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

Stormwater Management 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:
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December 12, 2025

MTE File No.: 46927-104

Engineers, Scientists, Surveyors.

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1.0 INTRODUCTION

1.1 Overview

MTE Consultants Inc. (MTE) has been retained by Fusion Homes (Fusion) to prepare a Preliminary Stormwater Management (SWM) Report 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 116.0ha and is located in the City of Guelph.

The subject lands are currently agricultural/open space and part of the University of Guelph's Agroforestry Research facility. The subject lands 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 December 10, 2025) for the proposed development has been prepared by MHBC Planning and forms the basis for this report. Refer to **Appendix A** for more details.

This report presents the stormwater management quality, quantity and water balance measures that are proposed to be provided for the development. This report should also 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 – Functional Servicing Report* (MTE, December 12, 2025);
- *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Hydrogeological Assessment* (MTE, December 12, 2025);
- *Guelph Innovation District (GID) Lands, Blocks 1 & 2 – Geotechnical Investigation Report* (MTE, December 12, 2025)

The lands are located within the Eramosa River Watershed as defined in the *Eramosa-Blue Springs Watershed Study - GRCA et al. (1999)*. The Subject Lands are surrounded by the Laurel Creek Conservation Area, Reservoir, and Nature Centre to the south, Creekside Church and rural residential homes to the north, an existing mobile trailer park to the east (Green Acre Park – aka Martin Lands), and Laurel Creek and a woodlot to the west.

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PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
LOCATION PLAN

Drawn OXR	Scale 1:10000	Figure **1.1**
Checked XXX	Project No. 46927-104	
Date 2024-04-19	Rev No. 0	

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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.

1.2.3 Guelph Innovation District Stormwater Management Study

The subject lands are located within the study area identified in the *Guelph Innovation District Stormwater Management Study (Wood., 2020).* This study was completed to assess the stormwater management requirements of the area and provide associated guidance and policies to mitigate the impacts of proposed GID development. The study established

preliminary locations for stormwater management facilities, as well as infiltration criteria for the subject lands.

1.3 Purpose of Study

The purpose of this study is to develop a comprehensive stormwater management strategy for the development proposal for the subject lands in accordance with the Draft Plan of Subdivision, taking the findings of previous studies and agency comments into consideration that is acceptable to the City of Guelph, the Grand River Conservation Authority (GRCA), and the Ministry of the Environment, Conservation and Parks (MECP- formerly known as the MOE).

1.4 Objectives

The objective of the stormwater management plan recommended by this report is to ensure that the proposed development includes the necessary controls to protect the hydrology and water quality of the receiving water systems. The plan will ensure that the proposed Plan of Subdivision provides the necessary blocks and corridors for stormwater management measures to be implemented. The primary objectives of this study are as follows:

- Document criteria for the management of stormwater runoff from the subject lands.
- Recommend a comprehensive plan for controlling the quality of stormwater runoff from the subject lands (including temperature mitigation as required).
- Recommend a comprehensive plan for controlling the quantity of stormwater runoff from the subject lands.
- Recommend a comprehensive plan for balancing infiltration to groundwater and surface water inputs to existing features.
- Prepare preliminary designs for the recommended stormwater management infrastructure within the subject lands.

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 nobs 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 Pre-Development Conditions

The subject lands are located in the southeastern end of the Eramosa River watershed, adjacent to the confluence of the Torrance Creek, Clythe Creek, and Hadati Creek with the Eramosa River. The pre-development catchment areas are shown in **Figure 2.1** and summarized as follows:

Catchment 101 (Outlet 1) – this catchment is 54.91ha in size with an agricultural/open space land use. For modelling purposes, the average slope is approximately 6.0%, with steeper localized slopes to the north. The majority of overland flow drains west towards Victoria Road South, where roadside ditches and culverts convey flow northward. The ultimate outlet is considered to be the Eramosa River to the north; east of Victoria Road South.

Catchment 102 (Outlet 2) – this catchment is 28.49ha in size with an agricultural/open space land use. For modelling purposes, the average slope is approximately 4.0%, with steeper localized slopes to the north. The majority of overland flow drains east towards the adjacent Natural Areas. The ultimate outlet is considered to be the Eramosa River to the east.

Catchment 103 (Outlet 3) – this catchment is 16.55ha in size, which includes approximately 8.00ha of external lands (Victoria Road South right-of-way, Stone Road East right-of-way, and some developed lands to the south). For modelling purposes, the average slope is approximately 2.0%. Overland flow from this catchment drains to the northeastern corner of the Victoria-Stone intersection, where an existing storm sewer network and overland conveyance directs flow towards an existing infiltration drypond (SWMF No. 104 – refer to 2020 *GID SWM Study*).

Catchment 104 – this catchment is 8.72ha in size, agricultural/open space land use. For modelling purposes, the average slope is approximately 11.0%. The majority of overland flow drains north. The ultimate outlet is considered to be the Eramosa River to the north.

Catchment 105 – this catchment is 15.26ha in size, agricultural/open space land use. For modelling purposes, the average slope is approximately 11.0%. The majority of overland flow drains east. The ultimate outlet is considered to be the Eramosa River to the east.

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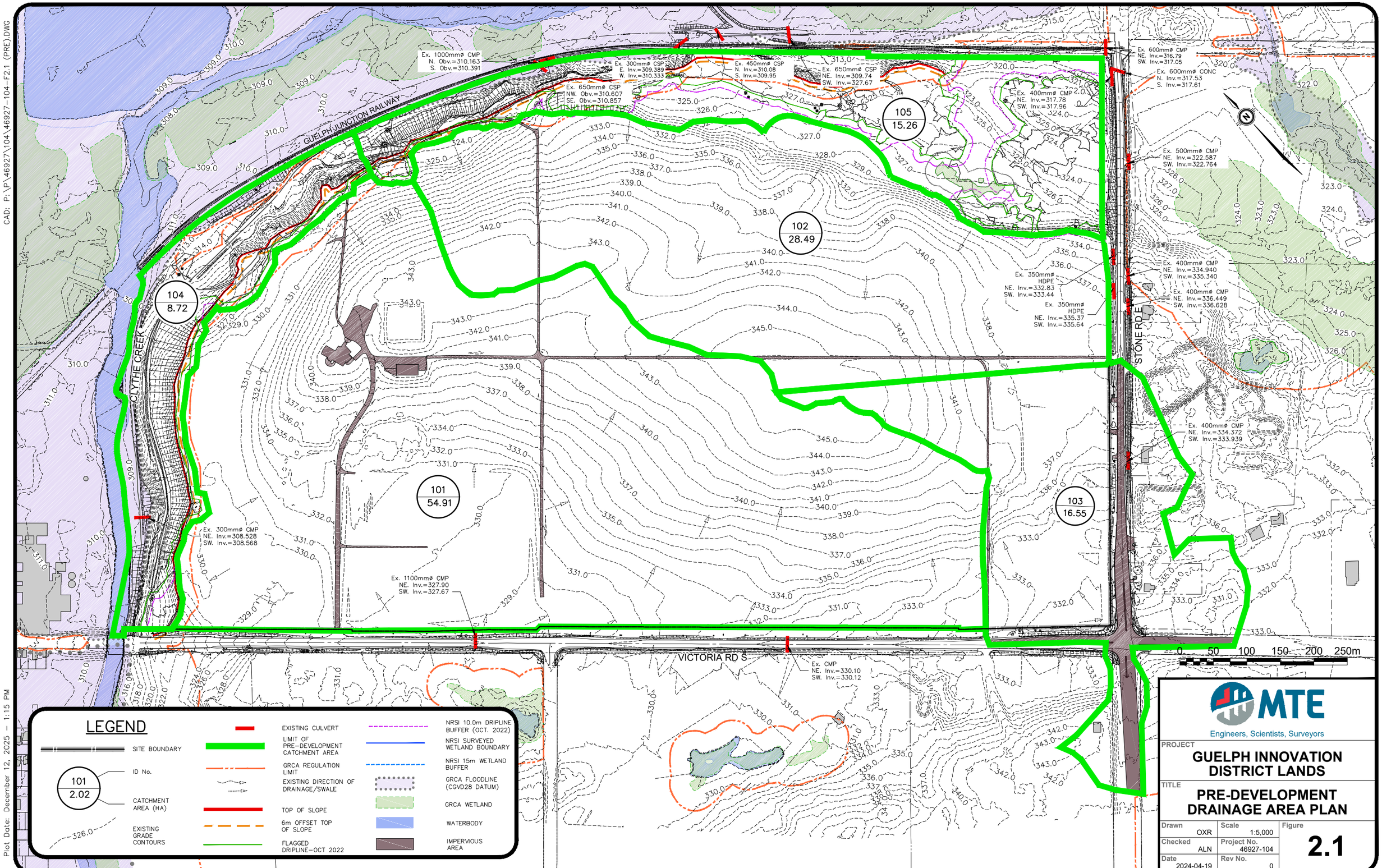

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PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
PRE-DEVELOPMENT DRAINAGE AREA PLAN

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Date	Rev No.	
2024-04-19	0	

Plot Date: December 12, 2025 – 1:15 PM

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2.3 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 *MSP*. 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 nobs onsite, the groundwater mimics the surface contours and concentric mounds are present near those locations. 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 5.6.

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.

Details involving infiltration criteria, proposed water balance measures, and stormwater quality management will be further discussed in subsequent sections.

2.4 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.

2.5 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 STORMWATER MANAGEMENT CRITERIA

New developments are required to provide stormwater management in accordance with provincial and municipal policies. Relevant documents, which have been previously listed, have been referenced in the design of the SWM plan for the subject lands, including:

- *Stormwater Management Planning and Design Manual* (MECP formerly MOE, 2003);
- *Policies for the Administration of the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation – Ontario Regulation 150/06* (GRCA, 2015);
- *Stormwater Management Study, Guelph Innovation District (Wood, 2020);*
- *Stormwater Management Master Plan: Municipal Class EA, Final Report*, (Aquafor Beech Ltd., 2023); and,
- *Development Engineering Manual,* (City, 2023).

Based on the above policies and relevant documents, the following SWM criteria have been established for the subject lands:

- **Water Quality Control** – Provide an Enhanced level of stormwater quality treatment prior to discharging to surface or groundwater systems.
- **Water Quantity Control** – Control peak flow rates to the Eramosa River to existing levels for the 5-year storm event. For the 25-year and 100-year storm events, control peak flow rates to the allowable Unitary Storage and Discharge Rates specified in the 2020 *GID SWM Study*. This will minimize flooding and preserve hydraulic and hydrologic functions. Note that the 5-year storm event rate criterion is self-imposed for the purposes of this study and not a requirement from any governing study. This is simply used to aid in sizing of the storm infrastructure and SWM facilities.
- **Infiltration / Water Balance** – 27mm rainfall capture in infiltrative Low Impact Development measures (LIDs) and maintain or enhance existing recharge rates across the development area.
- **Thermal Mitigation** – Implement thermal preventative and mitigation measures to maintain cool water fish habitat (Eramosa River).

It should be noted that the overall SWM design criteria established in the 2020 *GID SWM Study*, and subsequently in the 2023 *SWM Master Plan*, includes a treatment train approach, with distributed LID Best Management Practices (BMPs) coupled with end-of-pipe SWMFs. To aid in the overall quality and quantity control for the subject lands, the goal of the LID BMPs is to be adequately sized to capture 27mm of rainfall depth over the entire development area, whereas the resulting excess flows are conveyed to the respective SWMFs.

It should further be noted that implementation of a reduced capture rainfall depth, per Section 5.3 of the 2020 *GID SWM Study*, is proposed for the development. Per the study, a reduced rainfall capture of up to 75% (i.e. 20mm) is allowed where the 27mm capture depth is not feasible. Refer to Section 5.7 of this report for more details.

3.1 Water Quality Control

All new SWMFs proposed for the development will need to provide an Enhanced level (80% TSS reduction) of water quality protection prior to discharging to surface or groundwater systems. Furthermore, a chloride mitigation strategy should be considered to protect groundwater from chloride-laden stormwater during winter months. As outlined in Section 5.3 of the 2022 *Stormwater Management Master Plan: Final Stormwater Infiltration Policy Recommendations (2023 Master Plan)*, consideration should be given to a winter bypass with operable controls for infiltration measures that receive runoff from roadways and/or parking areas (i.e. surfaces that receive winter maintenance). Furthermore, site specific Salt Management Plans shall be developed to align with *Source Water Protection Policies.* Lastly, non-infiltrating end-of-pipe SWMFs should be lined.

Erosion and Sediment Control (ESC) Plans shall be designed to incorporate flexible ESC measures, to accommodate required changes resulting from specific rainfall events or site conditions. The ESC measures should aim to protect the downstream features from sediment-laden runoff during construction, until such time that the contributing drainage areas have been vegetated and established. Refer to Section 7.0 for more details.

3.2 Water Quantity Control

As described in the foregoing studies, the overall SWM strategy for the GID Lands is to maintain existing hydraulic and hydrologic conditions. As such, allowable post-development flow rates to the Eramosa River were developed in two ways.

First, the 2020 *GID SWM Study* established Unitary Storage Volumes and Discharge Rates to the Eramosa River for GID and proposed the post-development allowable flow rates for the 25-year and 100-year storm events.

Secondly, since a Unitary Rate is not available in the 2020 study for a 5-year storm event, a pre-development hydrologic model was developed using SWMHYMO to confirm the existing flow rates off-site. It is assumed that a post-to-pre-development peak flow rate maintenance would be appropriate for the 5-year storm event. This additional analysis helps appropriately size receiving sewers and SWMFs, ensuring capacity for the 5-year event flows.

The appropriate quantity control is to be provided by the proposed SWMFs; ultimately discharging to the Eramosa River. The post-development total allowable peak flow rates outlined in **Table 3.1** below include a combination of flow from the respective SWMF and any other additional uncontrolled flow, where applicable.

Table 3.1 – Post Development Quantity Control Targets

Storm Event	Unitary Storage Volumes (m^3/imp. ha)[1]	Unitary Discharge (m^3/s/ha)[1]	Outlet 1 - North to Eramosa River[4]		Outlet 2 - East to Eramosa River[4]		Outlet 3 - (SWMF No. 104)[4]	
			Storage (m^3)	Discharge (m^3/s)[3]	Storage (m^3)	Discharge (m^3/s)[3]	Storage (m^3)	Discharge (m^3/s)[3]
5-year	-	-	-	1.141	-	0.589	-	0.382
25-year	175	0.069	8,508	4.205	1,445	1.029	3,079	1.663
100-year	325	0.131	15,800	7.983	2,683	1.953	5,718	3.157

*Note: 1. Taken from Table 5.4.4 of the 2020 *Stormwater Management Study, Guelph Innovation District* by Wood.
2. Areas used to determine the allowable release rates are the post-development catchments. See Section 5.3.
3. Allowable Discharge Rates (in post-development) = SWMF flows + uncontrolled flows
4. 'Outlets' are further defined in Section 4.2 to follow.

As identified in the 2020 *GID SWM Study* and subsequent studies, additional erosion controls are not required due to the implementation of upstream LID BMPs (i.e. the 27mm capture).

3.3 Infiltration / Water Balance

Water Balance criteria are set out by the policies and analyses conducted for the 2020 *GID SWM Study* and 2022 *Infiltration Policy (2023 Master Plan)*. The studies outline requirements for infiltration and the protection of groundwater and surface water features. In a general sense, the requirement is to maintain pre-development infiltration in post-development conditions, while protecting groundwater resources.

The following recommendations have been outlined specifically for the subject lands:

- LID BMPs are recommended to reduce stormwater runoff and promote groundwater recharge;
- LID integration in the public right-of-ways, open spaces, and amenity areas are encouraged; and,
- Design a distributed infiltration strategy such that 27mm of capture over pre-development conditions is maintained in post-development conditions.

The *2022 Infiltration Policy* highlights restrictions based on high-risk activities and/or Wellhead Protection Area (WHPA) vulnerability scores, infiltration opportunities, and recommendations specific for the GID infiltration measures proposed within this study. The most significant policy affecting overall infiltration and SWM is the required 27mm capture in LID BMPs.

The *Policy* gives direction as to where and when typical infiltration measures (e.g. soakaway pits, galleries, bioretention, etc.) are appropriate and provides recommendations to ensure groundwater resources are protected at all times. Following the decision flow chart, tables, and recommendations outlined in the *Policy*, the proposed infiltration strategy for GID shall incorporate appropriate pre-treatment (e.g. oil-grit separators (OGSs) or end-of-pipe facilities), where needed, prior to introducing stormwater runoff back into the groundwater system.

Additionally, as previously stated, the *2023 Master Plan* allows for a reduced rainfall capture of up to 75% (i.e. 20mm) where the 27mm capture depth is not feasible for sites with restrictions and/or constraints. The use of this exception will be further explored in the subsequent sections of this report when discussing the overall infiltration and water balance strategies.

3.4 Thermal Mitigation

According to the City's latest *SWM Master Plan*, the Eramosa River has been classified as having a cool water regime. Therefore, the following criteria should be applied:

- Pre-development water balance is to be maintained;
- Infiltration and filtration measures should be maximized, where possible; and,
- All end-of-pipe facilities should be designed to implement appropriate thermal mitigation measures.

4.0 PROPOSED DEVELOPMENT AND SWM STRATEGY

4.1 Proposed Area Grading

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 5.6.

4.2 Post-Development Conditions

The preferred SWM solution for the subject lands requires the implementation of at-source distributed infiltration measures, end-of-pipe infiltration measures, LIDs, and three proposed SWMFs. These facilities are generally aligned with the drainage patterns and SWMF locations recommended in the 2020 *GID SWM Study*. Effort was made to locate SWMFs to optimize the proposed grading, sanitary sewer servicing, and storm sewer servicing. The SWM plan is designed to meet the criteria presented in Section 3.1 of this report.

Minor storm event runoff from all respective contributing areas will be conveyed by the proposed storm sewer system to the SWMFs. Excess runoff from major storm events will flow overland to the facilities, via the proposed right-of-ways and designed overland flow routes, where applicable.

For modelling and analysis purposes, as mentioned in Section 3.2, flow to the Eramosa River has been divided into three distinct 'Outlets'. Outlet 1 flows north, Outlet 2 flows east, and Outlet 3 is considered the existing infiltration facility (SWMF No. 104), which ultimately flows north along Victoria Road South once the infiltration capacity is exceeded. These Outlets are still maintained under post-development conditions and summarize a combination of flows from the respective SWMFs and the associated uncontrolled areas from their contributing catchments. The post-development drainage catchments are shown in **Figure 4.1** and are summarized as follows:

Outlet 1

- **Catchment 201-1** – Catchment 201-1 consists of the northeastern portion of the developed tablelands and is proposed to drain to the eastern forebay of SWMF 1. The drainage area contains a combination of single-family residential blocks, and multiple residential blocks. The average overland slope is approximately 1.5% and the drainage area is approximately 20.11ha.
- **Catchment 201-2** – Catchment 201-2 consists of the northwestern portion of the developed tablelands and is proposed to drain to the western forebay of SWMF 1. The drainage area contains a combination of single-family residential blocks, multiple residential blocks, mixed-use blocks, and park blocks. The average overland slope is approximately 1.5% and the drainage area is approximately 35.05ha.
- **Catchment 201-3 –** Catchment 201-3 consists of development block embankments and proposed road sections that drain uncontrolled towards and along Victoria Road South; ultimately northward to the Eramosa River. The average overland slope is approximately 5.0% and the drainage area is approximately 2.61ha.
- **Catchment 201-4** – Catchment 201-4 consists of SWM and development block embankments that drain uncontrolled northward towards the Eramosa River. The average overland slope is approximately 20.0% and the drainage area is approximately 0.78ha.
- **Catchment 201-5** – Catchment 201-5 consists of the SWM block. The average overland slope is approximately 15.0% and the drainage area is approximately 2.39ha.

Outlet 2

- **Catchment 202-1** – Catchment 202-1 consists of the southeastern portion of the developed lands and is proposed to drain to SWMF 2. The drainage area contains a combination of single-family residential blocks, a mixed-use block, a park block, and SWMF 2 itself. The average overland slope is approximately 1.5% and the drainage area is approximately 10.16ha.
- **Catchment 202-2** – Catchment 202-2 consists of a park block and open space block, along the east. The catchment drains uncontrolled eastward towards the Eramosa River. The average overland slope is approximately 7.5% and the drainage area is approximately 2.68ha.
- **Catchment 202-3** – Catchment 202-3 consists of an open space block in the southeastern corner of the subject lands that drain uncontrolled eastward towards the Eramosa River. The average overland slope is approximately 33.0% and the drainage area is approximately 2.07ha.

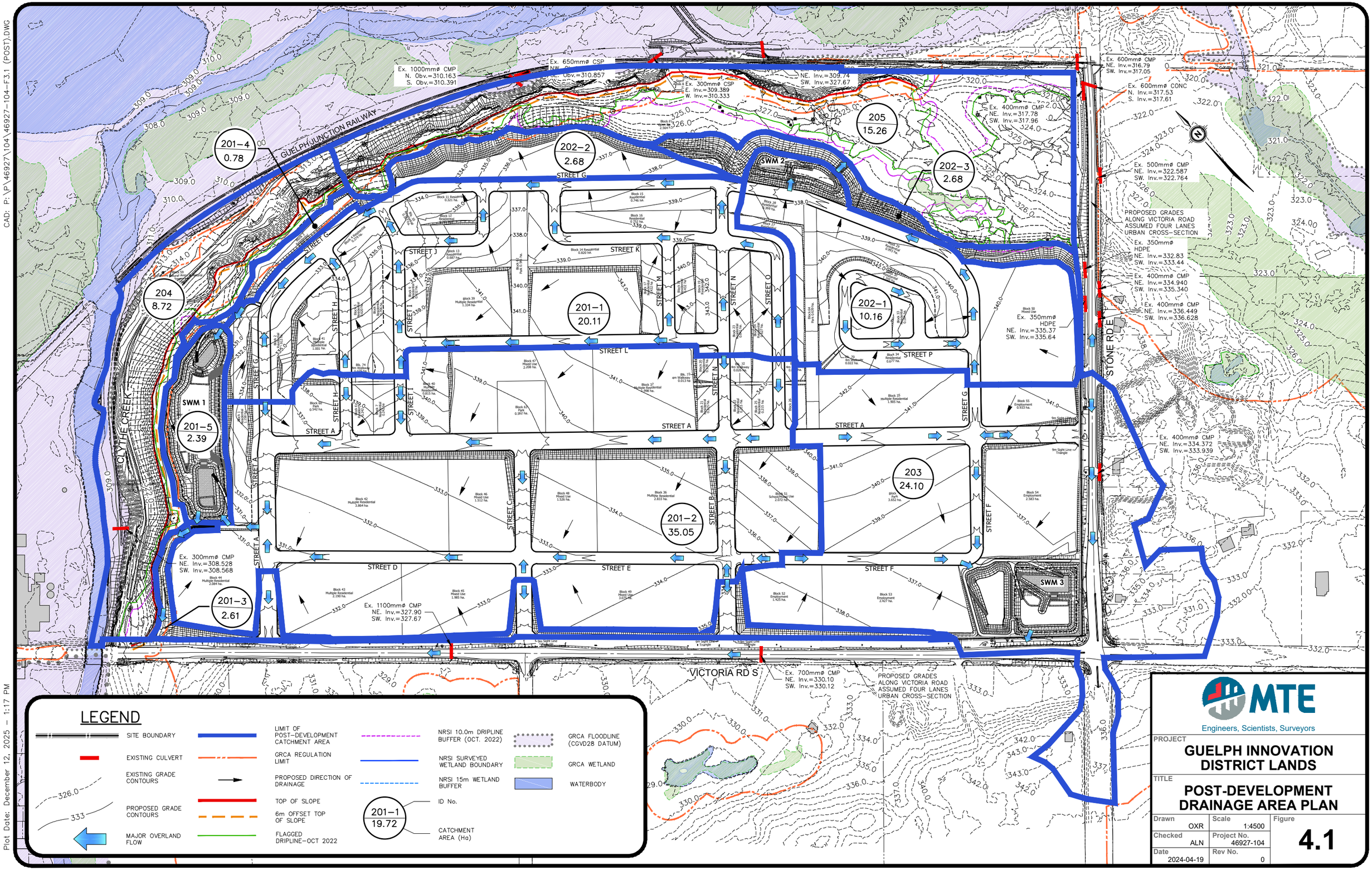
Outlet 3

- **Catchment 203** – Catchment 203 consists of the southwestern portion of the developed lands and external lands surrounding the Victoria-Stone intersection. This catchment is proposed to drain to SWMF 3. The drainage area contains a combination of existing single-family residential and aggregate extraction land uses, with a proposed multiple residential block, employment blocks, an institutional block, a park block, and SWMF 3 itself. The average overland slope is approximately 4.0% and the drainage area is approximately 24.10ha.

Undeveloped Areas

- **Catchment 204** – this catchment is 8.72ha in size, agricultural/open space land use. For modelling purposes, the average slope is approximately 11.0%. The majority of overland flow drains north. The ultimate outlet is considered to be the Eramosa River to the north.
- **Catchment 205** – this catchment is 15.26ha in size and is not proposed to be developed from its existing agricultural/open space land use. For modelling purposes, the average slope is approximately 11.0%. The majority of overland flow drains east. The ultimate outlet is considered to be the Eramosa River to the east.

All SWMFs are designed to outlet to the Eramosa River, through a combination of piped and overland flows. SWMF 3 includes the amalgamation of existing SWMF No. 104 and is designed as a wet pond with an infiltration cell. This will help maintain existing groundwater recharge in the area, currently being provided by the existing facility.



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Plot Date: December 12, 2025 – 1:17 PM

March 7, 2025 — 2:07 p.m. — Plotted By: ALee

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5.0 STORMWATER MANAGEMENT DESIGN

5.1 Hydrologic Modeling

As previously mentioned in Section 3.2, a 5-year storm event existing conditions model was developed using the SWMHYMO modelling platform. The model was then updated to reflect assumed proposed conditions and SWM strategies within the subject lands to create a proposed hydrologic model. The proposed conditions were also modelled for the 25 and 100-year return period rainfall events (3-hour Chicago distribution derived from the City's IDF parameters). Per the GRCA's request, the Regional (Hurricane Hazel) storm event was also modelled to confirm overland flow route conveyance capacity throughout.

It should be noted that pre-development models were not created for the 25-year and 100-year storm events. As previously mentioned, allowable release rates for these storm events are calculated using the established Unitary Discharge Rates from the 2020 *GID SWM Study*.

The pre- and post-development modelling is included in **Appendix B**. The IDF and hydrologic parameters for each of the pre- and post-development catchment areas are included in **Appendix C**.

5.2 Stormwater Management Facilities

The subject lands are located within the Eramosa-Blue Springs Subwatershed. The southwestern portion of the subject lands, along with existing lands south of Stone Road and west of Victoria Road will utilize a stormwater management facility (SWMF3) located at the northeast corner of Victoria Road and Stone Road. The southeastern portion of the subject lands will utilize a stormwater management facility (SWMF2) located at the eastern end of the development adjacent to the Significant Natural Areas. The remainder of the subject lands will utilize a stormwater management facility (SWMF1) at the northern end of the development adjacent to the Eramosa River.

5.3 Water Quality Control

The proposed SWMFs are designed as wet ponds with permanent pool depths of 1.5m. The facilities will incorporate sediment forebays with a depth of 1.5m, which offer benefits of dilution and settling of sediment. A planting scheme will be prepared that carefully selects plant species and their location in and around the basins to stabilize banks, mitigate temperature increases, deter waterfowl from nesting within the area, and provide aesthetics and safety benefits.

Since the majority of annual rainfall occurs in storms less than or equal to a 25mm event, the majority of water borne sediment is also transported to the stormwater management facilities in these less intense events. Therefore, the sediment forebays are designed targeting the smaller flow events. Furthermore, since larger storm events will have greater peak flows, there is potential for re-suspension of accumulated sediment. To achieve this objective, the forebay has been designed to avoid scour with storm pipes flowing at capacit. Flows greater than the 5 year event will be directed overland, directly into the main cell of each SWMF.

The forebay design is based on classic particle settling and flow dispersion equations as presented in the MECP's 2003 *SWM Manual*. The methodology presented in that document suggests that the design flow for the forebay should be taken as the peak outflow from the facility. The main cell will essentially be empty (or at its permanent pool level) and there will be no mass of water at the outlet of the forebay that would control the flow through the forebay to the main pond's discharge rate.

This being the case, the design of the forebay should be based on the notion that the flow into the forebay equals the flow through the forebay, which equals the flow out of the forebay. In using this approach, the recommended settling velocity of 0.0003m/s (from MECP, 2003) results in extremely large and unachievable forebay lengths. Therefore, the forebay is designed to satisfy the following four conditions:

- Settling length based on a settling velocity of 0.0003m/s (from MECP, 2003) in order to settle finer particles using the main pond peak discharge for the 25mm event;
- Settling length based on a settling velocity of 0.0055m/s in order to settle "Gross Grit" particle sizes using the forebay inflow/outflow for the 25mm event;
- Dispersion length such that, based on flow and depth of water, the velocity through the forebay is less than 0.5m/s; and,
- Velocity based on flow divided by cross-sectional area is less than 0.15m/s to prevent scouring.

The 2003 MOE document suggests that the clean-out frequency for a stormwater management facility be based on the sediment loading within the entire pond, however, it is recommended that the clean-out frequency be based on the loadings within the forebay only. The MOE SWM manual states that an appropriate pond cleanout frequency is 10 years. Through discussions with the City during Block Plan approval, it was determined that due to operation constraints, the City would prefer cleanout frequency of 20 years with a maximum depth of 0.50m of sediment accumulation in the forebay. As such the SWM facilities were initially designed to meet all MOE requirements, and the forebays were then oversized to achieve the increased cleanout frequency. The clean-out frequency for the proposed SWM facilities can be found in the respective forebay design calculations in **Appendix C**.

5.3.1 SWM Facility 1

The total drainage area for SWMF 1 (Catchments 201-1, 201-2, and 201-5) is 57.55ha at 68.1% imperviousness. The MECP requires 221m^3/ha of total storage for an Enhanced level wet pond, 40m^3/ha of which is extended detention, so the required permanent pool and extended detention volumes for SWMF 1 are 10,398m^3 and 2,302m^3, respectively.

The combined forebays and main pond have permanent pool volumes of 4,027m^3 and 8,998m^3, respectively, for a total permanent pool volume of 13,025m^3. Therefore, SWMF 1 has adequately provided the minimum required permanent pool volume per MECP guidelines.

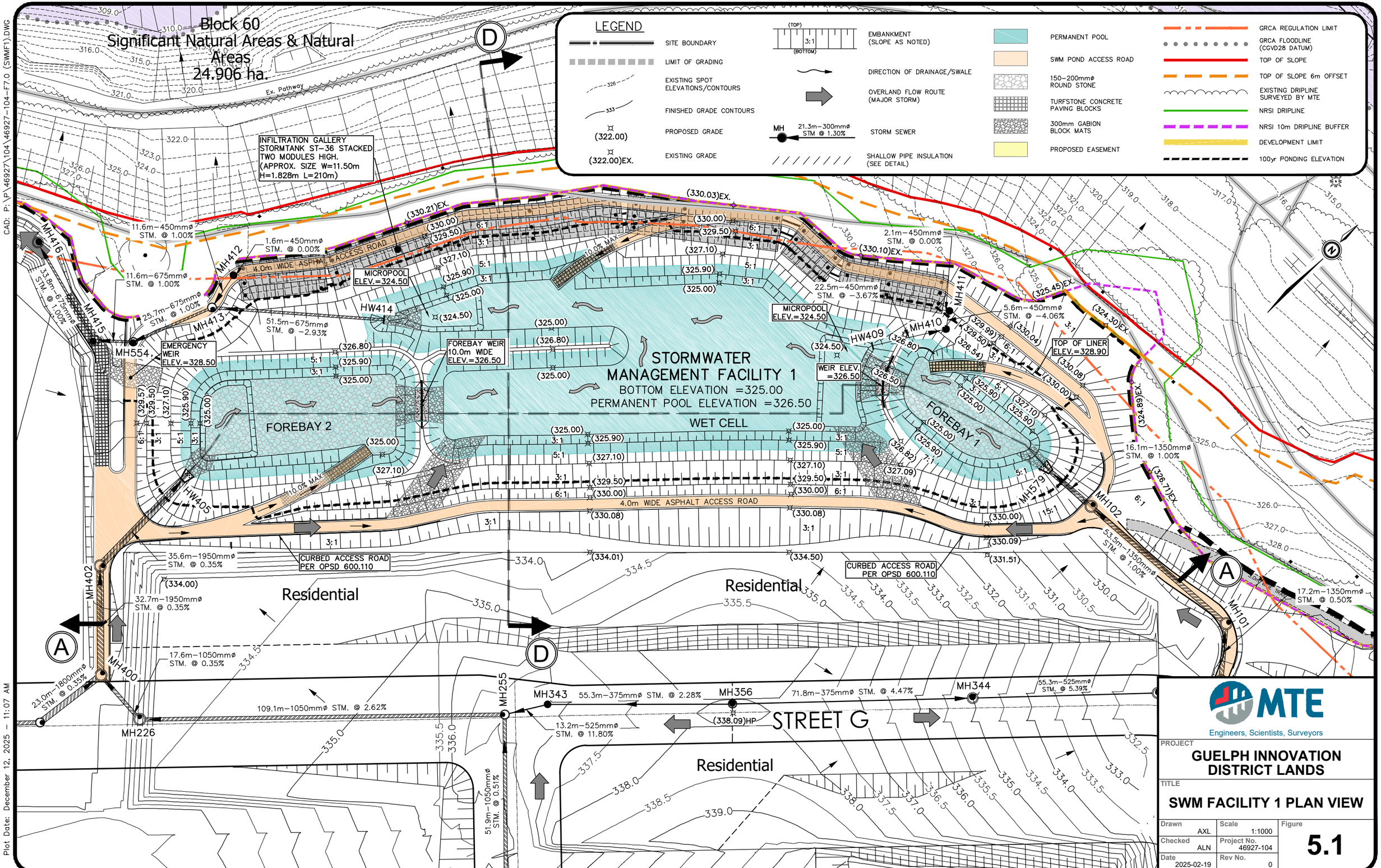
The SWMF 1 design characteristics are summarized in **Table 5.1** below. Refer to **Figure 5.1** to **Figure 5.5** for plan and profile details of the SWMF.

