravel

	Units	Annual	% Total	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Temperature	deg C	**7.20**		-6.3	-5.9	-0.8	5.9	12.6	17.8	20.2	19.1	15.2	8.8	2.6	-2.8
Heat Index (i)	-	**36.17**		0.00	0.00	0.00	1.28	4.05	6.84	8.28	7.61	5.38	2.35	0.37	0.00
Unadjusted PET (UPET)	mm/day	**1.054**		0.00	0.00	0.00	0.88	1.95	2.81	3.22	3.03	2.38	1.34	0.37	0.00
Latitude correction (r)	-			24.3	24.5	30.6	33.6	38.0	38.6	38.9	36.0	31.2	28.5	24.2	23.0
Potential Evapotranspiration (PET)	mm	**567.8**		0.0	0.0	0.0	29.5	74.3	108.5	124.9	109.1	74.3	38.2	9.0	0.0
Precipitation (P)	mm	**850.7**	**100.0**	66.3	46.1	57	81.2	80.2	80.5	96.2	67.2	75.2	71	74.9	54.9
P - PET	mm			66.3	46.1	57.0	51.7	5.9	-28.0	-28.7	-41.9	0.9	32.8	65.9	54.9
Accum. Water Loss	mm							0.0	-28.0	-56.7	-98.6				
Soil Moisture Retention (Storage - ST)	mm			150.0	150.0	150.0	150.0	150.0	124.0	102.0	76.0	76.9	109.7	150.0	150.0
Storage Change (ΔST)	mm			0.0	0.0	0.0	0.0	0.0	-26.0	-22.0	-26.0	0.9	32.8	40.3	0.0
Actual Evapotranspiration (AE)	mm	**543.2**	**63.8**	0.0	0.0	0.0	29.5	74.3	106.5	118.2	93.2	74.3	38.2	9.0	0.0
Water Balance as Surplus/Deficit	mm	**307.5**	**36.2**	66.3	46.1	57.0	51.7	5.9	-26.0	-22.0	-26.0	0.9	32.8	65.9	54.9
Determination of Water Balance as 'Combined-Runoff' (Recharge + Direct Runoff) - (using WBM Assumptions)															
Soil Moisture Surplus (SMS)	mm	**83.2**		0.0	0.0	0.0	51.7	5.9	0.0	0.0	0.0	0.0	0.0	25.6	0.0
Water Balance from SMS (Assumption 1)	mm	**83.2**		3.3	1.6	0.8	26.2	16.1	8.0	4.0	2.0	1.0	0.5	13.1	6.5
				0.01	0.01	0.00	0.00	2.96	1.48	0.74	0.37	0.18	0.09	0.05	0.02
				0.05	0.03	0.01	25.84	12.92	6.46	3.23	1.61	0.81	0.40	0.20	0.10
				3.21	1.60	0.80	0.40	0.20	0.10	0.05	0.03	0.01	0.01	12.82	6.41
Accumulated Snow (Assumption 2)	mm	**224.3**		0.0	0.0	0.0	224.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Balance from Snow (Assumption 3)	mm	**224.5**		0.5	0.3	0.1	22.4	100.9	50.5	25.2	12.6	6.3	3.2	1.6	0.9
Water Balance as 'Combined-Runoff'	mm	**308.2**	**36.2**	3.8	1.9	0.9	48.7	117.0	58.5	29.3	14.6	7.3	4.1	14.6	7.4

Assumptions for Monthly 'Combined-Runoff' Estimations (from WBM):

1 - Combined 'Runoff' from the Soil Moisture Surplus is assumed to be 50% in the first month and then 50% of the remaining soil surplus each following month.

2 - All Snow is Accumulated and Stored throughout Winter Sub-Zero Months (i.e. No melt until first above-zero month)

3 - Combined 'Runoff' from Snowmelt is assumed to be 10% of the Accumulated Snow in the first month and then 50% of the remaining snowmelt in each following month.

1. Pre-Development Water Balance

Determination of Recharge + Direct Runoff Components - using MECP Infiltration Factor Method (MECP 1995, 2003)

Catchment Area (m^2)	MECP Infiltration Factors (0 to 1.00)								Annual Rates				Annual Rates			
	Topography		Soil		Cover		Sum		EvapoT (mm)	Balance (mm)	Recharge (mm)	Runoff (mm)	EvapoT (m^3/yr)	Balance (m^3/yr)	Recharge (m^3/yr)	Runoff (m^3/yr)
Pervious, Fields	Rolling	0.15	Loam	0.25	Cultivated	0.1	0.5		543.2	307.5	153.8	153.8	10,592	5,997	2,998	2,998
19,500 m2									63.8%	36.2%	18.1%	18.1%	63.8%	36.2%	18.1%	18.1%
Pervious, Woodland/Wetland	Rolling	0.15	Loam	0.25	Woodland & Wetland	0.2	0.6		543.2	307.5	184.5	123.0	3,150	1,784	1,070	713
5,800 m2									63.8%	36.2%	21.7%	14.5%	63.8%	36.2%	21.7%	14.5%
Impervious Rooftops (Existing Buildings/Paved)							0.2		85.1	765.6	153.1	612.5	119	1,072	214	858
1,400 m2									10.0%	90.0%	18.0%	72.0%	10.0%	90.0%	18.0%	72.0%
Total Site													13,861	8,852	**4,283**	4,569
26,700 m2													61.0%	39.0%	18.9%	20.1%

Assumptions for Evapotranspiration/Recharge/Runoff Proportioning:

1 - Pervious Areas - by MECP Infiltration Factor Method (MECP 1995, 2003)

2 - Impervious Areas to Pervious Areas - Assume 10% Lost to Evapotranspiration and Balance Split 20/80% to Recharge/Runoff

Pre-Development Recharge: 4,283 (m^3/yr)

2. Post-Development Water Balance without Mitigation Measures

Determination of Recharge + Direct Runoff Components - using MECP Infiltration Factor Method (MECP 1995, 2003)

Catchment Area (m^2)	MECP Infiltration Factors (0 to 1.00)								Annual Rates				Annual Rates			
	Topography		Soil		Cover		Sum		EvapoT (mm)	Balance (mm)	Recharge (mm)	Runoff (mm)	EvapoT (m^3/yr)	Balance (m^3/yr)	Recharge (m^3/yr)	Runoff (m^3/yr)
Pervious, Landscaped	Rolling	0.15	Loam	0.25	Cultivated	0.1	0.5		543.2	307.5	153.8	153.8	4,698	2,660	1,330	1,330
8,650 m2									63.8%	36.2%	18.1%	18.1%	63.8%	36.2%	18.1%	18.1%
Impervious Rooftops to Pervious Landscaped Areas							0.5		597.5	253.2	126.6	126.6	2,629	1,114	557	557
4,400 m2									70.2%	29.8%	14.9%	14.9%	70.2%	29.8%	14.9%	14.9%
Impervious to Storm Sewer System							0		85.1	765.6	0.0	765.6	1,161	10,451	0	10,451
13,650 m2									10.0%	90.0%	0.0%	90.0%	10.0%	90.0%	0.0%	90.0%
Total Site													8,489	14,225	**1,887**	12,338
26,700 m2													37.4%	62.6%	8.3%	54.3%

