



Guelph Innovation District (GID) Lands, Blocks 1 & 2

Functional Servicing Report

Project Location:

328 Victoria Road South and 588 Stone Road East
Guelph, Ontario

Prepared for:

Fusion Homes
500 Hanlon Creek Boulevard
Guelph, Ontario, N1C 0A1

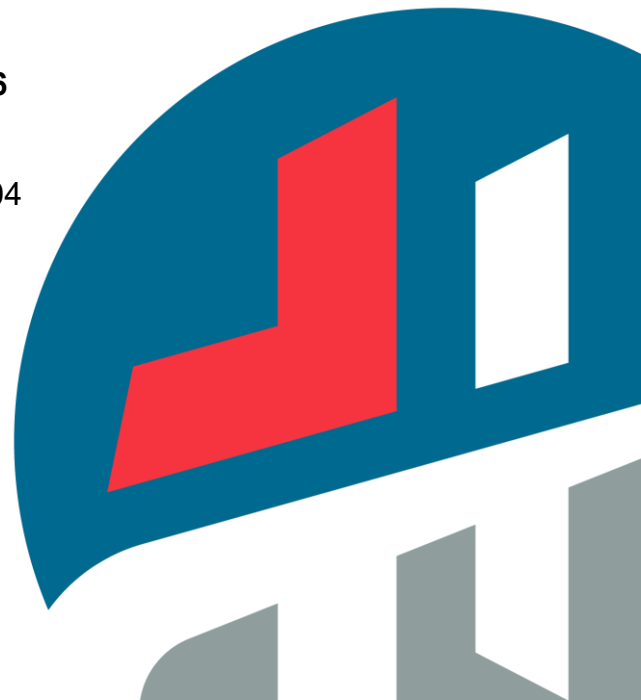
Prepared by:

MTE Consultants Inc.
520 Bingemans Centre Drive
Kitchener, ON N2B 3X9

December 12, 2025

Revised: June 12, 2026

MTE File No.: 46927-104





Contents

1.0	Introduction	1
1.1	Overview	1
1.2	Background Information.....	2
1.2.1	Engineering Master Servicing Plan for GID Lands, Blocks 1 & 2.....	2
1.2.2	Eramosa-Blue Springs Watershed Study Report	2
2.0	Existing Conditions and background information	4
2.1	Topographical Information	4
2.2	Geotechnical and Hydrogeological Information.....	4
2.3	Slope Stability Assessment.....	5
2.4	Environmental Buffers	5
3.0	Proposed Development	6
3.1	Municipal Right-of-ways and Roadworks	6
3.1.1	Proposed Widening of Victoria Road South and Stone Road East.....	7
4.0	Proposed Grading	8
4.1	Grading Considerations	8
4.2	Lot Grading.....	8
4.3	Community and Multi-Use Trails	9
5.0	Municipal Servicing.....	10
5.1	Sanitary Servicing.....	10
5.2	Water Distribution	13
5.3	Storm Servicing	17
5.4	Stormwater Management	20
5.5	Groundwater and Waterproofing Measures	20
6.0	Utility Servicing.....	22
7.0	Conclusions and Recommendations	23

Figures

Figure 1.1 – Location Plan	3
Figure 5.1 – Sanitary Drainage Area Plan	11
Figure 5.2 – Sanitary Servicing Plan	12
Figure 5.3 – Water Distribution Plan.....	16
Figure 5.4 – Storm Drainage Area Plan	18
Figure 5.5 – Storm Servicing Plan.....	19
Figure 5.6 – Groundwater Strategy	21

Tables

Table 3.1 – Road Classifications	6
Table 3.2 – Proposed Pavement Structure.....	7
Table 5.1 – Peaking Factors for Watermain Design	13
Table 5.2 – Pressure Guidelines for Watermain Design	14

Appendices

Appendix A	Draft Plan of Subdivision (11x17 Reduced)
Appendix B	Right-of-Way Cross-Sections
Appendix C	Sanitary Design Calculations
Appendix D	Storm Design Calculations
Appendix E	Foundation Drainage System – Technical Memorandum

Drawings

MTE Drawing 46927-104-EC1.1 – Existing Conditions Plan	Encl.
MTE Drawing 46927-104-AG1.1 – Preliminary Grading Contour Plan	Encl.
MTE Drawing 46927-104-MS11.1 – Conceptual Trail Connection Plan	Encl.

1.0 INTRODUCTION

1.1 Overview

MTE Consultants Inc. (MTE) has been retained by Fusion Homes (Fusion) to prepare a Functional Servicing Report (FSR) in support of a Draft Plan of Subdivision application for the proposed Guelph Innovation District (GID) Lands, herein referred to as the ‘subject lands’.

The subject lands consist of approximately 116.60ha of developable area located in the City of Guelph (City). The subject lands are currently agricultural/open space and part of the University of Guelph’s Agroforestry Research facility. They are bounded by Stone Road East to the south, Victoria Road South to the west, and the Guelph Junction Railway and the Eramosa River to the north and east. Refer to **Figure 1.1** for a site location plan.

Development plans for the subject lands include the construction of street-oriented residential units, multiple residential and mixed-use blocks, a school site, employment blocks, park lands, stormwater management facilities, open space blocks, and the required roads and municipal services (storm, sanitary, and water). A Draft Plan of Subdivision (dated May 28, 2026) for the proposed development has been prepared by MHBC Planning and forms the basis for this report. Refer to **Appendix A** for more details.

The purpose of this report is to prepare a functional servicing strategy for the subdivision which implements the Engineering Master Servicing Plan and prepare a preliminary servicing plan which reflects the Draft Plan of Subdivision and outlines how the subdivisions can be developed on full municipal services, including sanitary sewage, domestic water, storm drainage, and utilities. This report should be read in conjunction with the following reports:

- *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Engineering Master Servicing Plan* (MTE, July 16, 2025);
- *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Stormwater Management Report* (MTE, June 11, 2026);
- *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Hydrogeological Assessment* (MTE, June 11, 2026);
- *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Geotechnical Investigation Report* (MTE, December 12, 2025);

1.2 Background Information

1.2.1 Engineering Master Servicing Plan for GID Lands, Blocks 1 & 2

The subject lands are located within the study area as identified in the *Engineering Master Servicing Plan for GID Lands, Blocks 1 & 2* prepared by MTE Consultants in April 2024 (Revised July 2025) (herein referred to as the 'MSP').

The objective of the *MSP* is to guide the development of the subject lands and develop a comprehensive design strategy that is acceptable to the City, the Grand River Conservation Authority (GRCA), and the Ministry of the Environment, Conservation and Parks (MECP), taking into consideration the findings and recommendations of previously completed and related studies.

The *MSP* informs the Block Plan process through:

- Review of relevant background policies and documents to incorporate objectives and recommendations into the site servicing and grading design;
- Identification and assessment of the relevant environmental, servicing, and engineering design considerations and recommendations for design of a preferred development plan; and,
- Development of a framework to be followed by subsequent submissions, including the Draft Plan of Subdivision Application and the Final Engineering Submissions.

The *MSP* highlights the existing site conditions and engineering design criteria/constraints, to which future plans will need to adhere. A preliminary design strategy, including considerations for grading, servicing, stormwater management (SWM), and an environmental noise assessment has been outlined. This design approach will be refined during future detailed design stages of the proposed development.

1.2.2 Eramosa-Blue Springs Watershed Study Report

The subject lands are located within the Eramosa River subwatershed. The GRCA has published the *Eramosa-Blue Springs Watershed Study Report (Aquafor Beech Ltd., 1999)*, which provides existing conditions and mitigation recommendations for the watershed.

The Eramosa River is categorised as a cool water stream with high levels of groundwater interaction, with areas of both groundwater discharge and recharge. Due to the mainly undeveloped nature of the catchment area, water quality throughout the watercourse is better than typical, with lower levels of nutrients and suspended solids and higher levels of dissolved oxygen. Baseflow is consistent and flood events are less frequent due to delayed peak flow times resulting from the mainly undeveloped contributing area.

It is recommended that any development in the catchment area maintain existing groundwater recharge rates as closely to at-source as possible, to maintain the current baseflow characteristics.



Engineers, Scientists, Surveyors

PROJECT

GUELPH INNOVATION DISTRICT LANDS

TITLE

LOCATION PLAN

Drawn	OXR	Scale	1:10000	Figure 1.1
Checked	CJC	Project No.	46927-104	
Date	2025-12-15	Rev No.	0	

2.0 EXISTING CONDITIONS AND BACKGROUND INFORMATION

2.1 Topographical Information

MTE conducted a detailed topographical survey of the subject lands in 2022. Existing topographical conditions for the subject lands, as well as the adjacent surrounding lands, are shown in **MTE Drawing 46927-104-EC1.1**.

There are two large existing mounds onsite, at approximate elevations of 343.0m-345.0m, creating a ridge near the center of the property in a north-south orientation. As such, existing surface runoff drains in all directions; south towards Stone Road East, west towards Victoria Road South, and north and east towards the Eramosa River.

There is significant topographic relief onsite, with upwards of 15.0m of difference within the developable 'tablelands' alone. There is also approximately 10.0m of relief within the adjacent Valleylands down to the river, not slated for development. The average slopes onsite range from approximately 2.0% – 8.0%, with steeper sections to the north ranging from 10.0% – 20.0%.

2.2 Geotechnical and Hydrogeological Information

MTE has conducted geotechnical investigations for the subject lands in 2022 and 2023. The latest 2025 report, *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Geotechnical Investigation Report*, summarizes the work performed, the findings of the investigations, and makes recommendations in support of future development plans, to be further discussed in this report. The fieldwork for this investigation involved drilling of 22 borehole locations (boreholes MW501-22 to MW520-22, BH654-22, and BH655-22) to depths of 1.4m to 11.1m. Soil conditions found in the boreholes generally show a mixture of silt till, sandy till, gravelly till, sand, and gravel. Auger refusal on bedrock occurred at boreholes MW501-22 to MW507-22, BH654-22, and BH655-22. The bedrock elevations varied from 1.4m to 11.1m below the ground surface, indicating shallow bedrock along the east adjacent to the Natural Areas, and much deeper bedrock depths along the northern extent of the subject lands. Refer to MTE's *Geotechnical Investigation Report* for more details.

Concurrently with the geotechnical investigations discussed above, MTE has also been conducting ongoing hydrogeological investigations and monitoring. The work performed to date includes: the construction of monitoring wells in some of the earlier boreholes drilled for the aforementioned geotechnical investigations (MW501-22, MW507A-22, MW507B-22, MW512A-22, MW512B-22, MW514-22, and MW520-22), the advancement of an additional 51 boreholes (MW601-22 to MW651-22) to depths of 0.9m to 12.2m, the construction of an additional seven monitoring wells (MW601-22 to MW607-22), and the installation of a minipiezometer (MP101-23) within the wetland onsite. The analysis of this additional data has confirmed the original assessments of the existing soil stratigraphy, location of the underlying bedrock, and provided additional information regarding the groundwater elevations encountered throughout. Refer to MTE's 2025 *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Hydrogeological Assessment* for more details.

Similarly to the existing topography, more specifically the previously discussed high topographic mounds onsite, the groundwater mimics the surface contours and concentric mounds are present near those locations. As identified in MTE's 2026 *Hydrogeological Assessment*, the latest measured groundwater levels near the mounds are above the proposed preliminary finished grades in those locations. As such, appropriate waterproofing measures shall be implemented for structures in these areas.; to be further discussed in Section 5.5.

Through additional review of GRCA mapping, it was confirmed that the subject lands are within the Eramosa-Blue Springs Creek subwatershed. Based on the *Eramosa-Blue Springs Watershed Study Report* (Beak International Inc. and Aquafor Beech Ltd., 1999), the subject lands are in a low stress diverse warm/cool water community. A large portion of the Eramosa-Blue Springs Creek subwatershed is considered an important recharge area to local streams and rivers. Within this subwatershed, infiltration techniques are encouraged to achieve a sitewide water balance. The subject lands are also within a Source Water Wellhead Protection Area B, with a vulnerability score of 8-10. Therefore, special attention is required for the protection of the groundwater resource and its interaction with any proposed development.

2.3 Slope Stability Assessment

As part of the geotechnical investigation, a slope stability assessment was completed for the Valleylands slope along the north and east limits of the subject lands. Various failure modes of this slope were investigated. An Erosion Hazard Setback Limit (EHSL) was established based on the recommendations for the Stable Top of Slope, as well as development setbacks following the GRCA and Ministry of Natural Resources and Forestry (MNRF) guidelines. The Stable Top of Slope and the associated 6.0m setback from the EHSL was established. The following Slope Stability Setback recommendations are proposed for the development:

- No additional fill shall be placed within the EHSL or on the face of the slope;
- No excavation work should be carried out along the face or the bottom of the slope without geotechnical review;
- No new infiltration or stormwater management infrastructure shall be placed within the EHSL areas;
- Surface runoff should be directed away from the slope to prevent gullies from forming and expanding; and,
- Though the conservation areas are currently well-vegetated, periodic planting might be required to maintain vegetation across the slope face.

Based on the above, the proposed development limits were established, as shown in the Draft Plan.

2.4 Environmental Buffers

There are regulated GRCA wetland complexes located north and east of the subject lands, adjacent to the Eramosa River and the Guelph Junction Railway corridor. Through site walks and specific OPA policy review, site-specific environmental buffers were established by NRSI. These buffers establish a Development Limit, beyond which development may not occur. This Development Limit was used to further establish a functional Draft Plan of Subdivision and help delineate pre-development and post-development catchment areas used in the SWM assessment. The buffers established onsite are as follows, of which, a combination of the most restrictive is what defines the Development Limit:

- Surveyed Dripline and associated 10.0m Buffer;
- Surveyed Wetland and associated 15.0m Buffer; and,
- Erosion Hazard Setback Limit and associated 6.0m Buffer.

3.0 PROPOSED DEVELOPMENT

The Draft Plan of Subdivision for this residential development comprises of the following:

- Low density residential blocks;
- Multiple residential blocks;
- Mixed-use blocks;
- Employment lands;
- School block;
- Three SWM facility blocks;
- Open space;
- Walkway blocks;
- Park blocks; and
- Municipal right-of-ways.

Generally speaking, construction of the proposed development will be phased in a north-south direction. This would begin with the construction and establishment of the required stormwater management facility (SWMF) to the north, followed by the development lands within its contributing catchment area.

3.1 Municipal Right-of-ways and Roadworks

As shown in the Draft Plan, the subject lands are serviced by collector and local roads. The roadways will be constructed to a full urban cross-section including asphalt pavement, concrete curb and gutter, concrete sidewalk, roadway illumination, and boulevard landscaping all in accordance with City standards. The proposed right-of-way width for collector roads is 26.0m (Streets A and B) and 24.0m (Street C), whereas local roads have an 18.0m width. Modified right-way cross-sections are proposed where not included in the City's Complete Streets Design Guidelines. Cross sections have been included in **Appendix B. Table 3.1** below identifies the proposed road classifications and applicable cross-section design references.

Table 3.1 – Road Classifications

Street	Classification	Right-of-way Width	Cross-section Design
A and B	Collector	26.0m	Figure B-3
C	Collector	24.0m	Figure B-2
D to O	Local	18.0m	Figure B-1

MTE's preliminary geotechnical investigation provides a proposed pavement structure based on underlying soil conditions, proposed roadway usage, and the City's standards. **Table 3.2** below provides the proposed pavement structure based on road classification.

Table 3.2 – Proposed Pavement Structure

Pavement Component	Thickness (mm)	
	Local Road	Collector Road
HL3 Surface Course Asphalt	40	45
HL8 Binder Course Asphalt	50	90
Granular 'A' Base	175	175
Granular 'B' Subbase	350	450

3.1.1 Proposed Widening of Victoria Road South and Stone Road East

The 2005 *Victoria Road Class EA Study, Environmental Study Report* was originally completed to address the existing conditions and future needs of Victoria Road South in Guelph. The report highlights key considerations, among others, for the future development of what is now considered the GID Lands. Some of the considerations include traffic volume growth, intersection design and improvements, and additional land requirements for the proposed widening.

- The preferred alternative includes a 4-laned rural cross-section with on-street bike lanes in both directions;
- The entire widening (12.0m) is proposed along the east side of Victoria Road South, to avoid the Arboretum lands to the west;
- At the Victoria-Stone intersection, an infiltration stormwater management facility (SWMF No. 104) has been designed to accommodate runoff from the intersection and immediately adjacent lands; and,
- From Stone Road East to the Eramosa River, a linear SWM system is proposed along the east side of Victoria Road South to provide the required stormwater quality and quantity control prior to recharge to the groundwater or discharge to the Eramosa River.

As the *Environmental Study Report* was completed prior to the *Guelph Innovation District Secondary Plan* it is considered outdated and does not represent the ultimate road design.

Currently based on recommendations in the *2022 Transportation Master Plan* and the *Guelph Innovation District Secondary Plan*, upgrades are required to Victoria Road South and Stone Road East. A Municipal Class Environmental Assessment (MCEA) will be completed to determine a preferred solution and preliminary design for improvements to both roads. The final road cross-sections will be determined through respective EA processes proposed for both roads. Ongoing coordination through these EA processes will continue throughout future development stages for GID, wherein the ultimate designs will meet the requirements of the *Complete Streets Design Guidelines*, and be accommodated by the proposed connections to the future right-of-ways. It is anticipated that design of Victoria Road South will be completed in 2026, with a construction timeline of 2027. It is anticipated that design of Stone Road East will be completed in 2028, with a construction timeline of 2030.

4.0 PROPOSED GRADING

4.1 Grading Considerations

A Preliminary Grading Plan illustrating road grades is enclosed (**MTE Drawing 46927-104-AG1.1**). The grading design of the subject lands is controlled by many factors, which include:

- Matching to centreline of road elevations of existing surrounding roads;
- Compatibility with the proposed widening and grading of Victoria Road South and Stone Road East;
- Matching to existing and proposed boundary grades around the perimeter of the Development Limit, while respecting existing natural features (established buffers);
- Drainage of major storm event overland flows towards the road right-of-ways, where applicable, and ultimately the proposed SWMFs;
- Compliance with municipal standards for minimum and maximum road grades;
- Servicing constraints (sanitary and storm), while maintaining adequate cover over municipal services; and,
- Optimizing proposed earthworks to minimize the cut/fill imbalance as much as possible.

Utilizing the proposed road layout, preliminary road grades are within the allowable range stated in the City's DEM. Preliminary residential lot grades typically are 2.0% (minimum) to 6.0% (maximum), with a combination of traditional back-to-front drainage, split drainage, walk-out, and walk-up type lots.