This SWMF will outlet through a dedicated storm sewer within an easement along the northern limits of the subject lands. Similarly, a conveyance channel will be graded within the same easement, with the capacity for the excess flow leaving the pond caused by the 100-year and Regional storm events. The combination of these two outlets will be designed to convey all storm event flows from the facility. The ultimate Outlet 1 is north to the Eramosa River, along the eastern side of Victoria Road South.

Refer to **Appendix C** for the appropriate SWMF design sheets and calculations.

Table 5.1 – SWM Facility 1 Design Characteristics

General	Facility Characteristics
Stormwater Management Facility Type	Wet pond
Required MECP Water Quality Protection	Enhanced
Total Contributing Area	57.55ha
Imperviousness	68.15%
Bottom Elevation (of main facility)	325.00m
Storage	
Unit Area Storage Volume Requirements as per SWMMP (MOE, 2003)	221m^3/ha
Required Total Volume	12,700m^3
Permanent Pool	
Required Permanent Pool Volume	10,398m^3
Permanent Pool Volume Provided	13,025m^3
Permanent Pool Elevation	326.50m
Water Quantity Control – 5-year Minor Storm Event	
Resulting Storage Volume	16,480m^3
Ponding Elevation	327.76m
Peak Outflow	0.163m^3/s
Water Quantity Control – 100-year Major Storm Event	
Resulting Storage Volume	27,140m^3
Ponding Elevation	328.45m
Peak Outflow	0.814m^3/s
Forebay	
Required Forebay Length (East / West)	39.7m / 65.3m
Actual Forebay Length (East / West)	46.7m / 65.3m
Permanent Pool Elevation	326.50m
Bottom Elevation	325.00m
Outlet Controls	
Orifice 1 Diameter (To Infiltration Gallery)	450mm
Orifice 1 Elevation (To Infiltration Gallery)	326.50m
Orifice 2 Diameter (Outlet)	675mm
Orifice 2 Elevation (Outlet)	327.50m



November 25, 2025 — 2:06 p.m. — Plotted By: ORahmaty

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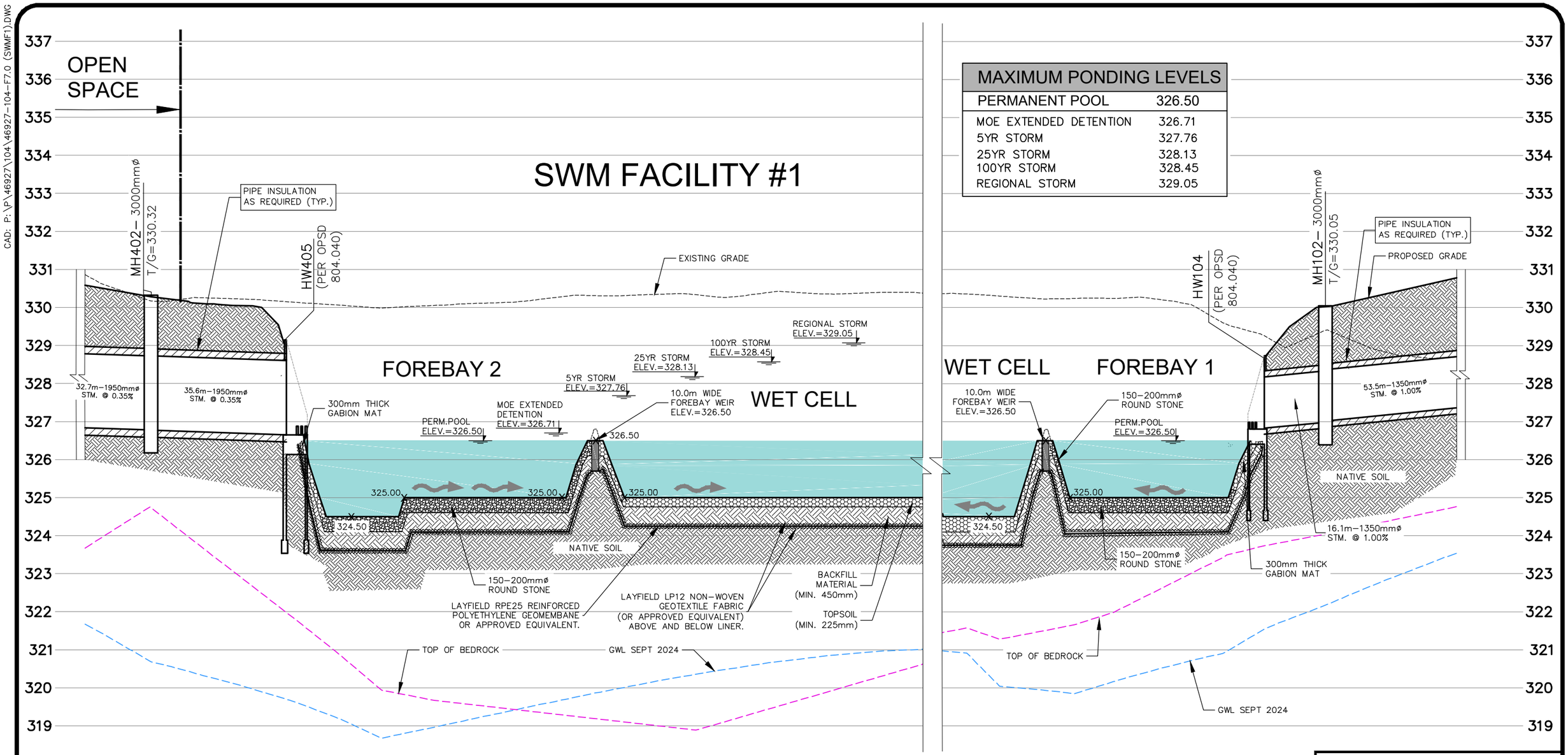

SWM FACILITY 1 - CROSS SECTION A-A

SCALE - H 1:1000 V 1:100

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PROJECT: GUELPH INNOVATION DISTRICT LANDS		
TITLE: SWM FACILITY 1 SECTION A-A		
Drawn: AXL	Scale: H 1:1000 V 1:100	Figure: 5.2
Checked: ALN	Project No.: 46927-104	
Date: 2025-02-19	Rev No.: 0	

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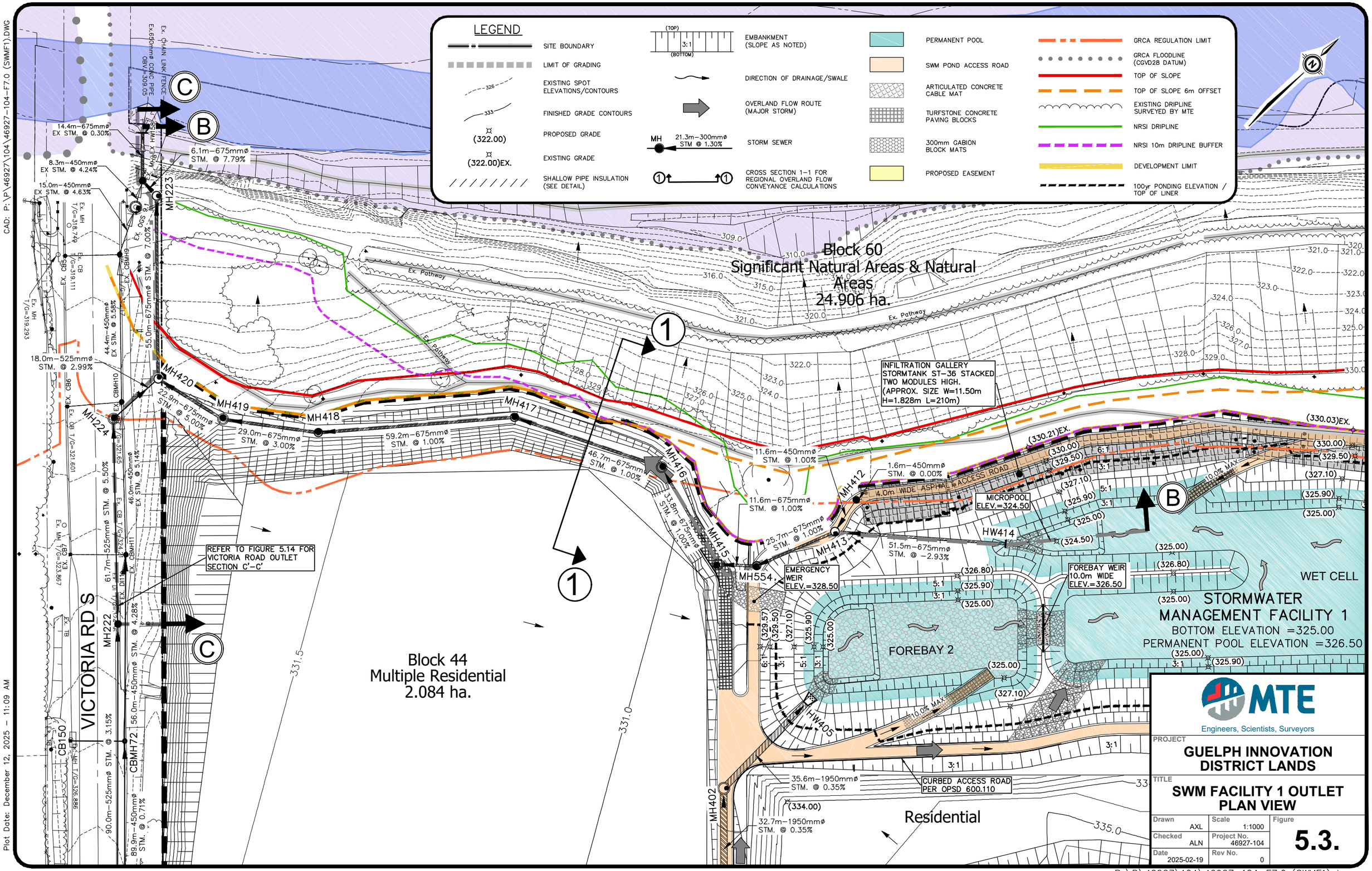

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Plot Date: December 12, 2025 – 11:09 AM

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PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
SWM FACILITY 1 OUTLET PLAN VIEW

Drawn	Scale	Figure
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Checked	Project No.	
ALN	46927-104	
Date	Rev No.	
2025-02-19	0	

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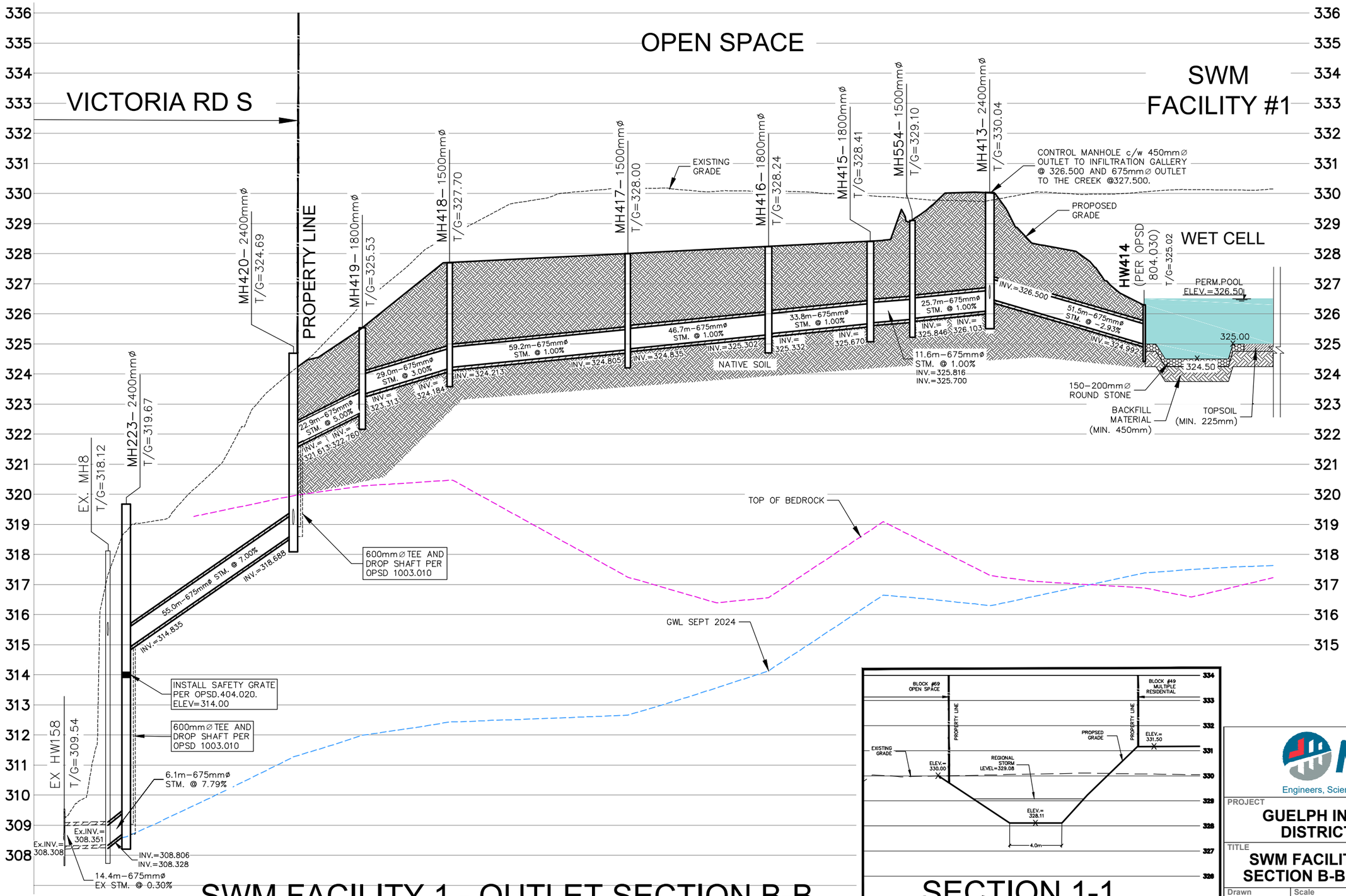
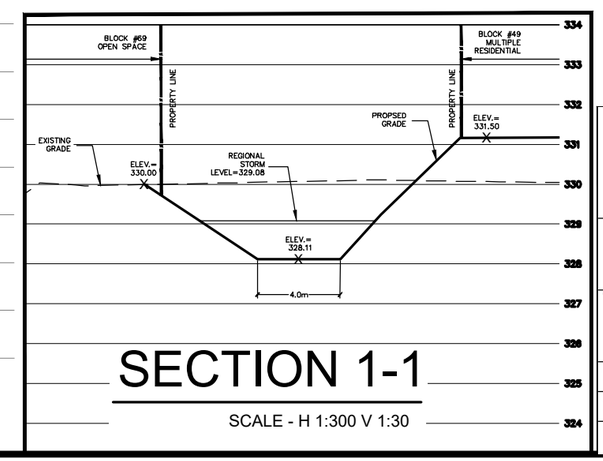


SWM FACILITY 1 - OUTLET SECTION B-B

SCALE - H 1:1250 V 1:125



SECTION 1-1

SCALE - H 1:300 V 1:30

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PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
SWM FACILITY 1 OUTLET SECTION B-B, SECTION 1-1

Drawn	Scale	Figure
AXL	AS SHOWN	5.4.
Checked	Project No.	
ALN	46927-104	
2025-02-19	Rev No. 0	

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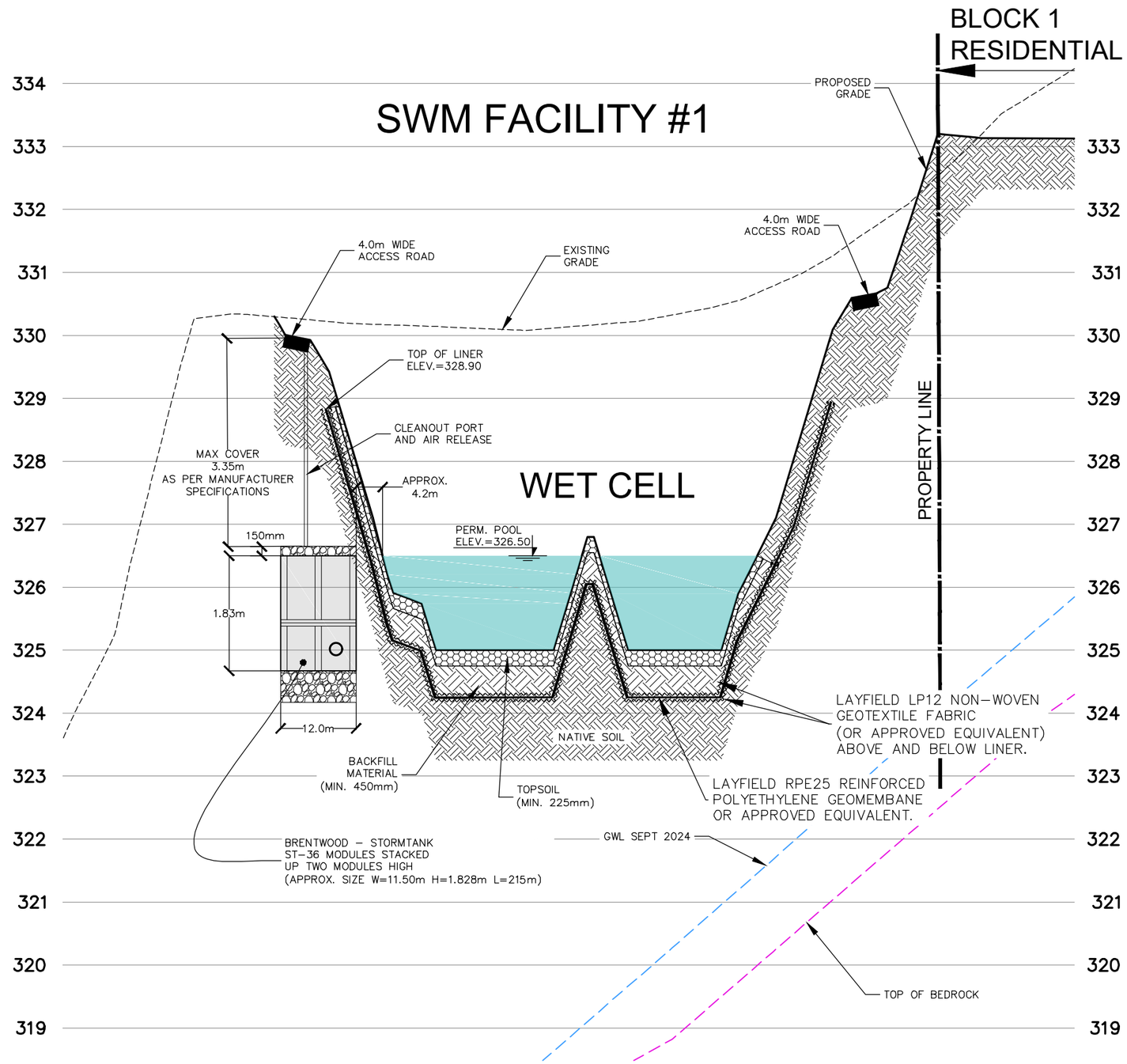

SWM FACILITY 1 - CROSS SECTION D-D

SCALE - H 1:750 V 1:75

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GUELPH INNOVATION DISTRICT LANDS

SWM FACILITY 1 SECTION INFILTRATION GALLERY DETAIL

AXL	Scale H 1:750 V 1:75	Figure **5.5.**
Checked ALN	Project No. 46927-104	
2025-02-19	Rev No. 0	

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Plot Date: December 12, 2025 – 11:17 AM

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5.3.2 SWM Facility 2

The total drainage area for SWMF 2 (Catchment 202-1) is 10.16ha at 66.0% imperviousness. The MECP requires 216m^3/ha of total storage for an Enhanced level wet pond, 40m^3/ha of which is extended detention, so the required permanent pool and extended detention volumes for SWMF 2 are 1,785m^3 and 407m^3, respectively.

The forebay and main pond have permanent pool volumes of 1,199m^3 and 1,677m^3, respectively, for a total permanent pool volume of 2,877m^3. Therefore, SWMF 2 has adequately provided the minimum required permanent pool volume per MECP guidelines.

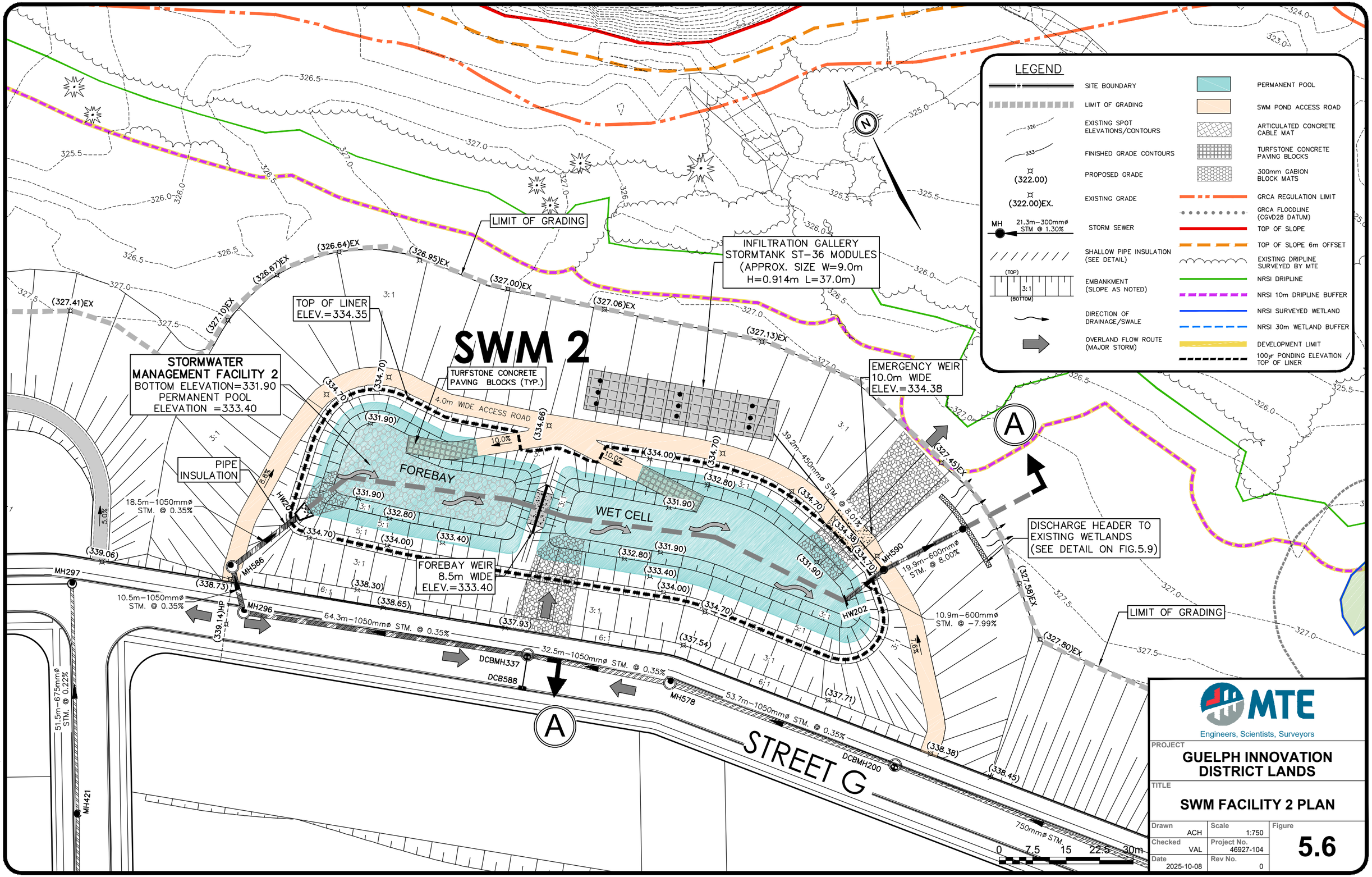
The SWMF 2 design characteristics are summarized in **Table 5.2** below. Refer to **Figure 5.6** to **Figure 5.7** for plan and profile details of the SWMF.

The pond is situated within the existing topography of the Significant Valleyland. The outlet from this SWMF will be directed northward through a spreader berm, mimicking existing drainage patterns. Flow will be conveyed through natural depressions within the downstream Natural Areas, travelling approximately 130m before reaching the existing slope, and then flowing towards the existing 1.8m wide box culvert beneath the adjacent railway. This culvert will then direct flow to Outlet 2; east to the Eramosa River. Further investigations into the existing conditions of the culvert, and the subsequent 650mm diameter CSP culvert beneath the trail, will be required to ensure the culverts can function as intended under the proposed development conditions.

Refer to **Appendix C** for the appropriate SWMF design sheets and calculations.

Table 5.2 – SWM Facility 2 Design Characteristics

General	Facility Characteristics
Stormwater Management Facility Type	Wet pond
Required MECP Water Quality Protection	Enhanced
Total Contributing Area	10.16ha
Imperviousness	66.0%
Bottom Elevation (of main facility)	331.90m
Storage	
Unit Area Storage Volume Requirements as per SWMMP (MOE, 2003)	216m^3/ha
Required Total Volume	2,191m^3
Permanent Pool	
Required Permanent Pool Volume	1,785m^3
Permanent Pool Volume Provided	2,877m^3
Permanent Pool Elevation	333.40m
Water Quantity Control – 5-year Minor Storm Event	
Resulting Storage Volume	2,169m^3
Ponding Elevation	334.07m
Peak Outflow	0.149m^3/s
Water Quantity Control – 100-year Major Storm Event	
Resulting Storage Volume	3,233m^3
Ponding Elevation	334.35m
Peak Outflow	0.580m^3/s
Forebay	
Required Forebay Length	15.5m
Actual Forebay Length	38.4m
Permanent Pool Elevation	333.40m
Bottom Elevation	331.90m
Outlet Controls	
Orifice 1 Diameter	130mm
Orifice 1 Elevation	333.40m
Cutout Weir Width	1.2m
Cutout Weir Elevation	333.91m
Emergency Overflow Weir Width	10.0m
Emergency Overflow Weir Elevation	334.38m



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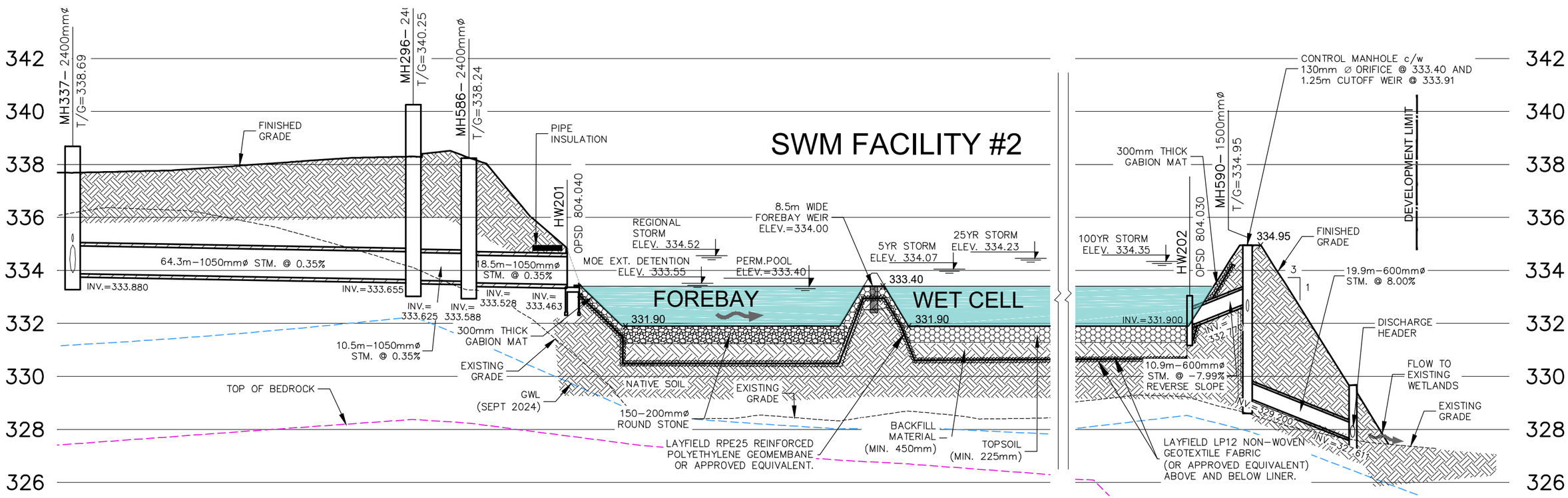

SWM FACILITY 2 - CROSS SECTION A-A

SCALE - H 1:750 V 1:150

MAXIMUM PONDING LEVELS	
PERMANENT POOL	333.40
MOE EXTENDED DETENTION	333.55
25mm STORM	333.90
5YR STORM	334.07
25YR STORM	334.23
100YR STORM	334.35
REGIONAL STORM	334.52

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TITLE
SWM FACILITY 2 SECTION A-A

Drawn	Scale	Figure
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Date 2025-10-28	Rev No. 0	

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Plot Date: December 12, 2025 – 11:35 AM

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5.3.3 SWM Facility 3

The total drainage area for SWMF 3 (Catchment 203) is 24.10ha at 72.0% imperviousness. The MECP requires 228m^3/ha of total storage for an Enhanced level wet pond, 40m^3/ha of which is extended detention, so the required permanent pool and extended detention volumes for SWMF 3 are 4,538m^3 and 964m^3, respectively.

The forebay and main pond have permanent pool volumes of 2,695m^3 and 5,134m^3, respectively, for a total permanent pool volume of 7,829m^3. Therefore, SWMF 3 has adequately provided the minimum required permanent pool volume per MECP guidelines.

The SWMF 3 design characteristics are summarized in **Table 5.3** below. Refer to **Figure 5.8** to **Figure 5.11** for plan and profile details of the SWMF.

All storm events up to and including the 100-year storm event will be fully infiltrated within the proposed infiltration cell of the facility. Therefore, no surface runoff will be generated or outlet from the facility.

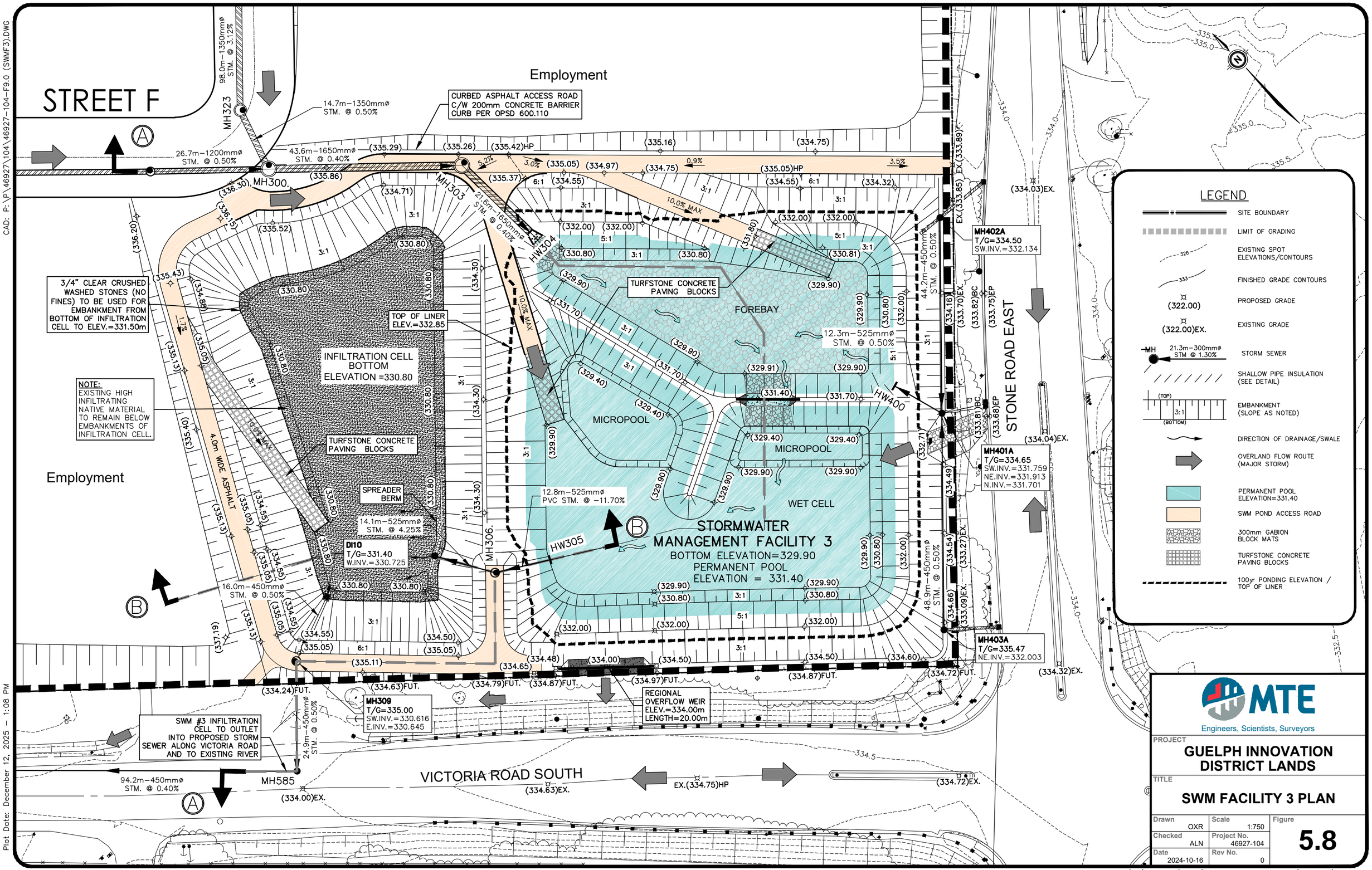
The design of SWMF 3 also includes the ‘retrofit’ (or amalgamation) of the existing SWMF No. 104 at the Victoria-Stone intersection. The three existing inlets to SWMF No. 104 will be combined to a single pipe and outlet through a newly proposed inlet headwall located within SWMF 3’s forebay.