Assumptions for Evapotranspiration/Recharge/Runoff Proportioning:

1 - Pervious Areas - by MECP Infiltration Factor Method (MECP 1995, 2003)

2 - Impervious Areas to Pervious Areas - Assumes an additional 10% evapotranspiration loss from roof. Balance Split 50/50% to Recharge/Runoff
(Assumes downspout disconnects to grass)

3 - Impervious Areas to Storm Sewer System - Assume 10% Lost to Evapotranspiration and Balance all to Runoff (i.e., no Recharge)

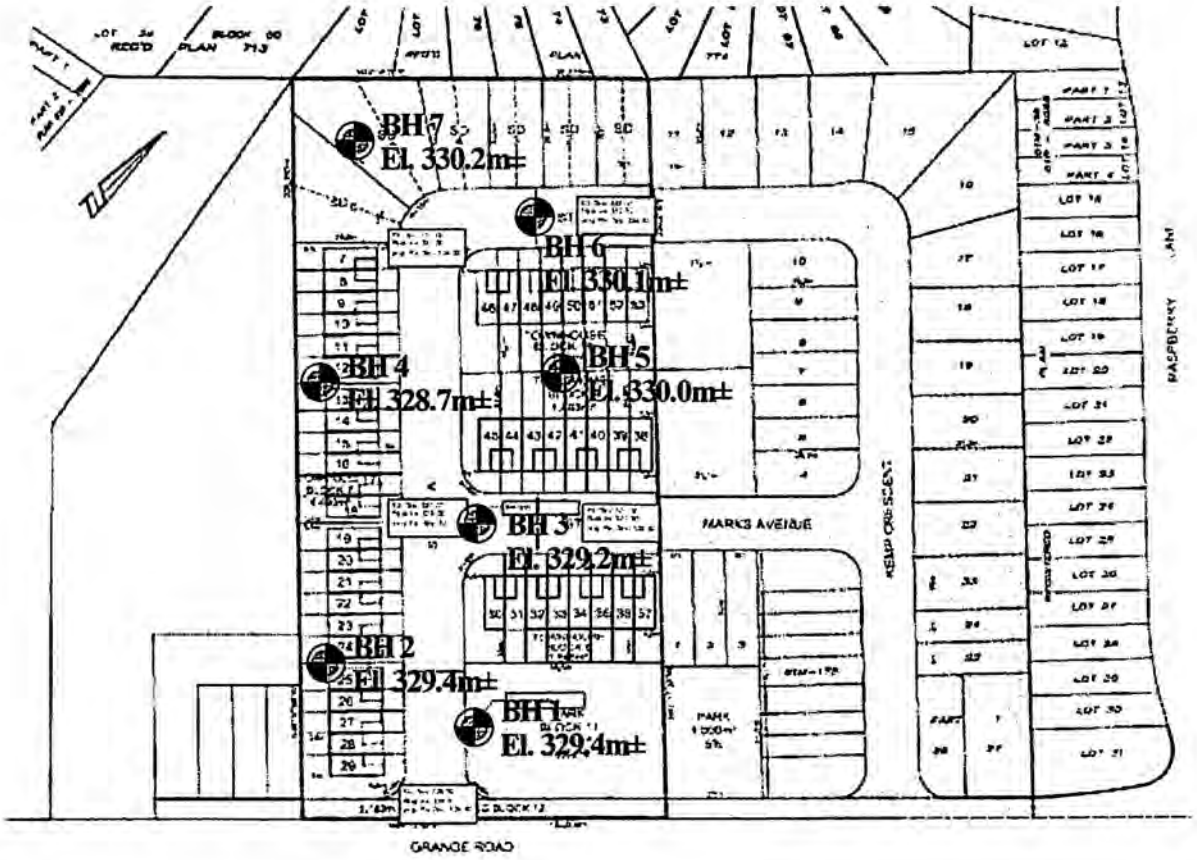
Pre-Development Recharge: 4,283 (m^3/yr)

Post-Development Recharge: 1,887 (m^3/yr)

Infiltration Deficit: 2,396 (m^3/yr)

APPENDIX F

V.A. Wood Inc. Borehole Logs and Grain Sizes (April 2021)



Benchmark: City of Guelph Benchmark No. 301
El. 330.245m

Note: The stratigraphy referred to in the report is based on the data from the test pits supplemented by geological data where available. The actual stratigraphy between and beyond the test pits may vary. The topsoil thicknesses quoted in the report are used for discussion purposes only and should not be used for estimating purposes.

V.A. WOOD (GUELPH) INC.
Consulting Geotechnical Engineers
405 York Road, Guelph, Ontario N1E 3H3
Ph. (519) 763-3101 Fax. (519) 763-5912

Borehole Location Plan
Proposed Residential Development
Part of Lot 7, R.P. 53, Division 'C'
300 Grange Road
Guelph, ON

Scale: Not to Scale
Date: May 19, 2021
Ref. No. G4398-21-4
Enclosure 1

REFERENCE No: G4398-21-4

BOREHOLE No: 1

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

CLIENT: Lunor Group Inc.

PROJECT: Residential Development

ENCLOSURE No: 2

LOCATION: 300 Grange Street, Guelph

SUPERVISOR: MO

SUBSURFACE PROFILE					SAMPLE					
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	PENETRATION RESISTANCE 20 40 60 80	WATER CONTENT % 5 10 15 20 25	UNIT WEIGHT
0.0	Ground Surface	329.4		Concrete 0.85m stickup; Well Casing Protector						
0.3	250mm Topsoil	329.1								
	brown, compact to very dense SILTY SAND TILL, trace to some gravel, occ. cobbles and/or boulders moist to wet			Soil Cuttings; PVC Pipe; Bentonite; W.L. @ El. 324.6m (5-MAY-21); PVC Screen; well sand	1	SS	20			
					2	SS	29			
					3	SS	34			
					4	SS	79			
					5	SS	62			
					6	SS	26			
6.0		323.4								
6.2	brown, very dense GRAVELLY SAND, occ. cobbles and/or boulders, wet	323.2			7	SS	50	150mm		
	Refusal on Probable Bedrock									

DRILLED BY: London Soil Test Ltd

HOLE DIAMETER: 200mm

DRILL METHOD: Hollow Stem Auger

DATUM: Geodetic

DRILL DATE: April 28, 2021

SHEET: 1 of 1

REFERENCE No: G 4398-21-4

CLIENT: Lunor Group Inc.