As previously discussed, existing grades exceed the maximum municipal standards. Therefore, proposed area grading operations may generate soil to be removed from the subject lands. Routine coordination with a Qualified Professional (QP) in excess soil management will be conducted to effectively manage any surplus and the associated requirements, per O. Reg. 406/19.

The two previously mentioned high points onsite will supply the majority of the redistributed earthworks required to optimize the overall cut/fill balance. As identified in MTE's 2025 *Hydrogeological Assessment*, the latest measured groundwater levels near the mounds are above the proposed preliminary finished grades in those locations. As such, appropriate waterproofing measures shall be implemented for structures in these areas; to be further discussed in Section 5.5.

4.2 Lot Grading

The preliminary overall grading scheme was developed utilizing the proposed road layout, preliminary centreline of road grades, and individual lot design to address the constraints and considerations listed in Section 4.1 above. Preliminary lot grades range from 2.0% (minimum) to 6.0% (maximum) with a combination of traditional back-to-front drainage, split drainage, and walk-out type lots. These three typical lot types will be graded following the grading details provided in Figures 1-3 of the City's DEM. The preliminary finished grades are designed to optimize earthmoving (cutting and filling) required for road and lot construction and follow the natural topography of the existing lands. Refer to **MTE Drawing 46927-104-AG1.1** for preliminary grading information for the subject lands.

4.3 Community and Multi-Use Trails

The proposed Draft Plan prepared by MHBC identifies the existing community trails, and the proposed community trails that will connect the proposed development to the Victoria Road and Stone Road multi-use trails. Proposed trails will be located outside of the natural features and buffers, or within the outer 5m of the buffer where required due to accessibility requirements.

Enclosed **MTE Drawing 46927-104-MS11.1** include the conceptual trail network, trail connections and conceptual grades designed to conform to the City of Guelph Accessibility Standards.

The following trail network has been established for the proposed development:

- East off-road trail along the eastern grading limits adjacent to NHS, provides a connection to Stone Road planned multi-use trail.
- North off-road running westerly and connecting to Street A and ultimately to the Victoria Road planned multi-use trail.

The proposed trails have been designed to match the following criteria:

- On-road and off-road multi-use trails will be 3m wide with 0.6m clear zone at each side per City standards
- All trails will be graded to maximum 5% (AODA compliance), wherever possible.

The final grading design associated with these trails will be coordinated with City of Guelph Parks Department. The existing trail network will be integrated into the proposed trails to provide accessible pedestrian connections and optimized active transportation systems.

5.0 MUNICIPAL SERVICING

5.1 Sanitary Servicing

The subject lands are proposed to be serviced by three connections to the existing 750mm diameter sanitary trunk sewer along Victoria Road South. This sanitary trunk, located on the west side of the road, conveys wastewater from the Kortright Heights Sewage Pumping Station located at Victoria Road South and MacAlister Boulevard. The sanitary trunk crosses the Eramosa River and gets reduced to 675mm and 600mm diameter further downstream, ultimately discharging to the Guelph Wastewater Treatment Plant.

A sanitary drainage area plan was developed to determine contributing drainage areas to each sewer within the subject lands. The preliminary sanitary catchment areas are identified in **Figure 5.1**. Furthermore, **Figure 5.2** illustrates the proposed sanitary sewer network. Both figures should be read in conjunction with the sanitary sewer design sheet included in **Appendix C**.

In general, proposed sanitary sewer sizes range from 200mm – 375mm in diameter. The majority of the local sewers are 200mm in diameter, whereas a larger proposed ‘trunk’ runs along the northern and eastern limits. This ‘trunk’ sewer is meant to service the southeastern corner of the subject lands, with sufficient size and depth to maintain adequate minimum and maximum cover and slopes. The ‘trunk’ begins in the southeastern corner (Street G) as a 200mm diameter sewer and progressively grows to 375mm diameter at the Victoria Road South connection point (Street A). The sanitary sewers range from 2.7m to 5.0m deep throughout the subject lands. The only exception to this is a section of the sewer that is approximately 10.0m deep due to the high point on Street G adjacent to SWMF1.

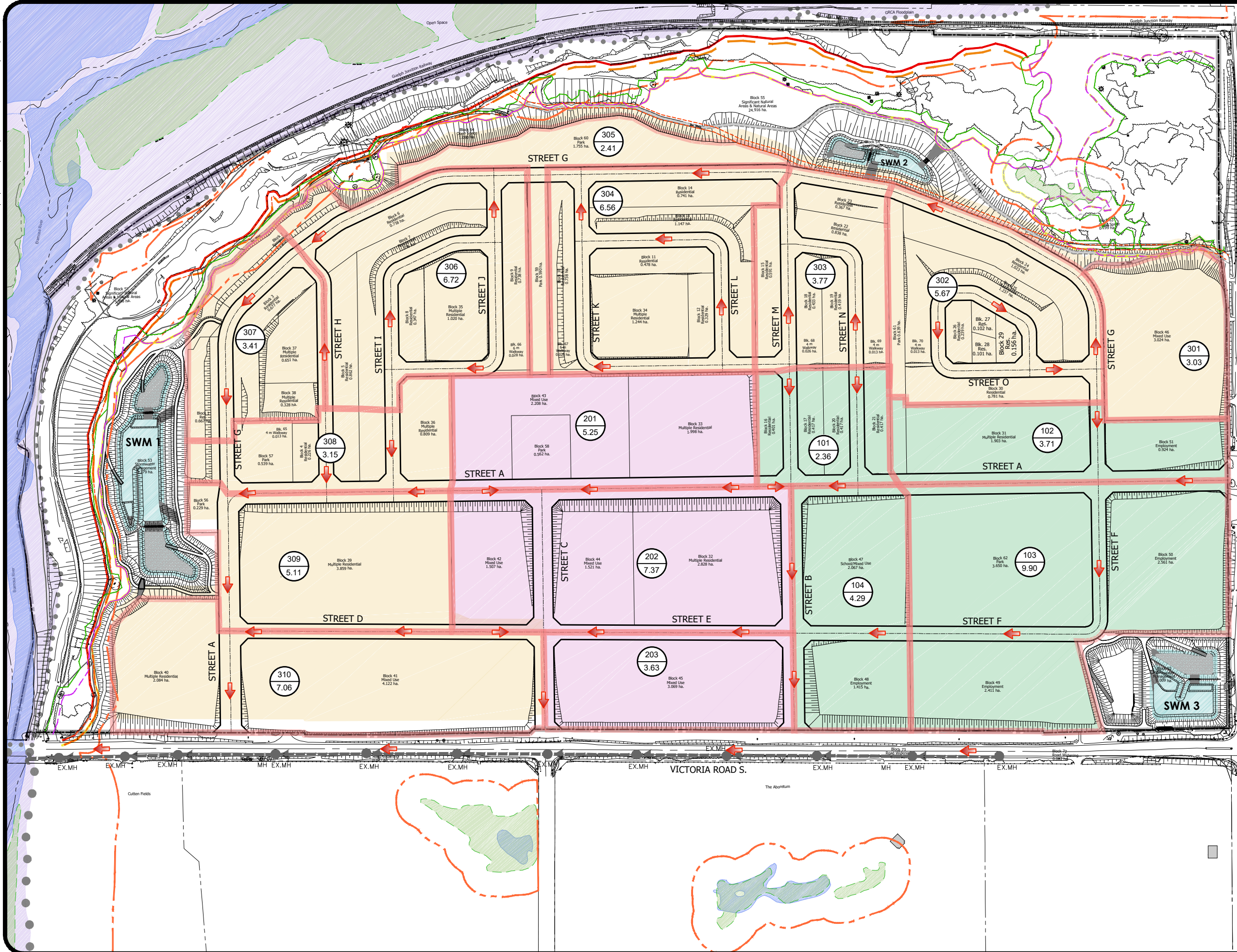
In both cases, where the deep sanitary sewer is fronting proposed single family residential blocks, a local 200mm diameter sanitary sewer is proposed at the minimum depth of cover of 2.7m, per City standards. Similarly, the remainder of the sanitary sewer network is generally at the minimum cover depth of 2.7m. Refer to **Figure 5.2** for more details.

Connections to the existing system are proposed at Streets A, B, and C. We are anticipating that Streets A and B will require a new MH at the connection point to existing sanitary sewer on Victoria Road.

Based on AMEC’s 2015 *GID Water and Wastewater Study*, the existing 750mm diameter trunk has a total capacity of 747.0L/s, of which 131.0L/s is currently used by the Kortright Heights Sewage Pumping Station. This equates to an existing availability of approximately 616.0L/s within the trunk sewer to service the GID, encompassing Blocks 1, 2, 3, and 4.

Based on Crozier’s 2025 *Engineering Master Servicing Plan Guelph Innovation District Block 3*, the estimated design peak flow from Block 3 is 59.4 L/s. This represents a 6.4L/s increase from the target scenario analyzed in AMEC’s 2015 *GID Water and Wastewater Study*.

Based on the sanitary analysis, the proposed development is projected to generate approximately 146 l/s of total flow through the three combined connections. Therefore, the analysis generally confirms that the existing sanitary sewer network can adequately convey the projected flows. Wastewater servicing capacity in the existing system, from point of connection to the treatment plant, will be verified through a capacity analysis in the City’s sanitary model.



LEGEND:

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- PROPOSED SANITARY DRAINAGE AREA
- GRCA REGULATION LIMIT
- GRCA FLOODLINE (CGVD28 DATUM)
- TOP OF SLOPE
- TOP OF SLOPE 6m OFFSET
- EXISTING DRIPLINE SURVEYED BY MTE
- NRSI DRIPLINE
- NRSI 10m DRIPLINE BUFFER
- NRSI SURVEYED WETLAND
- NRSI 30m WETLAND BUFFER

103 BLOCK No.
3.99 AREA (ha)

FLOW ROUTE

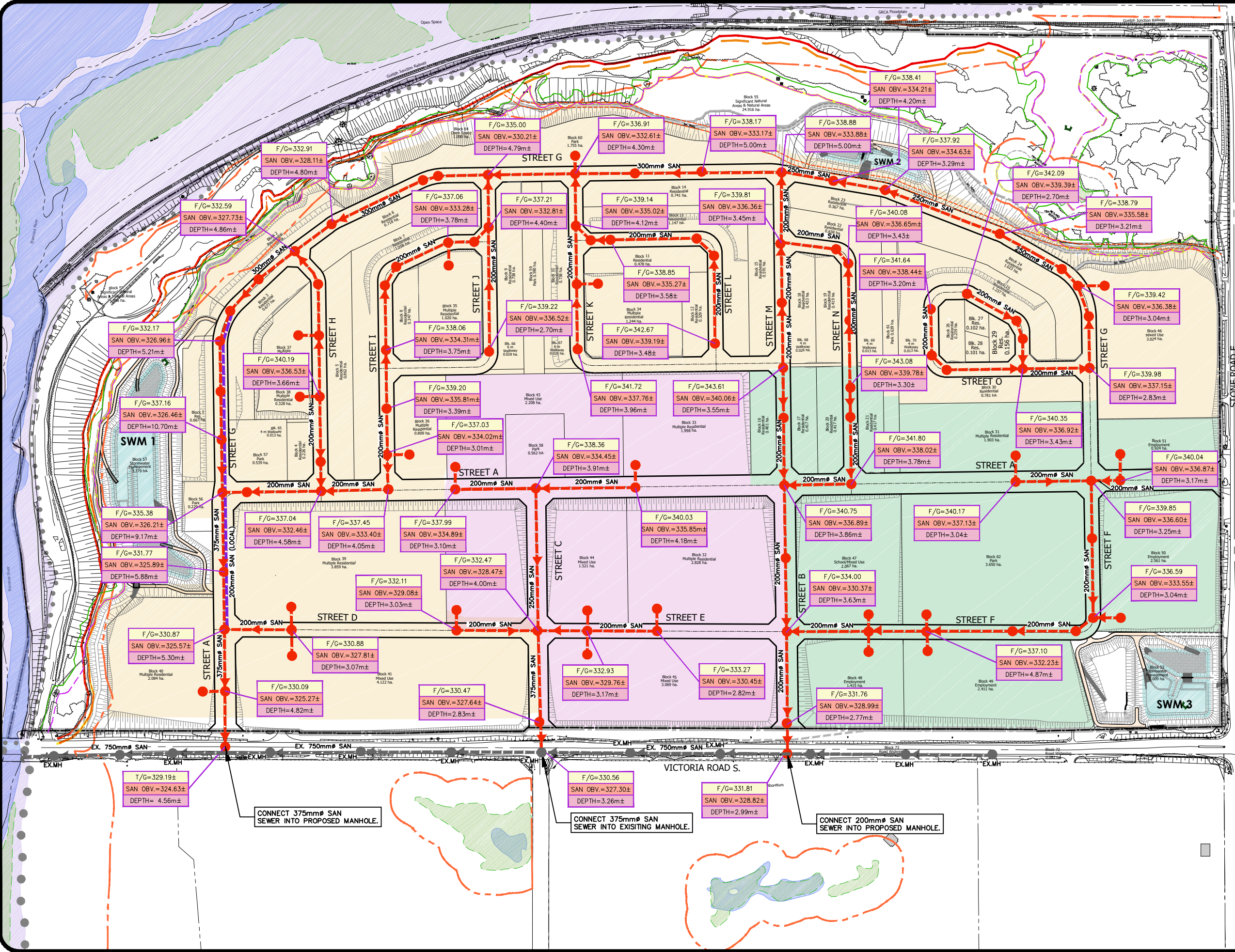
- SANITARY DRAINAGE TO OUTLET 1
- SANITARY DRAINAGE TO OUTLET 2
- SANITARY DRAINAGE TO OUTLET 3

MTE
Engineers, Scientists, Surveyors

PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
SANITARY DRAINAGE AREA PLAN

Drawn	OXR	Scale	1:4500	Figure	5.1
Checked	ALN	Project No.	46927-104		
Date	2024-10-09	Rev No.	0		



LEGEND:

- SITE BOUNDARY
- - - DEVELOPMENT LIMIT
- EX.MH EX. SAN. EXISTING SANITARY SEWER
- MH SAN. PROPOSED SANITARY SEWER
- LOCAL SEWER 200mm SAN
- GRCA REGULATION LIMIT
- GRCA FLOODLINE (CGVD28 DATUM)
- TOP OF SLOPE
- TOP OF SLOPE 6m OFFSET
- EXISTING DRIPLINE SURVEYED BY MTE
- NRSI DRIPLINE
- NRSI 10m DRIPLINE BUFFER
- NRSI SURVEYED WETLAND
- NRSI 30m WETLAND BUFFER
- F/G=360.35 C/L ROAD FINISHED GRADE
- SAN OBV.=357.46± PROPOSED LOCAL SANITARY OBVERT
- DEPTH=2.90m± SANITARY COVER
- SANITARY DRAINAGE TO OUTLET 1
- SANITARY DRAINAGE TO OUTLET 2
- SANITARY DRAINAGE TO OUTLET 3



PROJECT			
GUELPH INNOVATION DISTRICT LANDS			
TITLE			
SANITARY SERVICING PLAN			
Drawn	OXR	Scale	1:4500
Checked	ALN	Project No.	46927-104
Date	2024-10-09	Rev No.	0
Figure			5.2

5.2 Water Distribution

The purpose of the water distribution strategy is to develop a watermain design suitable to meet the development requirements. To confirm that the existing municipal infrastructure can support the development, the 2015 *Water and Wastewater Study* (WWS) and 2023 *Water and Wastewater Servicing Master Plan Report* (WWMP) were reviewed.

The subject lands lie within the City's Pressure Zone 1. Based on the modelling results from the WWS, the current hydraulic grade line (HGL) of Pressure Zone 1 is approximately 379.0m, with a serviceability range of approximately 323.0m to 343.0m within recommended pressure guidelines. The 2023 WWMP lists the Zone 1 HGL at 277.0m, which is believed to be a typo. Review of the City's InfoWater model confirms that this HGL is actually 377.0m, set by the Clair elevated tank. This falls in line with the WWS modelling results, setting an approximate serviceability range of 321.0m to 341.0m within recommended pressure guidelines.

Based on the preliminary grading strategy for the development, finished grade elevations generally fall within the Pressure Zone 1 serviceability range. Therefore, the majority of daily pressures are expected to be within the recommended guidelines. There are a few exceptions near the centre of the property, where localized road grades exceed approximately 343.0m. As such, there may be instances where individual lots in these areas could require the installation of booster pumps. This will be further analyzed and refined during the detailed design stage.

The WWS and WWMP were further compared to establish the governing design criteria for GID. Although the WWMP is not specific to GID, it does provide City-wide design criteria used during the study. The following provides a summary of expected design values to be used for future development.

Daily Demands

As per the WWS, the average daily demand is 300L/c/day for residential, institutional, commercial, and industrial uses. However, as part of the *Water Conservation and Efficiency Strategy Update* (City, 2009), and policies adopted within the OPA 54, institutional, industrial, and commercial developments shall be required to decrease water use to a target of 250L/c/day via greywater reuse and rainwater harvesting strategies. The WWMP uses a less conservative 167L/c/day for residential and 191L/c/day for employment, based on 2019 SCADA data and calibration requirements. As such, the more conservative 300L/c/day shall be applied in future modelling exercises to align with the City's DEM requirements for sanitary design (i.e. water coming in equals the [waste]water coming out).

Peaking Factors

The most conservative peaking factors to be used in the watermain design are from the *Design Guidelines for Drinking Water Systems* (MECP, 2008). As such, the peaking factor is taken from Table 3-1 of the MECP document, based on the total estimated population for the subject lands. The MECP peaking factors presented in **Table 5.1** are to be used during future analyses.

Table 5.1 – Peaking Factors for Watermain Design

Demand Scenario	MECP	WWS	WWMP
Average Day	1.00	1.00	1.00
Maximum Day	2.00	1.50	1.34
Peak Hour	3.00	2.50	-
Minimum Hour	0.50	-	-

Fire Flow Demands

The WWMP utilized a number of fire flow demands throughout the City based on land use and densities. These values, ranging from 80L/s (Low Residential) to 367L/s (Large Commercial), generally fall in line with industry standards when applying the requirements under the *Fire Underwriters Survey* (FUS). Furthermore, the WWS states that this method for calculating the fire flow demands should be followed. However, since development plans were not available at the time of the WWS, a fire flow demand of 250L/s was applied at two conceptual major intersections within the GID Lands. According to the WWMP estimates, this value could represent anything from very high density residential, medium density commercial, large institutional, or industrial. Therefore, it is deemed conservative and appropriate. The results of the WWS generally indicate that there is upwards of 700L/s available at fire flow nodes and that fire flow availability should not be a constraint for the development. Future analyses shall follow suit and apply the requirements of the FUS for these calculations.