Refer to **Appendix C** for the appropriate SWMF design sheets and calculations.

Table 5.3 – SWM Facility 3 Design Characteristics

General	Facility Characteristics
Stormwater Management Facility Type	Wet pond
Required MECP Water Quality Protection	Enhanced
Total Contributing Area	24.90ha
Imperviousness	72.0%
Bottom Elevation (of main facility)	329.90m
Storage	
Unit Area Storage Volume Requirements as per SWMMP (MOE, 2003)	228m^3/ha
Required Total Volume	5,503m^3
Permanent Pool	
Required Permanent Pool Volume	4,538m^3
Permanent Pool Volume Provided	7,830m^3
Permanent Pool Elevation	331.40m
Water Quantity Control – 5-year Minor Storm Event	
Resulting Storage Volume (Wet Cell)	7,200m^3
Resulting Storage Volume (Infiltration Cell)	120m^3
Ponding Elevation (Wet Cell)	332.36m
Ponding Elevation (Infiltration Cell)	330.85m
Peak Outflow	0.000m^3/s*
Water Quantity Control – 100-year Major Storm Event	
Resulting Storage Volume (Wet Cell)	13,510m^3
Resulting Storage Volume (Infiltration Cell)	1,732m^3
Ponding Elevation (Wet Cell)	333.10m
Ponding Elevation (Infiltration Cell)	331.39m
Peak Outflow	0.000m^3/s*
Forebay	
Required Forebay Length	33.5m
Actual Forebay Length	57.7m
Permanent Pool Elevation	331.40m
Bottom Elevation	329.90m
Outlet Controls	
Orifice 1 Diameter	100mm
Orifice 1 Elevation	331.22m
Orifice 2 Diameter	100mm
Orifice 2 Elevation	331.60m
Emergency Overflow Weir Width	15.0m
Emergency Overflow Weir Elevation	334.80m

*Note: There is no outflow from SWMF 3 as storms up to and including the 100-year event are fully infiltrated within the infiltration cell.


STREET F
Employment
CURBED ASPHALT ACCESS ROAD C/W 200mm CONCRETE BARRIER CURB PER OPSD 600.110
98.0m–1350mmø STM. @ 3.12%
14.7m–1350mmø STM. @ 0.50%
26.7m–1200mmø STM. @ 0.50%
43.6m–1650mmø STM. @ 0.40%
21.6m–1650mmø STM. @ 0.40%
MH323
MH300
MH303
HW304
MH306
HW305
HW400
3/4" CLEAR CRUSHED WASHED STONES (NO FINES) TO BE USED FOR EMBANKMENT FROM BOTTOM OF INFILTRATION CELL TO ELEV.=331.50m
TOP OF LINER ELEV.=332.85
INFILTRATION CELL BOTTOM ELEVATION =330.80
NOTE: EXISTING HIGH INFILTRATING NATIVE MATERIAL TO REMAIN BELOW EMBANKMENTS OF INFILTRATION CELL.
TURFSTONE CONCRETE PAVING BLOCKS
SPREADER BERM
4.0m WIDE ASPHALT
Employment
DI10
T/G=331.40
W.INV.=330.725
14.1m–525mmø STM. @ 4.25%
16.0m–450mmø STM. @ 0.50%
12.8m–525mmø PVC STM. @ –11.70%
12.3m–525mmø STM. @ 0.50%
FOREBAY
MICROPOOL
MICROPOOL
WET CELL
STORMWATER MANAGEMENT FACILITY 3
BOTTOM ELEVATION=329.90
PERMANENT POOL ELEVATION = 331.40
44.2m–450mmø STM. @ 0.50%
48.9m–450mmø STM. @ 0.50%
MH402A
T/G=334.50
SW.INV.=332.134
MH401A
T/G=334.65
SW.INV.=331.759
NE.INV.=331.913
N.INV.=331.701
MH403A
T/G=335.47
NE.INV.=332.003
STONE ROAD EAST
MH309
T/G=335.00
SW.INV.=330.616
E.INV.=330.645
REGIONAL OVERFLOW WEIR ELEV.=334.00m LENGTH=20.00m
SWM #3 INFILTRATION CELL TO OUTLET INTO PROPOSED STORM SEWER ALONG VICTORIA ROAD AND TO EXISTING RIVER
24.9m–450mmø STM. @ 0.50%
94.2m–450mmø STM. @ 0.40%
MH585
VICTORIA ROAD SOUTH
LEGEND
SITE BOUNDARY
LIMIT OF GRADING
EXISTING SPOT ELEVATIONS/CONTOURS
FINISHED GRADE CONTOURS
PROPOSED GRADE
EXISTING GRADE
STORM SEWER
SHALLOW PIPE INSULATION (SEE DETAIL)
EMBANKMENT (SLOPE AS NOTED)
DIRECTION OF DRAINAGE/SWALE
OVERLAND FLOW ROUTE (MAJOR STORM)
PERMANENT POOL ELEVATION=331.40
SWM POND ACCESS ROAD
300mm GABION BLOCK MATS
TURFSTONE CONCRETE PAVING BLOCKS
100yr PONDING ELEVATION / TOP OF LINER
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PROJECT
GUELPH INNOVATION DISTRICT LANDS
TITLE
SWM FACILITY 3 PLAN
Drawn OXR
Scale 1:750
Figure 5.8
Checked ALN
Project No. 46927-104
Date 2024-10-16
Rev No. 0
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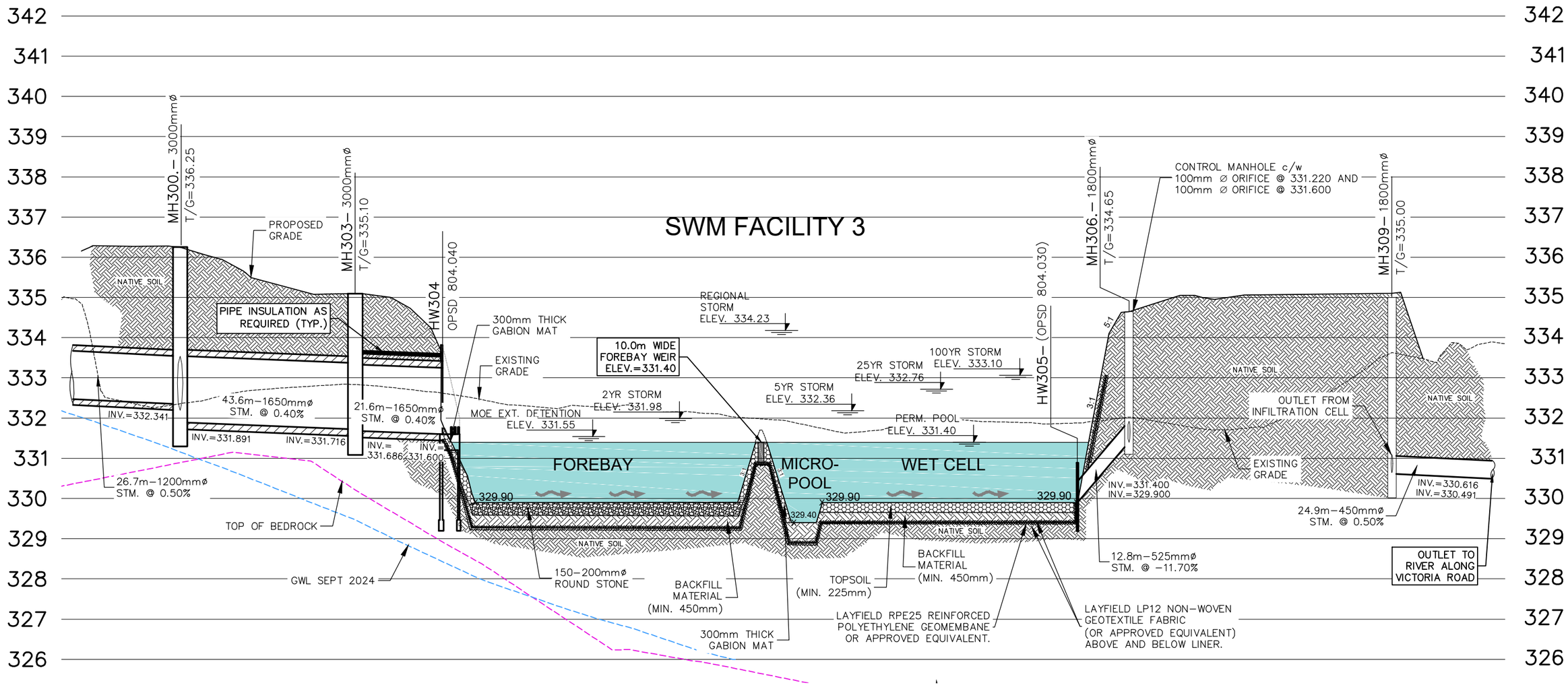

SWM FACILITY 3 - CROSS SECTION A-A

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PROJECT: GUELPH INNOVATION DISTRICT LANDS		
TITLE: SWM FACILITY 3 SECTION		
Drawn: OXR	Scale: H 1:1000 V 1:100	Figure: 5.9
Checked: ALN	Project No.: 46927-104	
Date: 2024-10-16	Rev No.: 0	

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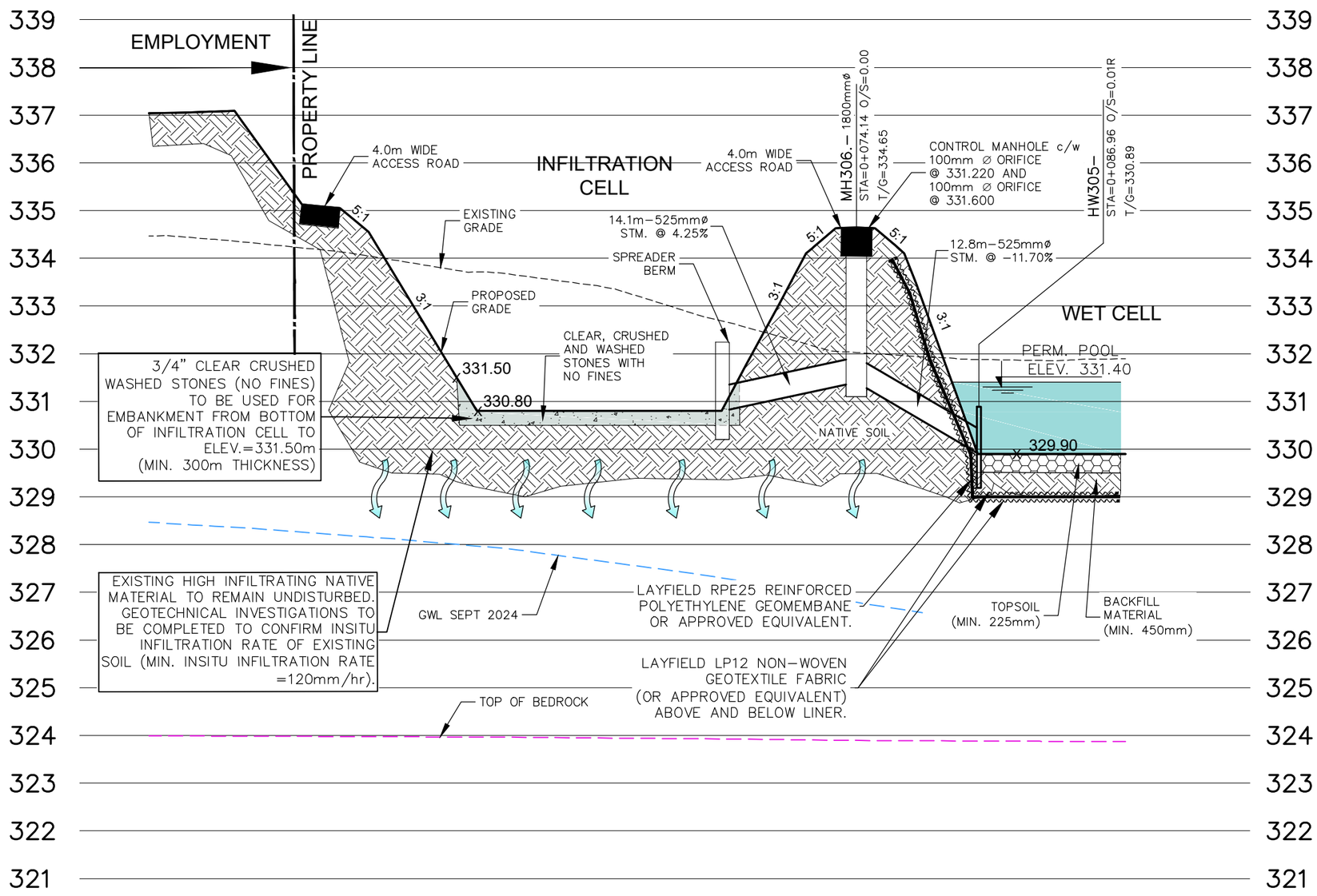

MAXIMUM PONDING LEVELS (NON-WINTER CONDITIONS)	
PERMANENT POOL	331.40
MOE EXTENDED DETENTION	331.55
5YR STORM	332.36
25YR STORM	332.76
100YR STORM	333.10
REGIONAL STORM	334.23

INFILTRATION CELL PONDING LEVELS	
CELL BOTTOM	330.80
5YR STORM	330.85
25YR STORM	331.12
100YR STORM	331.50

SWM FACILITY 3 - CROSS SECTION B-B

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PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
SWM FACILITY 3 SECTION

Drawn	Scale	Figure
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Date: 2024-10-16	Rev No. 0	

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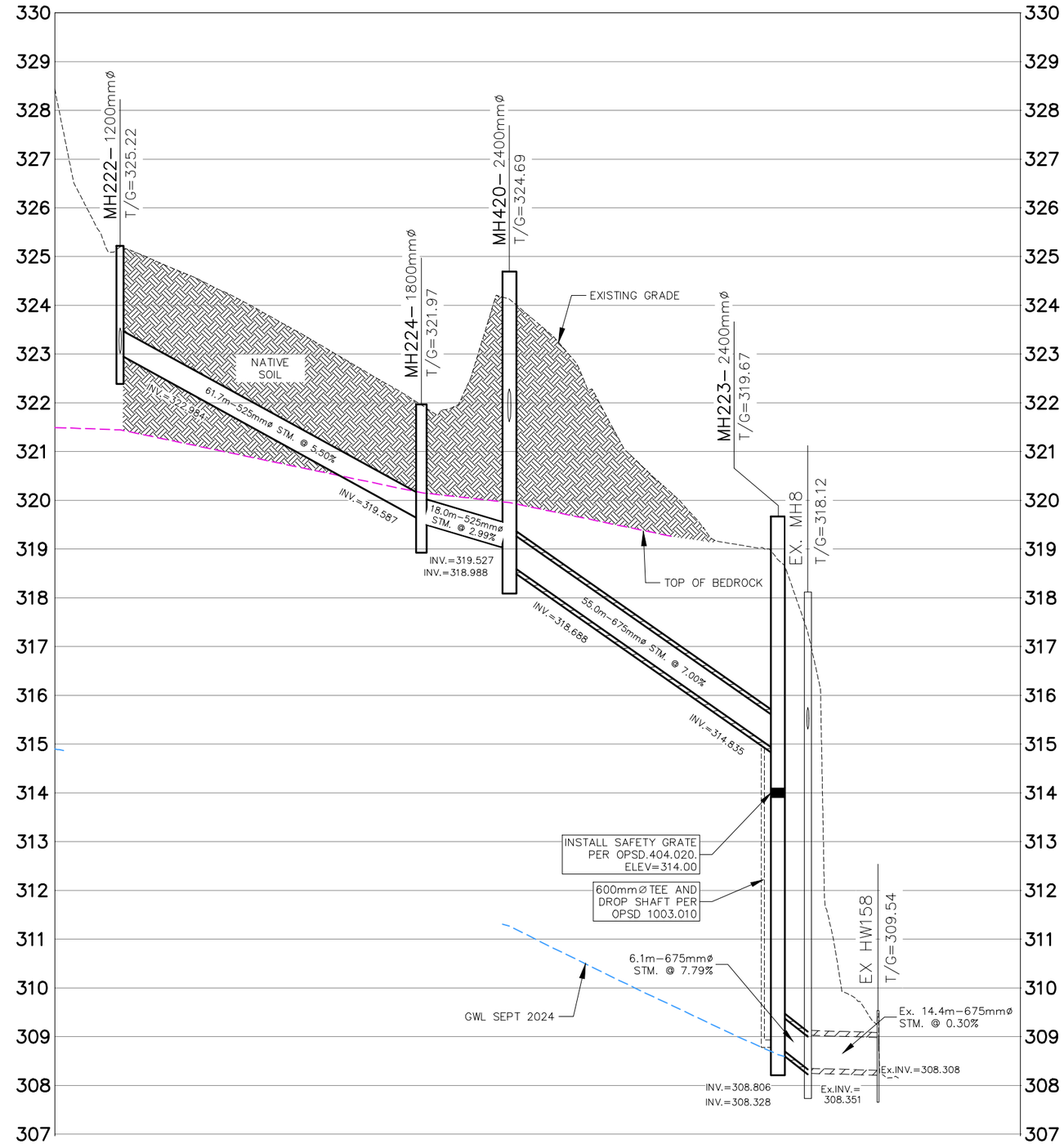

VICTORIA ROAD OUTLET SECTION C'-C'

SCALE - H 1:1000 V 1:100

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PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
VICTORIA ROAD OUTLET SECTION C'-C'

Drawn	Scale	Figure
AXL	H 1:1000 V 1:100	5.11
Checked: ALN	Project No. 46927-104	
Date: 2025-02-19	Rev No. 0	

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5.4 Water Quantity Control

Flows for all storm events will be conveyed to the SWMFs by a combination of storm sewers (sized for the 5-year storm event) and overland flow routes (road right-of-ways and designed channels). Similarly, the outlets from all SWMFs include a combination of piped flow and overflow channel design, to appropriately convey all storm event flows to their respective outlet locations. The post-development SWMHYMO modelling output is included in **Appendix B**.

5.4.1 SWM Facility 1

SWMF 1 incorporates a typical reverse slope pipe from within the permanent pool, which outlets into a control manhole through a 675mm diameter pipe at an elevation of 326.50m. This control manhole diverts minor storm event flows towards the proposed infiltration gallery within the northern SWMF embankment. Due to the length of the infiltration gallery, an additional 450mm dia. inlet pipe is provided at the east side of the wet cell to allow for a distributed flow into the gallery. Once the gallery becomes full, the overflow is directed back to the control manhole, in which an outlet pipe conveys runoff towards Outlet 1 (Eramosa River).

Due to existing storm sewer size constraints along Victoria Road South, the SWMF outlet is proposed to be a 675mm diameter pipe at a minimum 1.0% slope. This is adequately sized to convey the majority (in excess of 75%) of the 100-year storm event flow. Excess flow from this event and from the Regional storm will be conveyed north through a designed overflow channel, constructed along the northwestern property limits. A summary of the stage-storage-discharge relationship for SWMF 1 is provided in **Table 5.4** below. Refer to **Appendix C** for more details.

Table 5.4 – SWMF 1 Stage-Storage-Discharge Summary

Elevation (m)	Discharge (m^3/s)	Volume (m^3)	Remarks
326.50	0.000	0	375mm orifice / Permanent Pool
327.00	0.033	6,030	Contour
327.50	0.033	12,846	675mm Outlet / Contour
328.00	0.430	20,152	Contour
328.50	0.846	27,941	6.4m Emergency Overflow Weir
328.80	3.148	32,845	Freeboard

A summary of the peak flows from the facility and the associated maximum ponding elevations for the post-development conditions is summarized in **Table 5.5**. The results in this table also indicate the combined peak flows at Outlet 1, which include the additional uncontrolled areas previously discussed in Section 4.2. The results demonstrate that post-development peak flows can be attenuated to the SWM criteria outlined in Section 3.2. Active storage volume has been provided for the 100-year storm event to a maximum elevation of 328.45m, or 1.95m above the permanent pool elevation. Refer to the SWMHYMO output in **Appendix B** for more details.

Table 5.5 – Outlet 1 Quantity Control Summary

Storm Event	Ponding Elevation (m)	Required Storage Volume (m^3)[3]	Provided Storage Volume (m^3)[1]	SWMF Release Rate (m^3/s)	Uncontrolled Flow Rate (m^3/s)	Combined Release Rate (m^3/s)[2]	Allowable Release Rate (m^3/s)[3]
5-year	327.76	-	27,941	0.163	0.154	0.187	1.141
25-year	328.13	8,508		0.570	0.274	0.596	4.205
100-year	328.45	15,800		0.814	0.384	0.853	7.983
Regional	329.05	-		7.677	0.439	8.076	*6.606*[4]

*Note: 1. Provided active storage volume from permanent pool elevation to the emergency overflow weir invert.
2. Combined rates include the SWMF release rate and the additional uncontrolled flow to the respective 'Outlet' location.
3. Taken from Table 3.1
4. There is no quantity control requirement for the Regional storm. The existing release rate is noted under the allowable column for purposes of comparison to the proposed release rates, at the request of the GRCA.

5.4.2 SWM Facility 2

SWMF 2 incorporates a typical reverse slope pipe from within the permanent pool, which outlets into a control manhole through a 130mm diameter orifice plate at an elevation of 333.40m. Additional controls include a 1.25m wide cutout weir at an elevation of 333.91m to convey larger storm events.

Outlet flows will be conveyed east to Outlet 2 (Eramosa River) through an 600mm diameter pipe at a 8.00% slope, outletting through a discharge header.

The discharge header allows for the outflow of the pond, up to the 100-year storm, to be horizontally dispersed over the slope. The header will intercept flow from the single pipe outlet and redistribute it horizontally through gabion baskets before outletting to the existing surface. The discharge header will aim to mimic a natural storm flow over the existing surface, and eliminate concerns of the impacts of erosion.

It should be noted that SWMF 2 controls are governed by an additional peak flow analysis conducted on the existing box culvert's contributing drainage area. Proposed peak flows are such that pre-development flows to the culvert are not exceeded under post-development conditions. Refer to **Appendix B** for more details regarding the additional modelling results.

A summary of the stage-storage-discharge relationship for SWMF 2 is provided in**Table 5.6** below. Refer to **Appendix C** for more details.

Table 5.6 – SWMF 2 Stage-Storage-Discharge Summary

Elevation (m)	Discharge (m^3/s)	Volume (m^3)	Remarks
333.40	0.000	0	130mm orifice / Permanent Pool
333.60	0.014	585	Contour
333.80	0.021	1,224	Contour
333.90	0.024	1,564	1.25m Cutout Weir
334.20	0.320	2,661	Contour
334.40	0.6904	3,445	10.0m Emergency Overflow Weir
334.70	3.358	4,702	Freeboard

A summary of the peak flows from the facility and the associated maximum ponding elevations for the post-development conditions is summarized in **Table 5.7**. The results in this table also indicate the combined peak flows at Outlet 2, which include the additional uncontrolled areas

previously discussed in Section 4.2. The results demonstrate that post-development peak flows can be attenuated to the SWM criteria outlined in Section 3.2. Active storage volume has been provided for the 100-year storm event to a maximum elevation of 334.35m, or 0.95m above the permanent pool elevation. Refer to the SWMHYMO output in **Appendix B** for more details.

Table 5.7 – Outlet 2 Quantity Control Summary

Storm Event	Ponding Elevation (m)	Required Storage Volume (m^3)[4]	Provided Storage Volume (m^3)[1]	SWMF Release Rate (m^3/s)[2]	Uncontrolled Flow Rate (m^3/s)	Combined Release Rate (m^3/s)[3]	Allowable Release Rate (m^3/s)[4]
5-year	334.07	-	3,350	0.149	0.277	0.299	0.589
25-year	334.23	1,445		0.357	0.498	0.595	1.029
100-year	334.35	2,683		0.580	0.702	0.962	1.953
Regional	334.52	-		1.389	0.624	2.008	*3.421*[5]

*Note: 1. Provided active storage volume from permanent pool elevation to the emergency overflow weir invert.
2. SWMF release rates are governed by the Wetland 3 water balance requirements. Refer to **Appendix E** for more details.
3. Combined rates include the SWMF release rate and the additional uncontrolled flow to the respective 'Outlet' location.
4. Taken from Table 3.1.
5. There is no quantity control requirement for the Regional storm. The existing release rate is noted under the allowable column for purposes of comparison to the proposed release rates, at the request of the GRCA.

5.4.3 SWM Facility 3

Flow from SWMF 3 is controlled with a bottom draw 100mm diameter orifice and is conveyed from the wet cell through the control manhole located within the infiltration cell berm. All storms up to and including the 100-year event are conveyed to the infiltration cell, where they are ultimately fully infiltrated back into the ground. The infiltration cell is equipped with a ditch-inlet structure and outlet pipe, which is only utilized as an emergency outlet to maintain a maximum 0.6m ponding level within the cell.

Excess flow from larger storm events will be conveyed to the same outlet location through a designed SWM channel, constructed along the eastern side of Victoria Road South. As previously discussed, initial concepts for the road widening of Victoria Road South (by others) include this roadside SWM swale. This dedicated treatment and conveyance swale is to be utilized for major overland flow from SWMF 3. The final layout and design of this roadside feature is to be determined through the ongoing road EA.

A summary of the stage-storage-discharge relationship for SWMF 3 is provided in **Table 5.8** below. Refer to **Appendix C** for more details.

Table 5.8 – SWMF 3 Stage-Storage-Discharge Summary

Elevation (m)	Discharge (m^3/s) Wet Cell / Infiltration Cell	Volume (m^3) Wet Cell / Infiltration Cell	Remarks
329.90	- / -	- / -	Bottom of Wet Cell
330.80	- / 0.000	- / 0	Contour / Bottom of Infiltration Cell
331.40	0.000 / 0.037	0 / 1,771	Permanent Pool / DI Overflow
331.60	0.013 / 0.179	1,355 / 2,419	Contour / 100mm orifice
332.00	0.032 / -	4,339 / -	Contour
332.40	0.042 / -	7,545 / -	Contour
332.80	0.051 / -	10,933 / -	Contour
333.10	0.056 / -	13,598 / -	Contour
334.00	0.070 / -	22,251 / -	Overflow Weir
334.30	5.101 / -	25,324 / -	Freeboard

A summary of the peak flows from the facility and the associated maximum ponding elevations for the post-development conditions is summarized in **Table 5.9**. The results in this table also indicate the combined peak flows at Outlet 3, which include the additional uncontrolled areas previously discussed in Section 4.2. The results demonstrate that post-development peak flows can be attenuated to the SWM criteria outlined in Section 5.1.2. Active storage volume has been provided for the 100-year storm event to a maximum elevation of 333.10m, or 1.70m above the permanent pool elevation within the wet cell. Maximum ponding within the infiltration cell is maintained under the 0.6m up to and including the 100-year storm event. Refer to the SWMHYMO output in **Appendix B** for more details.

Table 5.9 – Outlet 3 Quantity Control Summary

Storm Event	Ponding Elevation (m) Wet Cell / Infiltration Cell	Required Storage Volume (m^3)[3]	Provided Storage Volume (m^3)[1]	SWMF Release Rate (m^3/s)	Combined Release Rate (m^3/s)[2]	Allowable Release Rate (m^3/s)[3]
5-year	332.36 / 330.85	-	22,251	0.037	0.037	0.382
25-year	332.76 / 331.12	3,079		0.037	0.037	1.663
100-year	333.10 / 331.39	5,718		0.037	0.037	3.157
Regional	334.23 / 331.50	-		3.319	3.319	*2.043*[4]

*Note: 1. Provided active storage volume from permanent pool elevation to the emergency overflow weir invert.
2. Combined rates include the SWMF release rate and the additional uncontrolled flow to the respective 'Outlet' location.
3. Taken from Table 3.1
4. There is no quantity control requirement for the Regional storm. The existing release rate is noted under the allowable column for purposes of comparison to the proposed release rates, at the request of the GRCA.

5.5 Overland Flow Conveyance

As discussed in Section 4.2, excess runoff from major storm events will flow overland to the SWM facilities, via the proposed right-of-ways and designed overland flow routes, where applicable.

As per Section 5.7 of the *Development Engineering Manual* the major system overland flow routes to the SWM facilities shall be designed to safely convey the 100-year storm and Regional Storm overland flow. The 100-year storm will govern the design of the overland flow routes in this case, as it produces larger peak flows, shown in the hydrologic modelling in **Appendix B.**

The *Development Engineering Manual* defines the major flow as flow in excess of the minor system capacity during period of surcharge or higher intensity events. As such the 100-year storm flows have been calculated using the Rational Method, and the capacity of the storm sewers have been subtracted to determine the overland flow rate at critical cross-sections. The cross sections were then modelled in FlowMaster to determine the level of flooding and confirm that the overland flow routes adequately convey the major flow during the 100-year storm. Where required, additional measures such as modified height barrier curb at the SWM inlets have been proposed to adequately convey the overland flows. Refer to **Appendix D** for calculations and more details.

5.6 Groundwater and Waterproofing Measures

As discussed in Section 4.1, 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 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 zone of influence is highlighted in **Figure 5.12**, 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, and are further explored within the *Functional Servicing Report*. MTE will work with the City to determine the most appropriate solution.

5.7 Water Balance Analysis

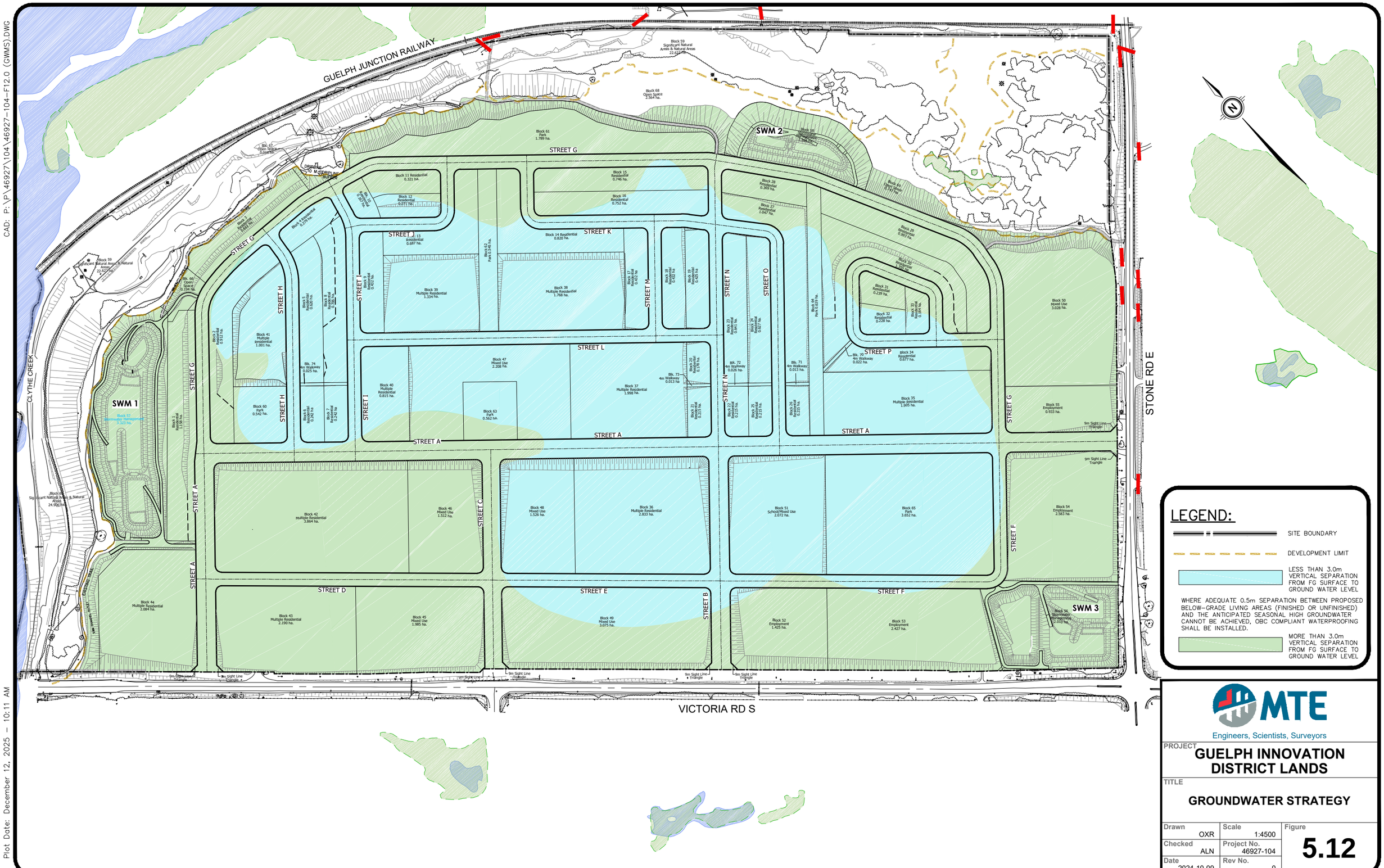
During typical urban developments, the conversion of previous vegetated areas to impervious surfaces leads to a decrease in evapotranspiration and infiltration volumes and an increase in runoff volumes. As stated in previous studies and in the City's *SWM Master Plan*, inputs to key natural features, e.g. groundwater resources and the Eramosa River, are to be maintained in post-development conditions. Therefore, a number of SWM practices are proposed within the development lands to achieve infiltration and water balance targets.