PROJECT: Residential Development

LOCATION: 300 Grange Street, Guelph

BOREHOLE No: 2

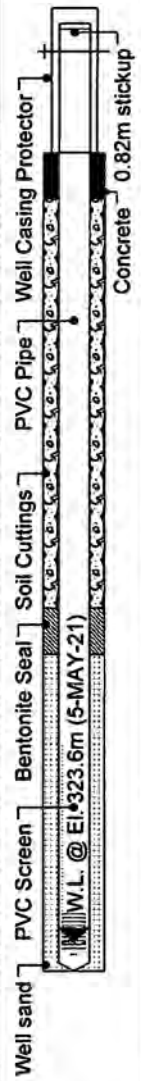
ENCLOSURE No: 3

SUPERVISOR: MO

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE			PENETRATION RESISTANCE	WATER CONTENT %	UNIT WEIGHT
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	20 40 60 80	5 10 15 20 25	
0.0	Ground Surface	329.4								
	50mm Topsoil									
0.6	grey, loose Sand and Gravel FILL moist	328.8			1	SS	7			
	brown, compact to very dense SILTY SAND TILL, trace to some gravel occ. cobbles and/or boulders moist				2	SS/AS	39			
					3	SS	15			
					4	SS/AS	62			
					5	SS	85			
					6	SS	64			
5.5	Refusal on Probable Bedrock	323.9								



DRILLED BY: London Soil Test Ltd

DRILL METHOD: Hollow Stem Auger

DRILL DATE: April 28, 2021

HOLE DIAMETER: 200mm

DATUM: Geodetic

SHEET: 1 of 1

REFERENCE No: G4398-21-4

BOREHOLE No: 3

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

CLIENT: Lunor Group Inc.

PROJECT: Residential Development

ENCLOSURE No: 4

LOCATION: 300 Grange Street, Guelph

SUPERVISOR: MO

SUBSURFACE PROFILE					SAMPLE			PENETRATION RESISTANCE				UNIT WEIGHT
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	GROUND WATER	NUMBER	TYPE	N-Values	20 40 60 80				
0.0	Ground Surface	329.2										
0.2	225mm Topsoil	329.0										
	brown, loose Silty Sand FILL moist				1	SS	10					
	Topsoil											
	brown, compact to very dense SILTY SAND TILL, trace clay occ. cobbles and/or boulders moist			▽ DRY C.I. @ El. 326.8m	2	SS	8					
					3	AS	26					
					4	SS	31					
					5	SS	79					
4.7		324.5										
4.9	brown, compact GRAVELLY SAND, trace silt, trace clay	324.3			6	SS/AS	80					
	Refusal on Probable Bedrock											

5 10 15 20 25

DRILLED BY: London Soil Test Ltd

HOLE DIAMETER: 200mm

DRILL METHOD: Hollow Stem Auger

DATUM: Geodetic

DRILL DATE: April 27, 2021

SHEET: 1 of 1

REFERENCE No: G4398-21-4

CLIENT: Luonr Group Inc.

PROJECT: Residential Development

LOCATION: 300 Grange Street, Guelph

BOREHOLE No: 4

ENCLOSURE No: 5

SUPERVISOR: MO

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE			PENETRATION RESISTANCE	WATER CONTENT %	UNIT WEIGHT
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	20 40 60 80	5 10 15 20 25	
0.0	Ground Surface	328.7		Casing Protector, 0.89m stickup, Concrete, PVC Pipe, Soil Cuttings, Bentonite Holeplug, W.L. @ El. 326.12m (5-MAY-21), Well Sand, PVC Screen						
0.1	150mm Topsoil	328.6								
	brown, compact to very dense, SILTY SAND TILL, trace to some gravel occ. cobbles and/or boulders, moist				1	SS	18			
					2	SS	70			
					3	SS	74			
					4	AS	25			
					5	SS	24			
4.5		324.2			6	SS	50	75m		
	Probable BEDROCK									
	Refusal on Probable Bedrock									

DRILLED BY: London Soil Test Ltd

DRILL METHOD: Hollow Stem Auger

DRILL DATE: April 28, 2021

HOLE DIAMETER: 200mm

DATUM: Geodetic

SHEET: 1 of 1

REFERENCE No: G4398-21-4

CLIENT: Luonr Group Inc.

PROJECT: Residential Development

LOCATION: 300 Grange Street, Guelph

BOREHOLE No: 5

ENCLOSURE No: 6

SUPERVISOR: MO

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE					
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	PENETRATION RESISTANCE 20 40 60 80	WATER CONTENT % 5 10 15 20 25	UNIT WEIGHT
0.0	Ground Surface	330.0		Concrete; Well Casing Protector						
0.3	250mm Topsoil	329.8			1	SS	6			
0.6	brown, loose Silty Sand FILL, moist	329.4								
	Topsoil				2	SS	29			
	brown, compact SAND AND GRAVEL some silt, trace clay, occ. cobbles and/or boulders, moist			W.L. @ El. 327.28m (5-MAY-21); Soil Cuttings	3	SS	46			
3.1		326.9			4	AS	13			
	grey, dense CLAYEY SANDY SILT, trace gravel, moist			Bentonite Hole Plug; PVC Pipe	5	SS	31			
4.7		325.3								
	mottled brown and grey, dense SILTY SAND TILL, trace to some gravel, moist			Well Sand; PVC Screen	6	SS	33			
6.0		324.0								
6.3	Probable BEDROCK	323.7			7	SS	50	125mm		
	Refusal on Probable Bedrock									

DRILLED BY: London Soil Test Ltd

DRILL METHOD: Hollow Stem Auger

DRILL DATE: April 27, 2021

HOLE DIAMETER: 200mm

DATUM: Geodetic

SHEET: 1 of 1

REFERENCE No: G4398-21-4

CLIENT: Lunor Group Inc.

PROJECT: Proposed Development

LOCATION: 300 Grange Street, Guelph

BOREHOLE No: 6

ENCLOSURE No: 7

SUPERVISOR: MO

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE					
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	PENETRATION RESISTANCE 20 40 60 80	WATER CONTENT % 5 10 15 20 25	UNIT WEIGHT
0.0	Ground Surface	330.1		Well Casing Protector; 0.82m Stickup; Concrete; PVC Pipe; Soil Cuttings; Bentonite Holeplug; W.L. @ El. 326.4m (5-MAY-21); PVC Screen; Well sand						
0.1	150 mm Topsoil	330.0								
	brown, loose to dense SILTY SAND trace clay, trace gravel, moist				1	SS	5			
					2	AS	34			
2.0		328.1			3	SS	50		ROCK	
	brown, compact to very dense, Gravelly SILTY SAND TILL, trace clay, occ. cobbles and/or boulders, moist				4	SS	21			
					5	SS	64			
4.9		325.2			6	SS	45			
5.2	probable BEDROCK	324.9								
	Refusal on Probable Bedrock									

DRILLED BY: London Soil Test

DRILL METHOD: Hollow Stem Auger

DRILL DATE: April 27, 2021

HOLE DIAMETER: 200mm

DATUM: Geodetic

SHEET: 1 of 1

REFERENCE No: G4398-21-4

CLIENT: Lunor Group Inc.