Friction Factor

It can reasonably be assumed that all new watermain constructed within the GID Lands will be constructed from PVC pipe. Therefore, moving forward, a friction factor of 150 should be used for all new pipes.

Pressures

The recommended minimum and maximum operating pressures outlined in all documents are taken from the MECP guidelines. The following **Table 5.2** demonstrates the minimum and maximum recommended pressures for all demand scenarios.

Table 5.2 – Pressure Guidelines for Watermain Design

Demand Scenario	Pressure Guideline (kPa)	
	Minimum	Maximum
Average Day	350	550
Maximum Day	350	550
Peak Hour	275	700
Minimum Hour	275	700
Max Day + Fire Flow	140	700

The WWS identified that pressures for the single unidentified modelling scenario presented, specific to GID, are within the recommended normal operating pressures presented above.

Pipe Velocity

The DGSSMS, WWS, and WWMP recommend that velocities throughout the distribution system should not exceed 5.0m/s under all flow conditions. Resulting pipe velocities will be assessed during future modelling and development stages. Adjustments should be made, to maintain pipe velocities within the recommended range.

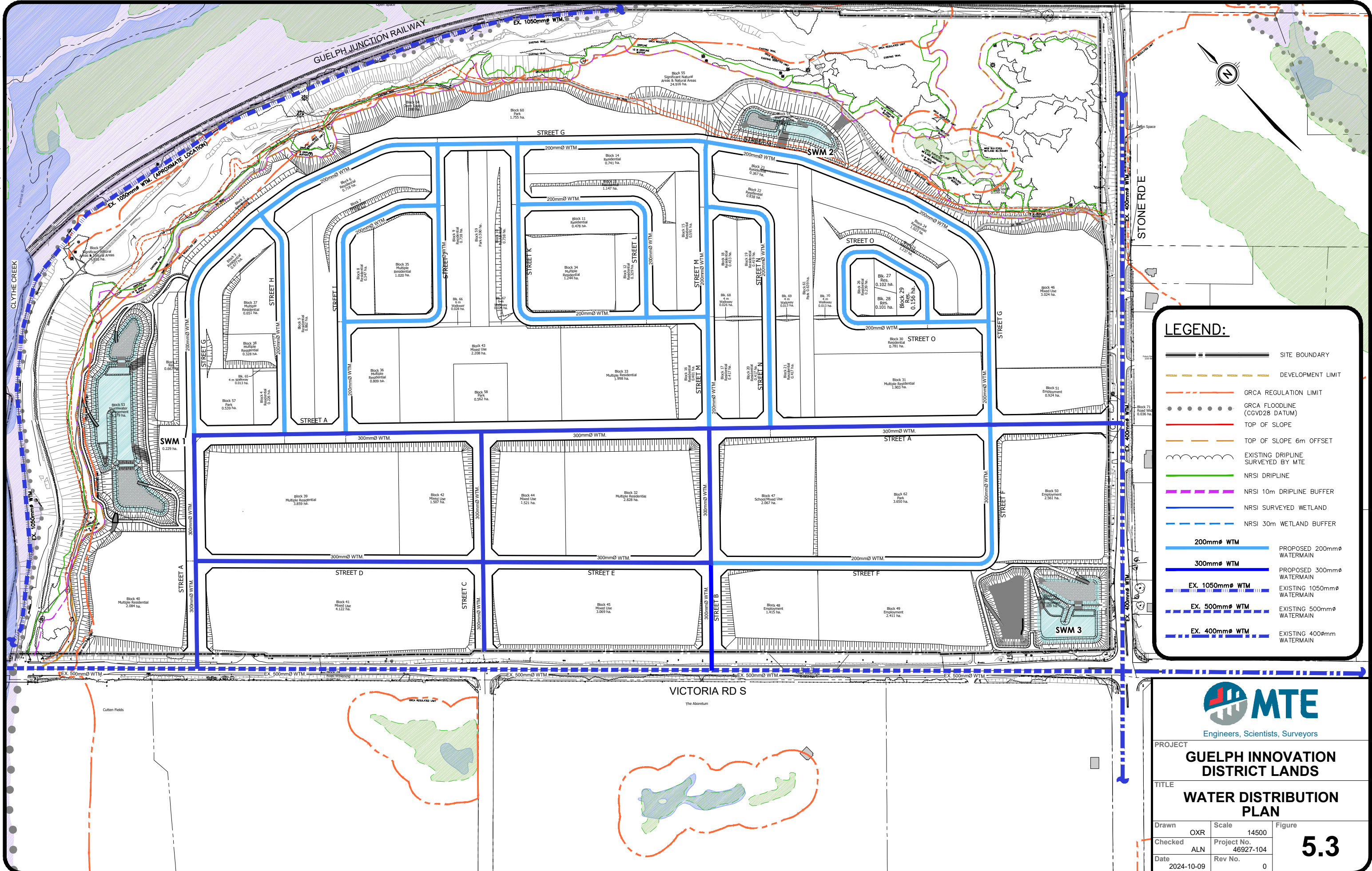
Although the land use concentrations vary between the plans used in the previous studies and the latest plan, it can be reasonably concluded that the subject lands can be adequately serviced by the surrounding existing water distribution system. The proposed internal distribution network can be designed and sized appropriately to accommodate localized increased demands and meet the worst-case future needs in terms of Maximum Day + Fire Flow demands.

Proposed connections to the existing distribution network will be available along the 400mm diameter watermain along Stone Road East and the 500mm diameter watermain along Victoria Road South. There is also a 1050mm transmission main located near the Guelph Junction Railway corridor in the Valleylands east of the subject lands. This transmission main conveys water from the Arkell Spring Grounds to the City's distribution network. The proposed watermain network will not be connected to the transmission main.

Overall, based on the review of the previous relevant studies, the following water distribution conclusions can be made:

- Direct connections to the existing 400mm diameter watermain along Stone Road East and the existing 500mm diameter watermain along Victoria Road South will adequately service the subject lands;
- The proposed water distribution system will adequately provide the required daily demands generally within the respective recommended minimum and maximum pressure ranges for all demand scenarios; and,
- Water modelling results from the WWS and the WWMP indicate that there is a surplus of available flow throughout the development and that fire flow demands should be met for all proposed land uses.

Detailed water distribution analyses will be performed by the City to assess the conclusions above. The proposed water distribution network is shown in **Figure 5.3**.



LEGEND:

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- GRCA REGULATION LIMIT
- GRCA FLOODLINE (CGVD28 DATUM)
- TOP OF SLOPE
- TOP OF SLOPE 6m OFFSET
- EXISTING DRIPLINE SURVEYED BY MTE
- NRSI DRIPLINE
- NRSI 10m DRIPLINE BUFFER
- NRSI SURVEYED WETLAND
- NRSI 30m WETLAND BUFFER
- 200mmØ WTM: PROPOSED 200mmØ WATERMAIN
- 300mmØ WTM: PROPOSED 300mmØ WATERMAIN
- EX. 1050mmØ WTM: EXISTING 1050mmØ WATERMAIN
- EX. 500mmØ WTM: EXISTING 500mmØ WATERMAIN
- EX. 400mmØ WTM: EXISTING 400mmØ WATERMAIN



MTE
Engineers, Scientists, Surveyors

PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
WATER DISTRIBUTION PLAN

Drawn OXR	Scale 14500	Figure 5.3
Checked ALN	Project No. 46927-104	
Date 2024-10-09	Rev No. 0	

5.3 Storm Servicing

There are three main storm drainage boundaries within the subject lands, each contributing stormwater flows to separate SWMFs; ultimately discharging to the Eramosa River. Specifics about the respective SWMFs will be further discussed in subsequent sections.

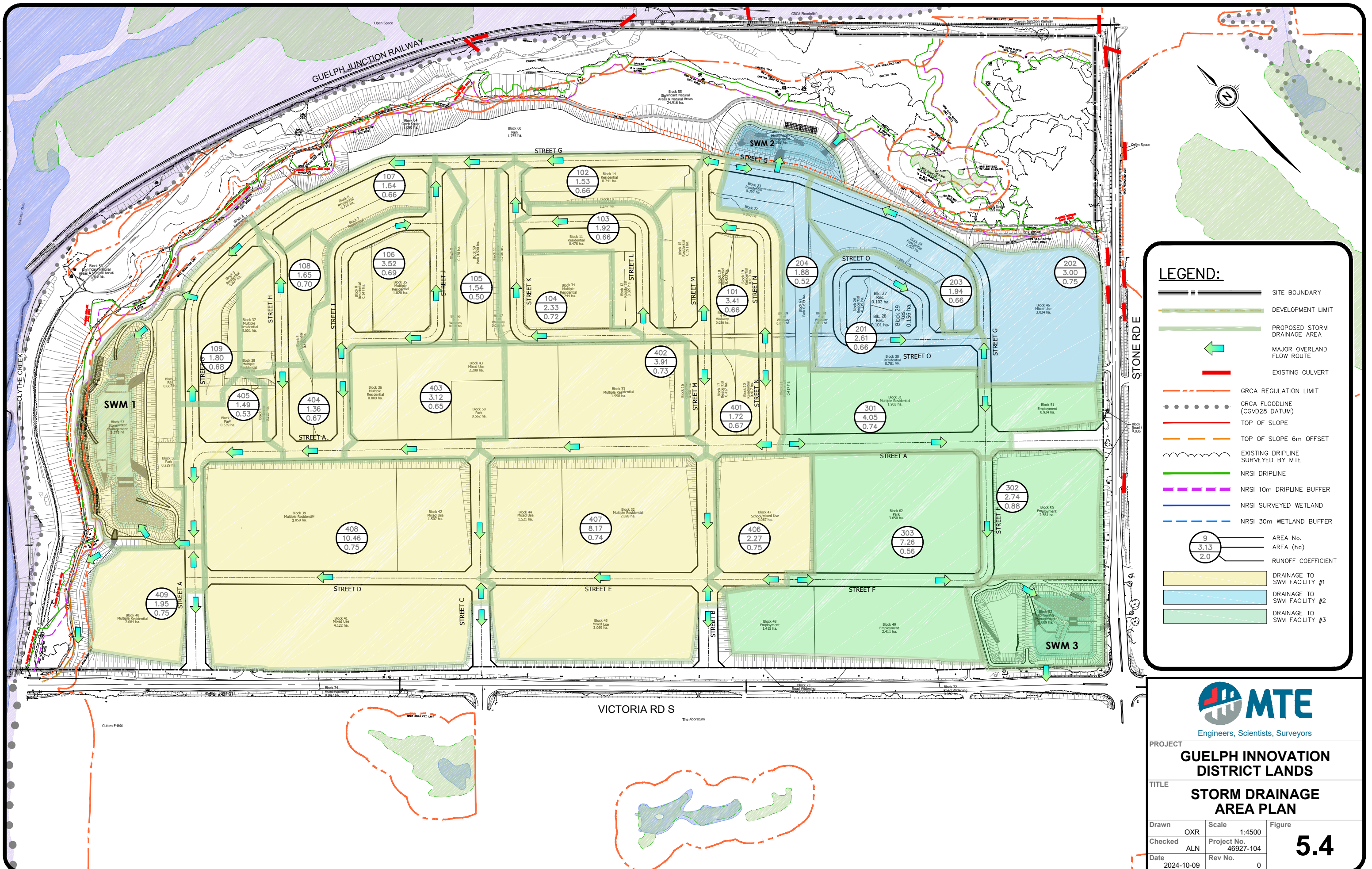
Minor and major storm events will be conveyed by the proposed storm sewers and road allowances to the SWMFs. In general, local storm sewers will be sized to accept runoff from a 5-year storm event utilizing the City's rainfall intensity-duration-frequency (IDF) parameters and will be constructed to typical depths with a minimum of 2.7m where residential lots are to be connected, per City standards.

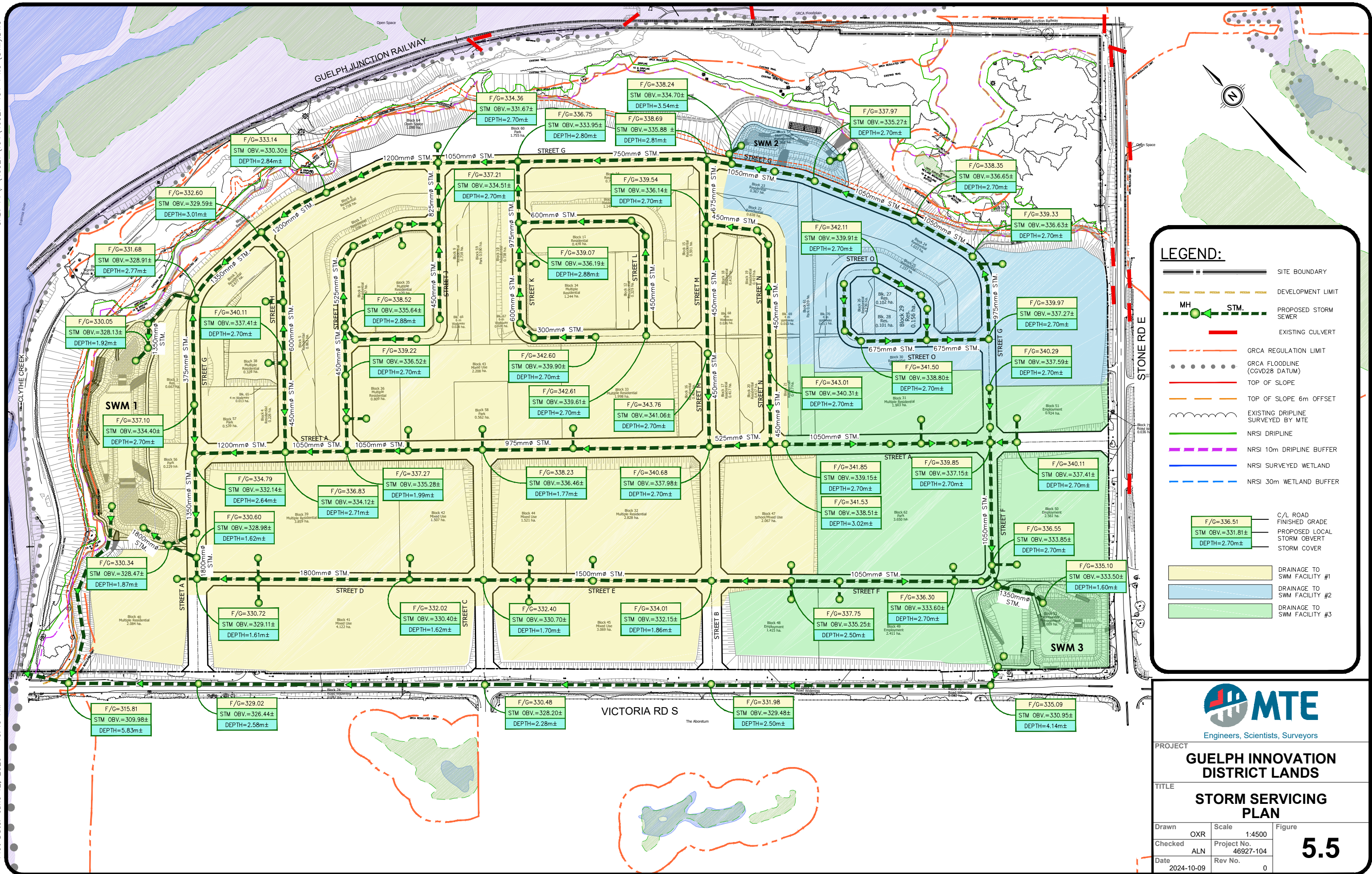
A storm drainage area plan was developed to determine contributing drainage areas to each sewer. The preliminary storm catchment areas are identified in **Figure 5.4**. Furthermore, **Figure 5.5** illustrates the proposed storm sewer network. Both figures should be read in conjunction with the storm sewer design sheet included in **Appendix D**, which confirms that the storm sewer network can adequately convey the 5-year storm event.

The proposed storm sewer sizes vary throughout the development; from 300mm – 450mm diameter local sewers at the upstream ends of the system to 1050mm – 1800mm diameter inlets to the SWMFs.

Under existing conditions, the Victoria-Stone intersection is serviced by a storm sewer network which outlets to the existing SWMF No. 104 through three inlet pipes. These existing inlets will be integrated into the design and construction of SWMF 3, such that runoff from the Victoria-Stone intersection continues to be effectively treated and controlled.

In addition to the three main SWMF drainage areas, there are localized uncontrolled areas near the four proposed road connections to Victoria Road South and Stone Road East. Required high points in the proposed roads create a grading scheme within the right-of-ways and the adjacent blocks, wherein road drainage and landscaped block embankments will drain offsite towards the existing roads. The drainage at the Street A / Stone Road East intersection will be captured within the existing storm network and conveyed to SWMF 3 for treatment, as discussed above. The drainage from Streets A, B, and C out to Victoria Road South will require additional attention and coordination during the ongoing MCEA process. Additional quality control for these areas, if required, shall be incorporated into the MCEA design and will be addressed during future design stages. It is anticipated that design of Victoria Road South will be completed in 2026, with a construction timeline of 2027. It is anticipated that design of Stone Road East will be completed in 2028, with a construction timeline of 2030.





5.4 Stormwater Management

The proposed SWM infrastructure onsite will include end-of-pipe SWMFs. The SWM strategy for the subject lands is presented in the *Stormwater Management Report* (MTE, June 11, 2026). The following summarizes the key points of the report:

- The three proposed SWMFs will provide quality and quantity control for the subject lands and external upstream lands.
- The proposed facilities provide volume retention and peak flow control of runoff from contributing drainage areas for storm events up to and including the 100-year storm event, where applicable, maintaining the allowable flow rates to the Eramosa River;
- An Enhanced level of stormwater quality control will be provided in the end-of-pipe facilities; and,
- Distributed and end-of-pipe infiltration measures ensure a water balance onsite and to adjacent wetland features, maintaining base flow conditions to the Eramosa River.