5.7.1 Infiltration

As identified in the *Master Plan Infiltration Policy*, one such target is the requirement for the 27mm capture in infiltrative LID BMPs in post-development conditions.

As previously stated, there are a number of site constraints which are not conducive to distributed infiltration techniques. High groundwater throughout, shallow underlying bedrock, relatively tight existing soil conditions, Valleyland slopes, grading requirements, and additional policy constraints based on WHPA vulnerability scores heavily dictate the overall infiltration strategy herein.

Due to the high groundwater, implementation of infiltrative measures will be restricted to the areas outside of the high groundwater zone. Runoff from within the high groundwater zone will be conveyed by the proposed storm sewer and outlet to end-of-pipe infiltration facilities, where



LEGEND:

- SITE BOUNDARY
- DEVELOPMENT LIMIT
- LESS THAN 3.0m VERTICAL SEPARATION FROM FG SURFACE TO GROUND WATER LEVEL

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.

- MORE THAN 3.0m VERTICAL SEPARATION FROM FG SURFACE TO GROUND WATER LEVEL

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TITLE
GROUNDWATER STRATEGY

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

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possible (e.g. infiltration galleries, SWM infiltration cell). Lot and block level infiltration galleries shall be constructed in all areas outside of the high groundwater zone.

Infiltration within Wellhead Protection Areas

The proposed infiltration infrastructure has been indicated in **Figure 5.13** and displays an overlay of the WHPA mapping. The *Master Plan Infiltration Policy* generally imposes restrictions on infiltration practices within WHPAs with vulnerability scoring of 8 or greater. Particularly the policy implements restrictions on infiltration of runoff from paved surfaces receiving winter maintenance. Given the site's location in a WHPA with vulnerability scoring between 8 and 10, meeting the infiltration criteria would be difficult due to these restrictions. Section 4.1 of the *Master Plan Infiltration Policy* does however provide exemptions at the City's discretion, should a site-specific hydrogeological study is completed.

When evaluating future infiltration of storm water on-site, we have considered Volume II of the Grand River Source Protection Plan. The Grand River Protection Plan identifies risks to municipal water quality and water supplies, and outlines policies and programs in order to reduce risk.

Specific source water protection policies relating to existing or future Stormwater Management with the City of Guelph are found in policy CG-MC-15.

CG-MC-15 states:

"For the existing or future discharge from a stormwater management facility within vulnerable areas where this activity is or would be a significant drinking water threat, the Ministry of the Environment, Conservation and Parks shall ensure that the Environmental Compliance Approval that governs the stormwater management facility includes appropriate terms and conditions to ensure that the activity ceases to be and/or never becomes a significant drinking water threat in the following vulnerable areas:

- *In Wellhead Protection Areas A and B where the vulnerability is equal to 10.*
- *In Wellhead Protection Areas in an Issue Contributing Area (ICA)."*

Currently MTE is proposing three Stormwater Management Facilities on-site, SWMF1, SWMF2, and SWMF3. SWMF1 and SWMF2 are located largely in areas identified as WHPA-B with a vulnerability score of 10, while SWMF3 i s located within WHPA-B with a vulnerability score of 8.

In order to determine if chloride is a significant threat MTE reviewed the Drinking Water Threats Table produced by the MECP (2018/2021). SWMF1 and SWMF2 is considered to have the following characteristics:

- SWMF1 Total Capture Area is 57.55ha, SWMF2 Total Capture Area is 10.16ha
- The predominant land use is low and medium density residential, mixed-use, employment lands, and park;
- Storm water management facility is a wet cell with a forebay designed to water to an infiltration cell (discharge storm water to groundwater);
- Located within a WHPA-B, vulnerability of 10.

Based on the above characteristics the risk associated with the circumstances is considered moderate. However, based on a review of on-site groundwater levels beneath SWMF1 and SWMF2 it is noted to flow off-site towards the Eramosa River. As such, infiltrating water will not impact groundwater source water supplies significantly as it will ultimately discharge to the adjacent surface water feature, which is not located within an Intake Protection Zone (IPZ) or

within a GUDI vulnerability area. As such, MTE is of the opinion that infiltration of storm water does not represent a significant drinking water threat.

In order to determine if chloride is a significant threat MTE reviewed the Drinking Water Threats Table produced by the MECP (2018/2021). SWMF3 is considered to have the following characteristics:

- Total Capture Area is 24.10ha;
- The predominant land use is medium density residential, employment lands and park;
- Storm water management facility is a wet cell with a forebay designed to water to an infiltration cell (discharge storm water to groundwater);
- Located within a WHPA-B, vulnerability of 8.

Based on the above characteristics the risk associated with the circumstances is considered low. As such, MTE is of the opinion that infiltration of storm water at SWMF3 does not represent a significant drinking water threat.

In conclusion, chloride is not considered a significant drinking water threat in the areas of the proposed SWMFs. MTE's opinion is that the proposed infiltration galleries on-site do not pose a significant drinking water threat. Additionally, a salt management plan will be developed during the detailed design phase.

Reduced Infiltration Target

Achieving the required 27mm capture across the entire development is impractical due to the limited available footprint for infiltration measures after all constraints are taken into consideration. As such, per the *Master Plan*, a reduced rainfall capture of up to 75% of 27mm should be targeted if the full 27mm capture is not feasible. This policy has been utilized for this study, and a full reduction to 20.25mm rainfall capture has been implemented.

The resulting infiltration volume for the entire development is 20,191.00m^3. A total of 7,180.20 m^3 will be passively infiltrated in the pervious areas. Active infiltration will be achieved via a combination of end-of-pipe infiltration galleries located in SWMF 1 and SWMF 2, an infiltration cell in SWMF 3, and various block/lot level infiltration galleries throughout the development, as indicated in **Figure 5.14** and summarized in **Table 5.10**. The design of the galleries will be further refined in future design stages as more information becomes available. Refer to **Appendix E** for preliminary sizing calculations of these infiltration galleries and overall infiltration volume calculations.

Table 5.10 – Summary of Infiltration Volumes

Infiltration Method	Infiltration Volume (m^3)
Passive Infiltration	7,180.20
Lot/Block Level Infiltration Galleries	4,659.10
End-of-pipe Infiltration Galleries/Cell	8,351.70
Total Infiltration Volume	20,191.00

Further analyses will be required at future final design stages, once more specific lot and building details become available, so that final infiltration volumes and proposed implementation measures can be confirmed.

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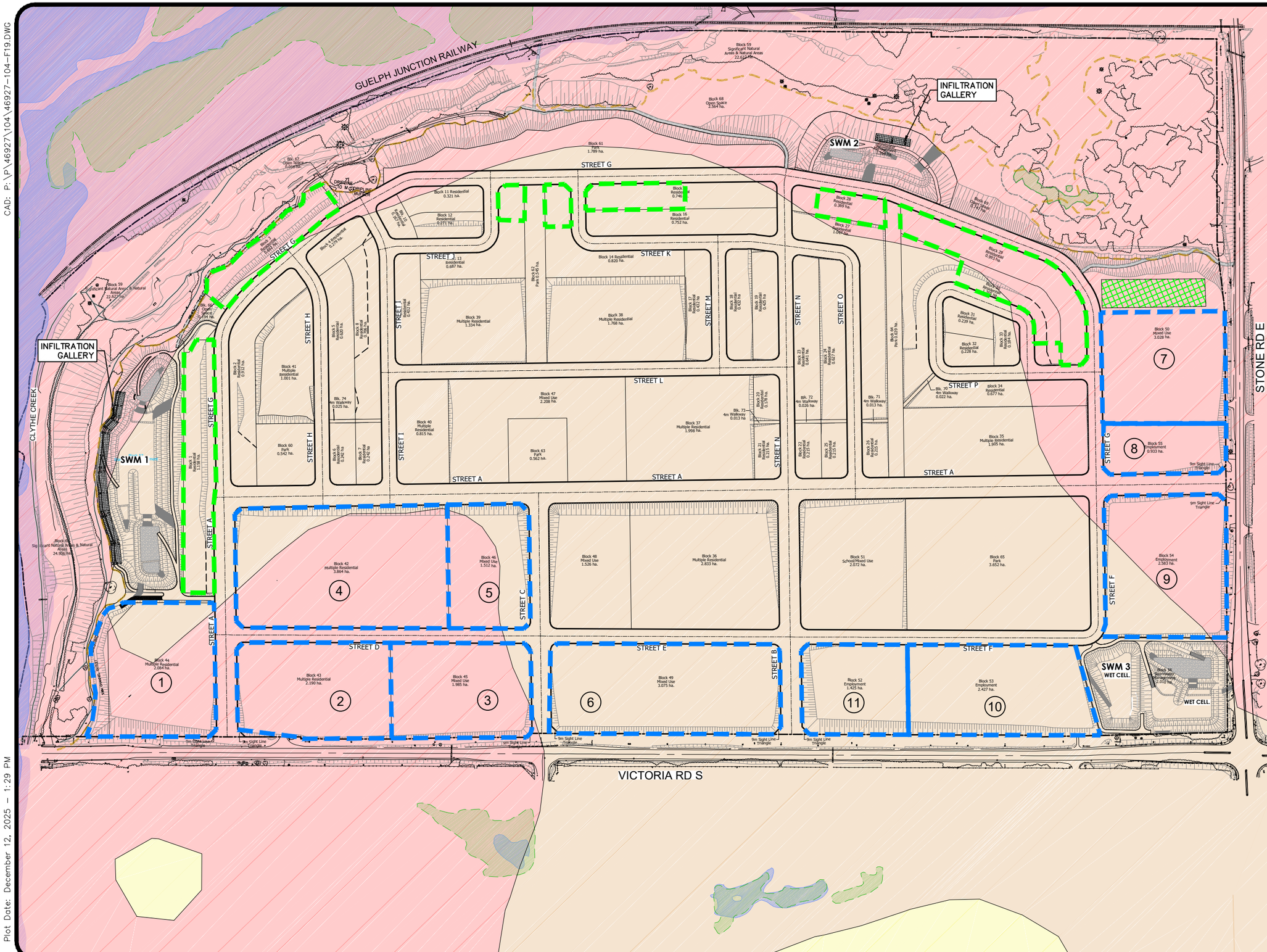

LEGEND:

- SITE BOUNDARY
- LIMIT OF POST-DEVELOPMENT CATCHMENT AREA
- (1) INFILTRATION GALLERY NUMBER
- ROOF RUNOFF TO WETLAND
- END OF PIPE INFILTRATION GALLERY
- DRAINAGE BOUNDARIES TO LOT LEVEL INFIL. GALLERIES
- DRAINAGE BOUNDARIES FOR BLOCK LEVEL INFIL. GALLERIES
- BLOCK LEVEL INFIL. GALLERIES

WHPA VULNERABILITY (GRCA):

- 10
- 8
- 6

WHPA VULNERABILITY MAP TAKEN FROM GRAND RIVER CONSERVATION AUTHORITY WEBSITE ON JULY 07, 2025.

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TITLE
INFILTRATION/SWM SYSTEM AND WHPA VULNERABILITY

Drawn	Scale	Figure
OXR	1:4500	5.13
Checked	Project No.	
ALN	46927-104	
Date	Rev No.	
2024-10-09	0	

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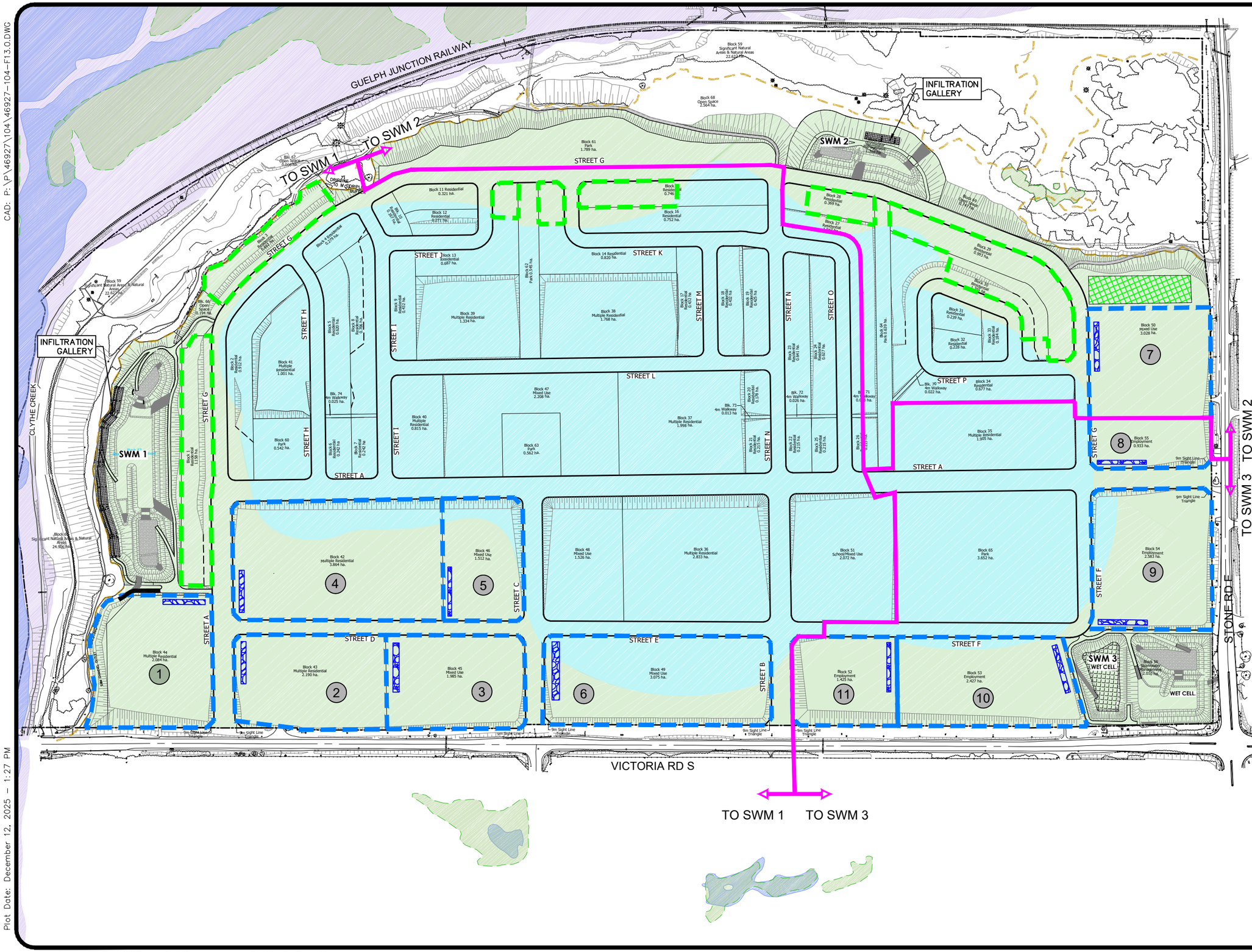

LEGEND:

- SITE BOUNDARY
- LIMIT OF POST-DEVELOPMENT CATCHMENT AREA
- (1) INFILTRATION GALLERY NUMBER
- ROOF RUNOFF TO WETLAND
- END OF PIPE INFILTRATION GALLERY
- DRAINAGE BOUNDARIES TO LOT LEVEL INFIL. GALLERIES
- DRAINAGE BOUNDARIES FOR BLOCK LEVEL INFIL. GALLERIES
- BLOCK LEVEL INFIL. GALLERIES
- LESS THAN 4.0m VERTICAL SEPARATION FROM FG SURFACE TO GROUND WATER LEVEL
- MORE THAN 4.0m VERTICAL SEPARATION FROM FG SURFACE TO GROUND WATER LEVEL

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TITLE
INFILTRATION STRATEGY

Drawn	Scale	Figure
OXR	1:4500	5.14
Checked: ALN	Project No. 46927-104	
Date: 2024-10-09	Rev No. 0	

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5.7.2 Wetlands

As outlined on Map 4 of NRSI's 2024 *Guelph Innovation District Lands, Block 1&2, Guelph, Environmental Impact Study*, there are six wetland complexes in the adjacent Natural Areas to the east. The wetlands have been identified with numbers 1 through 6, as shown in **Figure E-2 and E-3** of **Appendix E**. Impacts to the water balance of these wetlands shall be mitigated.

Wetlands 1, 2, 4, and 5 are outside of the development and separated by the railway. Due to the location of the railway culverts, these wetlands do not receive surface drainage directly from areas proposed to be developed. As such, the balance to these features is deemed to be maintained.

The Wetland 3 drainage area receives surface runoff to a channel fed by Culvert 2 and a surface catchment area that is largely within the development. Ultimately, there is no concern for the impact of flows to the wetland, as the channel functions in a flow through condition with the wetland. Peak flows from SWMF 2 will be controlled to pre-development peak rates through the culvert and will be conveyed there under post-development conditions.

The groundwater catchment for Wetland 3 falls largely within the limits of the 202 catchment for SWMF 2, with the rest of the catchment area outside of the development limits remaining unchanged from existing conditions. As demonstrated in the previous section, the infiltration target within the 202 catchment is largely being met, to the allowable reduced rainfall capture. Considering that the larger encompassing 202 catchment is meeting the required infiltration targets, the infiltration balance to Wetland 3 is considered to be maintained.

Wetland 6 is within the site limits and will be influenced by the development of the subject lands. An annual analysis of the pre-development and post-development surface runoff was conducted based on the surface drainage area, soil type, existing ground cover conditions, and existing terrain. The analysis accounts for a portion of outflow from the adjacent Mixed Use Block 50 to be directed towards the wetland to reduce losses to the annual runoff to the wetland. The estimated roof area required to be redirected to achieve an annual water balance is 1,960 m^2. Refer to **Appendix E** for more detailed calculations**.**

The groundwater catchment for Wetland 6 falls largely within the limits of the 202 catchment for SWMF 2, with the rest of the catchment area outside of the development limits remaining unchanged from existing conditions. As demonstrated in the previous section, the infiltration target within the 202 catchment is largely being met, to the allowable reduced rainfall capture. Considering that the larger encompassing 202 catchment is meeting the required infiltration targets, the infiltration balance to Wetland 6 is considered to be maintained.

5.8 Thermal Mitigation

Thermal preventative and mitigation measures are important components of water quality treatment. During future detailed design stages of the subject lands, the development plans and studies will include details of the proposed thermal mitigation measures to be put in place to ensure the existing cool water regime present in the Eramosa River is not negatively impacted. As identified in the *SWM Master Plan*, examples of such measures include, but are not limited to:

- Bottom draw outlets from SWMFs;
- Enhanced SWMF landscaping to increase permanent pool shading;
- Improved SWMF design (which includes location and orientation to minimize sun exposure, shading of paved surfaces within the catchment, increasing length-to-width ratios, and selective planting species); and,

- Consideration for infiltration and dry pond facilities.

The main methodology of the thermal mitigation plan is to infiltrate warmed stormwater below ground level where cold groundwater and/or relatively colder ambient temperatures will cool the stormwater, lowering the average stormwater temperatures prior to discharge to natural features.

The following measures have been proposed for the subject lands, and in combination will achieve the specified criteria.

Linear / Lot Level Infiltration

The majority of the stormwater runoff that is generated at the lot-level via roofs and yards, will be effectively disconnected from surface water features during all rain events up to a 20mm depth through the proposed at-source infiltration measures (amended topsoil and infiltration galleries).

End-of-Pipe Infiltration

Portions of subcatchments 201 and 202 will be designed to be completely infiltrated up to a 20mm depth by means of infiltration galleries located within the pond blocks.

Controlled development areas of subcatchment 203 will be designed to be completely infiltrated during all non-winter rain events by means of an infiltration cell located beside the wet pond.

SWM Facility Design Features

Features within the SWMFs to assist in reducing the temperature of surface runoff from the site are:

- Bottom draw outlet for cooling benefits resulting from thermal stratification within the facility.
- SWM facility perimeter plantings to be incorporated in the landscaping design for the facility.

5.9 Landscape Design

Landscape designs for the proposed stormwater management facilities will be completed during the final design stage of the development. The landscape design is to address aesthetics, erosion protection, long term bank stability, and to limit pedestrian access into the permanent pool components. The facilities will be designed in accordance with the *Urban Design Guidelines – Guelph Innovation District, Blocks 1 & 2 (MHBC, April 2024).*

5.10 Chloride Impact Assessment

A chloride impact assessment for the subject lands shall be prepared in the future. The purpose of this assessment shall be to assess impacts to the groundwater system, and if necessary, mitigate the impacts by proposing enhanced development and construction techniques. The assessment requires the calculation of the salt loading from de-icing operation to the groundwater so as to ensure that groundwater chloride concentrations will remain within the Reasonable Use Guidelines established by the Ministry of the Environment, Conservation and Parks (MECP – formerly known as the MOE).

The City shall minimize chloride infiltration into groundwater through best management practices when applying salt to streets during winter months in accordance with the City's salt

management plan. Furthermore, site specific Salt Management Plans shall be developed to align with *Source Water Protection Policies.*

5.11 Block Level Stormwater Management

The proposed Draft Plan of Subdivision for the subject lands contains a number of Blocks that will be developed through a Site Plan Approval process and or a Draft Plan of Condominium. As part of that process, a detailed Stormwater Management Plan will be prepared showing how the stormwater control measures will adhere to the SWM criteria and be implemented within the Block. To facilitate this process and ensure adherence with the SWM criteria, the future SWMFs will be designed to provide quality control, quantity control, and water balance in accordance with the City of Guelph's *Stormwater Management Master Plan*.

6.0 MONITORING PROGRAM

In accordance with the recommendations of the *Stormwater Management Master Plan* and the *Eramosa-Blue Springs Watershed Study*, a monitoring program is to be designed and implemented by the developer. The plan will serve to ensure that the mitigation measures proposed within the development are implemented and performing at an acceptable level.

A detailed monitoring program will be outlined as more design details are confirmed, including SWM outlets and LID measures. The program include input from the City and GRCA. A general framework for the monitoring program is established below;

6.1 Pre-Construction Monitoring Program

This stage of the monitoring is intended to establish the detailed site background conditions and baseline data. The pre-construction monitoring includes the following parameters:

- **Groundwater** – monitoring includes water level (continuous via datalogger) and annual general chemistry.
- **Surface water** – monitoring includes water quality (total suspended solids and temperature) at the upstream and downstream of SWM Facility catchment limits. For TSS, samples will be taken annually. Temperature will be monitored on a continuous basis, at 1-hour intervals.

6.2 During-Construction Monitoring Program

The purpose of this stage of the monitoring is to continue with the pre-construction monitoring program in order to monitor the effectiveness of erosion and sediment control measures, and to confirm that mitigative measures are functioning properly. Additional monitoring (over and above the pre-construction program) will include:

- **Stormwater Management Facility** – TSS samples will be taken annually at the outlet of the SWMFs. The program shall also include continuous water level monitoring, at 1-hour intervals, at the respective facility outlets and standard inspection of vegetation, structures, and general operation of hydraulic controls (observations of drawdown) within the SWMFs. These visual inspections are to occur seasonally and typically after a significant rainfall event.
- **Erosion and Sediment Control** – per ESC plans to be prepared during detailed design.

This stage will begin at the commencement of area grading of the subdivision and will continue until 90% buildout of the subdivision.

6.3 Post-Construction Monitoring Program

This period of the monitoring will begin following 90% buildout of the subdivision (buildings are constructed, lots are sodded/landscaped, SWMF plantings are established, and open spaces are stabilized) and following clean-out of the SWMF. The purpose of this stage of the monitoring is to ensure that the SWMFs continue to operate as designed. The post-construction monitoring period will extend for a 2-year period. Monitoring during this stage will include all components from the pre-construction and during-construction monitoring program. It is recommended that, following completion of the developer's portion of the post-development monitoring program and assumption of the SWMFs by the City, the City continues with a post-development inspection and maintenance program to ensure the long-term effectiveness of the SWMFs.

7.0 EROSION AND SEDIMENT CONTROL MEASURES

Precautions will be taken during construction to limit erosion and sedimentation. Erosion and Sediment Control Plans will be prepared and provided during the detailed design stage. The plans will illustrate the erosion and sediment control measures to be implemented during construction, which will limit impacts associated with development.

Typically, the recommended construction sequence for erosion and sediment control measures are as follows:

- Placement of all sediment control fencing where required;
- Topsoil stripping within the permanent SWMF and temporary sedimentation basin footprints, and strategic placement of topsoil stockpiles. Placement of sediment control fencing around all stockpile areas;
- Construction of temporary sediment control ponds outside of the permanent SWMF, which will serve as sedimentation basins for the site during construction;
- Construction of the permanent SWMFs, and any associated infiltration measures, prior to area grading;
- Construction of temporary swales to direct runoff to sedimentation basins, with rock check dams as required to control velocities; and
- Re-vegetation of completed areas as soon as possible after construction, including those areas not slated for construction within 60 days.

The permanent SWMFs will be constructed prior to their respective catchment's area grading. Temporary sediment basins will be constructed outside of the SWMFs to address runoff during area grading operations. Storage consistent with the GRCA's requirement of 125m^3/ha of live and dead storage, respectively (total 250m^3/ha), will be provided. This storage will be provided to ensure that suspended material will have ample time to settle out. In addition, the sediment basins will be sized with sufficient capacity to allow flows to pass without breaching. Once the active construction and grading activities have been completed, the sedimentation basins can be cleaned out.

Where rock check dams are proposed to promote sedimentation and reduce velocities, clean aggregate is to be placed perpendicular to the direction of flow in the swale, with a small volume of excavation on the upstream side to provide storage for accumulated sediment.

Sediment control fencing shall consist of filter fabric attached to page wire fencing and sealed at ground level. It will be installed at the perimeter of the work areas and intermittently on sloped areas where required. Sediment control fencing will be placed around all topsoil stockpiles.

Access to topsoil or fill storage areas will be located on the upstream side of storage piles. This practice will ensure continuity of the sediment control fencing in the downslope direction; which is most vulnerable to erosion and sediment deposition. Further, topsoil and hydroseed will be placed on all exposed areas following the completion of grading activities.

It is recommended that during construction, monitoring and inspection of the erosion and sediment controls be conducted to ensure the satisfactory performance of these measures. Reporting of the inspection and monitoring results should be distributed to the City and GRCA. If it is found that the erosion and sediment control measures are not working adequately, they shall be augmented to the satisfaction of the City and the GRCA, based on field decisions.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the foregoing analyses, it is concluded that:

1. The stormwater management strategy outlined herein will provide the GID development with appropriate levels of quality, quantity, erosion, water balance and thermal mitigation.
2. 'Enhanced' water quality control will be provided through the proposed end-of-pipe SWMFs. Furthermore, the capture and infiltration of approximately 20mm of rainfall sitewide will help recharge groundwater and reduce peak flow and erosion considerations downstream.
3. Quantity control targets for post-development peak flows can be achieved in the proposed stormwater management facilities for the 25 year through the 100-year storm events.
4. Adequate storage and release rate control has been provided to meet the extended detention storage and drawdown requirements for the 25 mm storm events.
5. Implementing erosion and sediment controls during construction will minimize any negative impacts of construction activities on the adjacent properties and the receiving watercourse.
6. Water Balance targets can be satisfactorily met through the use of the prescribed lot-level, and end-of-pipe infiltration measures as described within this report.
7. Surface water balance to significant surface water features can be satisfactorily met through the flows at the outlets of the SWMFs and the intentional catchment area delineation for roof areas and rear yards.

The findings of this report, and the above conclusions, lead to the following recommendations:

1. That the quality/quantity control stormwater management facilities be constructed to provide control of stormwater as described in Section 5 of this report.
2. That the Water Balance, as calculated in this report, be reviewed and re-confirmed during final design.
3. That during the site grading operations, soils be selectively excavated and placed, under the supervision of a geotechnical engineer, in order to maximize the post-development areas suitable for infiltration.
4. That erosion and sediment controls during construction as described in Section 7 of this report be implemented.
5. That the conceptual design and modeling of the future stormwater management facilities contained within the subdivision be reviewed and re-confirmed at the time of final design.
6. Salt Management Plans be prepared for all blocks subject to site plan approval and/or a plan of condominium approval.

All of which is respectfully submitted,

MTE Consultants Inc.

Matthew Willcox, P. Eng
Design Engineer
519-743-6500
mwillcox@mte85.com

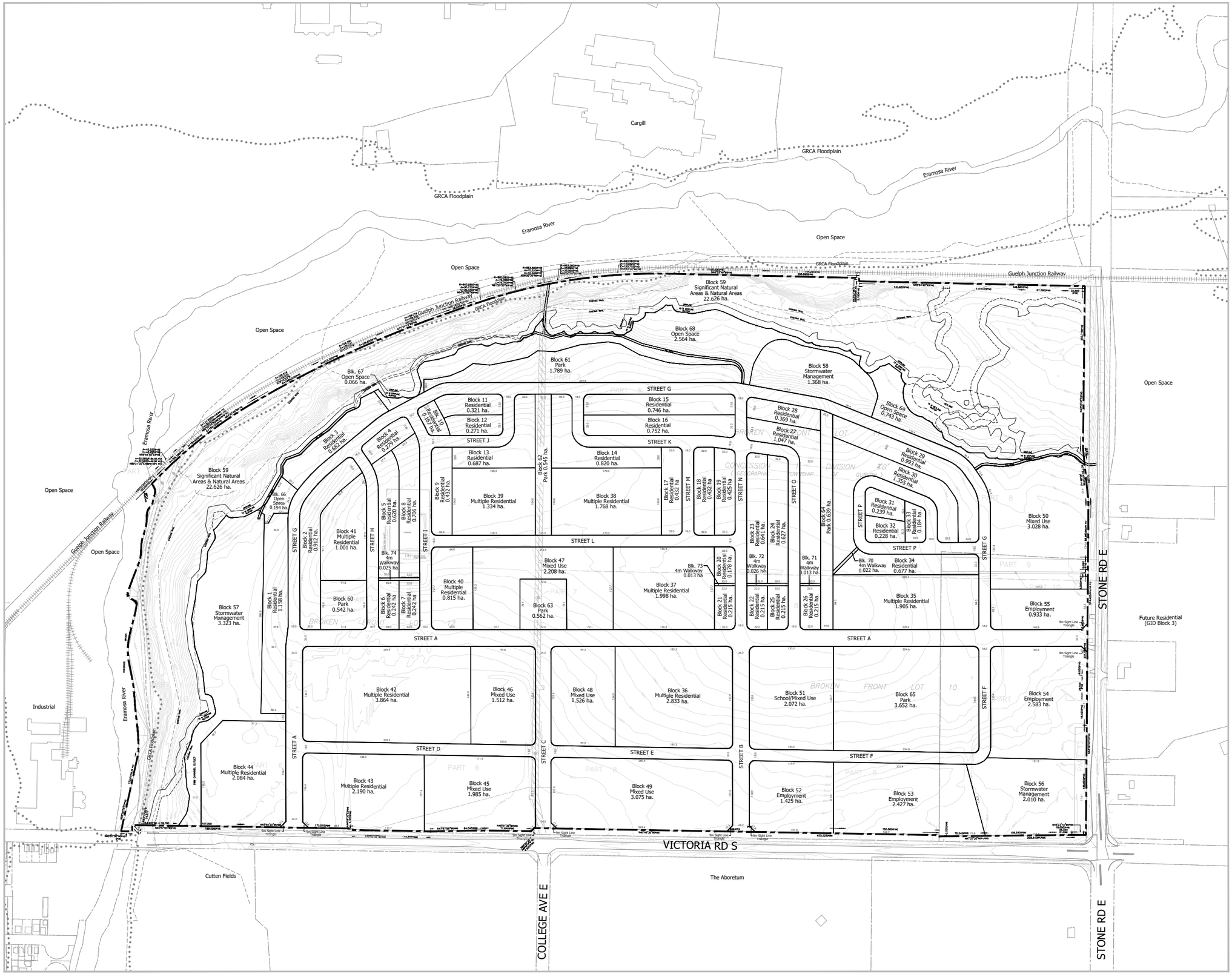
Valentina Lazic, P.Eng.
Design Engineer
519-743-6500
vlazic@mte85.com

MPW:jng

https://mte85.sharepoint.com/sites/46927-104/Shared Documents/02 - Reports/MTE Reports/Preliminary SWM/46927-104_rpt_2025-12-12_Preliminary SWM.docx

Appendix A

Draft Plan of Subdivision



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.