PROJECT: Residential Development

LOCATION: 300 Grange Street, Guelph

BOREHOLE No: 7

ENCLOSURE No: 8

SUPERVISOR: MO

V.A. WOOD (GUELPH) INC.
CONSULTING GEOTECHNICAL ENGINEERS

405 YORK ROAD, GUELPH, ONTARIO N1E 3H3
PH. (519) 763-3101 FAX (519) 763-5912

SUBSURFACE PROFILE					SAMPLE			PENETRATION RESISTANCE	WATER CONTENT %	UNIT WEIGHT
DEPTH (m)	DESCRIPTION	ELEVATION	SYMBOL	MONITORING WELL	NUMBER	TYPE	N-VALUE	20 40 60 80	5 10 15 20 25	
0.0	Ground Surface	330.2		Well Casing Protector; 0.82m Stickup; Concrete; PVC Pipe; Soil Cuttings; W.L. @ El. 326.31m (5-MAY-21); Bentonite Holeplug; Well sand; PVC Screen						
0.3	250mm Topsoil	329.9								
0.9	brown, loose GRAVEL AND SAND moist	329.3			1	SS	9			
	brown, dense to very dense Gravelly SILTY SAND TILL, trace clay moist				2	SS	49			
					3	SS	50			
					4	AS	54			
					5	SS	44			
					6	SS	57			
6.0		324.2								
6.2	PROBABLE BEDROCK	324.0			7	SS	50			
	Refusal on Probable Bedrock									

DRILLED BY: London Soil Test Ltd

DRILL METHOD: Hollow Stem Auger

DRILL DATE: April 27, 2021

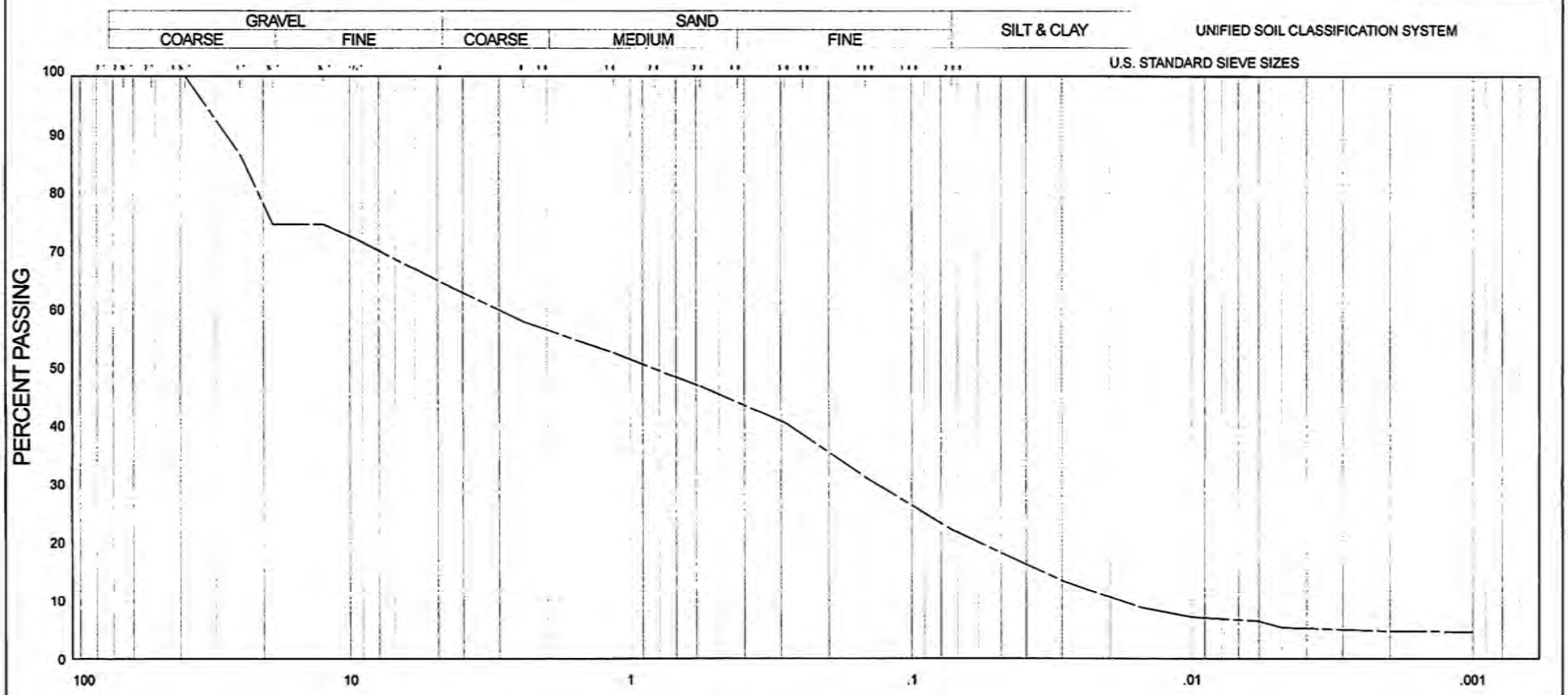
HOLE DIAMETER: 200mm

DATUM: Geodeitic

SHEET: 1 of 1

GRAIN SIZE DISTRIBUTION

OUR REFERENCE N° G4398-21-4



PROJECT: Proposed Residential Development
LOCATION: 300 Grange Road, Guelph, ON
BOREHOLE N°: 5
SAMPLE N°: 2
DEPTH: 0.7 - 1.2 m±
ELEVATION: 329.3 - 328.8 m±

COEFFICIENT OF UNIFORMITY:
COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

SAND AND GRAVEL, some silt, trace clay (SM)