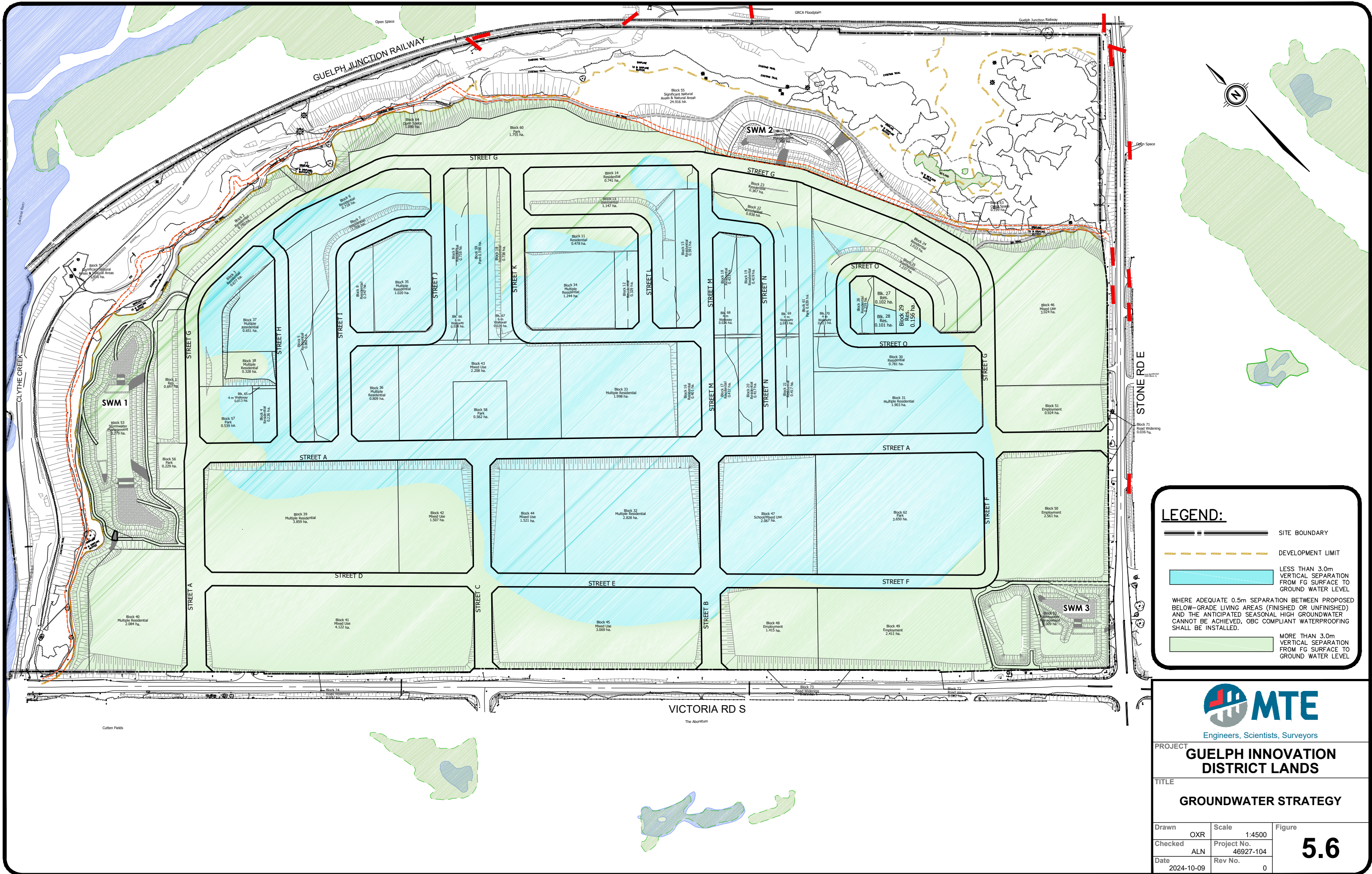
Storm drainage conveyance for the subject lands will be provided via a combination of minor (piped) and major (overland) drainage systems; directed towards the proposed downstream SWMFs as shown in **Figure 5.5**. The storm sewers will be designed for the 5-year storm event with overland flow routes generally flowing through the proposed road allowances.

5.5 Groundwater and Waterproofing Measures

As discussed in Section 2.2, high groundwater levels near the southwestern and northeastern quadrants of the subject lands have been measured above the proposed preliminary finished grades in those locations. As such, appropriate waterproofing measures shall be implemented for structures in these areas. Where adequate 0.5m separation between proposed below-grade living areas (finished or unfinished) and the anticipated seasonal high groundwater cannot be achieved, OBC compliant waterproofing shall be installed.

To establish the extent of the anticipated waterproofing requirements, a surface comparison was done between the proposed finished grade surface (less 3.0m) and the measured spring groundwater high. The 3.0m depth ensures that groundwater levels are maintained at a minimum separation of 0.5m below basement floors, per the City's DEM. The extent of the zone of influence is highlighted in **Figure 5.6**, and denotes where waterproofing measures are anticipated to be implemented.

Alternative solutions to address the high groundwater in these areas of the subject lands will continue to be explored. A third-pipe foundation drainage system to manage the high groundwater around building foundations has been detailed in the technical memos in **Appendix E** for consideration. MTE will work with the City to determine the most appropriate solution.



PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
GROUNDWATER STRATEGY

Drawn	OXR	Scale	1:4500	Figure 5.6
Checked	ALN	Project No.	46927-104	
Date	2024-10-09	Rev No.	0	

6.0 UTILITY SERVICING

The subject lands will be serviced by connections to, and extensions of, existing services from Victoria Road South and Stone Road East.

Guelph Hydro – Alectra Utilities (electrical), Bell Canada (telephone), Enbridge Gas (natural gas), and Rogers Cable (cable TV) are all expected to extend their services to the subject lands prior to the building permit stage. Confirmation of utility servicing will be undertaken at the appropriate time, to ensure services are available prior to occupancy.

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing analysis, it is concluded that:

1. The proposed site grading strategy will meet City of Guelph standards, is compatible with the future widening and grading of Victoria Road South / Stone Road East, provides major overland flow routes to the end-of-pipe SWMFs, and respects environmental buffers.
2. The proposed sanitary sewer network will service the required wastewater flows onsite and will outlet to the sanitary trunk sewer on Victoria Road South, which has capacity to convey the subject lands' wastewater flows.
3. The proposed watermain distribution network will provide water servicing to the subject lands and will meet fire flow demands for all proposed land uses. This water distribution network will connect to the existing watermains along Stone Road East and Victoria Road South.
4. The proposed storm sewer network will direct minor flow events to the end-of-pipe SWMFs and will meet City of Guelph standards.
5. Stormwater management for the subject lands can be accommodated by directing the stormwater runoff to three proposed SWM facilities for treatment prior to being released to their respective outlets, as highlighted in Section 5.4 of this report.
6. The subject lands can be adequately serviced through the extension of existing utilities including hydro, gas, cable TV, and telephone.

All of which is respectfully submitted,

MTE Consultants Inc.



Matthew Willcox, P. Eng

Design Engineer

519-743-6500

mwillcox@mte85.com

MPW:jng



Valentina Lazic, P.Eng.

Design Engineer

519-743-6500

vlazic@mte85.com

https://mte85.sharepoint.com/sites/46927-104/Shared Documents/02 - Reports/MTE Reports/FSR/46927-104_rpt_2026-06-12_Functional Servicing Report.docx

Appendix A

Draft Plan of Subdivision (11x17 Reduced)

DRAFT PLAN OF SUBDIVISION

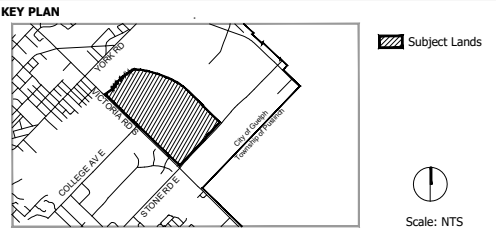
LEGAL DESCRIPTION
PART OF BROKEN FRONT LOTS 10, 11 & 12
CONCESSION 1, DIVISION 'G'
GEOGRAPHIC TOWNSHIP OF GUELPH
IN THE CITY OF GUELPH, COUNTY OF WELLINGTON

OWNER'S CERTIFICATE
I HEREBY AUTHORIZE MACNAUGHTON HERMSEN BRITTON CLARKSON PLANNING LIMITED TO SUBMIT THIS PLAN FOR APPROVAL.

Date: Client Name
Company Name

SURVEYOR'S CERTIFICATE
I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

Date: J. Andrew Smith, Surveyor, O.L.S.
Callion Dietz Incorporated



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

(a) As Shown	(e) As Shown	(h) Municipal Water Supply
(b) As Shown	(f) As Shown	(i) Loam / Sandy Loam
(c) As Shown	(g) As Shown	(j) As Shown
(d) Residential, Multiple Residential, Mixed Use, School, Employment, Open Space, Park, Stormwater Management	(k) All Services As Required	(l) As Shown

DESCRIPTION	LOTS/BLOCKS	UNITS	AREA
Residential	1-30	457	17.725 ha
Multiple Residential	31-40	861	16.724 ha
Mixed Use	41-46	3,722	15.451 ha
School/Mixed Use	47		2.067 ha
Employment	48-51		7.311 ha
Stormwater Management	52-54		7.156 ha
Significant Natural Area & Natural Areas	55		24.916 ha
Park	56-62		7.964 ha
Open Space	63,64		1.289 ha
Walkway	65-70		0.121 ha
Road Widening	71-74		0.108 ha
Roads			15.764 ha

Total	74	5,040	116.596 ha
-------	----	-------	------------

- NOTES
- All dimensions are in metres unless otherwise shown.
 - Survey information provided by Callion Dietz Land Surveying Ontario, Nov. 2016.
 - Topographic information provided by MTE.
 - Wetland, dripline, and buffers provided by NRSI INC, Oct. 2022.
 - Contains information made available under Grand River Conservation Authority's Open Data Licence v1.0.
 - Contains information licensed under the Open Government Licence - City of Guelph.
 - Daylight triangle 9m x 9m.
 - Conceptual 3 meter trail location.

Revision No.	Date	Issued / Revision	By
1.	Nov. 11, 2025	Preliminary Draft Plan;	SP

Stamp	Date May 28, 2026
File No.	1405G
Plan Scale	1:2,500 (Arch D)
Drawn By	S.P./J.B
Checked By	D.A.

Project	GUELPH INNOVATION DISTRICT BLOCK 1 & 2 Fusion Homes Guelph, Ontario.
---------	--

File Name	DRAFT PLAN OF SUBDIVISION
Dwg No.	1 of 1

Scale Bar

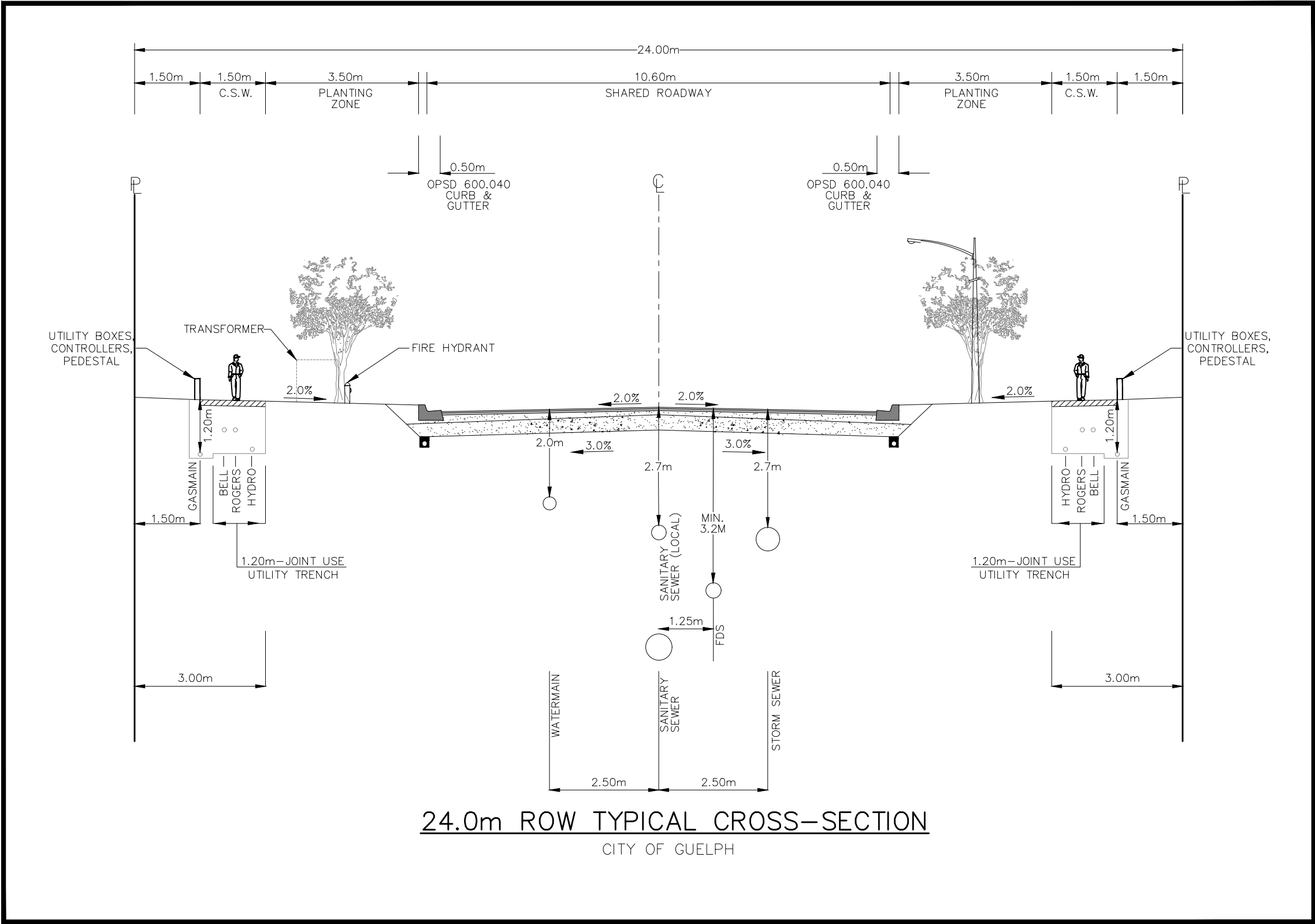
K:\1405G - GSD Block 1 and 2\2025\1405G Draft Plan of Subdivision_28May2026.dwg

Appendix B

Right-of-Way Cross-Sections

18.0m ROW TYPICAL CROSS-SECTION

 MTE		
Engineers, Scientists, Surveyors		
PROJECT GUELPH INNOVATION DISTRICT		
TITLE 18.0m ROW TYPICAL CROSS-SECTION		
Drawn AXL	Scale 1:100	Figure B-1
Checked ALN	Project No. 46927-104	
Date (yyyy-mm-dd) 2025-02-26	Rev No. 0	





Engineers, Scientists, Surveyors

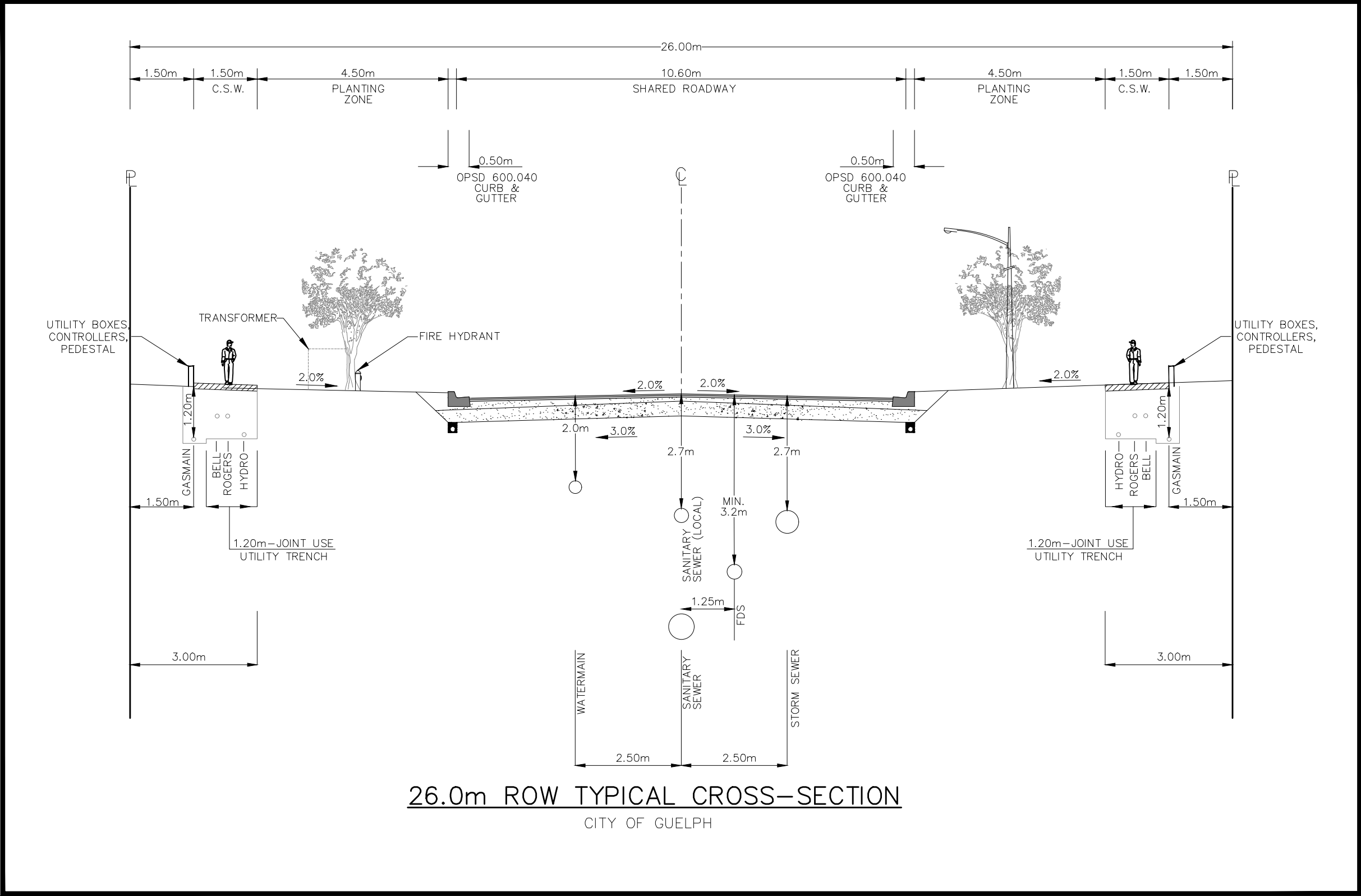
PROJECT

GUELPH INNOVATION DISTRICT

TITLE

24.0m ROW TYPICAL CROSS-SECTION

Drawn	AXL	Scale	1:100	Figure	B-2
Checked	ALN	Project No.	46927-104		
Date (yyyy-mm-dd)	2025-03-11	Rev No.	0		