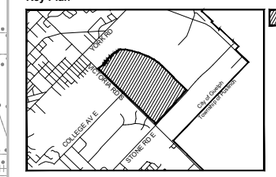
DATE: _____ _____ OWNER

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
ONTARIO LAND SURVEYOR

Key Plan



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

A. AS SHOWN	B. AS SHOWN	C. AS SHOWN
D. AS SHOWN	E. AS SHOWN	F. AS SHOWN
G. AS SHOWN	H. MUNICIPAL WATER SUPPLY	I. TBD
J. AS SHOWN	K. ALL SERVICES AS REQUIRED	L. AS SHOWN

Area Schedule

Description	Block	Area (ha)	Units
Low Density Residential	1-34	17.724	457
Multiple Residential	35-44	19.792	1,003
Mixed Use	45-50	13.334	3,084
School/Mixed Use	51	2.072	
Employment	52-55	7.367	
Stormwater Management	56-58	6.701	
Significant Natural Area & Natural Areas	59	22.626	
Park	60-65	7.729	
Open Space	66-69	3.567	
Walkway	70-74	0.099	
Roads		15.585	
TOTAL	74	116.596	4,544

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

Notes

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SHOWN.
2. SURVEY INFORMATION PROVIDED BY CALLON DIETZ LAND SURVEYING ONTARIO, NOV. 2016.
3. TOPOGRAPHIC INFORMATION PROVIDED BY MTE.
4. WETLAND, DRIPLINE, AND BUFFERS PROVIDED BY NRSI INC, OCT. 2022.
5. CONTAINS INFORMATION MADE AVAILABLE UNDER GRAND RIVER CONSERVATION. AUTHORITY'S OPEN DATA LICENCE V1.0.
6. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – CITY OF GUELPH.
7. COLLECTOR SIGHT LINE TRIANGLE 9m. LOCAL STREET CORNER RADIUS 8m.

MHBC PLANNING URBAN DESIGN & LANDSCAPE ARCHITECTURE
200-540 BINGEMANS CENTRE DR. KITCHENER, ON. N2B 3X9 | P: 519.576.3650 F: 519.576.0121 | WWW.MHBCPLAN.COM

Approval Stamp	
Date	December 10, 2025
File No.	1405G
Plan Scale	1:2,500 (Arch D)
Drawn By	SP/JB
Checked By	DA

Project

Guelph Innovation District
Block 1 & 2
Fusion Homes
Guelph, Ontario

north

File Name	Draft Plan of Subdivision
Dwg No.	1 of 1

Scale Bar: 0 25 50 100 150 200m

K:\1405G - GID Block 1 and 2\DP\DP_10Dec2025.dwg

Appendix B

Hydrologic Modelling

EXISTING CONDITIONS

```
==============================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 3053466
        StormWater Management HYdrologic Model           999    999    =========

 ****************************************************************************
 **************************** SWMHYMO Ver/4.05  ****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                 *********
 ****************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ****************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: MTE Consultants Inc.                        +++++++++
 +++++++++                Burlington            SERIAL#:3053466       +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ****************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********           Maximum value for ID numbers  :     10             *********
 *********           Max. number of rainfall points: 105408             *********
 *********           Max. number of flow points    : 105408             *********
 ****************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****-------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                 *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).    *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.             *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       *****
 *****     *:  see WARNING or NOTE message printed at end of run.         *****
 *****    **:  see  ERROR  message printed at end of run.                 *****
 ****************************************************************************
 ****************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 ****************************************************************************

 **********************   S U M M A R Y   O U T P U T   **********************
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 ****************************************************************************
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 * Output  filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\PRE\pre.out          *
 * Summary filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\PRE\pre.sum          *
 * User comments:                                                           *
 * 1:_______________________________________________________________________*
 * 2:_______________________________________________________________________*
 * 3:_______________________________________________________________________*
 ****************************************************************************
```

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#*************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-24-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*************************************************************************
# EXISTING CONDITIONS ANALYSIS
#*************************************************************************
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 001:0001-----------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
 001:0002-----------------------------------------------------------------------
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      Comment  =
      [SDT= 5.00:SDUR=   3.00:PTOT=  40.47]
#*************************************************************************
# Existing Catchment 1 - Existing drainage north to Eramosa River
#*************************************************************************
 001:0003--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
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      [CN= 66.0: N= 3.00]
      [Tp=  .35:DT= 1.00]
#*************************************************************************
# Existing Catchment 2 - Existing drainage east to Eramosa River
#*************************************************************************
 001:0004--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:102           28.49     .589 No_date    1:24    8.73 .216
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# Existing Catchment 3 - Existing drainage to Victoria and Stone Road Intersect
#*************************************************************************
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      [CN= 68.3: N= 3.00]
      [Tp=  .34:DT= 1.00]
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# Existing SWMF No. 104 at Victoria and Stone Road Intersection
#*************************************************************************
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     ROUTE RESERVOIR -> 03:103           16.55     .382 No_date    1:24    9.68  n/a
      [RDT= 1.00] out<- 04:SWM104        16.55     .381 No_date    1:25    9.68  n/a
            overflow <= 05:ovflw-bio       .00     .000 No_date    0:00     .00  n/a
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#*************************************************************************
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     DESIGN NASHYD      06:104            8.72     .236 No_date    1:10    6.81 .168
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#*************************************************************************
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#******************************************************************************
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                      +  05:ovflw-bio       .00     .000 No_date    0:00     .00  n/a
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#******************************************************************************
# Total Flow Off-Site to Eramosa River
#******************************************************************************
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                      +  02:102           28.49     .589 No_date    1:24    8.73  n/a
                      +  06:104            8.72     .236 No_date    1:10    6.81  n/a
                      +  07:105           15.26     .366 No_date    1:12    6.81  n/a
                      +  08:103-OUT       16.55     .381 No_date    1:25    9.68  n/a
      [DT= 1.00]  SUM=  09:Total        123.93    2.521 No_date    1:22    8.58  n/a
#******************************************************************************
 001:0011-------------------------------------------------------------------------
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-------------------------------------------------------------------------------------
*************************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2025-11-24     at 09:49:16
=====================================================================================
```

```
==============================================================================

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   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 3053466
        StormWater Management HYdrologic Model           999    999    =========

 ****************************************************************************
 **************************** SWMHYMO Ver/4.05  ****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                 *********
 ****************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ****************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: MTE Consultants Inc.                       +++++++++
 +++++++++                Burlington            SERIAL#:3053466      +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ****************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
 *********           Maximum value for ID numbers  :     10            *********
 *********           Max. number of rainfall points: 105408            *********
 *********           Max. number of flow points    : 105408            *********
 ****************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****-------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).   *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).   *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.            *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).      *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).      *****
 *****     *:  see WARNING or NOTE message printed at end of run.        *****
 *****    **:  see  ERROR  message printed at end of run.                *****
 ****************************************************************************
 ****************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 ****************************************************************************

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 * Summary filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\PRE\REGpre.sum       *
 * User comments:                                                           *
 * 1:_______________________________________________________________________*
 * 2:_______________________________________________________________________*
 * 3:_______________________________________________________________________*
 ****************************************************************************
```

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#*************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-24-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*************************************************************************
# EXISTING CONDITIONS ANALYSIS
#*************************************************************************
 RUN:COMMAND#
 001:0001-----------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
 001:0002-----------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=60.00:SDUR=  48.00:PTOT= 285.08]
#*************************************************************************
# Existing Catchment 1 - Existing drainage north to Eramosa River
#*************************************************************************
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#*************************************************************************
# Existing Catchment 2 - Existing drainage east to Eramosa River
#*************************************************************************
 001:0004--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:102           28.49    3.421 No_date   46:06  192.13 .674
      [CN= 65.3: N= 3.00]
      [Tp=  .34:DT= 1.00]
#*************************************************************************
# Existing Catchment 3 - Existing drainage to Victoria and Stone Road Intersect
#*************************************************************************
 001:0005--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:103           16.55    2.043 No_date   46:06  200.31 .703
      [CN= 68.3: N= 3.00]
      [Tp=  .34:DT= 1.00]
#*************************************************************************
# Existing SWMF No. 104 at Victoria and Stone Road Intersection
#*************************************************************************
 001:0006--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 03:103           16.55    2.043 No_date   46:06  200.31  n/a
      [RDT= 1.00] out<- 04:SWM104        16.55    2.042 No_date   46:07  200.31  n/a
            overflow <= 05:ovflw-bio       .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.3255E-01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Existing Catchment 4 - Existing drainage north to Eramosa River (Undeveloped)
#*************************************************************************
 001:0007--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      06:104            8.72    1.018 No_date   46:01  172.01 .603
      [CN= 58.0: N= 3.00]
      [Tp=  .16:DT= 1.00]
#*************************************************************************
# Existing Catchment 5 - Existing drainage east to Eramosa River (Undeveloped)
#*************************************************************************
 001:0008--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      07:105           15.26    1.776 No_date   46:01  172.01 .603
      [CN= 58.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
```

```
#******************************************************************************
# Total Flow from SWMF No. 104
#******************************************************************************
 001:0009--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            04:SWM104        16.55    2.042 No_date   46:07  200.31  n/a
                      +  05:ovflw-bio       .00     .000 No_date    0:00     .00  n/a
      [DT= 1.00]  SUM=  08:103-OUT       16.55    2.042 No_date   46:07  200.31  n/a
#******************************************************************************
# Total Flow Off-Site to Eramosa River
#******************************************************************************
 001:0010--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:101           54.91    6.606 No_date   46:07  194.05  n/a
                      +  02:102           28.49    3.421 No_date   46:06  192.13  n/a
                      +  06:104            8.72    1.018 No_date   46:01  172.01  n/a
                      +  07:105           15.26    1.776 No_date   46:01  172.01  n/a
                      +  08:103-OUT       16.55    2.042 No_date   46:07  200.31  n/a
      [DT= 1.00]  SUM=  09:Total        123.93   14.802 No_date   46:04  190.18  n/a
#******************************************************************************
 001:0011-------------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------------
*************************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2025-11-24     at 09:49:24
=====================================================================================
```

PROPOSED
CONDITIONS

STORM 001 = 5-yr

STORM 002 = 25-yr

STORM 003 = 100-yr

```
==============================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 3053466
        StormWater Management HYdrologic Model           999    999    =========

 ****************************************************************************
 **************************** SWMHYMO Ver/4.05  ****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                   OTTHYMO-83 and OTTHYMO-89.                *********
 ****************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ****************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: MTE Consultants Inc.                        +++++++++
 +++++++++               Burlington            SERIAL#:3053466        +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ****************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********           Maximum value for ID numbers  :     10             *********
 *********           Max. number of rainfall points: 105408             *********
 *********           Max. number of flow points    : 105408             *********
 ****************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****-------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).   *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).   *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.            *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).      *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).      *****
 *****     *:  see WARNING or NOTE message printed at end of run.        *****
 *****    **:  see  ERROR  message printed at end of run.                *****
 ****************************************************************************
 ****************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 ****************************************************************************

 **********************   S U M M A R Y   O U T P U T   **********************
 ****************************************************************************
 *         DATE: 2025-11-25     TIME: 14:10:48     RUN COUNTER: 000120      *
 ****************************************************************************
 * Input   filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\POST\post.dat        *
 * Output  filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\POST\post.out        *
 * Summary filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\POST\post.sum        *
 * User comments:                                                           *
 * 1:_______________________________________________________________________*
 * 2:_______________________________________________________________________*
 * 3:_______________________________________________________________________*
 ****************************************************************************
```

```
#*************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-24-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*************************************************************************
# PROPOSED CONDITIONS ANALYSIS
#*************************************************************************
 RUN:COMMAND#
 001:0001-------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
 001:0002-------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   3.00:PTOT=  40.47]
#*************************************************************************
# Proposed Catchment 201 - Outlet is North to Eramosa River
#*************************************************************************
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:201-1         20.11    4.769 No_date    1:01   29.44 .727
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    02:201-2         35.05    8.259 No_date    1:02   30.64 .757
      [XIMP=.70:TIMP=.70]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 001:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:201-5          2.39     .769 No_date    1:00   27.33 .675
      [XIMP=.59:TIMP=.59]
      [SLP=****:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*************************************************************************
# Post-Development - Total Flow to SWMF 1
#*************************************************************************
 001:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:201-1         20.11    4.769 No_date    1:01   29.44  n/a
                      +  02:201-2         35.05    8.259 No_date    1:02   30.64  n/a
                      +  03:201-5          2.39     .769 No_date    1:00   27.33  n/a
      [DT= 1.00]  SUM=  04:Inlet-1       57.55   13.326 No_date    1:01   30.09  n/a
#*************************************************************************
# Preliminary SWMF 1 Design
#*************************************************************************
 001:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 04:Inlet-1       57.55   13.326 No_date    1:01   30.09  n/a
      [RDT= 1.00] out<- 01:SWMF-1        57.55     .163 No_date    3:08   30.08  n/a
            overflow <= 02:ovflw-1        .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1648E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Uncontrolled Flow North to Eramosa River
#*************************************************************************
 001:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:201-3          2.61     .112 No_date    1:08    9.58 .237
      [CN= 68.0: N= 3.00]
      [Tp=  .14:DT= 1.00]
 001:0009---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
  *  DESIGN NASHYD      04:201-4           .78     .112 No_date    1:00    9.58 .237
      [CN= 68.0: N= 3.00]
      [Tp=  .01:DT= 1.00]
```

```
 001:0010--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:204            8.72     .236 No_date    1:10    6.81 .168
      [CN= 58.0: N= 3.00]
      [Tp=  .16:DT= 1.00]
#*****************************************************************************
# Post-Development - Total Uncontrolled Flow to Outlet 1
#*****************************************************************************
 001:0011--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            03:201-3          2.61     .112 No_date    1:08    9.58  n/a
                      +  04:201-4           .78     .112 No_date    1:00    9.58  n/a
      [DT= 1.00]  SUM=  06:Total-1        3.39     .154 No_date    1:00    9.58  n/a
#*****************************************************************************
# Post-Development - Total Flow to Outlet 1
#*****************************************************************************
 001:0012--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:SWMF-1        57.55     .163 No_date    3:08   30.08  n/a
                      +  02:ovflw-1         .00     .000 No_date    0:00     .00  n/a
                      +  03:201-3          2.61     .112 No_date    1:08    9.58  n/a
                      +  04:201-4           .78     .112 No_date    1:00    9.58  n/a
      [DT= 1.00]  SUM=  07:Total-1       60.94     .187 No_date    1:00   28.94  n/a
#*****************************************************************************
# Total Flow to Outlet 1 - Including Undeveloped Area
#*****************************************************************************
 001:0013--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            05:204            8.72     .236 No_date    1:10    6.81  n/a
                      +  07:Total-1       60.94     .187 No_date    1:00   28.94  n/a
      [DT= 1.00]  SUM=  08:Total-1       69.66     .394 No_date    1:09   26.17  n/a
#*****************************************************************************
# Proposed Catchment 202 - Outlet is East to Eramosa River
#*****************************************************************************
 001:0014--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:202-1         10.16    2.711 No_date    1:01   29.44 .727
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*****************************************************************************
#*****************************************************************************
# Preliminary SWMF 2 Design
#*****************************************************************************
 001:0015--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 03:202-1         10.16    2.711 No_date    1:01   29.44  n/a
      [RDT= 1.00] out<- 02:SWMF-2        10.16     .149 No_date    2:00   29.44  n/a
            overflow <= 01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2169E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Uncontrolled Flow East to Eramosa River
#*****************************************************************************
 001:0016--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      04:202-2          2.68     .138 No_date    1:06   10.31 .255
      [CN= 70.1: N= 3.00]
      [Tp=  .12:DT= 1.00]
 001:0017--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:202-3          2.07     .167 No_date    1:02   10.09 .249
      [CN= 69.5: N= 3.00]
      [Tp=  .06:DT= 1.00]
 001:0018--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      07:205           15.26     .366 No_date    1:12    6.81 .168
      [CN= 58.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
#*****************************************************************************
#*****************************************************************************
# Post-Development - Total Uncontrolled Flow to Target 2
#*****************************************************************************
 001:0019--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            04:202-2          2.68     .138 No_date    1:06   10.31  n/a
                      +  05:202-3          2.07     .167 No_date    1:02   10.09  n/a
      [DT= 1.00]  SUM=  08:Total-2        4.75     .277 No_date    1:03   10.22  n/a
#*****************************************************************************
# Post-Development - Total Flow to Target 2
#*****************************************************************************
 001:0020--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
                      +  02:SWMF-2        10.16     .149 No_date    2:00   29.44  n/a
                      +  04:202-2          2.68     .138 No_date    1:06   10.31  n/a
                      +  05:202-3          2.07     .167 No_date    1:02   10.09  n/a
      [DT= 1.00]  SUM=  09:Total-2       14.91     .299 No_date    1:03   23.32  n/a
#*****************************************************************************
# Total Flow to Outlet 2 - Including Undeveloped Area
#*****************************************************************************
 001:0021--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            07:205           15.26     .366 No_date    1:12    6.81  n/a
                      +  09:Total-2       14.91     .299 No_date    1:03   23.32  n/a
      [DT= 1.00]  SUM=  10:Total-2       30.17     .594 No_date    1:10   14.97  n/a
#*****************************************************************************
# Proposed Catchment 203 - Outlet is Victoria and Stone Road Intersection
#*****************************************************************************
 001:0022--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:203           24.10    7.108 No_date    1:01   31.25 .772
      [XIMP=.72:TIMP=.72]
      [SLP=4.00:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*****************************************************************************
# Preliminary SWMF 3 Design
#*****************************************************************************
 001:0023--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:203           24.10    7.108 No_date    1:01   31.25  n/a
      [RDT= 1.00] out<- 02:SWMF-3        24.10     .041 No_date    3:09   31.24  n/a
            overflow <= 03:ovflw-3         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.7200E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Infiltration Cell:
# SWMF 3 Bottom Draw Directed to INF Cell to infiltrate 100yr STM
# Overflow from INF Cell to be captured in ditch inlet which outlets to
# Victoria Road Swale/ Ditch which ultimately outlets to Eramosa River via
# 1100mm dia. CMP culvert northwest of College Ave East
#*****************************************************************************
 001:0024--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 02:SWMF-3        24.10     .041 No_date    3:09   31.24  n/a
      [RDT= 1.00] out<- 04:INFcell       24.10     .037 No_date    1:55   31.24  n/a
            overflow <= 05:Ovflw-INFc      .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1202E-01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Overflow from SWMF and INF Cell - to outlet to Victoria Road
#*****************************************************************************
 001:0025--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            03:ovflw-3         .00     .000 No_date    0:00     .00  n/a
                      +  05:Ovflw-INFc      .00     .000 No_date    0:00     .00  n/a
#*****************************************************************************
  ** END OF RUN :   1

*****************************************************************************


 RUN:COMMAND#
 002:0001-----------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
```

```
      [NRUN  =   2 ]
#*****************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-24-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*****************************************************************************
# PROPOSED CONDITIONS ANALYSIS
#*****************************************************************************
 002:0002-------------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   3.00:PTOT=  57.18]
#*****************************************************************************
# Proposed Catchment 201 - Outlet is North to Eramosa River
#*****************************************************************************
 002:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:201-1         20.11    7.032 No_date    1:01   43.23 .756
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 002:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    02:201-2         35.05   11.679 No_date    1:02   44.77 .783
      [XIMP=.70:TIMP=.70]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 002:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:201-5          2.39    1.070 No_date    1:00   40.52 .709
      [XIMP=.59:TIMP=.59]
      [SLP=****:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*****************************************************************************
# Post-Development - Total Flow to SWMF 1
#*****************************************************************************
 002:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:201-1         20.11    7.032 No_date    1:01   43.23  n/a
                      +  02:201-2         35.05   11.679 No_date    1:02   44.77  n/a
                      +  03:201-5          2.39    1.070 No_date    1:00   40.52  n/a
      [DT= 1.00]  SUM=  04:Inlet-1       57.55   19.209 No_date    1:01   44.06  n/a
#*****************************************************************************
# Preliminary SWMF 1 Design
#*****************************************************************************
 002:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 04:Inlet-1       57.55   19.209 No_date    1:01   44.06  n/a
      [RDT= 1.00] out<- 01:SWMF-1        57.55     .570 No_date    3:03   44.05  n/a
            overflow <= 02:ovflw-1         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2210E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Uncontrolled Flow North to Eramosa River
#*****************************************************************************
 002:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:201-3          2.61     .202 No_date    1:08   17.69 .309
      [CN= 68.0: N= 3.00]
      [Tp=  .14:DT= 1.00]
 002:0009---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
  *  DESIGN NASHYD      04:201-4           .78     .194 No_date    1:00   17.69 .309
      [CN= 68.0: N= 3.00]
      [Tp=  .01:DT= 1.00]
 002:0010---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:204            8.72     .437 No_date    1:10   12.94 .226
      [CN= 58.0: N= 3.00]
      [Tp=  .16:DT= 1.00]
#*****************************************************************************
# Post-Development - Total Uncontrolled Flow to Outlet 1
#*****************************************************************************
 002:0011---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            03:201-3          2.61     .202 No_date    1:08   17.69  n/a
                      +  04:201-4           .78     .194 No_date    1:00   17.69  n/a
      [DT= 1.00]  SUM=  06:Total-1        3.39     .274 No_date    1:00   17.69  n/a
#*****************************************************************************
# Post-Development - Total Flow to Outlet 1
#*****************************************************************************
 002:0012---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:SWMF-1        57.55     .570 No_date    3:03   44.05  n/a
                      +  02:ovflw-1         .00     .000 No_date    0:00     .00  n/a
                      +  03:201-3          2.61     .202 No_date    1:08   17.69  n/a
                      +  04:201-4           .78     .194 No_date    1:00   17.69  n/a
      [DT= 1.00]  SUM=  07:Total-1       60.94     .596 No_date    3:00   42.58  n/a
#*****************************************************************************
# Total Flow to Outlet 1 - Including Undeveloped Area
#*****************************************************************************
 002:0013---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            05:204            8.72     .437 No_date    1:10   12.94  n/a
                      +  07:Total-1       60.94     .596 No_date    3:00   42.58  n/a
      [DT= 1.00]  SUM=  08:Total-1       69.66     .724 No_date    1:10   38.87  n/a
#*****************************************************************************
# Proposed Catchment 202 - Outlet is East to Eramosa River
#*****************************************************************************
 002:0014---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:202-1         10.16    3.786 No_date    1:01   43.23 .756
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*****************************************************************************
#*****************************************************************************
# Preliminary SWMF 2 Design
#*****************************************************************************
 002:0015---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 03:202-1         10.16    3.786 No_date    1:01   43.23  n/a
      [RDT= 1.00] out<- 02:SWMF-2        10.16     .357 No_date    1:34   43.23  n/a
            overflow <= 01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2748E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Uncontrolled Flow East to Eramosa River
#*****************************************************************************
 002:0016---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      04:202-2          2.68     .249 No_date    1:06   18.90 .331
      [CN= 70.1: N= 3.00]
      [Tp=  .12:DT= 1.00]
 002:0017---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:202-3          2.07     .298 No_date    1:02   18.55 .324
      [CN= 69.5: N= 3.00]
      [Tp=  .06:DT= 1.00]
 002:0018---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      07:205           15.26     .681 No_date    1:12   12.94 .226
      [CN= 58.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
#*****************************************************************************
#*****************************************************************************
# Post-Development - Total Uncontrolled Flow to Target 2
#*****************************************************************************
 002:0019---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            04:202-2          2.68     .249 No_date    1:06   18.90  n/a
                      +  05:202-3          2.07     .298 No_date    1:02   18.55  n/a
      [DT= 1.00]  SUM=  08:Total-2        4.75     .498 No_date    1:03   18.75  n/a
#*****************************************************************************
# Post-Development - Total Flow to Target 2
#*****************************************************************************
 002:0020---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
```

```
                    +  02:SWMF-2        10.16     .357 No_date    1:34   43.23  n/a
                    +  04:202-2          2.68     .249 No_date    1:06   18.90  n/a
                    +  05:202-3          2.07     .298 No_date    1:02   18.55  n/a
     [DT= 1.00]  SUM=  09:Total-2       14.91     .595 No_date    1:06   35.43  n/a
#*************************************************************************
# Total Flow to Outlet 2 - Including Undeveloped Area
#*************************************************************************
 002:0021---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            07:205           15.26     .681 No_date    1:12   12.94  n/a
                    +  09:Total-2       14.91     .595 No_date    1:06   35.43  n/a
     [DT= 1.00]  SUM=  10:Total-2       30.17    1.235 No_date    1:10   24.05  n/a
#*************************************************************************
# Proposed Catchment 203 - Outlet is Victoria and Stone Road Intersection
#*************************************************************************
 002:0022---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:203           24.10    9.931 No_date    1:01   45.55 .797
      [XIMP=.72:TIMP=.72]
      [SLP=4.00:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*************************************************************************
# Preliminary SWMF 3 Design
#*************************************************************************
 002:0023---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:203           24.10    9.931 No_date    1:01   45.55  n/a
      [RDT= 1.00] out<- 02:SWMF-3        24.10     .050 No_date    3:10   45.55  n/a
            overflow <= 03:ovflw-3         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1058E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Infiltration Cell:
# SWMF 3 Bottom Draw Directed to INF Cell to infiltrate 100yr STM
# Overflow from INF Cell to be captured in ditch inlet which outlets to
# Victoria Road Swale/ Ditch which ultimately outlets to Eramosa River via
# 1100mm dia. CMP culvert northwest of College Ave East
#*************************************************************************
 002:0024---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 02:SWMF-3        24.10     .050 No_date    3:10   45.55  n/a
      [RDT= 1.00] out<- 04:INFcell       24.10     .037 No_date    1:26   45.55  n/a
            overflow <= 05:Ovflw-INFc      .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.8092E-01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Overflow from SWMF and INF Cell - to outlet to Victoria Road
#*************************************************************************
 002:0025---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            03:ovflw-3          .00     .000 No_date    0:00     .00  n/a
                    +  05:Ovflw-INFc       .00     .000 No_date    0:00     .00  n/a
#*************************************************************************
  ** END OF RUN :   2

*************************************************************************
```

```
 RUN:COMMAND#
 003:0001-------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   3 ]
#*************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-24-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*************************************************************************
# PROPOSED CONDITIONS ANALYSIS
#*************************************************************************
 003:0002-------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   3.00:PTOT=  71.25]
#*************************************************************************
# Proposed Catchment 201 - Outlet is North to Eramosa River
#*************************************************************************
 003:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:201-1         20.11    8.627 No_date    1:01   55.24 .775
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 003:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    02:201-2         35.05   14.356 No_date    1:02   57.03 .800
      [XIMP=.70:TIMP=.70]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 003:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:201-5          2.39    1.296 No_date    1:00   52.10 .731
      [XIMP=.59:TIMP=.59]
      [SLP=****:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*************************************************************************
# Post-Development - Total Flow to SWMF 1
#*************************************************************************
 003:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:201-1         20.11    8.627 No_date    1:01   55.24  n/a
                    +  02:201-2         35.05   14.356 No_date    1:02   57.03  n/a
                    +  03:201-5          2.39    1.296 No_date    1:00   52.10  n/a
     [DT= 1.00]  SUM=  04:Inlet-1       57.55   23.642 No_date    1:01   56.20  n/a
#*************************************************************************
# Preliminary SWMF 1 Design
#*************************************************************************
 003:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 04:Inlet-1       57.55   23.642 No_date    1:01   56.20  n/a
      [RDT= 1.00] out<- 01:SWMF-1        57.55     .814 No_date    3:02   56.19  n/a
            overflow <= 02:ovflw-1         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2714E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Uncontrolled Flow North to Eramosa River
#*************************************************************************
 003:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:201-3          2.61     .288 No_date    1:08   25.70 .361
      [CN= 68.0: N= 3.00]
      [Tp=  .14:DT= 1.00]
 003:0009---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
  *  DESIGN NASHYD      04:201-4           .78     .266 No_date    1:00   25.70 .361
      [CN= 68.0: N= 3.00]
      [Tp=  .01:DT= 1.00]
 003:0010---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:204           8.72     .633 No_date    1:10   19.18 .269
      [CN= 58.0: N= 3.00]
      [Tp=  .16:DT= 1.00]
#*************************************************************************
# Post-Development - Total Uncontrolled Flow to Outlet 1
#*************************************************************************
 003:0011---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            03:201-3          2.61     .288 No_date    1:08   25.70  n/a
                    +  04:201-4           .78     .266 No_date    1:00   25.70  n/a
     [DT= 1.00]  SUM=  06:Total-1        3.39     .384 No_date    1:00   25.70  n/a
#*************************************************************************
```

```
# Post-Development - Total Flow to Outlet 1
#*****************************************************************************
 003:0012---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:SWMF-1         57.55     .814 No_date    3:02   56.19  n/a
                      +  02:ovflw-1         .00     .000 No_date    0:00     .00  n/a
                      +  03:201-3          2.61     .288 No_date    1:08   25.70  n/a
                      +  04:201-4           .78     .266 No_date    1:00   25.70  n/a
      [DT= 1.00]  SUM=  07:Total-1       60.94     .853 No_date    3:00   54.50  n/a
#*****************************************************************************
# Total Flow to Outlet 1 - Including Undeveloped Area
#*****************************************************************************
 003:0013---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            05:204             8.72     .633 No_date    1:10   19.18  n/a
                      +  07:Total-1       60.94     .853 No_date    3:00   54.50  n/a
      [DT= 1.00]  SUM=  08:Total-1       69.66    1.198 No_date    1:13   50.08  n/a
#*****************************************************************************
# Proposed Catchment 202 - Outlet is East to Eramosa River
#*****************************************************************************
 003:0014---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:202-1         10.16    4.629 No_date    1:01   55.24 .775
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*****************************************************************************
#*****************************************************************************
# Preliminary SWMF 2 Design
#*****************************************************************************
 003:0015---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 03:202-1         10.16    4.629 No_date    1:01   55.24  n/a
      [RDT= 1.00] out<- 02:SWMF-2        10.16     .580 No_date    1:26   55.23  n/a
            overflow <= 01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.3233E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Uncontrolled Flow East to Eramosa River
#*****************************************************************************
 003:0016---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      04:202-2          2.68     .352 No_date    1:06   27.32 .383
      [CN= 70.1: N= 3.00]
      [Tp=  .12:DT= 1.00]
 003:0017---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:202-3          2.07     .418 No_date    1:02   26.85 .377
      [CN= 69.5: N= 3.00]
      [Tp=  .06:DT= 1.00]
 003:0018---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      07:205           15.26     .988 No_date    1:12   19.18 .269
      [CN= 58.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
#*****************************************************************************
#*****************************************************************************
# Post-Development - Total Uncontrolled Flow to Target 2
#*****************************************************************************
 003:0019---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            04:202-2          2.68     .352 No_date    1:06   27.32  n/a
                      +  05:202-3          2.07     .418 No_date    1:02   26.85  n/a
      [DT= 1.00]  SUM=  08:Total-2        4.75     .702 No_date    1:03   27.11  n/a
#*****************************************************************************
# Post-Development - Total Flow to Target 2
#*****************************************************************************
 003:0020---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
                      +  02:SWMF-2        10.16     .580 No_date    1:26   55.23  n/a
                      +  04:202-2          2.68     .352 No_date    1:06   27.32  n/a
                      +  05:202-3          2.07     .418 No_date    1:02   26.85  n/a
      [DT= 1.00]  SUM=  09:Total-2       14.91     .962 No_date    1:06   46.28  n/a
#*****************************************************************************
# Total Flow to Outlet 2 - Including Undeveloped Area
#*****************************************************************************
 003:0021---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            07:205           15.26     .988 No_date    1:12   19.18  n/a
                      +  09:Total-2       14.91     .962 No_date    1:06   46.28  n/a
      [DT= 1.00]  SUM=  10:Total-2       30.17    1.897 No_date    1:10   32.57  n/a
#*****************************************************************************
# Proposed Catchment 203 - Outlet is Victoria and Stone Road Intersection
#*****************************************************************************
 003:0022---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:203           24.10   12.774 No_date    1:00   57.92 .813
      [XIMP=.72:TIMP=.72]
      [SLP=4.00:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*****************************************************************************
# Preliminary SWMF 3 Design
#*****************************************************************************
 003:0023---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:203           24.10   12.774 No_date    1:00   57.92  n/a
      [RDT= 1.00] out<- 02:SWMF-3        24.10     .056 No_date    3:10   57.92  n/a
            overflow <= 03:ovflw-3         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1351E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Infiltration Cell:
# SWMF 3 Bottom Draw Directed to INF Cell to infiltrate 100yr STM
# Overflow from INF Cell to be captured in ditch inlet which outlets to
# Victoria Road Swale/ Ditch which ultimately outlets to Eramosa River via
# 1100mm dia. CMP culvert northwest of College Ave East
#*****************************************************************************
 003:0024---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 02:SWMF-3        24.10     .056 No_date    3:10   57.92  n/a
      [RDT= 1.00] out<- 04:INFcell       24.10     .037 No_date    1:18   57.92  n/a
            overflow <= 05:Ovflw-INFc      .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.1732E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*****************************************************************************
# Overflow from SWMF and INF Cell - to outlet to Victoria Road
#*****************************************************************************
 003:0025---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            03:ovflw-3         .00     .000 No_date    0:00     .00  n/a
                      +  05:Ovflw-INFc      .00     .000 No_date    0:00     .00  n/a
#*****************************************************************************
 003:0002-------------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------
*******************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0009 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
   Simulation ended on 2025-11-25     at 14:10:51
===============================================================================
```