PLASTIC PROPERTIES

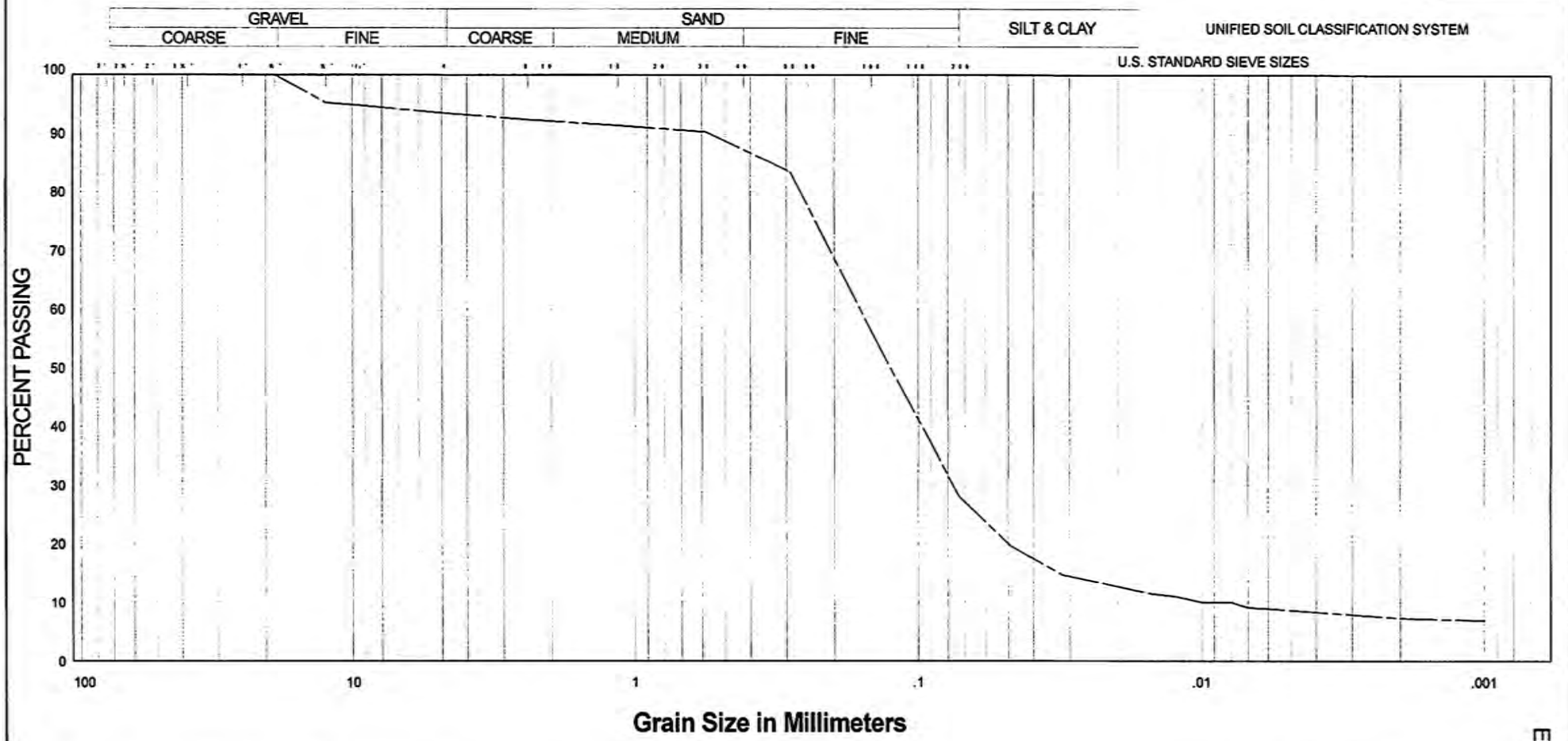
LIQUID LIMIT	% =
PLASTIC LIMIT	% =
PLASTICITY INDEX	% =
MOISTURE CONTENT	% = 9.1

ENCLOSURE N° 9

V. A. WOOD (GUELPH) INCORPORATED

GRAIN SIZE DISTRIBUTION

OUR REFERENCE N° G4398-21-4



PROJECT: Proposed Residential Development
LOCATION: 300 Grange Road, Guelph, ON
BOREHOLE N°: 6
SAMPLE N°: 2
DEPTH: 0.7 - 1.2 m±
ELEVATION: 329.4 - 328.9 m±

COEFFICIENT OF UNIFORMITY:
COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

SILTY SAND, trace clay, trace gravel (SM)

PLASTIC PROPERTIES

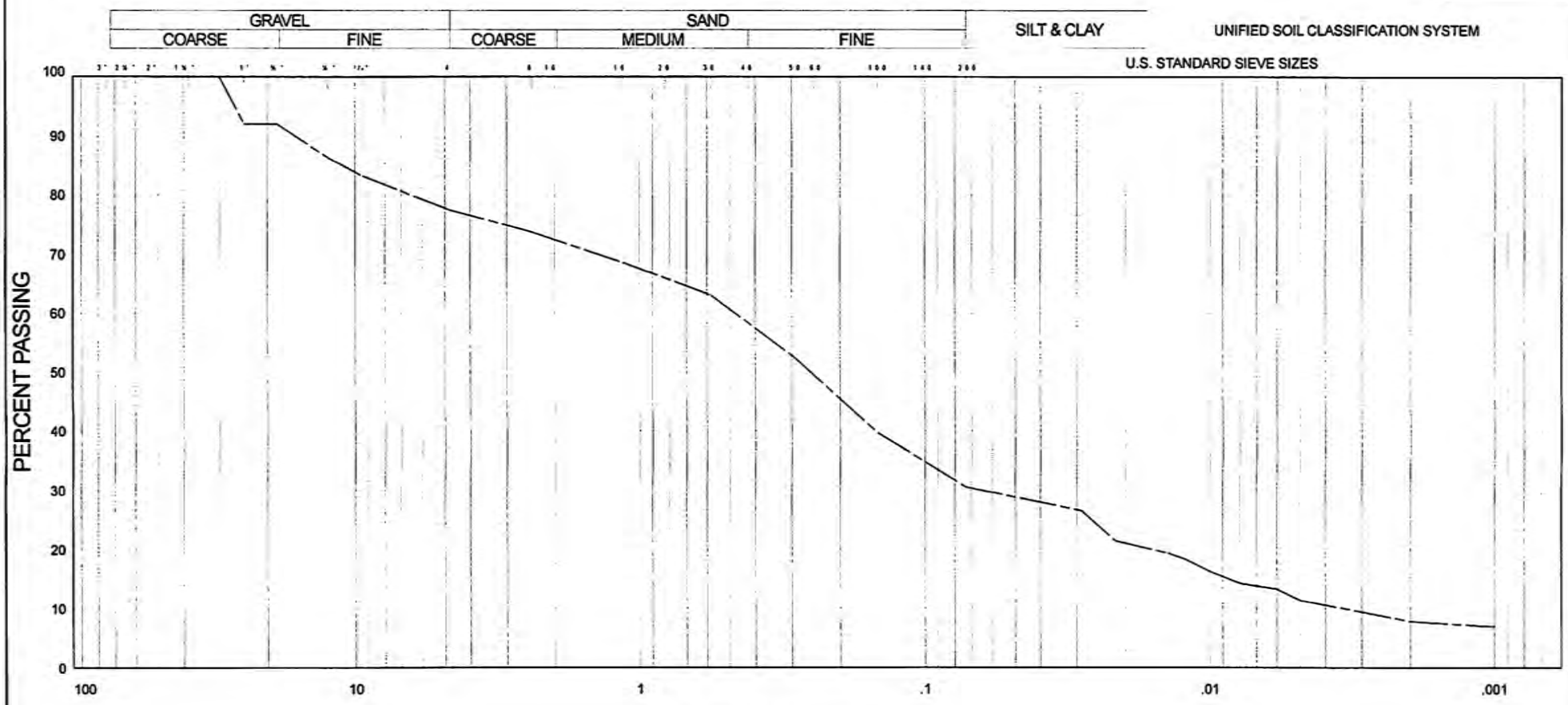
LIQUID LIMIT	% =
PLASTIC LIMIT	% =
PLASTICITY INDEX	% =
MOISTURE CONTENT	% = 11.0