26.0m ROW TYPICAL CROSS-SECTION
CITY OF GUELPH



Engineers, Scientists, Surveyors

PROJECT		
GUELPH INNOVATION DISTRICT		
TITLE		
26.0m ROW TYPICAL CROSS-SECTION		
Drawn	AXL	Scale 1:100
Checked	ALN	Project No. 46927-104
Date (yyyy-mm-dd)	2025-03-11	Rev No. 0

Figure

B-3

Appendix C

Sanitary Design Calculations

GID CITY OF GUELPH				SANITARY SEWER DESIGN SHEET ENGINEERING AND PUBLIC WORKS								Design Parameters Average Daily Flow Residential0.00347 L/s/p Commercial0.95 L/s/ha Industrial0.40 L/s/ha Inst. / School0.25 L/s/ha Mannings "n" Min. Velocity0.6 m/sec Max. Velocity3.0 m/sec Residential Harmon Peaking Factor (F) F = 1 + 14/(4 + P^{0.5}) Commercial Peaking Factor = 2.5 Residential Areas Infiltration0.25 L/s/ha
--	--	--	--	--	--	--	--	--	--	--	--	--

* based on populations from Draft Plan
** 6% of City population works from home

Appendix D

Storm Design Calculations

GID
PERCENT IMPERVIOUS AND RUNOFF COEFFICIENT
Guelph, Ontario

Project Number: 46927-104
Date: June 2, 2026
Design By: MPW
File: Q:\46927\104\SWM\C Coefficients\C Coefficient Calculation - June 2026.xlsx

	Runoff Coefficient	Percent Impervious
PARKS	0.25	7%
R.O.W.	0.70	70%
RESIDENTIAL	0.65	65%
MULTI-RES	0.75	80%
MIXED USE	0.75	80%
SCHOOL	0.75	80%
SWM	0.65	*
EMPLOYMENT	0.9	100%

1. Runoff coefficients and percent impervious from City of Guelph EDM
2. Roads percent impervious assumed based on calculations below these notes.
3. Residential assumed to be >12m frontage
4. Mixed-use assumed to be same percent impervious as multi-residential
5. Percent impervious for SWM is individually calculated for each pond

R.O.W. Assumptions

	Impervious Width (m)	Pervious Width (m)
18.0m Width		
Asphalt	7	0
Curb	1	0
Sidewalk	3.6	0
Boulevard	0	6.4
	11.6	6.4
	64.4%	35.6%

	Impervious Width (m)	Pervious Width (m)
24.0m Width		
Asphalt	10	0
Curb	1	0
Sidewalk	3	0
Boulevard	0	10
	14	10
	58.3%	41.7%

	Impervious Width (m)	Pervious Width (m)
26.0m Width		
Asphalt	10	0
Curb	1	0
Sidewalk	3	0
Boulevard	0	12
	14	12
	53.8%	46.2%

R.O.W. fronted by low density residential on both sides is 100% impervious at the location of the driveways.

Assuming 457 units from the draft plan with an average driveway width of 6m, the total length of road with a 100% impervious cross section would be 1,371m.

There is a total of 7,303m of road centerline within the subject lands.18.8% of which should be considered 100% impervious.

	Centreline Length (m)	
18.0m Width	6425	88.0%
24.0m Width	294	4.0%
26.0m Width	584	8.0%
	7303	

	Centreline Length (m)	% Impervious	C
18.0m Width	5054	64.4%	0.66
18.0m Width (100% Impervious)	1371	100%	0.90
24.0m Width	294	58.3%	0.61
26.0m Width	584	53.8%	0.58

Weighted Average 70%
% Impervious

Weighted Average 0.70
C

SWMF1 - EAST FOREBAY

		AREA	C	AC	Weighted C
101	R.O.W.	1.01	0.70	0.70	0.66
	RESIDENTIAL	2.40	0.65	1.56	
		3.41		2.26	

		AREA	C	AC	Weighted C
102	R.O.W.	0.43	0.70	0.30	0.66
	RESIDENTIAL	1.10	0.65	0.72	
		1.53		1.01	

		AREA	C	AC	Weighted C
103	R.O.W.	0.60	0.70	0.42	0.66
	RESIDENTIAL	1.32	0.65	0.86	
	MULTI-RES	0.00	0.75	0.00	
		1.92		1.28	

		AREA	C	AC	Weighted C
104	R.O.W.	0.74	0.70	0.52	0.72
	RESIDENTIAL	0.35	0.65	0.23	
	MULTI-RES	1.24	0.75	0.93	
		2.33		1.68	

		AREA	C	AC	Weighted C
105	R.O.W.	0.23	0.70	0.16	0.50
	RESIDENTIAL	0.72	0.65	0.47	
	PARKS	0.59	0.25	0.15	
		1.54		0.78	

		AREA	C	AC	Weighted C
106	R.O.W.	1.14	0.70	0.79	0.69
	RESIDENTIAL	1.36	0.65	0.88	
	MULTI-RES	1.02	0.75	0.77	
		3.52		2.44	

		AREA	C	AC	Weighted C
107	R.O.W.	0.49	0.70	0.34	0.66
	RESIDENTIAL	1.15	0.65	0.75	
	MULTI-RES	0.00	0.75	0.00	
	MULTI-RES	0.00	0.75	0.00	
		1.64		1.09	

		AREA	C	AC	Weighted C
108	R.O.W.	0.32	0.70	0.22	0.70
	MULTI-RES	0.64	0.75	0.48	
	RESIDENTIAL	0.69	0.65	0.45	
		1.65		1.15	

		AREA	C	AC	Weighted C
109*	RESIDENTIAL	0.43	0.65	0.28	0.64
	SWM	1.35	0.65	0.88	
	PARKS	0.03	0.25	0.01	
		1.81		1.16	

		AREA	C	AC	Weighted C
109	R.O.W.	0.52	0.70	0.36	0.68
	MULTI-RES	0.27	0.75	0.20	
	RESIDENTIAL	1.01	0.65	0.66	
		1.80		1.22	

Total Catchment 20.20
Total C 0.68
%IMP 69.00

SWMF1 - WEST FOREBAY

		AREA	C	AC	Weighted C
401	R.O.W.	0.65	0.70	0.45	0.67
	RESIDENTIAL	1.07	0.65	0.70	
		1.72		1.15	

		AREA	C	AC	Weighted C
402	R.O.W.	0.79	0.70	0.55	0.73
	RESIDENTIAL	0.20	0.65	0.13	
	MULTI-RES	2.00	0.75	1.50	
	MIXED USE	0.92	0.75	0.69	
		3.91		2.87	

		AREA	C	AC	Weighted C
403	R.O.W.	0.44	0.70	0.31	0.65
	MULTI-RES	0.81	0.75	0.61	
	MIXED USE	1.29	0.75	0.97	
	PARKS	0.56	0.25	0.14	
		3.1		2.02	

		AREA	C	AC	Weighted C
404	R.O.W.	0.59	0.70	0.41	0.67
	RESIDENTIAL	0.77	0.65	0.50	
	MULTI-RES	0.00	0.75	0.00	
		1.36		0.91	

		AREA	C	AC	Weighted C
405	R.O.W.	0.7	0.70	0.49	0.53
	RESIDENTIAL	0.251	0.65	0.16	
	PARKS	0.539	0.25	0.13	
		1.49		0.79	

		AREA	C	AC	Weighted C
406	SCHOOL	2.07	0.75	1.55	0.75
	EMPLOYMENT	0.00	0.9	0.00	
	R.O.W.	0.19	0.70	0.13	
		2.26		1.68	

		AREA	C	AC	Weighted C
407	R.O.W.	0.96	0.70	0.67	0.74
	MULTI-RES	2.83	0.75	2.12	
	MIXED USE	4.38	0.75	3.29	
		8.17		6.08	

		AREA	C	AC	Weighted C
408	R.O.W.	0.972	0.70	0.68	0.75
	MULTI-RES	3.859	0.75	2.89	
	MIXED USE	5.629	0.75	4.22	
		10.46		7.79	

		AREA	C	AC	Weighted C
409	R.O.W.	0.16	0.70	0.11	0.75
	MULTI-RES	1.79	0.75	1.34	
		1.95		1.45	

		AREA	C	AC	Weighted C
410*	RESIDENTIAL	0.43	0.65	0.28	0.64
	SWM	1.35	0.65	0.88	
	PARKS	0.03	0.25	0.01	
		1.81		1.16	

Total Catchment 36.22
Total C 0.70
%IMP 70.00

SWMF2

		AREA	C	AC	Weighted C
201	R.O.W.	0.83	0.70	0.58	0.66
	RESIDENTIAL	1.78	0.65	1.16	
		2.61		1.74	

		AREA	C	AC	Weighted C
202	R.O.W.	0.24	0.70	0.17	0.75
	MIXED USE	2.76	0.75	2.07	
		3.00		2.24	

		AREA	C	AC	Weighted C
203	R.O.W.	0.45	0.70	0.31	0.66
	RESIDENTIAL	1.49	0.65	0.97	
		1.94		1.28	

		AREA	C	AC	Weighted C
204*	SWM	0.69	0.65	0.45	0.65

		AREA	C	AC	Weighted C
205	R.O.W.	0.21	0.70	0.15	0.52
	RESIDENTIAL	1.03	0.65	0.67	
	PARKS	0.64	0.25	0.16	
		1.88		0.98	

Total Catchment 10.12
Total C 0.66
%IMP 66.00

SWMF3

		AREA	C	AC	Weighted C
301	R.O.W.	0.99	0.70	0.69	0.74
	RESIDENTIAL	0.17	0.65	0.11	
	MULTI-RES	1.90	0.75	1.43	
	EMPLOYMENT	0.81	0.9	0.73	
	PARKS	0.18	0.25	0.05	
		4.05		3.00	

		AREA	C	AC	Weighted C
302	R.O.W.	0.31	0.70	0.22	0.88
	EMPLOYMENT	2.43	0.90	2.19	
		2.74		2.40	

		AREA	C	AC	Weighted C
303	R.O.W.	0.44	0.70	0.31	0.56
	EMPLOYMENT	3.17	0.9	2.85	
	PARKS	3.65	0.25	0.91	
		7.26		4.07	

		AREA	C	AC	Weighted C
304*	SWM	2.00	0.65	1.30	0.73
	EXTERNAL	8.05	0.75	6.04	
		10.050		7.34	

Total Catchment 24.10
Total C 0.70
%IMP 72.00

GID CITY OF GUELPH				STORM SEWER DESIGN SHEET							Design Parameters								
Project Number: 46927-104 Date: June 11, 2026 Design By: OXR/ALN/MPW Checked By: VAL File: Q:\46927\104\STM\46927-104_Storm Sewer Design Sheet (June 26).xlsx				ENGINEERING AND PUBLIC WORKS							5 YEAR STORM								
				Drainage Area Plan No: 46927-104-F4.4							Q=kAIC, k=0.00278 Intensity (I) = a(tc) ^b a = 632.750 b = -0.741 c = 0 Manning's "n" 0.013 Min. Velocity 0.60 m/s Max. Velocity 6.00 m/s								
LOCATION				STORMWATER FLOW 5 YEAR STORM								DESIGN							
STREET	AREA NUMBER	MANHOLE LOCATION		AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME TOTAL	RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY	PIPE FULL		
		FROM MH	TO MH															ha	ha
SWM 1 NE FB	101			3.410	0.66	2.2506	2.2506	10.0000	1.2218	114.87675	718.74571	675	250.0	1.90	1158.67080	3.2379	3.4102	62.03	
	102			1.530	0.66	1.0098	3.2604	11.2218	1.6909	105.47150	955.98444	825	253.0	0.70	1200.97164	2.2466	2.4937	79.60	
								12.9127											
	103			1.920	0.66	1.2672	1.2672	10.0000	2.4327	114.87675	404.68967	600	310.0	0.80	549.18862	1.9424	2.1238	73.69	
								12.4327											
	104			2.330	0.72	1.6776	6.2052	12.9127	1.0791	95.05338	1639.71423	975	242.0	1.40	2651.64997	3.5515	3.7378	61.84	
	105			1.540	0.50	0.7700	6.9752	13.9918	0.4365	89.56525	1736.76477	1050	107.0	1.70	3560.43007	4.1118	4.0856	48.78	
								14.4283											
	106			3.520	0.69	2.4288	2.4288	10.0000	2.1189	114.87675	775.65519	825	295.0	0.65	1157.28523	2.1649	2.3204	67.02	
								12.1189											
107			1.640	0.66	1.0824	10.4864	14.4283	1.2226	87.54949	2552.25945	1350	260.0	0.90	5063.50417	3.5375	3.5443	50.41		
							15.6509												
108			1.650	0.70	1.1550	1.1550	10.0000	0.8088	114.87675	368.85777	450	185.0	4.00	570.21228	3.5853	3.8121	64.69		
							10.8088												
109			1.800	0.68	1.2240	12.8654	15.6509	0.7201	82.42866	2948.12813	1350	126.0	0.50	3774.11318	2.6367	2.9161	78.11		
SWM BLOCK			0.000	0.00	0.0000	12.8654	16.3711	0.5205	79.72625	2851.47391	1350	90.5	0.50	3774.11318	2.6367	2.8978	75.55		
SWM 1 SW FB	401			1.720	0.67	1.1524	1.1524	10.0000	1.4423	114.87675	368.02744	525	201.0	1.10	451.05312	2.0836	2.3227	81.59	
	402			3.910	0.73	2.8543	4.0067	11.4423	1.8794	103.96180	1157.99163	900	304.0	0.75	1567.77545	2.4644	2.6959	73.86	
	403			3.120	0.65	2.0280	6.0347	13.3217	1.2159	92.88237	1558.23789	1050	181.0	0.50	1930.91431	2.2299	2.4811	80.70	
	404			1.360	0.67	0.9112	6.9459	14.5376	0.5410	87.06139	1681.12084	1200	83.0	0.50	2756.81862	2.4376	2.5570	60.98	
	405			1.490	0.53	0.7897	7.7356	15.0786	1.4614	84.73584	1822.24148	1200	245.0	0.60	3019.94349	2.6702	2.7942	60.34	
								16.5400											
	406			2.270	0.75	1.7025	1.7025	5.0000	0.4156	191.99741	908.71416	675	107.0	3.00	1455.94138	4.0686	4.2914	62.41	
	407			8.170	0.74	6.0458	7.7483	5.4156	1.6308	180.96822	3898.10501	1500	306.0	0.50	4998.44473	2.8285	3.1273	77.99	
	408			10.460	0.75	7.8450	15.5933	7.0464	2.4456	148.89842	6454.65333	1800	520.0	0.50	8128.02225	3.1941	3.5438	79.41	
	409			1.950	0.75	1.4625	17.0558	9.4920	0.2511	119.40179	5661.45056	1800	52.0	0.50	8128.02225	3.1941	3.4518	69.65	
							9.7431												
SWM BLOCK			0.000	0.00	0.0000	24.7914	16.5400	0.1992	79.12217	5453.10742	1800	35.5	0.35	6800.39131	2.6724	2.9701	80.19		
SWM 2	201			2.610	0.66	1.7226	1.7226	10.0000	1.8440	114.87675	550.12501	675	260.0	0.85	774.98398	2.1657	2.3500	70.99	
	202			3.000	0.75	2.2500	3.9726	11.8440	0.7422	101.33768	1119.15596	975	110.0	0.60	1735.91239	2.3250	2.4703	64.47	
	203			1.940	0.66	1.2804	5.2530	12.5861	1.5740	96.87512	1414.70036	1050	230.0	0.50	1930.91431	2.2299	2.4354	73.27	
	204			1.880	0.52	0.9776	6.2306	14.1601	0.7406	88.77519	1537.68108	1050	110.0	0.50	1930.91431	2.2299	2.4754	79.63	
								14.9007											
SWM BLOCK			0.000	0.00	0.0000	6.2306	14.9007	0.1457	85.48405	1480.67505	1050	18.5	0.35	1615.51882	1.8657	2.1158	91.65		
							15.0465												

LOCATION				STORMWATER FLOW 5 YEAR STORM								DESIGN						
STREET	AREA NUMBER	MANHOLE LOCATION		AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME		RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY	PIPE FULL
		FROM MH	TO MH					TOTAL	IN PIPE									
								ha	min	mm/hr	L/s	mm	m	%	L/s	m/s	m/s	%
SWM 3																		
	301			4.050	0.74	2.9970	2.9970	5.0000	1.5939	191.99741	1599.65718	1050	273.0	0.70	2284.68862	2.6385	2.8545	70.02
	302			2.740	0.88	2.4112	5.4082	6.5939 7.1675	0.5736	156.40309	2351.48856	1050	164.0	2.10	3957.19677	4.5700	4.7653	59.42
	303			7.260	0.56	4.0656	4.0656	10.0000 11.8814	1.8814	114.87675	1298.37934	1050	270.0	0.50	1930.91431	2.2299	2.3919	67.24
	SWM BLOCK			0.000	0.00	0.0000	9.4738	11.8814	0.4159	101.10112	2662.71674	1350	65.2	0.40	3375.66945	2.3583	2.6131	78.88

*All storm sewers are to be designed using 5-year design storm outlined on the City of Guelph Intensity-Duration Frequency Curves and shall operate without surcharge. Parks and single detached residential shall use a 10-minute time of concentration. All other land uses shall use a 5-minute time of concentration. (Development Engineering Manual-City of Guelph-October 2023).

Appendix E

Foundation Drainage System - Technical Memorandums

Project Name: Guelph Innovation District
(GID) Lands, Blocks 1 & 2

MTE File No.: 46927-104

To: Sandra Vrbanc - City of Guelph
Engineering and Transportation
Services

Date: December 12, 2025
Revised: June 11, 2026

cc: Dan Bollinger / Josh Shilling / Ryan
Scott - Fusion Homes
Dave Hicks – MTE
Dave Aston / Aleah Clarke – MHBC
Nathan Miller – NRSI

From: Valentina Lazic, P. Eng.

RE: Guelph Innovation District (GID) Lands, Blocks 1 & 2 Proposed Groundwater Management Strategy

1.0 OVERVIEW

MTE Consultants Inc. (MTE) has been retained by Fusion Homes (Fusion) to complete preliminary engineering in support of a Draft Plan application for the proposed Guelph Innovation District (GID) Lands, herein referred to as the 'subject lands'.