PROPOSED CONDITIONS

REGIONAL STORM

```
==============================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 3053466
        StormWater Management HYdrologic Model           999    999    =========

 ****************************************************************************
 **************************** SWMHYMO Ver/4.05  ****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                 *********
 ****************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ****************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: MTE Consultants Inc.                        +++++++++
 +++++++++               Burlington            SERIAL#:3053466        +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ****************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********           Maximum value for ID numbers  :     10             *********
 *********           Max. number of rainfall points: 105408             *********
 *********           Max. number of flow points    : 105408             *********
 ****************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****-------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                 *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).    *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.             *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       *****
 *****     *:  see WARNING or NOTE message printed at end of run.         *****
 *****    **:  see  ERROR  message printed at end of run.                 *****
 ****************************************************************************
 ****************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 ****************************************************************************

 **********************   S U M M A R Y   O U T P U T   **********************
 ****************************************************************************
 *         DATE: 2025-11-26     TIME: 09:59:00     RUN COUNTER: 000135      *
 ****************************************************************************
 * Input   filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\POST\RegPOST.dat     *
 * Output  filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\POST\RegPOST.out     *
 * Summary filename: Q:\46927\104\SWM\SWMHYMO\2025-1~1\POST\RegPOST.sum     *
 * User comments:                                                           *
 * 1:_______________________________________________________________________*
 * 2:_______________________________________________________________________*
 * 3:_______________________________________________________________________*
 ****************************************************************************
```

```
#*************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-24-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*************************************************************************
# PROPOSED CONDITIONS ANALYSIS
#*************************************************************************
 RUN:COMMAND#
 001:0001-------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
 001:0002-------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT=60.00:SDUR=  48.00:PTOT= 285.08]
#*************************************************************************
# Proposed Catchment 201 - Outlet is North to Eramosa River
#*************************************************************************
 001:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:201-1         20.11    2.796 No_date   46:00  255.45 .896
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 001:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    02:201-2         35.05    4.892 No_date   46:00  258.85 .908
      [XIMP=.70:TIMP=.70]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
 001:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:201-5          2.39     .334 No_date   46:00  249.52 .875
      [XIMP=.59:TIMP=.59]
      [SLP=****:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*************************************************************************
# Post-Development - Total Flow to SWMF 1
#*************************************************************************
 001:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:201-1         20.11    2.796 No_date   46:00  255.45  n/a
                      +  02:201-2         35.05    4.892 No_date   46:00  258.85  n/a
                      +  03:201-5          2.39     .334 No_date   46:00  249.52  n/a
      [DT= 1.00]  SUM=  04:Inlet-1       57.55    8.022 No_date   46:00  257.27  n/a
#*************************************************************************
# Preliminary SWMF 1 Design
#*************************************************************************
 001:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 04:Inlet-1       57.55    8.022 No_date   46:00  257.27  n/a
      [RDT= 1.00] out<- 01:SWMF-1        57.55    7.677 No_date   46:05  257.24  n/a
            overflow <= 02:ovflw-1        .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.3706E+01, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Uncontrolled Flow North to Eramosa River
#*************************************************************************
 001:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:201-3          2.61     .337 No_date   46:00  199.49 .700
      [CN= 68.0: N= 3.00]
      [Tp=  .14:DT= 1.00]
 001:0009---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
  *  DESIGN NASHYD      04:201-4           .78     .102 No_date   46:00  199.49 .700
      [CN= 68.0: N= 3.00]
      [Tp=  .01:DT= 1.00]
```

```
 001:0010--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:204            8.72    1.018 No_date   46:01  172.01 .603
      [CN= 58.0: N= 3.00]
      [Tp=  .16:DT= 1.00]
#*************************************************************************
# Post-Development - Total Uncontrolled Flow to Outlet 1
#*************************************************************************
 001:0011--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            03:201-3          2.61     .337 No_date   46:00  199.49  n/a
                      +  04:201-4           .78     .102 No_date   46:00  199.49  n/a
      [DT= 1.00]  SUM=  06:Total-1        3.39     .439 No_date   46:00  199.49  n/a
#*************************************************************************
# Post-Development - Total Flow to Outlet 1
#*************************************************************************
 001:0012--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:SWMF-1        57.55    7.677 No_date   46:05  257.24  n/a
                      +  02:ovflw-1         .00     .000 No_date    0:00     .00  n/a
                      +  03:201-3          2.61     .337 No_date   46:00  199.49  n/a
                      +  04:201-4           .78     .102 No_date   46:00  199.49  n/a
      [DT= 1.00]  SUM=  07:Total-1       60.94    8.076 No_date   46:04  254.03  n/a
#*************************************************************************
# Total Flow to Outlet 1 - Including Undeveloped Area
#*************************************************************************
 001:0013--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            05:204            8.72    1.018 No_date   46:01  172.01  n/a
                      +  07:Total-1       60.94    8.076 No_date   46:04  254.03  n/a
      [DT= 1.00]  SUM=  08:Total-1       69.66    9.078 No_date   46:04  243.76  n/a
#*************************************************************************
# Proposed Catchment 202 - Outlet is East to Eramosa River
#*************************************************************************
 001:0014--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    03:202-1         10.16    1.417 No_date   46:00  255.45 .896
      [XIMP=.66:TIMP=.66]
      [SLP=1.50:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*************************************************************************
#*************************************************************************
# Preliminary SWMF 2 Design
#*************************************************************************
 001:0015--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 03:202-1         10.16    1.417 No_date   46:00  255.45  n/a
      [RDT= 1.00] out<- 02:SWMF-2        10.16    1.389 No_date   46:02  255.45  n/a
            overflow <= 01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.3923E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Uncontrolled Flow East to Eramosa River
#*************************************************************************
 001:0016--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      04:202-2          2.68     .352 No_date   46:00  205.19 .720
      [CN= 70.1: N= 3.00]
      [Tp=  .12:DT= 1.00]
 001:0017--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      05:202-3          2.07     .272 No_date   46:00  203.57 .714
      [CN= 69.5: N= 3.00]
      [Tp=  .06:DT= 1.00]
 001:0018--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      07:205           15.26    1.776 No_date   46:01  172.01 .603
      [CN= 58.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
#*************************************************************************
#*************************************************************************
# Post-Development - Total Uncontrolled Flow to Target 2
#*************************************************************************
 001:0019--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            04:202-2          2.68     .352 No_date   46:00  205.19  n/a
                      +  05:202-3          2.07     .272 No_date   46:00  203.57  n/a
      [DT= 1.00]  SUM=  08:Total-2        4.75     .624 No_date   46:00  204.48  n/a
#*************************************************************************
# Post-Development - Total Flow to Target 2
#*************************************************************************
 001:0020--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:ovflw-2         .00     .000 No_date    0:00     .00  n/a
                      +  02:SWMF-2        10.16    1.389 No_date   46:02  255.45  n/a
                      +  04:202-2          2.68     .352 No_date   46:00  205.19  n/a
                      +  05:202-3          2.07     .272 No_date   46:00  203.57  n/a
      [DT= 1.00]  SUM=  09:Total-2       14.91    2.008 No_date   46:00  239.21  n/a
#*************************************************************************
# Total Flow to Outlet 2 - Including Undeveloped Area
#*************************************************************************
 001:0021--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            07:205           15.26    1.776 No_date   46:01  172.01  n/a
                      +  09:Total-2       14.91    2.008 No_date   46:00  239.21  n/a
      [DT= 1.00]  SUM=  10:Total-2       30.17    3.783 No_date   46:01  205.22  n/a
#*************************************************************************
# Proposed Catchment 203 - Outlet is Victoria and Stone Road Intersection
#*************************************************************************
 001:0022--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN STANDHYD    01:203           24.10    3.411 No_date   46:00  260.54 .914
      [XIMP=.72:TIMP=.72]
      [SLP=4.00:DT= 1.00]
      [LOSS= 2 :CN= 68.0]
#*************************************************************************
# Preliminary SWMF 3 Design
#*************************************************************************
 001:0023--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 01:203           24.10    3.411 No_date   46:00  260.54  n/a
      [RDT= 1.00] out<- 02:SWM3-BD       11.23     .070 No_date   42:13  260.52  n/a
            overflow <= 03:Ovflw-SWM3    12.87    3.341 No_date   46:00  260.54  n/a
     {MxStoUsed=.2225E+01, TotOvfVol=.3354E+01, N-Ovf=    2, TotDurOvf=    6.hrs}
#*************************************************************************
# SWM 3-Reg:
# Stage-Storage of SWMF 3 above 100yr ponding elevation to model outlet
# over emergency overflow weir
#*************************************************************************
 001:0024--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 03:Ovflw-SWM3    12.87    3.341 No_date   46:00  260.54  n/a
      [RDT= 1.00] out<- 04:SWM3-Reg      12.87    3.319 No_date   46:01  260.54  n/a
            overflow <= 05:Ovflw-Ston      .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2283E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
# Infiltration Cell:
# SWMF 3 Bottom Draw Directed to INF Cell to infiltrate 100yr STM
# Overflow from INF Cell to be captured in ditch inlet which outlets to
# Victoria Road Swale/ Ditch which ultimately outlets to Eramosa River via
# 1100mm dia. CMP culvert northwest of College Ave East
#*************************************************************************
 001:0025--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ROUTE RESERVOIR -> 02:SWM3-BD       11.23     .070 No_date   42:13  260.52  n/a
      [RDT= 1.00] out<- 06:INFcell       11.23     .066 No_date   58:29  260.53  n/a
            overflow <= 07:Ovflw-INFc      .00     .000 No_date    0:00     .00  n/a
     {MxStoUsed=.2012E+00, TotOvfVol=.0000E+00, N-Ovf=    0, TotDurOvf=    0.hrs}
#*************************************************************************
 001:0026-------------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------
*******************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
 001:0009 DESIGN NASHYD
      *** WARNING: Time step is too large for value of TP.
                   R.V. may be ok.  Peak flow could be off.
   Simulation ended on 2025-11-26     at 09:59:01
```

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Appendix C

SWMF Design Calculations

GID
STORMWATER MANAGEMENT
Guelph, Ontario

Project Number: 46927-104
Date: November 24, 2025
Design By: MPW
File: Q:\46927\104\SWM\SWMF 1\46927-104_SWMF 1 Master Design Sheet.xlsx

HYDROLOGIC PARAMETERS

Pre-Development Conditions

Sub-Catchment Number	Area	Overland Slope	Overland Length	SCS Curve Number *MTO Drainage Management Manual Table 1.09 (MTO, 1997)			Percent Impervious	Weighted Curve Number	Runoff Coefficient		Weighted Runoff Coefficient	Time of Concentration	Time to Peak	Land Use	Design Command	Comment
				Hydrologic Soil Group	Pervious (AMC II)	Impervious		CN	Pervious	Impervious	RC	ToC	Tp			
	(ha)	*(%)*	*(m)*				*(%)*					*(hr)*	*(hr)*			
101	54.91	6.0	500	B	65.0	98.0	3.0	66.0	0.20	0.90	0.22	0.59	0.35	Agricultural	NASHYD	Existing drainage north to Eramosa River
102	28.49	4.0	350	B	65.0	98.0	1.0	65.3	0.20	0.90	0.21	0.57	0.34	Agricultural	NASHYD	Existing drainage east to Eramosa River
103	16.55	2.0	250	B	65.0	98.0	10.0	68.3	0.20	0.90	0.27	0.57	0.34	Agricultural	NASHYD	Existing drainage to Victoria at Stone Rd. (existing infiltration facility)
104	8.72	11.0	150	B	58.0	98.0	0.0	58.0	0.20	0.90	0.20	0.27	0.16	Woodlot	NASHYD	Existing drainage north to Eramosa River
105	15.26	11.0	200	B	58.0	98.0	0.0	58.0	0.20	0.90	0.20	0.31	0.19	Woodlot	NASHYD	Existing drainage east to Eramosa River
Total	**123.93**															

Post-Development Conditions

Sub-Catchment Number	Area	Overland Slope	Overland Length	SCS Curve Number *MTO Drainage Management Manual Table 1.09 (MTO, 1997)			Percent Impervious	Weighted Curve Number	Runoff Coefficient		Weighted Runoff Coefficient	Time of Concentration	Peak Flow	Land Use	Design Command	Comment
				Hydrologic Soil Group	Pervious (AMC II)	Impervious		CN	Pervious	Impervious	RC	ToC	Tp			
	(ha)	*(%)*	*(m)*				*(%)*					*(hr)*	*(hr)*			
Outlet 1 - Drainage North to Eramosa River																
201-1	20.11	1.5	850	B	68.0	98.0	66.0	68.0	0.20	0.90	0.66	0.55	0.33	Mix of residential and 'mixed land use'	STANDHYD	Proposed drainage to SWMF1 east forebay
201-2	35.05	1.5	900	B	68.0	98.0	70.0	68.0	0.20	0.90	0.69	0.55	0.33	Mix of residential and 'mixed land use'	STANDHYD	Proposed drainage to SWMF1 west forebay
201-5	2.39	15.0	50	B	68.0	98.0	59.0	68.0	0.20	0.90	0.61	0.03	0.02	SWMF	STANDHYD	Proposed SWMF1
Total to SWMF 1	**57.55**						**68.1**									
201-3	2.61	5.0	100	B	68.0	98.0	22.0	68.0	0.20	0.90	0.35	0.24	0.14	Embankment and roadway	STANDHYD	Uncontrolled drainage to Victoria Road - north to River
201-4	0.78	20.0	30	B	68.0	98.0	41.0	68.0	0.20	0.90	0.49	0.02	0.01	Residential rear lots	STANDHYD	Uncontrolled drainage directly north to Eramosa River
204	8.72	11.0	150	B	58.0	98.0	0.0	58.0	0.20	0.90	0.20	0.27	0.16	Woodlot	NASHYD	Existing drainage north to Eramosa River
Total Uncontrolled	**12.11**						**7.4**									
Total North to River	**69.66**						**57.6**									
Outlet 2 - Drainage East To Eramosa River																
202-1	10.16	1.5	550	B	68.0	98.0	66.0	68.0	0.20	0.90	0.66	0.38	0.23	Mix of residential and 'mixed land use'	STANDHYD	Proposed drainage to SWMF2
Total to SWMF 2	**10.16**						**66.0**									
202-2	2.68	7.5	75	B	68.0	98.0	7.0	70.1	0.20	0.90	0.25	0.21	0.12	Park and open space	NASHYD	Uncontrolled drainage directly east to Eramosa River
202-3	2.07	33.0	50	B	68.0	98.0	5.0	69.5	0.20	0.90	0.24	0.10	0.06	Embankment and open space	NASHYD	Uncontrolled drainage directly east to Eramosa River
205	15.26	11.0	200	B	58.0	98.0	0.0	58.0	0.20	0.90	0.20	0.31	0.19	Woodlot	NASHYD	Existing drainage east to Eramosa River
Total Uncontrolled	**20.01**						**1.5**									
Total East to River	**30.17**						**23.2**									
Outlet 3 - Drainage to Victoria and Stone Intersection (Outlet to River North along Victoria)																
203	24.10	4.0	300	B	68.0	98.0	72.0	68.0	0.20	0.90	0.70	0.16	0.09	Employment, mixed-use, and mixed existing uses	STANDHYD	Proposed and existing drainage to SWMF3
Total to SWMF 3	**24.10**						**72.0**									
Total Offsite	**123.93**						**52.0**									

GID
PERCENT IMPERVIOUS AND RUNOFF COEFFICIENT
Guelph, Ontario

Project Number: 46927-104
Date: November 27, 2025
Design By: MPW
File: Q:\46927\104\SWM\C Coefficients\C Coefficient Calculation.xlsx

	Runoff Coefficient	Percent Impervious
PARKS	0.25	7%
ROADS	0.66	65%
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 standard 18m wide cross section
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

SWMF1 - EAST FOREBAY

		AREA	C	AC	Weighted C
101	ROADS	0.96	0.66	0.63	0.65
	RESIDENTIAL	1.91	0.65	1.24	
		2.87		1.88	

		AREA	C	AC	Weighted C
102	ROADS	0.40	0.66	0.26	0.65
	RESIDENTIAL	0.75	0.65	0.49	
		1.15		0.75	

		AREA	C	AC	Weighted C
103	ROADS	1.01	0.66	0.67	0.66
	RESIDENTIAL	2.44	0.65	1.59	
	MULTI-RES	0.21	0.75	0.16	
		3.66		2.41	

		AREA	C	AC	Weighted C
104	ROADS	0.52	0.66	0.34	0.54
	RESIDENTIAL	0.80	0.65	0.52	
	MULTI-RES	0.03	0.75	0.02	
	PARKS	0.55	0.25	0.14	
		1.90		1.02	

		AREA	C	AC	Weighted C
105	ROADS	0.71	0.66	0.47	0.73
	MULTI-RES	2.68	0.75	2.01	
		3.39		2.48	

		AREA	C	AC	Weighted C
106	ROADS	0.93	0.66	0.61	0.66
	RESIDENTIAL	1.89	0.65	1.23	
	MULTI-RES	0.09	0.75	0.07	
		2.91		1.91	

		AREA	C	AC	Weighted C
107	ROADS	0.34	0.66	0.22	0.66
	RESIDENTIAL	0.80	0.65	0.52	
	MULTI-RES	0.51	0.75	0.38	
	MULTI-RES	0.13	0.75	0.10	
		1.78		1.22	

		AREA	C	AC	Weighted C
108	ROADS	0.47	0.66	0.31	0.65
	RESIDENTIAL	1.28	0.65	0.83	
	PARKS	0.02	0.25	0.01	
		1.77		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	

Total Catchment	21.24	Total C	0.66
		%IMP	66.00

SWMF1 - WEST FOREBAY

		AREA	C	AC	Weighted C
401	ROADS	0.69	0.66	0.46	0.65
	RESIDENTIAL	1.03	0.65	0.67	
		1.72		1.12	

		AREA	C	AC	Weighted C
402	ROADS	0.79	0.66	0.52	0.73
	RESIDENTIAL	0.18	0.65	0.12	
	MULTI-RES	2.00	0.75	1.50	
	MIXED USE	0.92	0.75	0.69	
		3.89		2.83	

		AREA	C	AC	Weighted C
403	ROADS	0.46	0.66	0.30	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	
		3.12		2.02	

		AREA	C	AC	Weighted C
404	ROADS	0.84	0.66	0.55	0.53
	RESIDENTIAL	0.57	0.65	0.37	
	MULTI-RES	0.11	0.75	0.08	
	PARKS	0.54	0.25	0.14	
		2.06		1.14	

		AREA	C	AC	Weighted C
405	ROADS	0.45	0.66	0.30	0.66
	RESIDENTIAL	0.32	0.65	0.21	
		0.77		0.51	

		AREA	C	AC	Weighted C
406	SCHOOL	2.07	0.75	1.55	0.75
	EMPLOYMENT	0.03	0.9	0.03	
	ROADS	0.17	0.66	0.11	
		2.27		1.69	

		AREA	C	AC	Weighted C
407	ROADS	1.14	0.66	0.75	0.74
	MULTI-RES	2.83	0.75	2.12	
	MIXED USE	4.20	0.75	3.15	
		8.17		6.02	

		AREA	C	AC	Weighted C
408	ROADS	1.2	0.66	0.79	0.74
	MULTI-RES	5.94	0.75	4.46	
	MIXED USE	3.32	0.75	2.49	
		10.46		7.74	

		AREA	C	AC	Weighted C
409	ROADS	0.16	0.66	0.11	0.74
	MULTI-RES	1.85	0.75	1.39	
	SWM	0.04	0.65	0.03	
		2.05		1.52	

		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	36.32	Total C	0.69
		%IMP	70.00

SWMF2

		AREA	C	AC	Weighted C
201	ROADS	0.93	0.66	0.61	0.65
	RESIDENTIAL	1.95	0.65	1.27	
		2.88		1.88	

		AREA	C	AC	Weighted C
202	ROADS	0.66	0.66	0.44	0.71
	RESIDENTIAL	1.50	0.65	0.98	
	MIXED USE	2.64	0.75	1.98	
	PARKS	0.01	0.25	0.00	
		4.81		3.39	

		AREA	C	AC	Weighted C
203	ROADS	0.22	0.66	0.15	0.55
	RESIDENTIAL	1.10	0.65	0.72	
	PARKS	0.46	0.25	0.12	
		1.78		0.98	

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

Total Catchment	10.16	Total C	0.66
		%IMP	66.00

SWMF3

		AREA	C	AC	Weighted C
301	ROADS	0.99	0.66	0.65	0.73
	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		2.96	

		AREA	C	AC	Weighted C
302	ROADS	0.31	0.66	0.20	0.87
	EMPLOYMENT	2.43	0.90	2.19	
		2.74		2.39	

		AREA	C	AC	Weighted C
303	ROADS	0.44	0.66	0.29	0.56
	EMPLOYMENT	3.17	0.9	2.85	
	PARKS	3.65	0.25	0.91	
		7.26		4.06	

		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
STORMWATER MANAGEMENT
Guelph, Ontario

Project Number:	46927-104
Date:	November 24, 2025
Design By:	MPW
File:	Q:\46927\104\SWM\SWMF 1\46927-104_SWMF 1 Master Design Sheet.xlsx

Water Quality Sizing Criteria — MOE Volumes — SWMF-1

Reference: Section 3.3 Water Quality, MOE Stormwater Management Planning and Design Manual, March 2003

Step 1: Choose Level of Water Quality Control
Enhanced 80% long-term S.S. removal

Step 2: Choose Type of Facility
Wet Pond

Step 3: Define Catchment area and Imperviousness

Catchment Area (ha)	Imperviousness (%)
57.55	68.15

Table 2.3 Interpolated Storage Volume Requirement (m3/ha)
220.67

Total Storage Volume Required (m3)
12699.71

Extended Detention Volume Required (m^3)
2302.00

Total Permanent Pool Required (m3)
10397.71

Table 3.2 Water Quality Storage Requirements based on Receiving Waters (from MOE Stormwater

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35	55	70	85
Enhanced 80% long-term S.S. removal	*Wetlands*	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. Removal	*Wetlands*	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. Removal	*Wetlands*	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

GID
STORMWATER MANAGEMENT
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STAGE-STORAGE RELATIONSHIP: Facility Volumes

SWMF-1

Stage	Active Depth	East Forebay			West Forebay			Main Pond			Total Pond Volume	Active Storage Volume	Volume Summary	Ponding Elevation	Comments	Stage
		Area	Volume	Cumulative Volume	Area	Volume	Cumulative Volume	Area	Volume	Cumulative Volume						
m	*m*	m^2	m^3	m^3	m^2	m^3	m^3	m^2	m^3	m^3	m^3	m^3	m^3	*m*		*m*
325.00		552	0	0	1316	0	0	4640	0	0	0					325.00
325.10		587	57	57	1384	135	135	4821	473	473	665					325.10
325.20		622	60	117	1451	142	277	5001	491	964	1358					325.20
325.30		656	64	181	1519	148	425	5182	509	1473	2080					325.30
325.40		691	67	249	1586	155	580	5362	527	2000	2829					325.40
325.50		726	71	319	1654	162	742	5543	545	2546	3608					325.50
325.60		761	74	394	1721	169	911	5723	563	3109	4414					325.60
325.70		795	78	472	1789	175	1087	5904	581	3690	5249					325.70
325.80		830	81	553	1856	182	1269	6084	599	4290	6112					325.80
325.90		865	85	638	1924	189	1458	6265	617	4907	7003					325.90
326.00		941	90	728	1991	196	1654	6445	636	5543	7924					326.00
326.10		1017	98	826	2059	203	1856	6626	654	6196	8878					326.10
326.20		1093	106	931	2126	209	2065	6806	672	6868	9865					326.20
326.30		1169	113	1044	2194	216	2281	6987	690	7558	10883					326.30
326.40		1245	121	1165	2261	223	2504	7167	708	8265	11935					326.40
326.50		1321	128	1293	2329	230	2734	7482	732	8998	13025		**13025**		**Permanent Pool**	326.50
326.50	0.00							11132	0	8998	13025	0				326.50
326.60	0.10							11503	1132	10129	14157	1132				326.60
326.70	0.20							11875	1169	11298	15326	2301	2302	326.71	MOE Extended Detention	326.70
326.80	0.30							12246	1206	12504	16532	3507				326.80
326.90	0.40							12617	1243	13748	17775	4750				326.90
327.00	0.50							12989	1280	15028	19055	6030				327.00
327.10	0.60							13360	1317	16345	20373	7348				327.10
327.20	0.70							13553	1346	17691	21718	8693				327.20
327.30	0.80							13746	1365	19056	23083	10058				327.30
327.40	0.90							13938	1384	20440	24467	11442				327.40
327.50	1.00							14131	1403	21844	25871	12846				327.50
327.60	1.10							14324	1423	23266	27293	14269				327.60
327.70	1.20							14517	1442	24708	28736	15711				327.70
327.80	1.30							14710	1461	26170	30197	17172	16480	327.76	5y	327.80
327.90	1.40							14902	1481	27650	31677	18653				327.90
328.00	1.50							15095	1500	29150	33177	20152				328.00
328.10	1.60							15288	1519	30669	34696	21672				328.10
328.20	1.70							15481	1538	32208	36235	23210	22100	328.13	25y	328.20
328.30	1.80							15674	1558	33765	37793	24768				328.30
328.40	1.90							15866	1577	35342	39370	26345				328.40
328.50	2.00							16059	1596	36939	40966	27941	27140	328.45	100yr	328.50
328.60	2.10							16252	1616	38554	42581	29557				328.60
328.70	2.20							16445	1635	40189	44216	31191				328.70
328.80	2.30							16637	1654	41843	45870	32845				328.80
328.90	2.40							16830	1673	43517	47544	34519				328.90
329.00	2.50							17023	1693	45209	49236	36211				329.00
329.10	2.60							17216	1712	46921	50948	37923	37060	329.05	Regional	329.10
329.20	2.70							17409	1731	48652	52680	39655				329.20

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Orifice Calculations

$Q_o=C_d*A_o*(2*g*H_o)$^0.5

	Orifice 1	Orifice 2	Orifice 3
C_d	0.63	0.63	0.63
Invert (m)	326.50	327.50	500.00
Width (m)			
Diameter/Height (m)	0.375	0.675	
Type (H/V)	V	V	V
Control	25mm		

C_d	Description
0.63	Orifice Plate
0.80	Orifice Tube

Weir Calculations

$Q_w = 2/3*C_d*(2g)^{1/2}*L*H_w^{3/2} + 8/15*C_d*(2g)^{1/2}*\tan\theta*H_w^{5/2}$

	Overflow Weir	Emergency Weir
C_d	0.50	0.50
Invert (m)		328.50
Length (m)		6.400
Side Slope (H:V)	0	10
Side Slope (rad)	0.000	1.471

STAGE-DISCHARGE RELATIONSHIP: Facility Hydraulics **SWMF-1**

Stage	Active Volume	Orifice 1			Orifice 2			Orifice 3			Weir 1 Flow	Weir 2 Flow	Total Flow
		Area	H_o	Flow	Area	H_o	Flow	Area	H_o	Flow			
m	m^3	m^2	m	m^3/s	m^2	m	m^3/s	m^2	m	m^3/s	m^3/s		m^3/s
326.50	0	0.00	0.00	0.0000	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0000
326.60	1132	0.02	0.05	0.0148	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0148
326.70	2301			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
326.80	3507			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
326.90	4750			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
327.00	6030			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
327.10	7348			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
327.20	8693			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
327.30	10058			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
327.40	11442			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
327.50	12846			0.0330	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0330
327.60	14269			0.0330	0.03	0.05	0.0206	0.00	0.00	0.0000	0.0000	0.0000	0.0536
327.70	15711			0.0330	0.09	0.10	0.0783	0.00	0.00	0.0000	0.0000	0.0000	0.1113
327.80	17172			0.0330	0.15	0.15	0.1661	0.00	0.00	0.0000	0.0000	0.0000	0.1991
327.90	18653			0.0330	0.22	0.20	0.2756	0.00	0.00	0.0000	0.0000	0.0000	0.3086
328.00	20152			0.0330	0.28	0.25	0.3966	0.00	0.00	0.0000	0.0000	0.0000	0.4296
328.10	21672			0.0330	0.34	0.30	0.5137	0.00	0.00	0.0000	0.0000	0.0000	0.5467
328.20	23210			0.0330	0.36	0.36	0.6012	0.00	0.00	0.0000	0.0000	0.0000	0.6342
328.30	24768			0.0330	0.36	0.46	0.6791	0.00	0.00	0.0000	0.0000	0.0000	0.7121
328.40	26345			0.0330	0.36	0.56	0.7489	0.00	0.00	0.0000	0.0000	0.0000	0.7819
328.50	27941			0.0330	0.36	0.66	0.8128	0.00	0.00	0.0000	0.0000	0.0000	0.8458
328.60	29557			0.0330	0.36	0.76	0.8720	0.00	0.00	0.0000	0.0000	0.3362	1.2412
328.70	31191			0.0330	0.36	0.86	0.9274	0.00	0.00	0.0000	0.0000	1.0565	2.0169
328.80	32845			0.0330	0.36	0.96	0.9797	0.00	0.00	0.0000	0.0000	2.1350	3.1477
328.90	34519			0.0330	0.36	1.06	1.0293	0.00	0.00	0.0000	0.0000	3.5858	4.6482
329.00	36211			0.0330	0.36	1.16	1.0767	0.00	0.00	0.0000	0.0000	5.4290	6.5386
329.10	37923			0.0330	0.36	1.26	1.1220	0.00	0.00	0.0000	0.0000	7.6855	8.8405
329.20	39655			0.0330	0.36	1.36	1.1656	0.00	0.00	0.0000	0.0000	10.3766	11.5753

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FOREBAY DESIGN CALCULATIONS — SWMF-1 (EAST)

Reference: Section 4.6.2 Wet Ponds, MOE Stormwater Management Planning and Design Manual, March 2003

Forebay Design Flows

Flow into forebay during the 1:5-year return period event	2.710	m^3/s	**From MTE STM Design Sheet*
Estimated pipe flow capacity for inlet pipe into forebay designed for the 1:5yr Storm Event	3.721	m^3/s	**Pipe designed for 90% Capcity*
Flow into forebay during the 25 mm - 4 hour design storm event	1.730	m^3/s	**From MTE STM SWMHYMO*
Peak flow from main pond outlet for the 25mm design storm	0.012	m^3/s	**From MTE STM SWMHYMO*

Forebay Characteristics

b =	15.3	*m*	bottom width
y =	1.5	*m*	depth
z =	3.8	:1	side slope
w =	21.0	*m*	average width
R =	1.16	*m*	hydraulic radius
A =	31.5	m^2	cross-sectional area

1. Length Calculation Based on Settling Velocity

Reference: MOE SWM P&D Manual, Equation 4.5: Forebay Settling Length

L = forebay flow length *(m)*
r = length-to-width ratio
Q_p = peak flow rate through forebay *(m^3/s)*
v_s = settling velocity *(m/s)*

Equation 4.5: Forebay Settling Length

a) Required Settling Length (assuming Q_p = forebay through-flow & v_s = 0.0055 m/s)

Q_p =	1.73	m^3/s	peak flow rate through forebay
v_s =	0.0055	*m/s*	settling velocity
r =	0.71		length-to-width ratio
L =	15.0	*m*	required settling length
L =	*15.0*	*m*	*trial length*

b) Required Settling Length (assuming Q_p = pond discharge & v_s = 0.0003 m/s)

Q_p =	0.012	m^3/s	peak flow rate through forebay
v_s =	0.0003	*m/s*	settling velocity
r =	0.10		length-to-width ratio
L =	2.0	*m*	required settling length
L =	*2.0*	*m*	*trial length*

Table 1: Average settling velocities

	Mass Removed	Particle Size Range	Average Settling Velocity
	%	μm	m/s
	80 - 100	x ≤ 20	0.00000254
Enhanced:	70 - 80	20 < x ≤ 40	0.00001300
Normal:	60 - 70	40 < x ≤ 60	0.00002540
Basic:	40 - 60	60 < x ≤ 130	0.00012700
Medium Sand:	20 - 40	130 < x ≤ 400	0.00059267
Gross Grit:	0 - 20	400 < x ≤ 4000	0.00550333

2. Length Calculation Based on Flow Dispersion Length

Reference: MOE SWM P&D Manual, Equation 4.6: Dispersion Length

Q =	3.72	m^3/s	inlet flow rate
d =	1.5	*m*	depth of permanent pool in forebay
V_f =	0.50	*m/s*	desired velocity in forebay (typical value ≤ 0.50 *m/s*)
L =	39.7	m	required length of dispersion

3. Required Forebay Length

$L_{\_min}$ =	39.7	*m*	Minimum required design length
$L_{\_design}$ =	**46.7**	***m***	**Proposed design length**
r =	2.22		design length-to-width ratio (typical minimum of 2.0)

4. Scour Velocity

Reference: MOE SWM P&D Manual, Sect. 4 Pg 56

v_s =	0.15	*m/s*	scour velocity (typical value = 0.15 *m/s*)
v =	**0.118**	***m/s***	**actual velocity**

OK The actual velocity through the forebay is less than the scour velocity.