ENCLOSURE N° 10

V. A. WOOD (GUELPH) INCORPORATED

GRAIN SIZE DISTRIBUTION

OUR REFERENCE N° G4398-21-4



PROJECT: Proposed Residental Development
LOCATION: 300 Grange Road, Guelph, ON
BOREHOLE N°: 4
SAMPLE N°: 5
DEPTH: 3.0 - 3.5m±
ELEVATION: 328.4 - 327.9m±

COEFFICIENT OF UNIFORMITY:
COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

Gravelly SILTY SAND TILL, trace clay (SM)

PLASTIC PROPERTIES

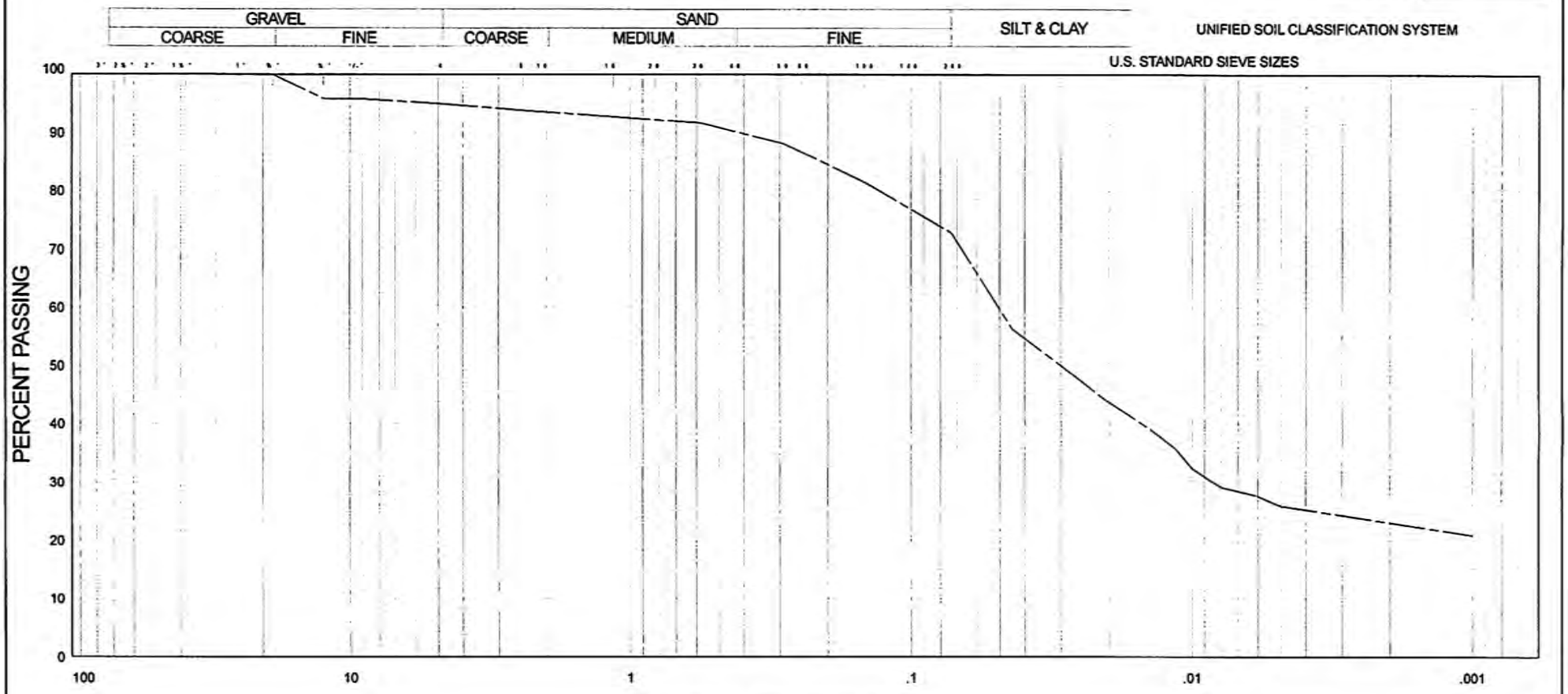
LIQUID LIMIT	% = -
PLASTIC LIMIT	% = -
PLASTICITY INDEX	% = -
MOISTURE CONTENT	% = 9.8

ENCLOSURE N° 11

V. A. WOOD (GUELPH) INCORPORATED

GRAIN SIZE DISTRIBUTION

OUR REFERENCE N° G4398-21-4



PROJECT: Proposed Residential Development
LOCATION: 300 Grange Road, Guelph, ON
BOREHOLE N°: 5
SAMPLE N°: 5
DEPTH: 3.0 to 3.5m±
ELEVATION: 327.9 to 327.4m±

COEFFICIENT OF UNIFORMITY:
COEFFICIENT OF CURVATURE:

Classification of Sample and Group Symbol:

CLAYEY SANDY SILT, trace gravel (CL)

PLASTIC PROPERTIES

LIQUID LIMIT	% = 27.7
PLASTIC LIMIT	% = 20.5
PLASTICITY INDEX	% = 7.1
MOISTURE CONTENT	% = 14.7

ENCLOSURE N° 12

V. A. WOOD (GUELPH) INCORPORATED

APPENDIX G

Enclosures

Soil Abbreviations and Terms Used on Record of Borehole Sheets

TERMINOLOGY DESCRIBING COMMON SOIL TYPES:

Topsoil	-	mixture of soil and humus capable of supporting vegetation
Peat	-	mixture of visible and invisible fragments of decayed organic matter
Till	-	unstratified glacial deposit which may range from clay to boulders
Fill	-	soil materials identified as being placed anthropologically