Previously, an Engineering Master Servicing Plan (MSP) was submitted to the City of Guelph on behalf of the landowner as part of the Block Plan submission. Comments were subsequently received from the City, with several comments regarding the proposed groundwater management strategy. Following receipt of these comments, an in-person meeting was held on June 3, 2025 to discuss the comments between all involved parties. For the purposes of the Block Plan submission, the proposed groundwater management methodology was revised with the intent that alternative solutions would continue to be explored at further design stages. This technical memorandum has been prepared alongside the Draft Plan submission to summarize the information presented to the City previously, and to provide additional information in support of the alternative proposed groundwater management strategy.

2.0 BACKGROUND INFORMATION

The hydrogeological investigation indicates that the subject lands experience high groundwater levels at two high points onsite.

The preferred lot level servicing strategy promoted in Section 5.5.2 of the City of Guelph Development Engineering Manual (DEM) states that foundation weepers are drained by gravity to the storm sewer system. This drainage system approach is acceptable when groundwater levels are generally low and on-site soils are permeable in nature.

When this is not feasible, the DEM presents two options. The first option is to direct the foundation weepers to a sump pump, which then outlets to the surface rear yard. The other option presented in the DEM is to drain the foundation weepers by gravity to a third pipe foundation drainage system (FDS).

Recommendations made within the MOE SWMPDM, state *"In areas where the seasonally high water table is within 1 metre of the building foundation drains, sump pumps should not be utilized. This requirement is imposed to prevent excessive sump pump operation and to prevent a looped system*

whereby the sump pump discharges maintain the foundation drainage. Where the use of sump pumps is not feasible, a third pipe may be used to convey foundation drainage to the receiving water.”

Based on this information MTE have prepared the following two alternative solutions, one of which (**Alternative 2**) being the system that was previously presented to the City.

3.0 PROPOSED ALTERNATIVES

For **Alternative 1**, an FDS system would be installed along the building footings. The groundwater would be collected in the foundation drains and would be pumped to a gravity outlet into a dedicated pipe system in the right-of-way. The system would be proposed near the southwestern and northeastern quadrants of the subject lands. Independent from each other these two pipe networks would function by intercepting groundwater flow within each catchment and directing it to respective dedicated infiltration galleries downstream, where clean groundwater will be reintroduced to the underlying aquifer.

Due to the abundance of groundwater currently at or near the surface, we would anticipate that the sump pumps for the residential development will be running many times a day all year long based on the hydrogeologic information gathered thus far.

Due to the proposed elevation of the drain at the footing, this alternative would not provide the required 0.5m separation to the basement floor per DEM standards. As such, OBC compliant waterproofing would be required to be installed as per Section 5.9 of the DEM.

No negative impacts would occur to the existing groundwater system, as the clean groundwater will simply be locally drained away from the foundations before being redistributed back into the groundwater system via the infiltration galleries. The profile of the groundwater table would simply be levelled to match the elevation of the FDS system and the proposed grading scheme. This is explained in further detail for **Alternative 2** below.

For **Alternative 2**, a modified FDS system would be installed below the foundations at an elevation such that 0.5m of separation will be maintained between the seasonal high groundwater and the finished basement floor elevation. The groundwater will be directed to a dedicated pipe system in the right-of-way near the southwestern and northeastern quadrants of the subject lands. Independent from each other these two pipe networks would function by intercepting groundwater flow within each catchment and directing it to respective dedicated infiltration galleries downstream. The system within the SWMF 1 catchment area will be directed to a dedicated infiltration gallery located within SWM Block 58. The system within the SWMF 2 and SWMF 3 catchment areas will be directed to a dedicated infiltration gallery located within SWM Block 59.

To establish the extent of this proposed system, a surface comparison was completed between the proposed finished grade surface (less 3.0m) and the anticipated seasonal groundwater high. The 3.0m depth ensures that groundwater levels are maintained at a minimum separation of 0.5m below basement floors, per the City's DEM. The extent of the current zone of influence is highlighted in **Figure 1.1** attached, which also illustrates the proposed foundation drain sewer network. The network consists of 200mm diameter sewer at approximately 3.2m depth. Ultimately, the FDS sewer will be designed following the guidelines of Section 5.5.2 of the City's DEM. The end-of-pipe infiltration galleries have been sized to allow infiltration at a rate equal to or greater than the incoming groundwater flow. The groundwater flow is determined using Darcy's Law, applied to field measured soil parameters that are presented within the *Hydrogeological Assessment*.

On individual lots, privately owned and maintained, private FDS system will be set such that 0.5m of separation will be maintained between the seasonal high groundwater and the finished basement floor elevation, as per the City's DEM. In addition, typical foundation weepers will connect to the unit's sump

pump with an overflow connection to grade. The foundation weepers and sump pump system will act as a fail-safe under major events, with the proposed modified FDS operating under typical weather conditions.

The installation of the FDS will act to locally lower groundwater elevations in areas where the groundwater is at or near the proposed basement floor elevations. The individual lot level FDS will act together to collectively lower the water table below the proposed basement floor elevations, therefore, this collective system has built in resiliency in that should a single FDS malfunction the collective drawdown of the water table by the overall system will mitigate potential impacts to the individual lot.

Similar to Alternative 1, no negative impacts would occur to the existing groundwater system. The clean groundwater will be locally drained away from the foundations and directed towards the infiltrative sand/sand-gravel areas on the site that have adequate separation from the groundwater for infiltration to occur. **Figure 5** from the *Hydrogeological Characterization Report*, appended to this technical memorandum, displays the location of these areas. The proposed infiltration galleries will release flows back into the groundwater flow regime at these locations. The profile of the groundwater table would simply be levelled to match the elevation of the modified FDS system and the proposed grading scheme. This system still allows infiltration and recharge back into the groundwater system locally, however it keeps the groundwater levels from rising beyond the inverts of the pipe system. We have confirmed that this levelling of the groundwater table occurs through the completion of post construction monitoring inspections of similar systems installed on previous projects, as referenced in **Section 4.0**. The groundwater profile has been found to take the shape of the drain's invert elevations, with consistent low flow levels typically seen within the solid portions of the system within the right-of-way. An example of this shown during a CCTV inspection from the Haylock project in Elora noted in **Section 4.0** is attached.

With respect to features adjacent to the subject lands which may receive groundwater inputs; though elevated groundwater conditions within the area of the system will be lowered, the overall direction of groundwater flow will not be disrupted. The existing surface water contribution will be matched to pre-development conditions, and the site wide infiltration requirements are being met which will maintain overall groundwater recharge. Please refer to the attached Hydrogeological Impact Assessment – Foundation Drainage System technical memo for further clarification in support of Alternative 2.

Furthermore, in the area adjacent to the on-site wetland the modified FDS pipe obvert is proposed to be at an elevation of ~333.9 mAMSL which is approximately 7m above the maximum groundwater elevation within the on-site Wetland. As such, MTE's opinion is that the on-site wetland will not be negatively impacted as a result of the proposed modified FDS.

The City's Environmental Planning and Development Engineering departments have both previously provided comments which generally express concerns regarding the proposed **Alternative 2** system and its function as a permanent dewatering system.

To address these comments we would note that MTE has historically denoted similar systems as "Groundwater Management Systems", on previous projects as referenced in **Section 4.0**. However, the system would function very similarly to the typical OBC "Foundation Drains" that are described Section 5.5.2 of the DEM. The only exception being that the proposed system would be installed at an elevation lower than the foundation wall to allow for adequate separation as per the DEM. The proposed system would match all other criteria of Option 2 from Section 5.5.2. The proposed system would not be a permanent dewatering system, and instead would provide **passive drainage without aid of any mechanical devices** to direct groundwater away from the building foundations by gravity before reintroducing it back to the underlying aquifer downstream.

It should be noted that based on a review of Ontario Ministry of Agriculture, Food and Rural Affairs (OMFRA) mapping the majority of the development area has systematic tile drainage that currently outlets to Victoria Road. The FDS will work much the same as the exiting tile drainage system with the exception that instead of outletting to a ditch along Victoria Road and ultimately into the storm sewer (which removes water from the subject lands) the FDS will re-infiltrate clean groundwater on-Site thereby maintaining the water balance continuing to recharge the underlying aquifer.

In addition, the City provided comments requesting further details regarding the system;

Development Engineering

61. *The figure indicates that the Groundwater Management System is comprised of a 200 mm diameter HDPE solid pipe. Please clarify how water is intended to enter the Groundwater Management System.*
62. *Please provide clarification on the location of the Groundwater Management System within the right-of-way with respect to other required services and utilities.*

Additional details for the proposed system, have been provided in **Figure 1.2** and **Figure 1.3** to show where the system would be installed in relation to the foundation, and connection to the right-of-way. Location within the right-of-way will vary with the width of the road, however, vertically the FDS will be located lower than sanitary, storm or water municipal services wherever possible.

It should be noted that both Alternatives are OBC compliant, per OBC 9.14.3:

9.14.3.2. Minimum Size

- (1) Drain tile or pipe used for *foundation* drainage shall be not less than 100 mm in diam.

9.14.3.3. Installation

- (1) Drain tile or pipe shall be laid on undisturbed or well-compacted *soil* so that the top of the tile or pipe is below the bottom of the floor slab or the ground cover of the crawl space.

9.14.5.1. Drainage Disposal

- (1) *Foundation* drains shall drain to a sewer, drainage ditch or dry well.

The two proposed alternative systems are summarized and compared in **Table 3.1** below.

Table 3.1 – Comparison of Alternatives

Criteria	Alternative 1 – FDS at Footing	Alternative 2 – FDS 0.5m Below BFE
Depth at Building	Footing elevation	0.5m below BFE
3 rd Pipe Sewer System in R.O.W.	Required	Required
Meets OBC 9.14.3.	Yes	Yes
OBC Compliant Foundation Waterproofing	Required	Not Required

Sump Pump	Required	Connected to Additional 100mm Foundation Weeper as Backup
Provides Adequate Groundwater Separation	No	Yes
Efficient Use of Energy	No	Yes
Impact to Existing Wetlands and Groundwater System	No	No

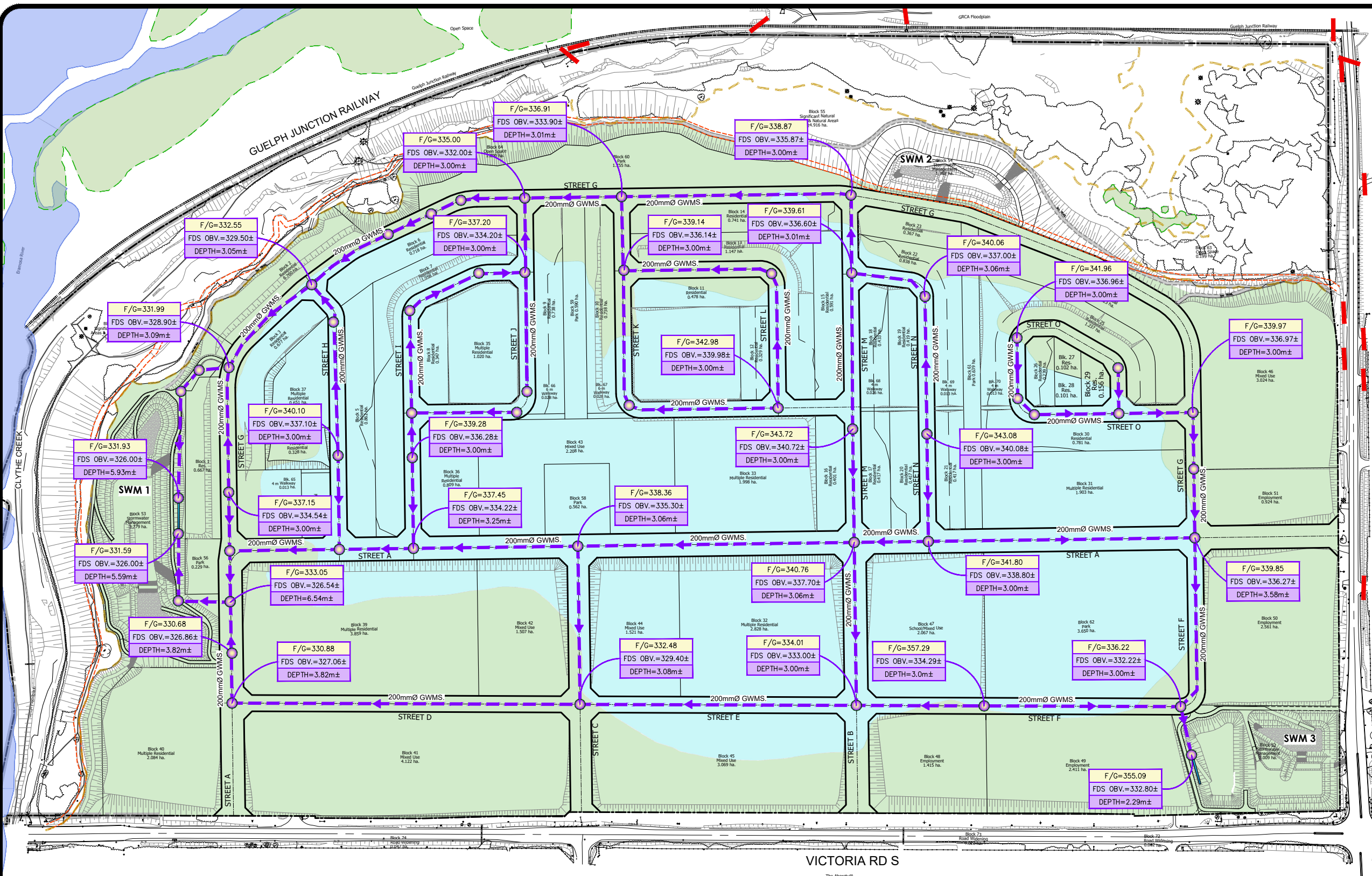
4.0 REFERENCE PROJECTS

MTE has previously implemented similar systems to the proposed Alternative 2 on a number of projects in the Region of Waterloo. A summary of the projects and associated municipality contact information is provided in **Table 4.1** below.

Table 4.1 – Summary of Reference Projects

Project Name (City/Town)	Year	Municipality Contacts
Lincoln Village (Waterloo, ON)	1999	Rob Martin, C.E.T. Engineering Technologist Development Services, Engineering and Construction Division City of Waterloo 100 Regina St. S., Waterloo, Ont. N2J 4A8 Phone: (519) 747-8771 Email: rmartin@city.waterloo.on.ca
Elora Meadows (Elora, ON)	2005	Colin Baker, P.Eng. Managing Director of Infrastructure Services Township of Centre Wellington 1 MacDonald Square, Elora, ON N0B 1S0 Phone: 519.846.9691 x357 Email: cbaker@centrewellington.ca
Haylock (Elora, ON)	2019	Brandon Buehler Engineering Technologist – Water/Wastewater Township of Centre Wellington 1 MacDonald Square, Elora, ON N0B 1S0 Phone: 519.846.9691 x356 Email: bbuehler@centrewellington.ca
Madwest (Breslau, ON)	2023	Jared Puppe, C.E.T. Director of Infrastructure Services Township of Woolwich. 24 Church Street West, P.O. Box 158, Elmira, ON N3B 2Z6 Phone: 519.669.6029 Email: jpuppe@woolwich.ca
Beisel Lands (Elmira, ON)	2024	
Brigadoon (Kitchener, ON)	2001	Chris Spere, P.Eng., C.E.T. Director of Engineering Services Development Engineering, 9 th Floor 200 King Street West, Kitchener, ON N2G 4G7 Phone: 519.741.2200 x7412 Email: chris.spere@kitchener.ca
Doon Creek (Kitchener, ON)	2007	
Chalon Estates (Kitchener, ON)	2011	

Attachments



LEGEND:

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- HDPE SOLID PIPE FOR FOUNDATION DRAINAGE SYSTEM AT APPROX. 3.20m DEEP.
- EXISTING CULVERT
- C/L ROAD FINISHED GRADE
- PROPOSED LOCAL FDS OBVERT
- FDS COVER
- INFILTRATION GALLERY (ADS-DC-780 CHAMBERS)
- LESS THAN 3.0m VERTICAL SEPARATION FROM FG SURFACE TO GROUND WATER LEVEL
- MORE THAN 3.0m VERTICAL SEPARATION FROM FG SURFACE TO GROUND WATER LEVEL



PROJECT GUELPH INNOVATION DISTRICT LANDS		
TITLE FOUNDATION DRAINAGE SYSTEM SERVICING PLAN		
Drawn OXR	Scale 1:4500	Figure 1.1
Checked ALN	Project No. 46927-104	
Date 2024-10-09	Rev No. 0	

Guelph Innovation District
Summary of FDS Infiltration Galleries
Conceptual Design
City of Guelph

Date: June 11, 2026
Project: 46927-104
File: Q:\46927\104\FDS\46927-104_FDS Infiltration Gallery Design.xlsx

Groundwater Flow Rate Calculation

Calculation of the groundwater flow rate (or flux, Q) in a saturated water table setting of any cross sectional area (A), and the velocity vector (v) in any direction starts with the basic equation of continuity of groundwater flow known as Darcy's Law:

$Q = v \cdot A$ where;

v = Darcy Velocity (K*i)

Q = Volumetric Flow (m³/sec)

A = Cross Sectional Area of Flow (m²)

Darcy Velocity (v) Calculation

$$v = K \cdot i$$

Drainage Area	Monitoring Well / Borehole Location	Material Description	Mound Location	i - Hydraulic Gradient (m/m)	K - Hydraulic Conductivity (m/s)	v - Darcy Velocity (m/s)
SWMF1	MW1-17	Sandy silt	North Mound	0.1	2.70E-07	2.70E-08
SWMF1	MW204-19	Sandy silt / Clayey silt	North Mound	0.1	2.53E-07	2.53E-08
SWMF1	MW209-19	Silty sand	South Mound	0.05	4.88E-08	2.44E-09
SWMF3	MW210-19	Sandy silt / Silty sand	South Mound	0.05	7.22E-06	3.61E-07
SWMF3	MW514-22	Sandy silt till	South Mound	0.05	1.15E-07	5.75E-09
SWMF1	MW604-22	Silty sand	South Mound	0.05	7.64E-07	3.82E-08

Max Darcy Velocity AVG (m/s)	3.61E-07
-------------------------------------	----------

1. Hydraulic gradient and hydraulic conductivity of the native material are referenced from those measured in MTE's 2025 Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Hydrogeological Assessment.
2. For the purposes of preliminary sizing of the infiltration galleries required, the maximum Darcy Velocity value calculated has been used for both drainage areas.

Groundwater Flow Rate (Q) Calculation

$$Q = v \cdot A$$

Drainage Area	v - Darcy Velocity (m/s)	Width of the Cross-Sectional Area (m)	Depth of Cross Sectional Area (m)	A - Cross-Sectional Area (m ²)	Q - Ground Water Flow Rate (L/s)
SWMF1	3.61E-07	455	3.00	1365	0.49
SWMF3	3.61E-07	500	3.00	1500	0.54

1. cross sectional widths are taken as average cross sectional width over the entire drainage area.
2. cross sectional depths are assumed based on depth from surface to level of adequate separation to footings required.