5. Weir Flow From Forebay

Reference: MOE SWM P&D Manual, Equation 4.4: Weir Flow

L =	14	*m*	length of crest of weir
α =	1.65		coefficient
H =	0.3	*m*	head
Q =	**3.80**	***m^3/s***	**discharge**

OK The weir flow from the forebay exceeds the flow entering the forebay

6. Estimated Cleanout Frequencies

A) MOE Clean-Out Frequency Estimate

(Reference: 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57 & App. H Pg. 12)

Forebay Design Volume =	1293	m^3
Selected TSS Removal Efficiency =	80%	
Estimated Catchment Impervious level =	66.00	%
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	20.11	*ha*
Calculated Annual sediment volume =	41	m^3/yr
MOE Clean-out Frequency Estimate =	**31.4**	***years***

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Table 2: Annual sediment loading

Impervious Level	Annual Loading
%	m^3/ha
35	0.6
55	1.9
70	2.8
85	3.8

B) MTE Recommended Clean-out Frequency Estimate

(Note: Forebay and Pond Sized to meet MOE Requirements)

Forebay

Forebay Design Volume =	1293	m^3
33% Volume Reduction =	427	
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	66	%
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	20.11	*ha*
Calculated Annual sediment volume =	26	m^3/yr
Cleanout frequency for 33% volume reduction =	**16.6**	***years***

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Wet Cell

Wet Cell Design Volume =	8998	m^3	*(Note: Wet Cell Design Volume does not include forebay volume)*
Estimated Wet Cell TSS Removal Efficiency =	30%		
Estimated Catchment Impervious level =	68.15	%	
Estimated annual sediment loading =	2.7	m^3/ha	
Catchment Contributing area =	57.55	*ha*	
Calculated Annual sediment volume =	46	m^3/yr	
Cleanout frequency for 33% volume reduction =	**64.0**	***years***	

C) City of Guelph Development Manual and Operational Objective

(Reference: 2023 CoG Development Engineering Manual, Figure 4)

Total Forebay Volume at 0.5m above bottom =	319	m^3
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	66.00	%
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	20.11	*ha*
Calculated Annual sediment volume =	26	m^3/yr
Cleanout frequency for 0.5m sediment accumulation =	**12.4**	***years***

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FOREBAY DESIGN CALCULATIONS — SWMF-1 (WEST)

Reference: Section 4.6.2 Wet Ponds, MOE Stormwater Management Planning and Design Manual, March 2003

Forebay Design Flows

Flow into forebay during the 1:5-year return period event	5.432	m^3/s	**From MTE STM Design Sheet*
Estimated pipe flow capacity for inlet pipe into forebay designed for the 1:5yr Storm Event	6.120	m^3/s	**Pipe designed for 90% Capcity*
Flow into forebay during the 25 mm - 4 hour design storm event	2.937	m^3/s	**From MTE STM SWMHYMO*
Peak flow from main pond outlet for the 25mm design storm	0.021	m^3/s	**From MTE STM SWMHYMO*

Forebay Characteristics

b =	21.5	*m*	bottom width
y =	1.5	*m*	depth
z =	3.8	:1	side slope
w =	27.2	*m*	average width
R =	1.23	*m*	hydraulic radius
A =	40.8	m^2	cross-sectional area

1. Length Calculation Based on Settling Velocity

Reference: MOE SWM P&D Manual, Equation 4.5: Forebay Settling Length

L = forebay flow length *(m)*
r = length-to-width ratio
Q_p = peak flow rate through forebay *(m^3/s)*
v_s = settling velocity *(m/s)*

a) Required Settling Length (assuming Q_p = forebay through-flow & v_s = 0.0055 m/s)

Q_p =	2.94	m^3/s	peak flow rate through forebay
v_s =	0.0055	*m/s*	settling velocity
r =	0.72		length-to-width ratio
L =	19.6	*m*	required settling length
L =	*19.6*	*m*	*trial length*

b) Required Settling Length (assuming Q_p = pond discharge & v_s = 0.0003 m/s)

Q_p =	0.021	m^3/s	peak flow rate through forebay
v_s =	0.0003	*m/s*	settling velocity
r =	0.09		length-to-width ratio
L =	2.5	*m*	required settling length
L =	*2.5*	*m*	*trial length*

Table 1: Average settling velocities

	Mass Removed	Particle Size Range	Average Settling Velocity
	%	μm	m/s
	80 - 100	x ≤ 20	0.00000254
Enhanced:	70 - 80	20 < x ≤ 40	0.00001300
Normal:	60 - 70	40 < x ≤ 60	0.00002540
Basic:	40 - 60	60 < x ≤ 130	0.00012700
Medium Sand:	20 - 40	130 < x ≤ 400	0.00059267
Gross Grit:	0 - 20	400 < x ≤ 4000	0.00550333

2. Length Calculation Based on Flow Dispersion Length

Reference: MOE SWM P&D Manual, Equation 4.6: Dispersion Length

Q =	6.12	m^3/s	inlet flow rate
d =	1.5	*m*	depth of permanent pool in forebay
V_f =	0.50	*m/s*	desired velocity in forebay (typical value ≤ 0.50 *m/s*)
L =	65.3	m	required length of dispersion

3. Required Forebay Length

$L_{\_min}$ =	65.3	*m*	Minimum required design length
$L_{\_design}$ =	**65.3**	***m***	**Proposed design length**
r =	2.40		design length-to-width ratio (typical minimum of 2.0)

4. Scour Velocity

Reference: MOE SWM P&D Manual, Sect. 4 Pg 56

v_s =	0.15	*m/s*	scour velocity (typical value = 0.15 *m/s*)
v =	**0.150**	***m/s***	**actual velocity**

OK The actual velocity through the forebay is less than the scour velocity.

5. Weir Flow From Forebay

Reference: MOE SWM P&D Manual, Equation 4.4: Weir Flow

L =	24	*m*	length of crest of weir
α =	1.65		coefficient
H =	0.3	*m*	head
Q =	**6.51**	**m^3/s**	**discharge**

OK The weir flow from the forebay exceeds the flow entering the forebay

6. Estimated Cleanout Frequencies

A) MOE Clean-Out Frequency Estimate

(Reference: 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57 & App. H Pg. 12)

MOE Required Forebay Design Volume =	2734	m^3
Selected TSS Removal Efficiency =	80%	
Estimated Catchment Impervious level =	70.00	*%*
Estimated annual sediment loading =	2.8	m^3/ha
Catchment Contributing area =	35.05	*ha*
Calculated Annual sediment volume =	79	m^3/yr
MOE Clean-out Frequency Estimate =	**34.8**	***years***

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Table 2: Annual sediment loading

Impervious Level	Annual Loading
%	m^3/ha
35	0.6
55	1.9
70	2.8
85	3.8

B) MTE Recommended Clean-out Frequency Estimate

(Note: Forebay and Pond Sized to meet MOE Requirements)

Forebay

MOE Required Forebay Design Volume =	2734	m^3
33% Volume Reduction =	902	
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	70	*%*
Estimated annual sediment loading =	2.8	m^3/ha
Catchment Contributing area =	35.05	*ha*
Calculated Annual sediment volume =	49	m^3/yr
Cleanout frequency for 33% volume reduction =	**18.4**	***years***

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Wet Cell

MOE Required Wet Cell Design Volume =	8998	m^3 *(Note: Wet Cell Design Volume does not include forebay volume)*
Estimated Wet Cell TSS Removal Efficiency =	30%	
Estimated Catchment Impervious level =	68.15	*%*
Estimated annual sediment loading =	2.7	m^3/ha
Catchment Contributing area =	57.55	*ha*
Calculated Annual sediment volume =	46	m^3/yr
Cleanout frequency for 33% volume reduction =	**64.0**	***years***

C) City of Guelph Development Manual and Operational Objective

(Reference: 2023 CoG Development Engineering Manual, Figure 4)

Required Total Forebay Volume at 0.5m above bottom =	742	m^3
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	70.00	*%*
Estimated annual sediment loading =	2.8	m^3/ha
Catchment Contributing area =	35.05	*ha*
Calculated Annual sediment volume =	49	m^3/yr
Cleanout frequency for 0.5m sediment accumulation =	**15.1**	***years***

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Water Quality Sizing Criteria — MOE Volumes — SWMF-2

Reference: Section 3.3 Water Quality, MOE Stormwater Management Planning and Design Manual, March 2003

Step 1: Choose Level of Water Quality Control

Enhanced 80% long-term S.S. removal

Step 2: Choose Type of Facility

Wet Pond

Step 3: Define Catchment area and Imperviousness

Catchment Area (ha)	Imperviousness (%)
10.16	66.00

Table 2.3 Interpolated Storage Volume Requirement (m3/ha)

215.67

Total Storage Volume Required (m3)

2191.17

Extended Detention Volume Required (m^3)

406.40

Total Permanent Pool Required (m^3)

1784.77

Table 3.2 Water Quality Storage Requirements based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35	55	70	85
Enhanced 80% long-term S.S. removal	*Wetlands*	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. Removal	*Wetlands*	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. Removal	*Wetlands*	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

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STAGE-STORAGE RELATIONSHIP: Facility Volumes

SWMF-2

		MOE Forebay Design			Add. Forebay Req'd For CoG Operational Clean-out Objective						MOE Wet Cell Design			MOE Total Pond Design					
Stage	Active Depth	Area	Volume	Cumulative Volume	Area	Volume	Cumulative Volume	Total Forebay Area	Total Forebay Volume	Total Cumulative Volume	Area	Volume	Cumulative Volume	Total MOE Pond Volume	Active Storage Volume	Volume Summary	Ponding Elevation	Comments	Stage
m	*m*	*m^2*	*m^3*	*m^3*	*m^2*	*m^3*	*m^3*	*m^2*		*m^3*	*m^2*	*m^3*	*m^3*	*m^3*	*m^3*	*m^3*	*m*		*m*
																			0.00
																			0.00
																			0.00
																			0.00
																			0.00
331.90		205	0	0	237	0	0	505	0	0	713	0	0	0					
332.00		238	22	22	247	24	24	539	52	52	761	74	74	126					332.00
332.10		272	26	48	257	25	49	573	56	108	809	78	152	260					332.10
332.20		305	29	77	268	26	76	609	59	167	859	83	236	402					332.20
332.30		339	32	109	278	27	103	645	63	230	909	88	324	554					332.30
332.40		372	36	144	288	28	131	683	66	296	960	93	417	713					332.40
332.50		405	39	183	299	29	161	721	70	366	1012	99	516	882					332.50
332.60		439	42	225	309	30	191	760	74	440	1065	104	620	1060					332.60
332.70		472	46	271	319	31	222	801	78	518	1118	109	729	1247					332.70
332.80		506	49	320	330	32	255	843	82	601	1174	115	844	1444					332.80
332.90		539	52	372	340	33	288	893	87	687	1243	121	965	1652					332.90
333.00		573	56	428	350	35	323	947	92	779	1314	128	1092	1872					333.00
333.10		606	59	487	361	36	358	996	97	876	1387	135	1228	2104					333.10
333.20		640	62	549	371	37	395	1049	102	979	1461	142	1370	2349					333.20
333.30		673	66	615	381	38	433	1103	108	1086	1536	150	1520	2606				Design MOE Permanent Pool Volume = 2877m3 > MOE Requirement of 1785m3	333.30
333.40		706	69	**683**	392	39	471	1159	113	1199	1614	158	**1677**	2877				Total Permanent Pool Volume = 2877m3	333.40
333.40	0.00										2772	0	0	2877	0				333.40
333.50	0.10										2934	285	285	3162	285				333.50
333.60	0.20										3063	300	585	3462	585	406	333.55	MOE Extended Detention (= 0.15m above Perm. Pool)	333.60
333.70	0.30										3196	313	898	3775	898				333.70
333.80	0.40										3331	326	1224	4101	1224				333.80
333.90	0.50										3467	340	1564	4441	1564	1531	333.90	25mm - 4hr Storm Event (= 0.5m above Perm. Pool)	333.90
334.00	0.60										3613	354	1918	4795	1918				334.00
334.10	0.70										3715	366	2285	5161	2285	2169	334.07	5yr Storm Event (= 0.67m above Perm. Pool)	334.10
334.20	0.80										3817	377	2661	5538	2661				334.20
334.30	0.90										3919	387	3048	5925	3048	2748	334.23	25yr Storm Event (= 0.83m above Perm. Pool)	334.30
334.40	1.00										4022	397	3445	6322	3445	3233	334.35	100yr Storm Event (= 0.95m above Perm. Pool)	334.40
334.50	1.10										4130	408	3853	6729	3853				334.50
334.60	1.20										4243	419	4271	7148	4271	3923	334.52	Regional Storm Event (= 1.12m above Perm. Pool)	334.60
334.70	1.30										4359	430	4702	7578	4702			0.3m Freeboard above 100yr Stm Elev. = 334.65m (=1.25m above Perm. Pool)	334.70

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STAGE-DISCHARGE RELATIONSHIP: Facility Hydraulics — SWMF-2

Orifice Calculations
$Q_o = C_d * A_o * (2*g*H_o)^{0.5}$

	Orifice 1	Orifice 2	Orifice 3
C_d	0.63	0.63	0.63
Invert (m)	333.40	500.00	500.00
Width (m)			
Diameter/Height (m)	0.130		
Type (H/V)	V	V	V
Control	MOE & 25mm		

C_d	Description
0.63	Orifice Plate
0.80	Orifice Tube

Weir Calculations
$Q_w = 2/3*C_d*(2g)^{1/2}*L*H_w^{3/2} + 8/15*C_d*(2g)^{1/2}*\tan\theta*H_w^{5/2}$

	Cutout Weir	Emergency Weir
C_d	0.50	0.50
Invert (m)	333.91	334.38
Length (m)	1.250	5.000
Side Slope (H:V)	0	10
Side Slope (rad)	0.000	1.471
Control	5yr-100yr	Regional

Stage	Active Volume	Orifice 1 - MOE & 25mm Drawdown			Orifice 2			Orifice 3			Cutout Weir 25yr-100yr Flow Control	Emergency Weir Flow	Total Flow		Average Discharge	Increment Volume	Increment Dewatering Time	Extended Detention: Cumulative Dewatering Time	Erosion Control: Cumulative Dewatering Time
		Area	H_o	Flow	Area	H_o	Flow	Area	H_o	Flow									
m	*m^3*	*m^2*	*m*	*m^3/s*	*m^2*	*m*	*m^3/s*	*m^2*	*m*	*m^3/s*	*m^3/s*		*m^3/s*		*m^3/s*	*m^3*	*hours*	*hours*	*hours*
333.40	0	0.00	0.00	0.0000	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0000		0.0034	285	23.19	31.33	48.28
333.50	285	0.01	0.05	0.0068	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0068		0.0102	300	8.15	8.15	25.10
333.60	585	0.01	0.14	0.0136	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0136		0.0158	313	5.51		16.95
333.70	898	0.01	0.24	0.0180	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0180		0.0197	326	4.60		11.44
333.80	1224	0.01	0.34	0.0214	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0214		0.0229	340	4.12		6.84
333.90	1564	0.01	0.44	0.0244	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0244		0.0507	354	1.94		2.73
334.00	1918	0.01	0.54	0.0271	0.00	0.00	0.0000	0.00	0.00	0.0000	0.0498	0.0000	0.0769		0.1296	366	0.79		0.79
334.10	2285	0.01	0.64	0.0295	0.00	0.00	0.0000	0.00	0.00	0.0000	0.1529	0.0000	0.1824		0.2512	377	0.42		
334.20	2661	0.01	0.74	0.0318	0.00	0.00	0.0000	0.00	0.00	0.0000	0.2882	0.0000	0.3200		0.4017	387	0.27		
334.30	3048	0.01	0.84	0.0338	0.00	0.00	0.0000	0.00	0.00	0.0000	0.4495	0.0000	0.4834		0.5869	397	0.19		
334.40	3445	0.01	0.94	0.0358	0.00	0.00	0.0000	0.00	0.00	0.0000	0.6330	0.0215	0.6904		0.9651	408	0.12		
334.50	3853	0.01	1.04	0.0377	0.00	0.00	0.0000	0.00	0.00	0.0000	0.8364	0.3658	1.2399		1.6836	419	0.07		
334.60	4271	0.01	1.14	0.0395	0.00	0.00	0.0000	0.00	0.00	0.0000	1.0578	1.0299	2.1272		2.7424	430	0.04		
334.70	4702	0.01	1.24	0.0412	0.00	0.00	0.0000	0.00	0.00	0.0000	1.2959	2.0206	3.3577		1.6788				

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FOREBAY DESIGN CALCULATIONS: 20yr Cleanout Forebay — SWMF-2

Reference: Section 4.6.2 Wet Ponds, MOE Stormwater Management Planning and Design Manual, March 2003

Forebay Design Flows

Flow into forebay during 1:5yr Storm Event	1.447	m^3/s	**From MTE STM Sewer Design Spreadsheet using Rational Flow*
Estimated pipe flow capacity for inlet pipe into forebay designed for the 1:5yr Storm Event	1.454	m^3/s	**Pipe designed for 90% Capcity*
Flow into forebay during the 25 mm - 4 hour design storm event	0.962	m^3/s	**From MTE STM SWMHYMO*
Peak flow from main pond outlet for the 25mm design storm	0.024	m^3/s	**From MTE STM SWMHYMO*

Forebay Characteristics

b =	13.5	*m*	bottom width
y =	1.5	*m*	depth
z =	3.8	:1	side slope
w =	19.2	*m*	average width
R =	1.14	*m*	hydraulic radius
A =	28.8	m^2	cross-sectional area

1. Length Calculation Based on Settling Velocity

Reference: MOE SWM P&D Manual, Equation 4.5: Forebay Settling Length

L = forebay flow length *(m)*
r = length-to-width ratio
Q_p = peak flow rate through forebay *(m^3/s)*
v_s = settling velocity *(m/s)*

a) Required Settling Length (assuming Q_p = forebay through-flow & v_s = 0.0055 m/s)

Q_p =	0.96	m^3/s	peak flow rate through forebay
v_s =	0.0055	*m/s*	settling velocity
r =	0.47		length-to-width ratio
L =	9.1	*m*	required settling length
L =	*9.1*	*m*	*trial length*

b) Required Settling Length (assuming Q_p = pond discharge & v_s = 0.0003 m/s)

Q_p =	0.024	m^3/s	peak flow rate through forebay
v_s =	0.0003	*m/s*	settling velocity
r =	0.22		length-to-width ratio
L =	4.2	*m*	required settling length
L =	*4.2*	*m*	*trial length*

Table 1: Average settling velocities

	Mass Removed	Particle Size Range	Average Settling Velocity
	%	*μm*	*m/s*
	80 - 100	x ≤ 20	0.00000254
Enhanced:	70 - 80	20 < x ≤ 40	0.00001300
Normal:	60 - 70	40 < x ≤ 60	0.00002540
Basic:	40 - 60	60 < x ≤ 130	0.00012700
Medium Sand:	20 - 40	130 < x ≤ 400	0.00059267
Gross Grit:	0 - 20	400 < x ≤ 4000	0.00550333

2. Length Calculation Based on Flow Dispersion Length

Reference: MOE SWM P&D Manual, Equation 4.6: Dispersion Length

Q =	1.45	m^3/s	inlet flow rate
d =	1.5	*m*	depth of permanent pool in forebay
V_f =	0.50	*m/s*	desired velocity in forebay (typical value ≤ 0.50 *m/s*)
L =	15.5	m	required length of dispersion

3. Required Forebay Length

$L_{\_min}$ =	15.5	*m*	Minimum required design length
$L_{\_design}$ =	**38.4**	***m***	**Proposed design length**
r =	2.00		design length-to-width ratio (typical minimum of 2.0)

4. Scour Velocity

Reference: MOE SWM P&D Manual, Sect. 4 Pg 56

v_s =	0.15	*m/s*	scour velocity (typical value = 0.15 *m/s*)
v =	**0.050**	***m/s***	**actual velocity**

OK The actual velocity through the forebay is less than the scour velocity.

5. Weir Flow From Forebay

Reference: MOE SWM P&D Manual, Equation 4.4: Weir Flow

L =	7.5	*m*	length of crest of weir
α =	1.65		coefficient
H =	0.3	*m*	head
Q =	**2.03**	***m^3/s***	**discharge**

OK The weir flow from the forebay exceeds the flow entering the forebay

6. Estimated Cleanout Frequencies

A) MOE Clean-Out Frequency Estimate
(Reference: 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57 & App. H Pg. 12)

Total Forebay Design Volume =	1199	m^3
Selected TSS Removal Efficiency =	80%	
Estimated Catchment Impervious level =	66.00	*%*
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	10.16	*ha*
Calculated Annual sediment volume =	21	m^3/yr
MOE Clean-out Frequency Estimate =	**57.6**	***years***

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Table 2: Annual sediment loading

Impervious Level	Annual Loading
%	m^3/ha
35	0.6
55	1.9
70	2.8
85	3.8

B) MTE Recommended Clean-out Frequency Estimate

(Note: Forebay and Pond Sized to meet MOE Requirements)

Forebay

Total Forebay Design Volume =	1199	m^3
33% Volume Reduction =	396	
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	66	%
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	10.16	ha
Calculated Annual sediment volume =	13	m^3/yr
Cleanout frequency for 33% volume reduction =	**30.4**	***years***

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Wet Cell

Total Wet Cell Design Volume =	2877	m^3 *(Note: Wet Cell Design Volume does not include forebay volume)*
Estimated Wet Cell TSS Removal Efficiency =	30%	
Estimated Catchment Impervious level =	66.00	%
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	10.16	ha
Calculated Annual sediment volume =	8	m^3/yr
Cleanout frequency for 33% volume reduction =	**121.7**	***years***

C) City of Guelph Development Manual and Operational Objective

(Reference: 2023 CoG Development Engineering Manual, Figure 4)

Total Forebay Volume at 0.5m above bottom =	296	m^3
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	66.00	%
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	10.16	ha
Calculated Annual sediment volume =	13	m^3/yr
Cleanout frequency for 0.5m sediment accumulation =	**22.8**	***years***

D) MOE Clean-Out Frequency Estimate for Oversized Permanent Pool

(Reference: 2003 MOE SWM P&D Manual, Sect. 6.4 Pg. 6-9)

Total Provided Permanent Pool Volume =	2877	m^3
Total Provided Permanent Pool Storage Volume =	283.1	m^3/ha
Selected TSS Removal Efficiency =	80%	
Target Maintenance Removal Efficiency =	75%	
Target Maintenance Removal Storage Volume =	142.3	m^3/ha
Estimated Design Removal Efficiency =	92.2%	
Estimated Catchment Impervious level =	66.00	%
Estimated annual sediment loading =	2.6	m^3/ha
Catchment Contributing area =	10.16	ha

Year	Initial MOE Perm. Pool Vol.	Est. Removal Efficiency	MOE Wet Cell Volume	MOE Forebay Vol.	Removal Efficiency		Annual Sediment Removal	Accum. Sediment Vol			Year End Perm. Pool Vol.	Remaining Perm. Pool Storage	
					Wet Cell	Forebay		Total	MOE Wet Cell	MOE Forebay			
	m^3	%	m^3	m^3	%	%	m^3/ha	m^3	m^3	m^3	m^3	m^3/ha	
1	2877	92.2%	1677	683	42.2%	50.0%	2.36	24.0	10.1	12.0	2853	280.77	
2	2853	91.9%	1667	671	42.0%	49.9%	2.35	23.9	20.2	23.9	2829	278.41	
3	2829	91.6%	1657	660	41.9%	49.7%	2.35	23.8	30.1	35.7	2805	276.07	
4	2805	91.3%	1647	648	41.7%	49.6%	2.34	23.8	40.1	47.5	2781	273.73	
5	2781	91.0%	1637	636	41.6%	49.4%	2.33	23.7	49.9	59.2	2757	271.40	
6	2757	90.7%	1627	624	41.5%	49.3%	2.32	23.6	59.7	70.8	2734	269.08	
7	2734	90.5%	1618	613	41.3%	49.1%	2.32	23.5	69.4	82.4	2710	266.76	
8	2710	90.2%	1608	601	41.2%	49.0%	2.31	23.5	79.1	93.9	2687	264.46	
9	2687	89.9%	1598	590	41.0%	48.8%	2.30	23.4	88.7	105.3	2663	262.15	
10	2663	89.6%	1589	578	40.9%	48.7%	2.29	23.3	98.2	116.7	2640	259.86	
11	2640	89.3%	1579	567	40.7%	48.6%	2.29	23.2	107.7	127.9	2617	257.57	
12	2617	89.0%	1570	556	40.6%	48.4%	2.28	23.2	117.1	139.2	2594	255.30	
13	2594	88.7%	1560	544	40.5%	48.3%	2.27	23.1	126.4	150.3	2571	253.02	
14	2571	88.5%	1551	533	40.3%	48.1%	2.26	23.0	135.7	161.4	2548	250.76	
15	2548	88.2%	1542	522	40.2%	48.0%	2.26	22.9	144.9	172.4	2525	248.50	
16	2525	87.9%	1532	511	40.0%	47.9%	2.25	22.9	154.1	183.3	2502	246.25	
17	2502	87.6%	1523	500	39.9%	47.7%	2.24	22.8	163.2	194.2	2479	244.01	
18	2479	87.4%	1514	489	39.8%	47.6%	2.24	22.7	172.2	205.0	2456	241.77	
19	2456	87.1%	1505	478	39.6%	47.4%	2.23	22.6	181.2	215.8	2434	239.54	
20	2434	86.8%	1496	468	39.5%	47.3%	2.22	22.6	190.1	***226.5***	2411	237.32	***0.5m Sediment Accumulation in MOE Forebay***
21	2411	86.5%	1487	457	39.4%	47.2%	2.22	22.5	198.9	237.1	2389	235.10	
22	2389	86.3%	1478	446	39.2%	47.0%	2.21	22.4	207.7	247.6	2366	232.90	
23	2366	86.0%	1470	436	39.1%	46.9%	2.20	22.4	216.5	258.1	2344	230.69	
24	2344	85.7%	1461	425	38.9%	46.8%	2.19	22.3	225.2	268.5	2322	228.50	
25	2322	85.4%	1452	415	38.8%	46.6%	2.19	22.2	233.8	278.9	2299	226.31	
26	2299	85.2%	1443	405	38.7%	46.5%	2.18	22.2	242.4	289.2	2277	224.13	
27	2277	84.9%	1435	394	38.5%	46.4%	2.17	22.1	250.9	299.4	2255	221.96	
28	2255	84.6%	1426	384	38.4%	46.2%	2.17	22.0	259.3	309.6	2233	219.79	
29	2233	84.4%	1418	374	38.3%	46.1%	2.16	21.9	267.7	319.7	2211	217.63	
30	2211	84.1%	1410	364	38.1%	46.0%	2.15	21.9	276.1	329.8	2189	215.48	
31	2189	83.8%	1401	354	38.0%	45.8%	2.15	21.8	284.4	339.8	2167	213.33	
32	2167	83.6%	1393	344	37.9%	45.7%	2.14	21.7	292.6	349.7	2146	211.19	
33	2146	83.3%	1385	334	37.7%	45.6%	2.13	21.7	300.8	359.6	2124	209.06	
34	2124	83.0%	1377	324	37.6%	45.4%	2.13	21.6	308.9	369.4	2102	206.94	
35	2102	82.8%	1368	314	37.5%	45.3%	2.12	21.5	317.0	379.1	2081	204.82	
36	2081	82.5%	1360	304	37.4%	45.2%	2.11	21.5	325.0	388.8	2059	202.70	
37	2059	82.3%	1352	295	37.2%	45.0%	2.11	21.4	332.9	398.5	2038	200.60	
38	2038	82.0%	1344	285	37.1%	44.9%	2.10	21.3	340.9	408.1	2017	198.50	
39	2017	81.7%	1336	275	37.0%	44.8%	2.09	21.3	348.7	417.6	1995	196.41	
40	1995	81.5%	1329	266	36.8%	44.6%	2.09	21.2	356.5	427.0	1974	194.32	
41	1974	81.2%	1321	256	36.7%	44.5%	2.08	21.1	364.3	436.4	1953	192.24	
42	1953	81.0%	1313	247	36.6%	44.4%	2.07	21.1	372.0	445.8	1932	190.17	
43	1932	80.7%	1305	238	36.4%	44.3%	2.07	21.0	379.6	455.1	1911	188.10	
44	1911	80.5%	1298	228	36.3%	44.1%	2.06	20.9	387.2	464.3	1890	186.04	
45	1890	80.2%	1290	219	36.2%	44.0%	2.05	20.9	394.8	473.5	1869	183.99	
46	1869	79.9%	1283	210	36.1%	43.9%	2.05	20.8	402.3	482.6	1849	181.94	
47	1849	79.7%	1275	201	35.9%	43.8%	2.04	20.7	409.7	491.7	1828	179.90	
48	1828	79.4%	1268	192	35.8%	43.6%	2.03	20.7	417.1	500.7	1807	177.87	
49	1807	79.2%	1260	183	35.7%	43.5%	2.03	20.6	424.5	509.7	1787	175.84	
50	1787	78.9%	1253	174	35.6%	43.4%	2.02	20.5	431.8	518.6	1766	173.82	
51	1766	78.7%	1246	165	35.4%	43.3%	2.01	20.5	439.0	527.4	1746	171.81	
52	1746	78.4%	1238	156	35.3%	43.1%	2.01	20.4	446.2	536.2	1725	169.80	
53	1725	78.2%	1231	147	35.2%	43.0%	2.00	20.3	453.4	545.0	1705	167.80	
54	1705	78.0%	1224	138	35.1%	42.9%	2.00	20.3	460.5	553.7	1685	165.80	
55	1685	77.7%	1217	130	34.9%	42.8%	1.99	20.2	467.6	562.3	1664	163.81	
56	1664	77.5%	1210	121	34.8%	42.6%	1.98	20.1	474.6	570.9	1644	161.83	
57	1644	77.2%	1203	113	34.7%	42.5%	1.98	20.1	481.5	579.4	1624	159.85	

Year	Initial MOE Perm. Pool Vol.	Est. Removal Efficiency	MOE Wet Cell Volume	MOE Forebay Vol.	Removal Efficiency		Annual Sediment Removal	Accum. Sediment Vol			Year End Perm. Pool Vol.	Remaining Perm. Pool Storage
					Wet Cell	Forebay		Total	MOE Wet Cell	MOE Forebay		
	m^3	%	m^3	m^3	%	%	m^3/ha	m^3	m^3	m^3	m^3	m^3/ha
58	1624	77.0%	1196	104	34.6%	42.4%	1.97	20.0	488.5	587.9	1604	157.88
59	1604	76.7%	1189	96	34.5%	42.3%	1.96	20.0	495.3	596.4	1584	155.92
60	1584	76.5%	1182	87	34.3%	42.2%	1.96	19.9	502.2	604.7	1564	153.96
61	1564	76.2%	1175	79	34.2%	42.0%	1.95	19.8	509.0	613.1	1544	152.01
62	1544	76.0%	1168	70	34.1%	41.9%	1.95	19.8	515.7	621.4	1525	150.06
63	1525	75.8%	1162	62	34.0%	41.8%	1.94	19.7	522.4	629.6	1505	148.12
64	1505	75.5%	1155	54	33.9%	41.7%	1.93	19.6	529.0	637.8	1485	146.19
65	1485	75.3%	1148	46	33.7%	41.5%	1.93	19.6	535.7	645.9	1466	144.26
66	1466	75.0%	1142	38	33.6%	41.4%	1.92	19.5	542.2	654.0	1446	142.34
67	1446	74.8%	1135	29	33.5%	41.3%	1.92	19.5	548.7	662.0	1427	140.42

Target Maintenance Removal Efficiency

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Water Quality Sizing Criteria — MOE Volumes — SWMF-3

Reference: Section 3.3 Water Quality, MOE Stormwater Management Planning and Design Manual, March 2003

Step 1: Choose Level of Water Quality Control

Enhanced 80% long-term S.S. removal

Step 2: Choose Type of Facility

Wet Pond

Step 3: Define Catchment area and Imperviousness

Catchment Area (ha)	Imperviousness (%)
24.10	72.00

Table 2.3 Interpolated Storage Volume Requirement (m3/ha)

228.33

Total Storage Volume Required (m3)

5502.83

Extended Detention Volume Required (m^3)

964.00

Total Permanent Pool Required (m^3)

4538.83

Table 3.2 Water Quality Storage Requirements based on Receiving Waters

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35	55	70	85
Enhanced 80% long-term S.S. removal	*Wetlands*	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
Normal 70% long-term S.S. Removal	*Wetlands*	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
Basic 60% long-term S.S. Removal	*Wetlands*	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