CLASSIFICATION (UNIFIED SYSTEM)

Clay	<0.002mm		
Silt	0.002 to .075mm		
Sand	0.075 to 4.75mm		
		Fine	0.075 to 0.425 mm
		Medium	0.425 to 2.0 mm
		Coarse	2.0 to 4.75 mm
Gravel	4.75 to 75mm		
		Fine	4.75 to 19 mm
		Coarse	19 to 75 mm
Cobbles	75 to 300mm		
Boulders	>300mm		

TERMINOLOGY

Soil Composition	**% by Weight**
"traces"	<10%
"some"(eg. some silt)	10-20%
Adjective (eg. sandy)	20-35%
"and"(eg. sand and gravel)	35-50%

Standard Penetration Resistance (SPT): Standard Penetration Resistance ('N' Values) refers to the number of blows required to advance a standard (ASTM D1586) 51 mm Ø (2 inch) split-spoon sampler by the use of a free falling, 63.5 Kg (140lbs) hammer. The number of blows from the drop weight is recorded for every 15 cm (6 inches). The hammer is dropped from a distance of 0.76m (30 inches) providing 474.5 Joules per blow. When the sampler is driven a total of 45 cm (18 inches) into the soil, the standard penetration index ('N' Value) is the total number of blows for the last 30 cm (12 inches).

Dynamic Cone Penetration Resistance (DCPT): Dynamic Cone Penetration Resistance is similar to a SPT with the 474.5 Joule/blow impulse provided by the free falling hammer where the split-spoon sampler is replaced by a 51 mm Ø, 60˚ conical point and the number of blows is recorded continuously for every 30 cm (12 inches).

COHESIVE SOILS CONSISTENCY

	(kPa)	**(P.S.F.)**	**Nominal 'N' Value**
Very Soft	<12	<250	0-2
Soft	12-25	250-500	2-4
Firm	25-50	500-1000	4-8
Stiff	50-100	1000-2000	8-15
Very Stiff	100-200	2000-4000	15-30
Hard	>200	>4000	>30

RELATIVE DENSITY OF COHESIONLESS SOIL

	'N' Value
Very Loose	0-4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

MOISTURE CONDITIONS:

Cohesive Soil	**Cohesionless Soil**
DTPL- Drier than plastic limit	Damp
APL- About plastic limit	Moist
WTPL- Wetter than plastic limit	Wet
MWTPL- Much wetter than plastic limit	Saturated

SAMPLE TYPES AND ADDITIONAL FIELD TESTS

SS	Split Spoon Sample (obtained from SPT)	**GS**	Grab Sample	**PP**	Pocket Penetrometer
		BS	Bulk Sample	**VANE**	Peak & Remolded shear
AS	Auger Sample	**TW**	Thin Wall Sample or Shelby Tube	**DMT**	Flat Plate Dilatometer

LABORATORY TESTS

SG	Specific Gravity	**S**	Sieve Analysis	**W**	Water Content
H	Hydrometer	**P**	Field Permeability	**K**	Lab Permeability
W_p	Plastic Limit	**W_L**	Liquid Limit	**I_p**	Plasticity Index
GSA	Grain Size Analysis	**C**	Consolidation	**UNC**	Unconfined compression

CHUNG & VANDER DOELEN
ENGINEERING LTD.

Enclosure A

Enclosure No.: 1
Sheet 1 of 1

FILE No: 2791

TEST PIT No. 1

Client: **Gemini Homebuilders**

Project: **Proposed Residential Subdivision**

Location: **316 Grange Road, Guelph, Ontario**

EQUIPMENT DATA

Machine: **Excavator**
Method: **Excavation**
Size:
Date: **Nov 25 25** TO **Nov 25 25**

Ground Elevation: **332.57 m**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL
332.17	400 mm TOPSOIL		
0.40	loose, dark brown SAND AND SILT trace organics, moist		
331.97			
0.60	compact, brown Fine SAND trace to some silt moist		
331.07			
1.50	compact to dense, brown SAND AND GRAVEL some silt to silty freq. cobbles and boulders moist		
329.87			
2.70	compact to dense, brown SAND AND SILT TILL trace gravel freq. cobbles occ. boulders moist		
328.07			
4.50	End of Test Pit		

SAMPLE: SAMPLE ID | TYPE | N-VALUE

SHEAR STRENGTH (kPa)
FIELD VANE: Peak ⊗ Rem. ×
LAB TEST: Unc. ■ P.P. □
50 100 150 200
PENETRATION RESISTANCE
STANDARD ● DYN. CONE ○
20 40 60 80

WATER CONTENT (%)
W_P W W_L
10 20 30

WELL DATA

DEPTH (m)

REMARKS

- in-situ guelph permeameter testing conducted at 2.77 mbgs (329.80 mASL)
- test pit open and dry, and side walls stable upon completion of excavation

PROJECT MANAGER: **MM**

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Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

Enclosure No.: 2
Sheet 1 of 1

FILE No: 2791

TEST PIT No. 2

Client: **Gemini Homebuilders**

Project: **Proposed Residential Subdivision**

Location: **316 Grange Road, Guelph, Ontario**

EQUIPMENT DATA

Machine: **Excavator**
Method: **Excavation**
Size:
Date: **Nov 25 25** TO **Nov 25 25**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	SAMPLE N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **331.33 m**						FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80	W_P W W_L; 10 20 30			
	350 mm TOPSOIL										
330.98											
0.35	loose, orangey brown SILTY SAND trace gravel moist	0.5								0.5	
330.58											
0.75	compact, brown SILTY SAND AND GRAVEL freq. cobbles occ. boulders moist	1.0								1.0	
		1.5								1.5	
329.48											
1.85	compact to dense, brown SANDY SILT to SAND AND SILT TILL trace gravel, trace clay freq. cobbles occ. boulders moist	2.0								2.0	
		2.5								2.5	in-situ guelph permeameter testing conducted at 2.29 mbgs (329.04 mASL)
		3.0								3.0	
327.93											
3.40	End of Test Pit	3.5								3.5	test pit open and dry, and side walls stable upon completion of excavation
		4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **MM**

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Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