FDS Infiltration Galleries

Facility No.	Capturing Pond Catchments	Borehole Ref.#'s	Est. Groundwater Elevation (m)	Est. Fin. Grade Over Chamb. (m)	Est. Facility Inv. (m)	Soil Type Below Inv.	In-situ Factored Infiltration Rate (mm/hr)	Design Depth (mm)	Required Ground Water Flow Rate (L/s)
SWM 1	201-1, 201-2	BH502-22	325.00	330.08	326.24	Gravelly Silt Till	74.2	1140	0.49
SWM 3	202-1, 202-2, & 203	MW520-22	328.80	336.20	332.78	Gravelly Silt Till	78.7	1140	0.54

Facility No.	Volume Provided (m ³)	Contact Area (m ²)	Provided Release Rate Capacity (L/s)	Possible Configuration		1:1 Open Trench to Obvert	
				Width (m)	Length (m)	Width (m)	Length (m)
SWM 1	17.10	26.88	0.55	1.91	14.11	8.99	21.19
SWM 3	17.10	26.88	0.59	1.91	14.11	8.15	20.35

1. The infiltration rate for SWMF1 gallery is based on the in-situ test result at TP103A-26 (185.5 mm/hr) with an applied 2.5 Safety Factor.
2. The infiltration rate for SWMF3 gallery is based on the in-situ test result at TP107-26 (196.7 mm/hr) with an applied 2.5 Safety Factor.
3. The contact area of the infiltration galleries have been sized in order for the release rate capacity to meet or exceed the incoming groundwater flow rate.
4. Design dimensions for FDS galleries (area, depth, etc) based on using ADS DC-780 (1140 mm depth incl. stone).

User Inputs

Chamber Model:	DC-780
Outlet Control Structure:	No
Project Name:	GID - FDS Gallery (SWM 1 & 3)
Engineer:	Matt Willcox
Project Location:	Ontario
Measurement Type:	Metric
Required Storage Volume:	17.50 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	229 mm.
Stone Above Chambers:	153 mm.
Design Constraint Dimensions:	(2.00 m. x 15.00 m.)

Results

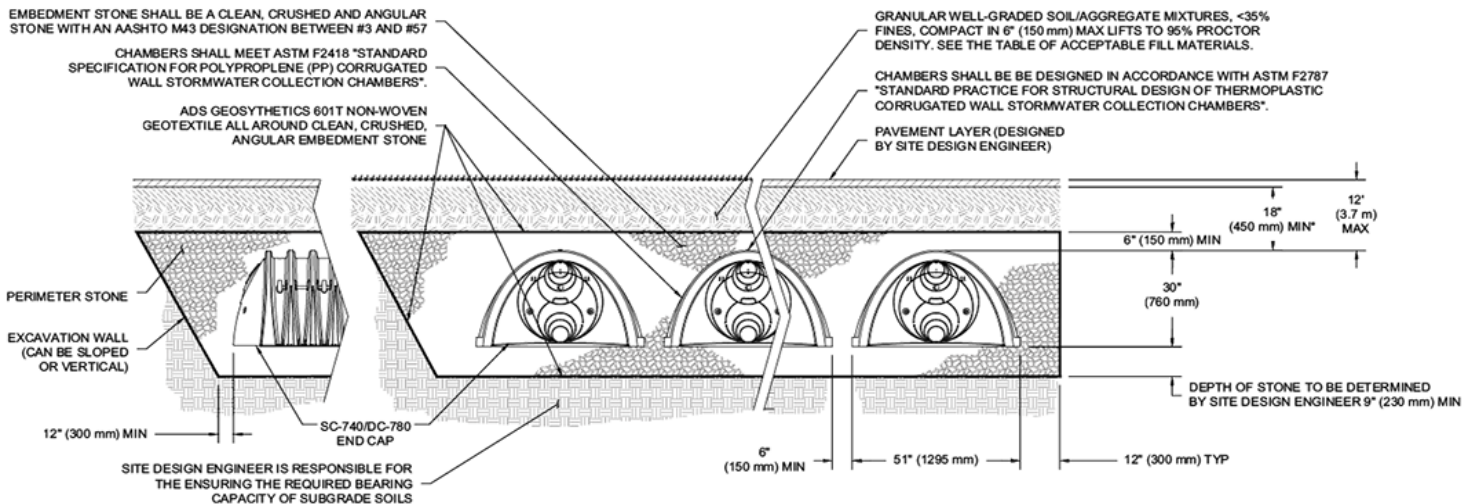
System Volume and Bed Size

Installed Storage Volume:	17.10 cubic meters.
Storage Volume Per Chamber:	1.31 cubic meters.
Number Of Chambers Required:	6
Number Of End Caps Required:	2
Chamber Rows:	1
Maximum Length:	14.12 m.
Maximum Width:	1.91 m.
Approx. Bed Size Required:	26.89 square meters.
Average Cover Over Chambers:	N/A .

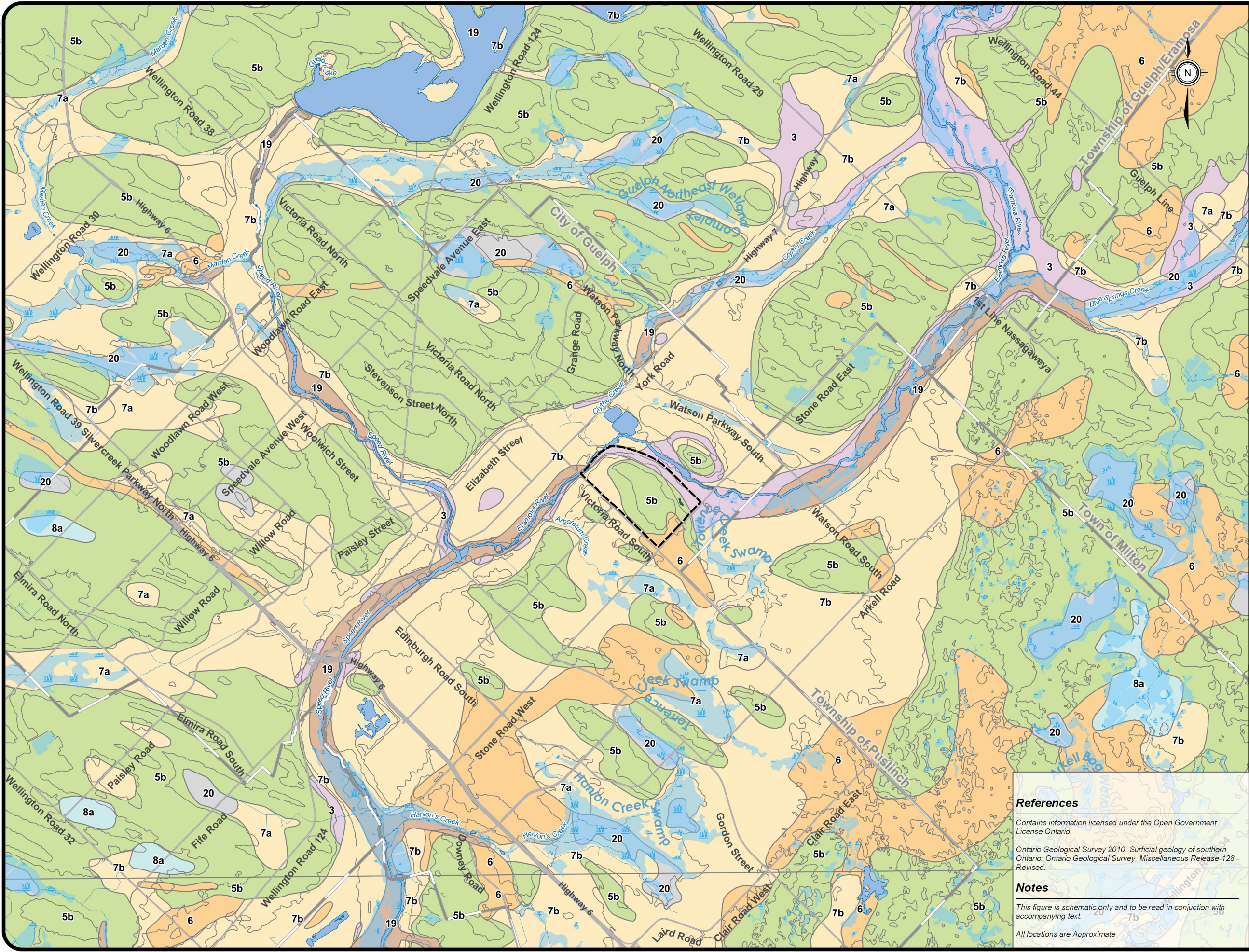
System Components

Amount Of Stone Required

(0% Overage):	23 cubic meters
(Cubic yard to ton factor:1.4):	41.62 tons
Volume Of Excavation (Not Including Fill):	31 cubic meters
Total Non-woven Geotextile Required:	109 square meters
Woven Geotextile Required (excluding Isolator Row):	0 square meters
Woven Geotextile Required (Isolator Row):	25 square meters
Total Woven Geotextile Required:	25 square meters
Impervious Liner Required:	0 square meters



*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).



Legend

Site Data

Boundaries

Subject Lands

Quaternary Geology

Quaternary Geology

- 20. Organic Deposits: peat, muck, marl
- 19. Modern alluvial deposits: clay, silt, sand, gravel, may contain organic remains
- 8. Fine-textured glaciolacustrine deposits: silt and clay, minor sand and gravel
- 8a. Massive to well laminated
- 7. Glaciofluvial deposits: river deposits and delta topset facies
- 7a. Sandy deposits
- 7b. Gravelly deposits
- 6. Ice-contact stratified deposit: sand and gravel, minor silt, clay and till
- 5b. Stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain
- Paleozoic
- 3. Paleozoic bedrock

Base Map

Boundaries

Municipal Boundary (Lower Tier)

Transportation

Roads

Railway

Surface Water

Surface Waterbody

Provincially Significant Wetland

Surface Watercourse

Groundsurface

Groundsurface Contour (10m Interval)

0 500 1,000 1,500 2,000 m



Engineers, Scientists, Surveyors

Project
Guelph Innovation District Lands - Hydrogeological Characterization
328 Victoria Road S. and 588 Stone Road East, Guelph, ON

Title
Quaternary Geology

Drawn	MDE	Scale (11x17)	Figure
Checked	PAG	1:50,000	
Date (yyyy-mm-dd)	2025-02-26	Project No. 46927-104	
		Rev No. 0	

5

References

Contains information licensed under the Open Government License Ontario.

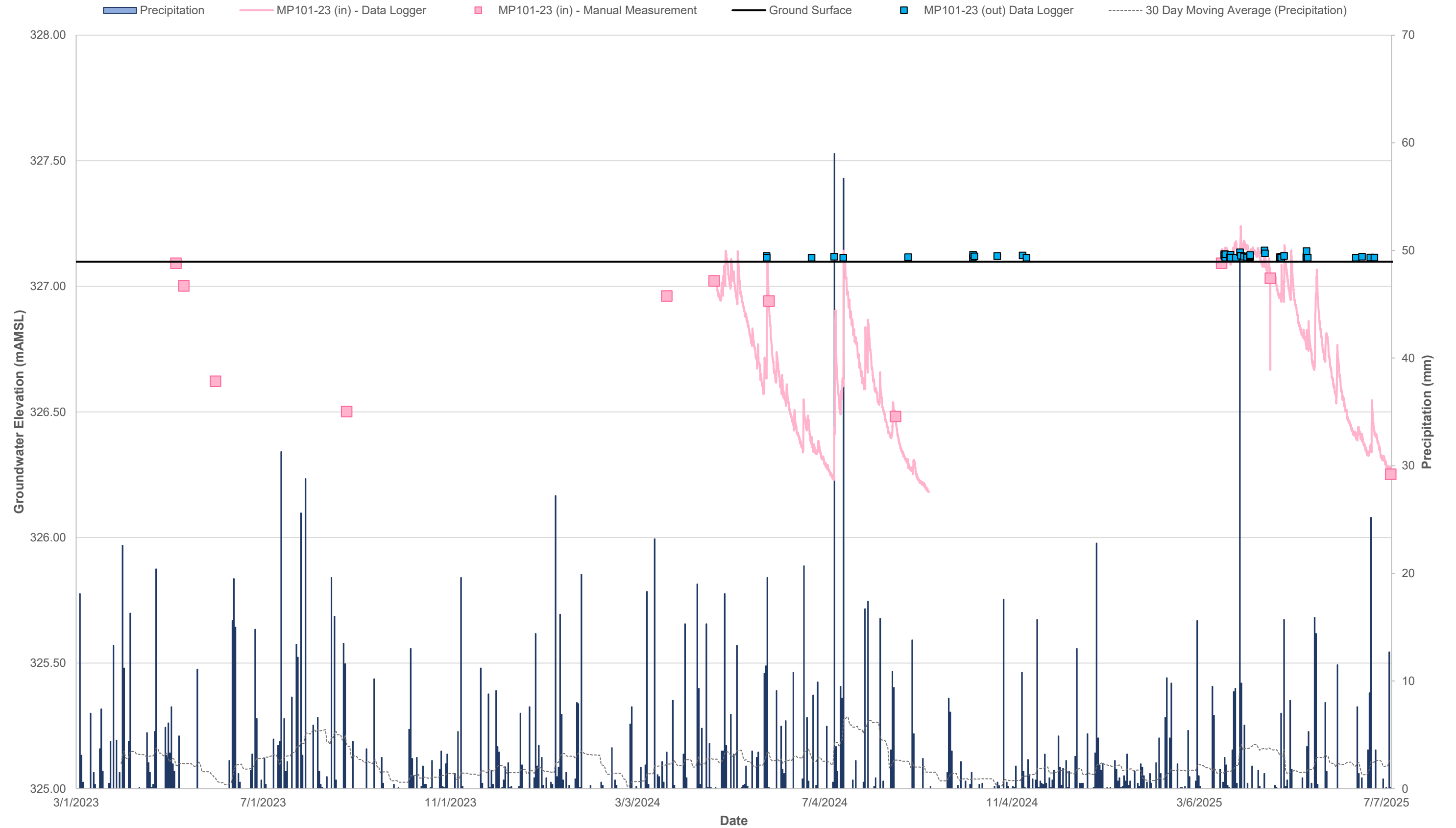
Ontario Geological Survey 2010. Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release-128 - Revised.

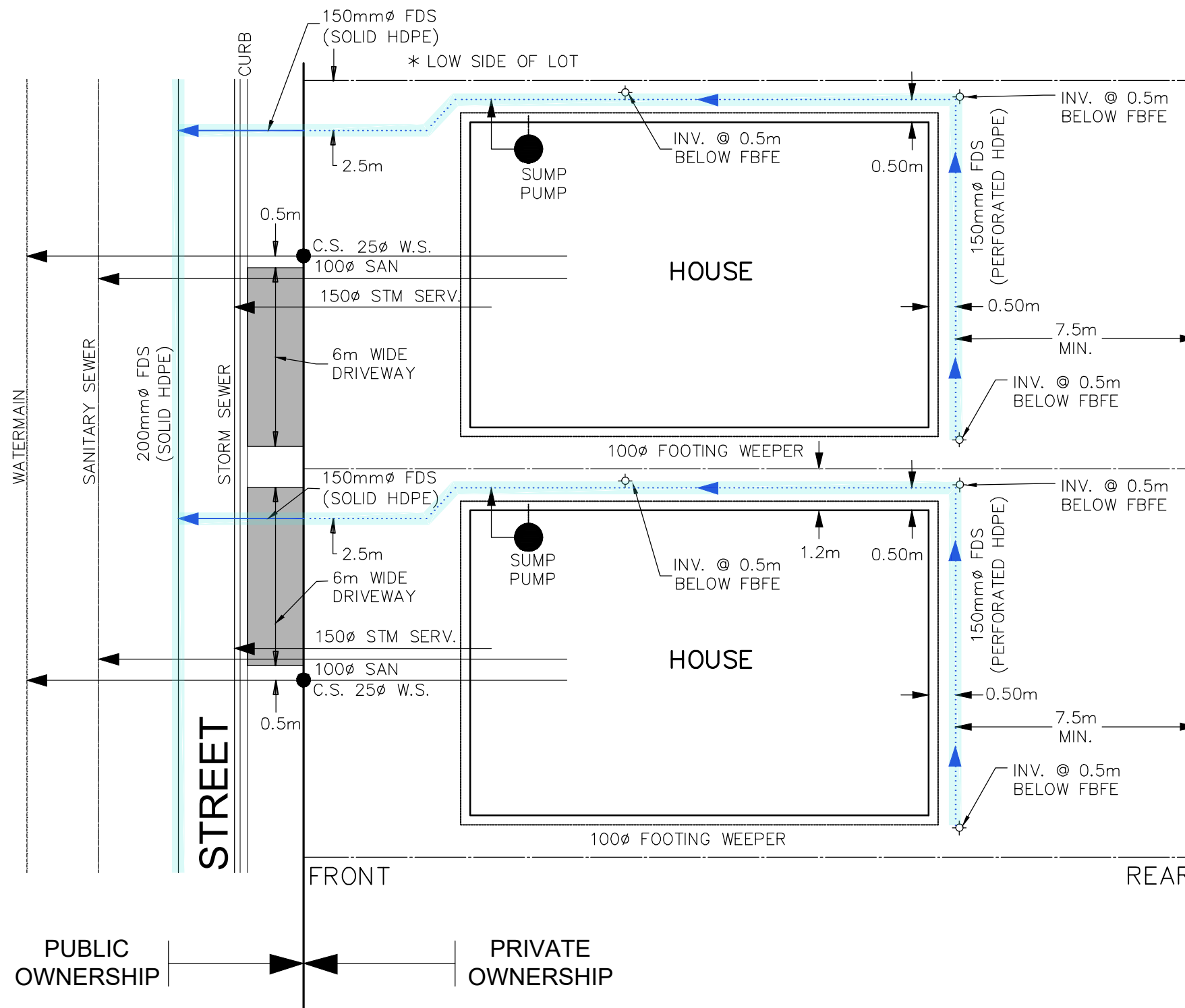
Notes

This figure is schematic only and to be read in conjunction with accompanying text.

All locations are Approximate

Hydrograph 1: Groundwater Elevations (mAMSL) - MP101-23





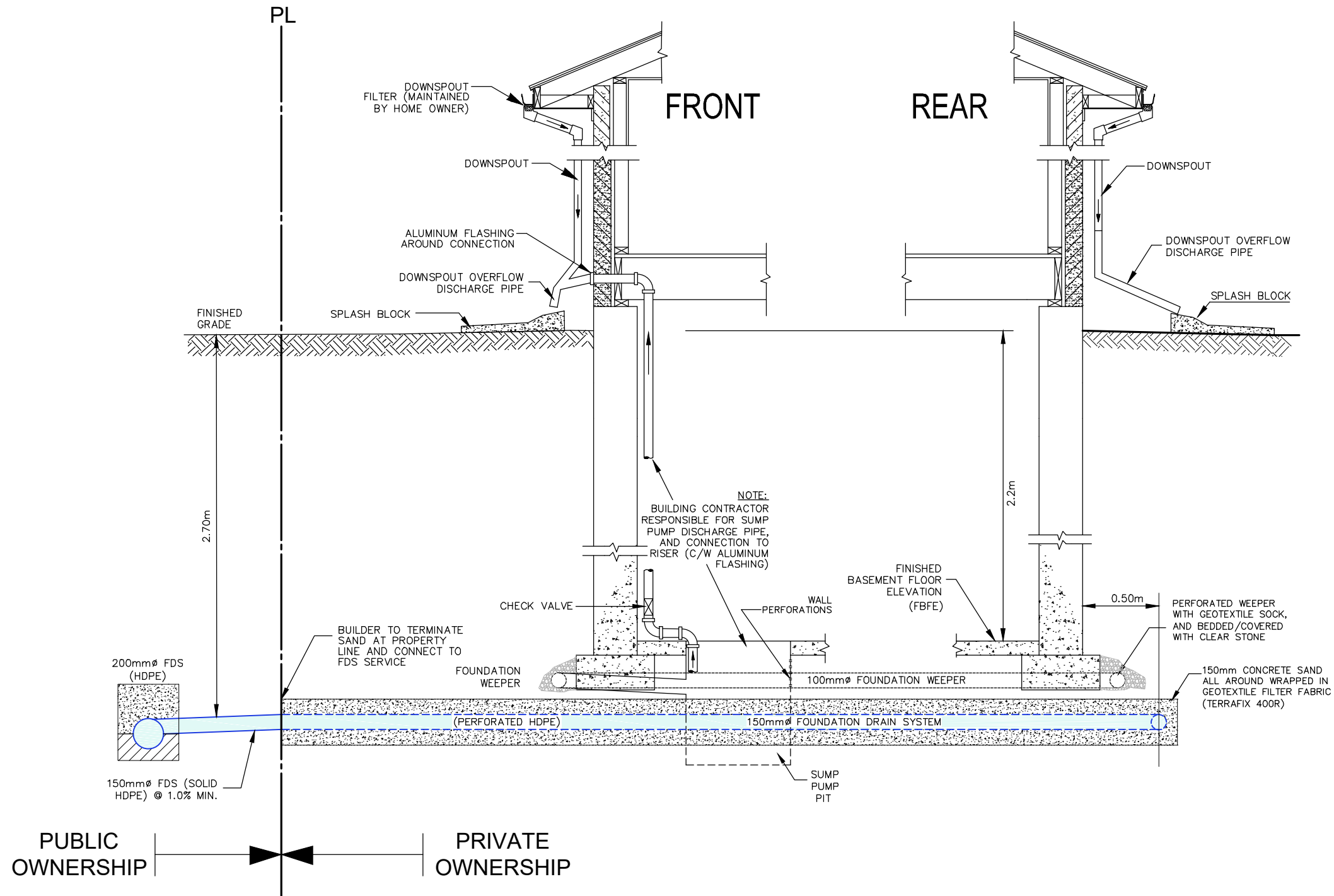
- WHERE FOUNDATION DRAIN SYSTEM (FDS) CONNECTIONS REQUIRED DUE TO ELEVATED GROUNDWATER LEVELS, BUILDER TO INSTALL 150mm DIAMETER SINGLE WALL HDPE PERFORATED PIPE (PATTERN TYPE B) TO ELEVATIONS INDICATED IN DETAIL. PIPE TO BE WRAPPED WITH FILTER SOCK, BEDDED AND BACKFILLED WITH CONCRETE SAND (OPSS-1002.05.02). END OF PIPE TO BE PLUGGED WITH CAP WITH NO DIRECT CONNECTIONS TO SURFACE OR ROOFTOP DRAINAGE.
 - WHERE ELEVATED GROUNDWATER LEVELS EXIST, BUILDER IS RECOMMENDED TO CONSIDER USE OF UNDERSLAB WEEPERS CONNECTED TO SUMP PUMP.
- PRIVATE OWNERSHIP:**
- ALL FOUNDATION DRAIN SYSTEM (FDS) PIPE TO BE SMOOTH WALLED SOLID WITH FILTER SOCK AS INDICATED, 320kPa STIFFNESS BOSS-2000 HDPE OR ALTERNATE WHICH IS CSA-182.8 CERTIFIED AND STAMPED ON PIPE (B182.6 ALSO ACCEPTABLE), WITH SOCKED SOIL TIGHT COUPLERS (OR BELL AND GASKET STYLE), WITH OPSS-1002.05.02 CONCRETE SAND BEDDING AND BACKFILL FOR PERFORATED PIPE SECTIONS, AND GRANULAR 'A' FOR SOLID PIPE SECTIONS. ALL FDS MH's TO HAVE LOCKABLE WATERTIGHT COVER AS PER OPSD 401.030, WITH MODIFIED LABEL TO READ "FDS".
- PUBLIC OWNERSHIP:**
- ALL FDS LOT CONNECTIONS TO BE 150mm DIAMETER SOLID LATERALS TO PROPERTY LINES, 320kPa STIFFNESS BOSS-2000 HDPE OR ALTERNATE WHICH IS CSA-182.8 CERTIFIED AND STAMPED ON PIPE (B182.6 ALSO ACCEPTABLE), WITH BELL AND GASKET STYLE COUPLERS, INSTALLED ON CLASS-'B' BEDDING AT A MINIMUM GRADE OF 1% TO A DEPTH AT PROPERTY LINE OF 2.7m TO INVERT OF PIPE. CONNECT TO NEW FDS MAINLINE USING "SNAP-TEE" OR "INSERT-TEE" FITTING.



PROJECT
**GUELPH INNOVATION
DISTRICT LANDS**

TITLE
FDS PLAN DETAIL

Drawn	FHG	Scale	NTS	Figure 1.2
Checked	MPW	Project No.	46927-104	
Date	2025-06-11	Rev No.	0	



NOTES: INSTALLATION OF FOUNDATION WEEPERS, DOWNSPOUTS, AND FOUNDATION DRAIN SYSTEM

1. FOUNDATION WEEPERS TO BE CONNECTED TO SUMP PUMP PIT, WITH PUMPED DISCHARGE OVER THE FOUNDATION WALL TO GRADE (PER DETAIL).
2. FOUNDATION WEEPERS TO BE PERFORATED, WITH GEOTEXTILE SOCK, AND BEDDED/COVERED WITH CLEAR STONE.
3. DOWNSPOUTS SHALL DISCHARGE TO GRADE.



PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
FDS CROSS SECTION

Drawn	FHG	Scale	NTS	Figure
Checked	MPW	Project No.	46927-104	1.3
Date	2025-06-11	Rev No.	0	

ELORA
HARRISON STREET
GWMSMH28G --> GWMSMH29G



20.0 m

09/07/2025

Project Name:	Guelph Innovation District (GID) Lands, Blocks 1 & 2	MTE File No.:	C46927-104
To:	Jim Hall / Sandra Vrbanc – City of Guelph Engineering and Transportation Services	Date:	June 12, 2026
cc:	Dan Bollinger / Josh Shilling / Ryan Scott - Fusion Homes Dave Hicks – MTE Dave Aston / Aleah Clarke – MHBC Nathan Miller – NRSI	From:	Fraser Cummings, M.Sc., P.Geo.

RE: Hydrogeological Impact Assessment – Foundation Drainage System

1.0 OVERVIEW

MTE Consultants Inc. (MTE) has been retained by Fusion Homes (Fusion) to complete a Hydrogeological Assessment in support of a Draft Plan application for the proposed Guelph Innovation District (GID) Lands, herein referred to as the 'subject lands'.

Per MTE's Functional Servicing Report (FSR), one of the alternative solutions to address the high groundwater in certain areas of the subject lands is a third-pipe foundation drainage system (FDS). This technical memorandum has been prepared alongside the Draft Plan submission to assess potential hydrogeological impacts related to the proposed FDS.

2.0 BACKGROUND INFORMATION

Based on the Hydrogeological Assessment (MTE, 2026) seasonal high groundwater elevations in monitoring wells on-Site were found to have the potential to be at or near the preliminary finished grade in two areas on the subject lands. These locations are illustrated on **Figure 3b** and **Figures 12a** through **12d** of MTE's Hydrogeological Assessment. Groundwater levels within these areas will need to be mitigated in order to maintain levels below the proposed basement elevations.

The preferred lot level servicing strategy promoted in Section 5.5.2 of the City of Guelph Development Engineering Manual (DEM) states that foundation weepers are drained by gravity to the storm sewer system. This drainage system approach is acceptable when groundwater levels are generally low and on-site soils are permeable in nature. When this is not feasible, the DEM presents two options. The first option is to direct the foundation weepers to a sump pump, which then outlets to the surface rear yard. The other option presented in the DEM is to drain the foundation weepers by gravity to a third pipe FDS.

This technical memo will assess potential hydrogeological impacts related to the proposed FDS. Per the FSR MTE has prepared two alternatives related to the FDS. Both alternatives act to locally drain groundwater away from the foundations before redistributing it back into the groundwater system via the infiltration galleries. The potential hydrogeological impact will be similar between alternatives and as such this impact assessment will not differentiate between the two alternatives.

3.0 IMPACT ASSESSMENT

Based on the groundwater flow maps presented in MTE's Hydrogeological Assessment groundwater flow generally mimics topography flowing radially from two groundwater mounds located in the central portion of the Site.

The installation of the FDS will act to locally lower groundwater elevations in areas where the groundwater is at or near the preliminary finished grade. Although each below grade structure will have an FDS, these individual systems will act together to collectively lower the water table. In this way the collective system has built in resiliency in that should a single FDS malfunction the collective drawdown of the water table by the overall system will mitigate potential impacts to the individual structure.

Despite the localized lowering of the water table it is MTE's opinion that the use of a FDS will not negatively impact the groundwater regime within the subject lands. The FDS only acts to prevent groundwater from increasing above a certain threshold during elevated groundwater conditions such as those observed during the spring. The FDS does not prevent water from infiltrating, it merely acts as a mitigation measure to ensure adequate separation between the water table and foundation floors. As such, during times of elevated groundwater the FDS will act to mitigate groundwater levels from raising above basement floor elevation. During this time the water table will re-equilibrate to a new maximum but as groundwater flow within the subject lands is primarily radial, groundwater flow directions outside of the FDS will be maintained. With regard to concerns related to groundwater flow to significant groundwater recharge areas (SGRA) west of the subject lands; MTE notes that both exfiltration locations are located within this same SGRA (**Figure 1**). As such, the infiltrated groundwater will continue to recharge the underlying aquifer.

MTE also considered potential impacts to the identified on-Site wetland located in Open Space Block (Block 63) east of Residential Block 24. MTE established a minipiezometer (MP101-23) in this wetland in April 2023. In April 2024 MTE installed a data logger within MP101-23 to continually measure groundwater levels on an hourly basis and installed a data logger outside of MP101-23 to measure surface water levels if present. MTE notes since monitoring began no standing water has been observed in the wetland during quarterly field visits. The attached **Hydrograph 1** shows continuous groundwater elevations for MP101-23 as well as surface water levels (when present). **Hydrograph 1** indicates that during the monitoring period (April 2023 to May 2026) groundwater elevations peaked at ~327.2 mAMSL. The data loggers within MP101-23 and outside of MP101-23 are removed during winter to prevent the data loggers from becoming damaged. As shown on **Hydrograph 1**, over the monitoring period groundwater levels are generally below ground surface. Surface water at MP101-23 is sporadic and is primarily related to precipitation events or the spring melt. MTE's interpretation is that these surface water readings are primarily related to snow melt and are infiltrating into the underlying sediments. Additionally, occasional data points from MP101-23 (out) were recorded when groundwater levels were observed during the monitoring period to be below the ground surface, further suggesting that surface water at MP101-23 is primarily related to precipitation and not groundwater discharge.

In order to maintain the current (pre-development) water balance the existing surface water contribution will be matched and the site wide infiltration requirements will be met which will maintain overall groundwater recharge. Additionally, based on a review of Ontario Ministry of Agriculture, Food and Rural Affairs (OMFRA) mapping the majority of the development area has systematic tile drainage. The FDS will work much the same as the existing tile drainage system with the exception that instead of outletting to a ditch along Victoria Road and ultimately into the storm sewer (which removes water from the subject lands) the FDS will re-infiltrate clean groundwater on-Site thereby maintaining the water balance continuing to recharge the underlying aquifer.

TFC: smk
Attach.

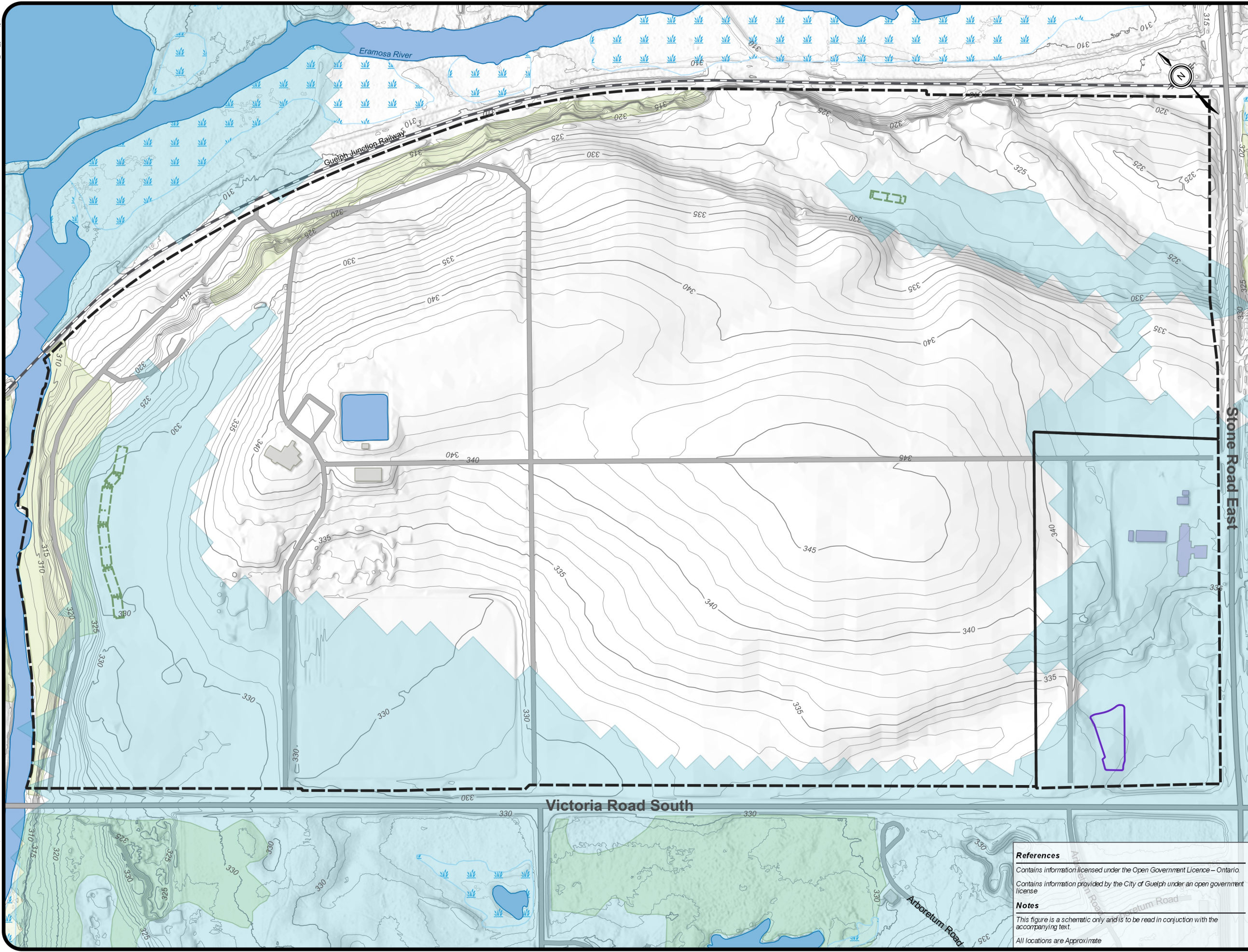
https://mte85.sharepoint.com/sites/46927-104/Shared Documents/Environmental/04. Deliverables/Hydrogeology/Draft Plan Submission/2026-06-12/appendices/Appendix E FDS Impact Assessment/46927-104_2026-06-12_tech memo_FDS.docx

Figure

CIS P:\P46927\104\6927_104_gw05.dwg

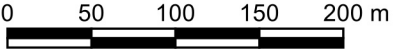
GWR06.02

Plot Date: June 12, 2026 - 10:56 Project: CRS NAD83 UTM zone 17N



Legend

- Site Data
- Boundaries
- Subject Lands
- Proposed Infiltration Boundaries
- SWMF3 Infiltration Cell
- Proposed Infiltration Gallery
- GRCA
- SWP SGRA Vulnerability (GRCA)
- Base Map
- Transporation
- Roads
- Railway
- Buildings
- Existing Building Footprint
- Former Building Footprint
- Surface Water
- Surface Waterbody
- Unevaluated Wetland
- Surface Watercourse
- Groundsurface
- Groundsurface Contour (1m Interval)
- Landuse
- Wooded Area



Project
Guelph Innovation District Lands
328 Victoria Road S. and 588 Stone Road East,
Guelph, ON

Title
**Significant Groundwater Recharge
Areas**

Drawn	KNR	Scale (11x17)	1:4,500	Figure 1
Checked	TFC	Project No.	46927-104	
Date (yyyy-MM-dd)	2026-06-12	Rev. No.	0	

References
Contains information licensed under the Open Government Licence – Ontario.
Contains information provided by the City of Guelph under an open government license

Notes
This figure is a schematic only and is to be read in conjunction with the accompanying text.
All locations are Approximate

Appendix C

Hydrograph

Hydrograph 1: Groundwater Elevations (mAMSL) - MP101-23