Enclosure No.: 3
Sheet 1 of 1

FILE No: 2791

TEST PIT No. 3

Client: **Gemini Homebuilders**

Project: **Proposed Residential Subdivision**

Location: **316 Grange Road, Guelph, Ontario**

EQUIPMENT DATA

Machine: **Excavator**
Method: **Excavation**
Size:
Date: **Nov 25 25** TO **Nov 25 25**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	SAMPLE N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
	Ground Elevation: **329.59 m**						FIELD VANE: Peak ⊗ Rem. × LAB TEST: Unc. ■ P.P. □ 50 100 150 200; PENETRATION RESISTANCE STANDARD ● DYN. CONE ○ 20 40 60 80	W_P W W_L 10 20 30			
329.14	450 mm TOPSOIL										
0.45	loose to compact, brown SAND AND SILT TILL trace gravel moist	0.5								0.5	
		1.0								1.0	
328.19											
1.40	compact to dense, brown SAND AND GRAVEL freq. cobbles occ. boulders moist to wet	1.5								1.5	
		2.0								2.0	in-situ guelph permeameter testing conducted at 2.13 mbgs (327.46 mASL)
		2.5								2.5	
		3.0							▽	3.0	free water at 3.1± m depth one hour after completion
	---------- saturated										saturated cave-in to 3.4± m depth
325.99		3.5								3.5	
325.89 3.60	compact, brown SAND AND SILT, saturated										
3.70	End of Test Pit	4.0								4.0	
		4.5								4.5	
		5.0								5.0	
		5.5								5.5	

PROJECT MANAGER: **MM**

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Enclosure No.: 4
Sheet 1 of 1

FILE No: 2791

TEST PIT No. 4

Client: **Gemini Homebuilders**

Project: **Proposed Residential Subdivision**

Location: **316 Grange Road, Guelph, Ontario**

EQUIPMENT DATA

Machine: **Excavator**
Method: **Excavation**
Size:
Date: **Nov 25 25** TO **Nov 25 25**

ELEV./ DEPTH (m)	DESCRIPTION	DEPTH (m)	SYMBOL	SAMPLE ID	SAMPLE TYPE	N-VALUE	SHEAR STRENGTH (kPa) / PENETRATION RESISTANCE	WATER CONTENT (%)	WELL DATA	DEPTH (m)	REMARKS
Ground Elevation: **330.40 m**							FIELD VANE: Peak ⊗ Rem. ×; LAB TEST: Unc. ■ P.P. □; 50 100 150 200; STANDARD ● DYN. CONE ○; 20 40 60 80	W_P W W_L; 10 20 30			
330.10	300 mm TOPSOIL										
0.30	compact to dense, brown SAND AND SILT TILL trace gravel freq. cobbles occ. boulders moist	0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0								0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0	in-situ guelph permeameter testing conducted at 2.61 mbgs (327.79 mASL)
326.30											
4.10	End of Test Pit	4.5 5.0 5.5								4.5 5.0 5.5	test pit open and dry, and side walls stable upon completion of excavation

PROJECT MANAGER: **MM**

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Kitchener, Ontario N2H 5E1
ph. (519) 742-8979, fx. (519) 742-7739

APPENDIX H

Municipal Well Records

Park #1 Municipal Well

6

Well #4

UTM Drilled for City of Guelph, Ontario. Hole No. 67 No. 855

Starter Aug. 20/36

Drilled by E.F. Roberts & Co. Driller Completed & tested Oct. 3 19 36

Elev. 1100

46? a.k.w.

Balincation 23 Near Park St. off Metcalf

Length of Pipe	Strata	Total Depth	Heaved	Water from Surface
0	0 - 10 Soil & Gravel			
	10 - 20 Gravel & Sand			
	20 - 28 " "			
	28 - On White Lime soft			
	29 - " " " hard			
5	29 - 50 Lime White	Small flow at 50 ft. static 40 ft.		
	50 - 60 " Brown			
	60-70 " " hard			
	70 - 77 " "			
	77 - 85 " "			
10	85 - 87 Shale Soft			
	87 - 90 " Grey			
	90 - 92 " "			
	92 -100 Lime stone black			
	100 -110 " " grey			
15	110 -120 " " "			
	120 -130 " " " soft			
	130 - 150 " " "			
	150 -155 fault	all cuttings for static 54 feet		
	155 - 158 Lime white			
20	158 -160 " "			
	160 -163 " grey			
	163 -168 " "			
	168 -173 " white soft			
	173 -178 " grey hard			
25	178 -187 " " "			"54-
	Tested Cap. 1000 I.G. - 22' draw down P.L. 76'			
	#3			
30				
33				

RECEIVED
JUN 3 1948
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

CSS.S8

Park #2 Municipal Well

3

Form No. 2 1M-Jan. 1947-(A3601)

UTM ... Z ... E

... R ... N

Elev. 5 R 1100

Basin 23

ONTARIO

The Well Drillers Act

Department of Mines, Province of Ontario

RECEIVED
FEB 6 1948
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

67 No. 858

Water Well Record

County or District Wellington ... Twp. of Guelph ... Con. 2 Lot 14½ ... Pt. Lot Plan 265

Owner City of Guelph ... Address Metcalfe St. ... Acres ...

Date Completed Aug. 29/46 ... Cost of Well (not including pump) $780.00

Pipe and Casing Record

Casing diameter(s) 8"

Length(s) of casing(s) 26 ft.

Length of screen ~

Type of screen ~

Type of pump ~

Capacity of pump ~

Depth of pump setting ~

Pumping Test

Date Aug 29 1946

Developed Capacity 1450 G.P.M.

Duration of Test 24 hours

Pumping Rate 1450 G.P.M.

Drawdown 17 ft.

Static level of completed well 73 ft.

Is well a gravel-wall type? Rock

Water Record

Kind (fresh or mineral) fresh

Quality (hard, soft, contains iron, sulphur etc.) Soft

Appearance (clear, cloudy, coloured) Clear

For what purpose(s) is the water to be used? City

How far is well from possible source of contamination? None

What is source of contamination? ~

Enclose a copy of any mineral analysis that has been made of water ~

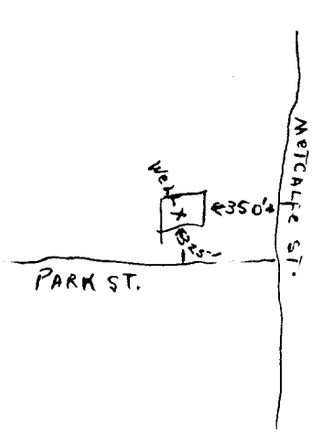
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
152 ft	Soft	79 ft.

Well Log

Drift and Bedrock Record	From	To
Hardpan & Stones Boulders	0 ft.	26 ft.
Yellow Limestone	26	42
Brown "	42	56
Dark Brown "	56	69
Hard Black "	69	80
Hard Dark Brown "	80	103
Grey "	103	114
Light Blue "	114	149
Blue & White with large holes "	149	156
This well was put out 20" to a depth of 166 ft $4756.00		

Location of Well

In diagram below show distances of well from road and lot line



#4

Situation: Is well on upland, in valley, or on hillside? upland

Drilling Firm J. L. Graham

Address 297 Exhibition St

Recorded by W. H. Cutting, Insp. Address R.R.1 Ariss

Date Jan. 31st 1947 Licence Number 40

CSS.S8