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STAGE-STORAGE RELATIONSHIP: Facility Volumes **SWMF-3**

		MOE Forebay			Add. Forebay Req'd For CoG Operational Clean-out Objective			Total	Total	Total	MOE Wet Cell			Total Pond Design					Infiltration Cell						
Stage	Active Depth	Area	Volume	Cumulative Volume	Area	Volume	Cumulative Volume	Forebay Area	Forebay Volume	Cumulative Volume	Area	Volume	Cumulative Volume	Total Pond Volume	Active Storage Volume	Volume Summary	Ponding Elevation	Comments	Area	Volume	Cumulative Volume	Volume Summary	Ponding Elevation	Comments	Stage
m	*m*	*m²*	*m³*	*m³*	*m²*	*m³*	*m³*	*m²*		*m³*	*m²*	*m³*	*m³*	*m³*	*m³*	*m³*	*m*		*m²*	*m³*	*m³*	*m³*	*m*		*m*
329.90		531	0	0	821	0	0	1352	0	0	2724	0	0	0											329.90
330.00		579	55	55	828	82	82	1407	138	138	2810	277	277	415											330.00
330.10		628	60	116	834	83	166	1462	143	281	2897	285	562	843											330.10
330.20		677	65	181	840	84	249	1517	149	430	2984	294	856	1286											330.20
330.30		726	70	251	847	84	334	1573	155	585	3072	303	1159	1744											330.30
330.40		775	75	326	854	85	419	1629	160	745	3162	312	1471	2216											330.40
330.50		823	80	406	864	86	505	1687	166	911	3250	321	1791	2702											330.50
330.60		872	85	491	873	87	591	1745	172	1082	3340	330	2121	3203											330.60
330.70		921	90	581	883	88	679	1804	177	1260	3432	339	2459	3719											330.70
330.80		970	95	675	895	89	768	1865	183	1443	3526	348	2807	4250					2742	0	0				330.80
330.90		1018	99	775	919	91	859	1937	190	1633	3641	358	3166	4799					2811	278	278	120	330.85	5yr Storm Event (= 0.05m above bottom of INF Cell)	330.90
331.00		1067	104	879	943	93	952	2010	197	1831	3759	370	3536	5366					2881	285	562				331.00
331.10		1116	109	988	969	96	1047	2085	205	2035	3879	382	3917	5953					2951	292	854				331.10
331.20		1165	114	1102	996	98	1146	2161	212	2248	4000	394	4311	6559					3021	299	1152	892	331.12	25yr Storm Event (= 0.32m above bottom of INF Cell)	331.20
331.30		1214	119	1221	1025	101	1247	2239	220	2468	4122	406	4718	7185				Design Permanent Pool Volume = 7830m3 > MOE Requirement of 4539m3	3093	306	1458				331.30
331.40		1262	124	1345	1040	103	1350	2302	227	2695	4216	417	**5134**	7829					3165	313	1771	1732	331.39	100yr Storm Event (= 0.59m above bottom of INF Cell)	331.40
331.40	0.00										6518	0	0	7829	0				3165	313	1771				331.40
331.50	0.10										6795	666	666	8495	666				3237	320	2091	2012	331.5	Reg Storm Event (= 0.7m above bottom of INF Cell)	331.50
331.60	0.20										7000	690	1355	9185	1355	964	331.55	MOE Extended Detention (= 0.15m above Perm. Pool)	3310	327	2419				331.60
331.70	0.30										7323	716	2072	9901	2072				3384	335	2753				331.70
331.80	0.40										7479	740	2812	10641	2812				3458	342	3095				331.80
331.90	0.50										7635	756	3567	11397	3567				3533	350	3445				331.90
332.00	0.60										7793	771	4339	12168	4339	4177	331.98	25mm Storm Event (= 0.58m above Perm. Pool)	3608	357	3802				332.00
332.10	0.70										7903	785	5124	12953	5124				3684	365	4167				332.10
332.20	0.80										8015	796	5919	13749	5919										332.20
332.30	0.90										8126	807	6727	14556	6727										332.30
332.40	1.00										8239	818	7545	15374	7545	7200	332.36	5yr Storm Event (= 0.96m above Perm. Pool)							332.40
332.50	1.10										8352	830	8374	16204	8374										332.50
332.60	1.20										8466	841	9215	17044	9215										332.60
332.70	1.30										8589	853	10068	17897	10068										332.70
332.80	1.40										8706	865	10933	18762	10933	10580	332.76	25yr Storm Event (= 1.36m above Perm. Pool)							332.80
332.85	1.45										8765	437	11369	19199	11369										332.85
332.90	1.50										8823	440	11809	19638	11809										332.90
332.95	1.55										8883	443	12252	20081	12252										332.95
333.00	1.60										8942	446	12697	20527	12697										333.00
333.05	1.65										9002	449	13146	20975	13146										333.05
333.10	1.70										9062	452	13598	21427	13598	13510	333.10	100yr Storm Event (= 1.7m above Perm. Pool)							333.10
333.15	1.75										9122	455	14052	21881	14052										333.15
333.20	1.80										9182	458	14510	22339	14510										333.20
333.25	1.85										9243	461	14970	22800	14970										333.25
333.30	1.90										9303	464	15434	23263	15434										333.30
333.35	1.95										9364	467	15901	23730	15901										333.35
333.40	2.00										9426	470	16371	24200	16371										333.40
333.45	2.05										9487	473	16843	24673	16843										333.45
333.50	2.10										9549	476	17319	25148	17319										333.50
333.60	2.20										9674	961	18280	26110	18280										333.60
333.70	2.30										9799	974	19254	27083	19254										333.70
333.80	2.40										9930	986	20241	28070	20241										333.80
333.90	2.50										10066	1000	21240	29070	21240										333.90
334.00	2.60										10152	1011	22251	30080	22251										334.00
334.10	2.70										10212	1018	23269	31099	23269										334.10
334.20	2.80										10272	1024	24294	32123	24294										334.20
334.30	2.90										10332	1030	25324	33153	25324	24533	334.23	Regional Storm Event (= 2.83m above Perm. Pool)							334.30
334.40	3.00										10392	1036	26360	34189	26360										334.40
334.50	3.10										10453	1042	27402	35231	27402										334.50

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STAGE-DISCHARGE RELATIONSHIP: Facility Hydraulics - Wet Cell

SWMF-3

Orifice Calculations
$Q_o = C_d * A_o * (2*g*H_o)^{\wedge}0.5$

	Orifice 1	Orifice 2	Orifice 3
C_d	0.63	0.63	0.80
Invert (m)	331.22	331.60	500.00
Width (m)			
Diameter/Height (m)	0.100	0.100	
Type (H/V)	V	V	V
Drawdown Control	MOE	25mm	
Outlet	To INF Cell		

C_d	Description
0.63	Orifice Plate
0.80	Orifice Tube

Weir Calculations
$Q_w = 2/3*C_d*(2g)^{1/2}*L*H_w^{3/2} + 8/15*C_d*(2g)^{1/2}*\tan\theta*H_w^{5/2}$

	Regional Weir	Weir 2
C_d	0.50	0.50
Invert (m)	334.00	500.00
Length (m)	20.000	
Side Slope (H:V)	3	
Side Slope (rad)	1.249	0.000
Outlet	Victoria Rd Swale	

		INFILTRATION CELL *(Infiltrating up to and including 100yr storm)*							Regional Storm Overflow									Extended Detention	Erosion Control
		Orifice 1 - MOE Drawdown			Orifice 2 - 25mm Drawdown				Orifice 3 - Regional STM										
Stage	Active Volume	Area	H_o	Flow	Area	H_o	Flow	Total Flow To INF Cell	Area	H_o	Flow	Regional Weir Emergency Outlet	Weir 2	Total Flow Flow	Average Discharge	Increment Volume	Increment Dewatering Time	Cumulative Dewatering Time	Cumulative Dewatering Time
m	*m^3*	*m^2*	*m*	*m^3/s*	*m^2*	*m*	*m^3/s*	*m^3/s*	*m^2*	*m*	*m^3/s*	*m^3/s*	*m3/s*	*m^3/s*	*m^3/s*	*m^3*	*hours*	*hours*	*hours*
331.40	0	0.00	0.13	0.0000	0.00	0.00	0.0000	0.0000	0.00	0.00	0.0000	0.0000	0.0000	0.0000	0.0041	67	4.51	38.88	82.43
331.41	67	0.01	0.14	0.0082	0.00	0.00	0.0000	0.0082	0.00	0.00	0.0000	0.0000	0.0000	0.0082	0.0094	599	17.79	34.37	77.93
331.50	666	0.01	0.23	0.0105	0.00	0.00	0.0000	0.0105	0.00	0.00	0.0000	0.0000	0.0000	0.0105	0.0116	690	16.59	16.59	60.14
331.60	1355	0.01	0.33	0.0126	0.00	0.00	0.0000	0.0126	0.00	0.00	0.0000	0.0000	0.0000	0.0126	0.0159	716	12.49		43.55
331.70	2072	0.01	0.43	0.0144	0.01	0.05	0.0049	0.0193	0.00	0.00	0.0000	0.0000	0.0000	0.0193	0.0219	740	9.41		31.06
331.80	2812	0.01	0.53	0.0160	0.01	0.15	0.0085	0.0244	0.00	0.00	0.0000	0.0000	0.0000	0.0244	0.0264	756	7.95		21.66
331.90	3567	0.01	0.63	0.0174	0.01	0.25	0.0110	0.0284	0.00	0.00	0.0000	0.0000	0.0000	0.0284	0.0300	771	7.14		13.71
332.00	4339	0.01	0.73	0.0187	0.01	0.35	0.0130	0.0317	0.00	0.00	0.0000	0.0000	0.0000	0.0317	0.0332	785	6.57		6.57
332.10	5124	0.01	0.83	0.0200	0.01	0.45	0.0147	0.0347	0.00	0.00	0.0000	0.0000	0.0000	0.0347	0.0360	796	6.14		
332.20	5919	0.01	0.93	0.0211	0.01	0.55	0.0163	0.0374	0.00	0.00	0.0000	0.0000	0.0000	0.0374	0.0387	807	5.80		
332.30	6727	0.01	1.03	0.0222	0.01	0.65	0.0177	0.0399	0.00	0.00	0.0000	0.0000	0.0000	0.0399	0.0411	818	5.53		
332.40	7545	0.01	1.13	0.0233	0.01	0.75	0.0190	0.0423	0.00	0.00	0.0000	0.0000	0.0000	0.0423	0.0434	830	5.31		
332.50	8374	0.01	1.23	0.0243	0.01	0.85	0.0202	0.0445	0.00	0.00	0.0000	0.0000	0.0000	0.0445	0.0456	841	5.13		
332.60	9215	0.01	1.33	0.0253	0.01	0.95	0.0214	0.0466	0.00	0.00	0.0000	0.0000	0.0000	0.0466	0.0477	853	4.97		
332.70	10068	0.01	1.43	0.0262	0.01	1.05	0.0225	0.0487	0.00	0.00	0.0000	0.0000	0.0000	0.0487	0.0496	865	4.84		
332.80	10933	0.01	1.53	0.0271	0.01	1.15	0.0235	0.0506	0.00	0.00	0.0000	0.0000	0.0000	0.0506	0.0511	437	2.37		
332.85	11369	0.01	1.58	0.0275	0.01	1.20	0.0240	0.0516	0.00	0.00	0.0000	0.0000	0.0000	0.0516	0.0520	440	2.35		
332.90	11809	0.01	1.63	0.0280	0.01	1.25	0.0245	0.0525	0.00	0.00	0.0000	0.0000	0.0000	0.0525	0.0529	443	2.32		
332.95	12252	0.01	1.68	0.0284	0.01	1.30	0.0250	0.0534	0.00	0.00	0.0000	0.0000	0.0000	0.0534	0.0538	446	2.30		
333.00	12697	0.01	1.73	0.0288	0.01	1.35	0.0255	0.0543	0.00	0.00	0.0000	0.0000	0.0000	0.0543	0.0547	449	2.28		
333.05	13146	0.01	1.78	0.0292	0.01	1.40	0.0259	0.0552	0.00	0.00	0.0000	0.0000	0.0000	0.0552	0.0556	452	2.26		
333.10	13598	0.01	1.83	0.0296	0.01	1.45	0.0264	0.0560	0.00	0.00	0.0000	0.0000	0.0000	0.0560	0.0565	455	2.24		
333.15	14052	0.01	1.88	0.0301	0.01	1.50	0.0268	0.0569	0.00	0.00	0.0000	0.0000	0.0000	0.0569	0.0573	458	2.22		
333.20	14510	0.01	1.93	0.0304	0.01	1.55	0.0273	0.0577	0.00	0.00	0.0000	0.0000	0.0000	0.0577	0.0581	461	2.20		
333.25	14970	0.01	1.98	0.0308	0.01	1.60	0.0277	0.0586	0.00	0.00	0.0000	0.0000	0.0000	0.0586	0.0590	464	2.18		
333.30	15434	0.01	2.03	0.0312	0.01	1.65	0.0282	0.0594	0.00	0.00	0.0000	0.0000	0.0000	0.0594	0.0598	467	2.17		
333.35	15901	0.01	2.08	0.0316	0.01	1.70	0.0286	0.0602	0.00	0.00	0.0000	0.0000	0.0000	0.0602	0.0606	470	2.15		
333.40	16371	0.01	2.13	0.0320	0.01	1.75	0.0290	0.0610	0.00	0.00	0.0000	0.0000	0.0000	0.0610	0.0614	473	2.14		
333.45	16843	0.01	2.18	0.0324	0.01	1.80	0.0294	0.0618	0.00	0.00	0.0000	0.0000	0.0000	0.0618	0.0622	476	2.13		
333.50	17319	0.01	2.23	0.0327	0.01	1.85	0.0298	0.0625	0.00	0.00	0.0000	0.0000	0.0000	0.0625	0.0633	961	4.22		
333.60	18280	0.01	2.33	0.0335	0.01	1.95	0.0306	0.0641	0.00	0.00	0.0000	0.0000	0.0000	0.0641	0.0648	974	4.17		
333.70	19254	0.01	2.43	0.0342	0.01	2.05	0.0314	0.0655	0.00	0.00	0.0000	0.0000	0.0000	0.0655	0.0663	986	4.13		
333.80	20241	0.01	2.53	0.0349	0.01	2.15	0.0321	0.0670	0.00	0.00	0.0000	0.0000	0.0000	0.0670	0.0677	1000	4.10		
333.90	21240	0.01	2.63	0.0355	0.01	2.25	0.0329	0.0684	0.00	0.00	0.0000	0.0000	0.0000	0.0684	0.0691	1011	4.06		
334.00	22251	0.01	2.73	0.0362	0.01	2.35	0.0336	0.0698	0.00	0.00	0.0000	0.0000	0.0000	0.0698	0.5430	1018	0.52		
334.10	23269	0.01	2.83	0.0369	0.01	2.45	0.0343	0.0712	0.00	0.00	0.0000	0.9450	0.0000	1.0162	1.8967	1024	0.15		
334.20	24294	0.01	2.93	0.0375	0.01	2.55	0.0350	0.0725	0.00	0.00	0.0000	2.7046	0.0000	2.7771	3.9389	1030	0.07		
334.30	25324	0.01	3.03	0.0382	0.01	2.65	0.0357	0.0738	0.00	0.00	0.0000	5.0269	0.0000	5.1007	6.5025	1036	0.04		
334.40	26360	0.01	3.13	0.0388	0.01	2.75	0.0363	0.0751	0.00	0.00	0.0000	7.8291	0.0000	7.9042	9.5236	1042	0.03		
334.50	27402	0.01	3.23	0.0394	0.01	2.85	0.0370	0.0764	0.00	0.00	0.0000	11.0667	0.0000	11.1431					

GID
STORMWATER MANAGEMENT
Guelph, Ontario

Project Number: 46927-104
Date: November 24, 2025
Design By: BKM
File: Q:\46927\104\SWM\SWMF 3\46927-104_SWMF 3 Master Design Sheet.xlsx

STAGE-DISCHARGE RELATIONSHIP: Facility Hydraulics - INF Cell

SWMF-3

Infiltration Calculations

Hydraulic Conductivity, k =	3.50E-05	m/s
Equation used for Hydraulic Conductivity =	*Kozeny-Carmen Formula*	
Infiltration Rate Calculation Used =	*OBC*	
Calculated Unfactored Design Infiltation Rate =	120	*mm/hr*
Factor Safety =	2.5	
Design Infiltation Rate =	48	*mm/hr*
Infiltration Cell Bottom Design Contact Area =	2742	*m2*
$Q_{\_infiltration\_SWMHYMO}$ =	0.037	m3/s

Weir Calculations

$Q_w = 2/3*C_d*(2g)^{1/2}*L*H_w^{3/2} + 8/15*C_d*(2g)^{1/2}*\tan\theta*H_w^{5/2}$

	INF Cell Overflow D.I.	Weir 2
C_d	0.50	0.50
Invert (m)	331.40	500.00
Length (m)	0.600	20.000
Side Slope (H:V)	3	10
Side Slope (rad)	1.249	1.471
Outlet	To Victoria Road Swale	To Victoria Road Swale

STAGE-DISCHARGE RELATIONSHIP

	Infiltration				INF Cell Overflow					Extended Detention	Erosion Control
Stage	Active Volume	Infiltration	Total Infiltration	Increment Volume	INF Cell Overflow D.I.	Weir 2	Total Overflow	Total Flow Flow	Increment Dewatering Time	Cumulative Dewatering Time	Cumulative Dewatering Time
m	*m^3*	*m^3/s*	*m^3/s*	*m^3*	*m^3/s*	*m^3/s*	*m^3/s*	*m^3/s*	*hours*	*hours*	*hours*
330.80	0	0.000	0.000	28	0.0000	0.0000	0.0000	0.0000			
330.81	28	0.037	0.037	250	0.0000		0.0000	0.0365	1.90	4.07	15.70
330.90	278	0.037	0.037	285	0.0000		0.0000	0.0365	2.17	2.17	13.80
331.00	562	0.037	0.037	292	0.0000		0.0000	0.0365	2.22		11.63
331.10	854	0.037	0.037	299	0.0000		0.0000	0.0365	2.27		9.42
331.20	1152	0.037	0.037	306	0.0000		0.0000	0.0365	2.33		7.14
331.30	1458	0.037	0.037	313	0.0000		0.0000	0.0365	2.38		4.82
331.40	1771	0.037	0.037	320	0.0000		0.0000	0.0365	2.44		2.44
331.50	2091	0.037	0.037	327	0.0392		0.0392	0.0757			
331.60	2419	0.037	0.037	335	0.1426		0.1426	0.1791			
331.70	2753	0.037	0.037	342	0.3202		0.3202	0.3567			
331.80	3095	0.037	0.037	350	0.5827		0.5827	0.6192			
331.90	3445	0.037	0.037		0.9396		0.9396	0.9761			

GID
STORMWATER MANAGEMENT
Guelph, Ontario

Project Number: 46927-104
Date: October 9, 2025
Design By: BKM
File: Q:\46927\104\SWM\SWMF 3\46927-104_SWMF 3 Master Design Sheet.xlsx

FOREBAY DESIGN CALCULATIONS: Proposed Forebay -20yr Cleanout — SWMF-3

Reference: Section 4.6.2 Wet Ponds, MOE Stormwater Management Planning and Design Manual, March 2003

Forebay Design Flows

Flow into forebay during 1:5yr Storm Event	2.693	m^3/s	*From MTE STM Sewer Design Spreadsheet using Rational Flow*
Estimated pipe flow capacity for inlet pipe into forebay designed for the 1:5yr Storm Event	3.139	m^3/s	*Pipe designed for 90% Capcity*
Flow into forebay during the 25 mm - 4 hour design storm event	2.564	m^3/s	*From MTE STM SWMHYMO*
Peak flow from main pond outlet for the 25mm design storm	0.035	m^3/s	*From Facility Hydraulics for Discharge to Infiltration Cell*

Forebay Characteristics

b =	23.15	*m*	bottom width
y =	1.5	*m*	depth
z =	3.8	:1	side slope
w =	28.8	*m*	average width
R =	1.24	*m*	hydraulic radius
A =	43.3	m^2	cross-sectional area

1. Length Calculation Based on Settling Velocity

Reference: MOE SWM P&D Manual, Equation 4.5: Forebay Settling Length

L = forebay flow length *(m)*
r = length-to-width ratio
Q_p = peak flow rate through forebay *(m^3/s)*
v_s = settling velocity *(m/s)*

a) Required Settling Length (assuming Q_p = forebay through-flow & v_s = 0.0055 m/s)

Q_p =	2.56	m^3/s	peak flow rate through forebay
v_s =	0.0055	*m/s*	settling velocity
r =	0.56		length-to-width ratio
L =	16.1	*m*	required settling length
L =	*16.1*	*m*	*trial length*

b) Required Settling Length (assuming Q_p = pond discharge & v_s = 0.0003 m/s)

Q_p =	0.035	m^3/s	peak flow rate through forebay
v_s =	0.0003	*m/s*	settling velocity
r =	0.14		length-to-width ratio
L =	4.0	*m*	required settling length
L =	*4.0*	*m*	*trial length*

Table 1: Average settling velocities

	Mass Removed	Particle Size Range	Average Settling Velocity
	%	*µm*	*m/s*
	80 - 100	x ≤ 20	0.00000254
Enhanced:	70 - 80	20 < x ≤ 40	0.00001300
Normal:	60 - 70	40 < x ≤ 60	0.00002540
Basic:	40 - 60	60 < x ≤ 130	0.00012700
Medium Sand:	20 - 40	130 < x ≤ 400	0.00059267
Gross Grit:	0 - 20	400 < x ≤ 4000	0.00550333

2. Length Calculation Based on Flow Dispersion Length

Reference: MOE SWM P&D Manual, Equation 4.6: Dispersion Length

Q =	3.14	m^3/s	inlet flow rate
d =	1.5	*m*	depth of permanent pool in forebay
V_f =	0.50	*m/s*	desired velocity in forebay (typical value ≤ 0.50 *m/s*)
L =	33.5	m	required length of dispersion

3. Required Forebay Length

L_{min} =	33.5	*m*	Minimum required design length
L_{design} =	**57.7**	***m***	**Proposed design length**
r =	2.00		design length-to-width ratio (typical minimum of 2.0)

4. Scour Velocity

Reference: MOE SWM P&D Manual, Sect. 4 Pg 56

v_s =	0.15	*m/s*	scour velocity (typical value = 0.15 *m/s*)
v =	**0.073**	***m/s***	**actual velocity**

OK The actual velocity through the forebay is less than the scour velocity.

5. Weir Flow From Forebay

Reference: MOE SWM P&D Manual, Equation 4.4: Weir Flow

L =	13	*m*	length of crest of weir
α =	1.65		coefficient
H =	0.4	*m*	head
Q =	**5.43**	***m^3/s***	**discharge**

OK The weir flow from the forebay exceeds the flow entering the forebay

6. Estimated Cleanout Frequencies

A) MOE Clean-Out Frequency Estimate
(Reference: 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57 & App. H Pg. 12)

MOE Required Forebay Design Volume =	2695	m^3
Selected TSS Removal Efficiency =	80%	
Estimated Catchment Impervious level =	72.00	
Estimated annual sediment loading =	2.9	
Catchment Contributing area =	24.10	
Calculated Annual sediment volume =	57	
MOE Clean-out Frequency Estimate =	**47.6**	

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Table 2: Annual sediment loading

Impervious Level	Annual Loading
%	m^3/ha
35	0.6
55	1.9
70	2.8
85	3.8

B) MTE Recommended Clean-out Frequency Estimate

(Note: Forebay and Pond Sized to meet MOE Requirements)

Forebay

MOE Required Forebay Design Volume =	2695	m^3
33% Volume Reduction =	889	m^3
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	72.00	%
Estimated annual sediment loading =	2.9	m^3/ha
Catchment Contributing area =	24.10	ha
Calculated Annual sediment volume =	35	m^3/yr
Cleanout frequency for 33% volume reduction =	**25.2**	***years***

Estimated clean-out frequency meets MOE recommended minimum of 10yrs (Ref. 2003 MOE SWM P&D Manual, Sect. 4 Pg. 57)

Wet Cell

MOE Required Wet Cell Design Volume =	5134	m^3
Estimated Wet Cell TSS Removal Efficiency =	30%	
Estimated Catchment Impervious level =	72.00	%
Estimated annual sediment loading =	2.9	m^3/ha
Catchment Contributing area =	24.10	ha
Calculated Annual sediment volume =	21	m^3/yr
Cleanout frequency for 33% volume reduction =	**79.9**	***years***

C) City of Guelph Development Manual and Operational Objective

(Reference: 2023 CoG Development Engineering Manual, Figure 4)

Total Forebay Volume at 0.5m above bottom =	745	m^3
Estimated Forebay TSS Removal Efficiency =	50%	
Estimated Catchment Impervious level =	72.00	%
Estimated annual sediment loading =	2.9	m^3/ha
Catchment Contributing area =	24.10	ha
Calculated Annual sediment volume =	35	m^3/yr
Cleanout frequency for 0.5m sediment accumulation =	**21.1**	***years***

D) MOE Clean-Out Frequency Estimate for Oversized Permanent Pool

(Reference: 2003 MOE SWM P&D Manual, Sect. 6.4 Pg. 6-9)

Total Inc. Provided Permanent Pool Volume =	7829	m^3
Total Provided Permanent Pool Storage Volume =	324.9	m^3/ha
Selected TSS Removal Efficiency =	80%	
Target Maintenance Removal Efficiency =	75%	
Target Maintenance Removal Storage Volume =	152.8	m^3/ha
Estimated Design Removal Efficiency =	95.0%	
Estimated Catchment Impervious level =	72.00	%
Estimated annual sediment loading =	2.9	m^3/ha
Catchment Contributing area =	24.10	ha

Year	Initial MOE Perm. Pool Vol.	Est. Removal Efficiency	MOE Wet Cell Volume	MOE Forebay Vol.	Removal Efficiency		Annual Sediment Removal	Accum. Sediment Vol			Year End Perm. Pool Vol.	Remaining Perm. Pool Storage
					Wet Cell	Forebay		Total	MOE Wet Cell	MOE Forebay		
	m^3	%	m^3	m^3	%	%	m^3/ha	m^3	m^3	m^3	m^3	m^3/ha
1	7829	95.0%	5134	1345	36.3%	58.7%	2.79	67.2	24.4	39.4	7762	322.08
2	7762	95.2%	5110	1305	36.4%	58.7%	2.79	67.3	48.9	78.9	7695	319.29
3	7695	94.8%	5086	1266	36.2%	58.6%	2.78	67.0	73.2	118.2	7628	316.50
4	7628	94.5%	5061	1227	36.1%	58.4%	2.77	66.8	97.3	157.2	7561	313.73
5	7561	94.2%	5037	1188	35.9%	58.2%	2.76	66.6	121.2	196.0	7494	310.97
6	7494	93.8%	5013	1149	35.7%	58.1%	2.75	66.3	144.9	234.5	7428	308.22
7	7428	93.5%	4989	1110	35.6%	57.9%	2.74	66.1	168.4	272.8	7362	305.48
8	7362	93.2%	4966	1072	35.4%	57.8%	2.73	65.9	191.7	310.8	7296	302.74
9	7296	92.8%	4943	1034	35.3%	57.6%	2.72	65.6	214.9	348.6	7230	300.02
10	7230	92.5%	4920	996	35.1%	57.4%	2.71	65.4	237.8	386.2	7165	297.31
11	7165	92.2%	4897	959	34.9%	57.3%	2.70	65.2	260.6	423.5	7100	294.60
12	7100	91.9%	4874	921	34.8%	57.1%	2.69	64.9	283.2	460.6	7035	291.91
13	7035	91.5%	4851	884	34.6%	56.9%	2.69	64.7	305.6	497.4	6970	289.22
14	6970	91.2%	4829	847	34.4%	56.8%	2.68	64.5	327.8	534.0	6906	286.55
15	6906	90.9%	4807	811	34.3%	56.6%	2.67	64.3	349.8	570.4	6841	283.88
16	6841	90.6%	4785	774	34.1%	56.5%	2.66	64.0	371.6	606.6	6777	281.22
17	6777	90.3%	4763	738	34.0%	56.3%	2.65	63.8	393.3	642.5	6714	278.57
18	6714	89.9%	4741	702	33.8%	56.1%	2.64	63.6	414.8	678.2	6650	275.94
19	6650	89.6%	4720	667	33.6%	56.0%	2.63	63.4	436.1	713.6	6587	273.31
20	6587	***89.3%***	4698	631	33.5%	55.8%	2.62	63.1	**457.3**	***748.9***	6524	270.69
21	6524	89.0%	4677	596	33.3%	55.7%	2.61	62.9	478.2	783.9	6461	268.08
22	6461	88.7%	4656	561	33.2%	55.5%	2.60	62.7	499.0	818.7	6398	265.48
23	6398	88.4%	4635	526	33.0%	55.4%	2.59	62.5	519.6	853.3	6336	262.88
24	6336	88.1%	4615	491	32.9%	55.2%	2.58	62.2	540.1	887.6	6273	260.30
25	6273	87.7%	4594	457	32.7%	55.0%	2.57	62.0	560.4	921.8	6211	257.73
26	6211	87.4%	4574	423	32.6%	54.9%	2.56	61.8	580.5	955.7	6149	255.16
27	6149	87.1%	4554	389	32.4%	54.7%	2.56	61.6	600.5	989.4	6088	252.61
28	6088	86.8%	4534	355	32.2%	54.6%	2.55	61.4	620.2	1022.9	6026	250.06
29	6026	86.5%	4514	322	32.1%	54.4%	2.54	61.2	639.9	1056.2	5965	247.52
30	5965	86.2%	4495	289	31.9%	54.3%	2.53	60.9	659.3	1089.3	5904	244.99
31	5904	85.9%	4475	255	31.8%	54.1%	2.52	60.7	678.6	1122.2	5844	242.47
32	5844	85.6%	4456	223	31.6%	54.0%	2.51	60.5	697.8	1154.8	5783	239.96
33	5783	85.3%	4437	190	31.5%	53.8%	2.50	60.3	716.8	1187.3	5723	237.46
34	5723	85.0%	4418	157	31.3%	53.7%	2.49	60.1	735.6	1219.5	5663	234.97
35	5663	84.7%	4399	125	31.2%	53.5%	2.48	59.9	754.3	1251.6	5603	232.48
36	5603	84.4%	4380	93	31.0%	53.4%	2.48	59.7	772.8	1283.4	5543	230.01
37	5543	84.1%	4362	61	30.9%	53.2%	2.47	59.5	791.2	1315.1	5484	227.54
38	5484	83.8%	4343	30	30.7%	53.1%	2.46	59.3	809.4	1346.5	5424	225.08
39	5424	83.5%	4325	-2	30.6%	52.9%	2.45	59.0	827.4	1377.8	5365	222.63
40	5365	83.2%	4307	-33	30.4%	52.8%	2.44	58.8	845.4	1408.8	5307	220.19
41	5307	82.9%	4289	-64	30.3%	52.6%	2.43	58.6	863.1	1439.7	5248	217.76
42	5248	82.6%	4271	-95	30.2%	52.5%	2.42	58.4	880.7	1470.3	5189	215.33
43	5189	82.3%	4254	-126	30.0%	52.3%	2.42	58.2	898.2	1500.8	5131	212.92
44	5131	82.1%	4236	-156	29.9%	52.2%	2.41	58.0	915.5	1531.1	5073	210.51
45	5073	81.8%	4219	-186	29.7%	52.1%	2.40	57.8	932.7	1561.2	5015	208.11
46	5015	81.5%	4202	-216	29.6%	51.9%	2.39	57.6	949.7	1591.1	4958	205.72
47	4958	81.2%	4185	-246	29.4%	51.8%	2.38	57.4	966.6	1620.8	4900	203.34
48	4900	80.9%	4168	-276	29.3%	51.6%	2.37	57.2	983.4	1650.3	4843	200.97
49	4843	80.6%	4151	-306	29.1%	51.5%	2.37	57.0	1000.0	1679.7	4786	198.60
50	4786	80.3%	4134	-335	29.0%	51.3%	2.36	56.8	1016.5	1708.8	4729	196.24
51	4729	80.1%	4118	-364	28.9%	51.2%	2.35	56.6	1032.8	1737.8	4673	193.90
52	4673	79.8%	4102	-393	28.7%	51.1%	2.34	56.4	1049.0	1766.6	4616	191.55
53	4616	79.5%	4085	-422	28.6%	50.9%	2.33	56.2	1065.1	1795.2	4560	189.22
54	4560	79.2%	4069	-450	28.4%	50.8%	2.32	56.0	*1081.0*	*1823.7*	4504	186.90
55	4504	78.9%	4053	-479	28.3%	50.6%	2.32	55.8	1096.8	1851.9	4448	184.58
56	4448	78.7%	4038	-507	28.2%	50.5%	2.31	55.6	1112.4	1880.0	4393	182.28

0.5m Sediment Accumulation in Increased Forebay, +/-0.17m Sediment Accumulation in MOE Wet Cell

Target Maintenance Removal Efficiency +/-1.1m Sediment Accumulation in MOE Forebay

Appendix D

Overland Flow Design Calculations

Overland Flow Conveyance Analysis - Summary
Guelph Innovation District, City of Guelph

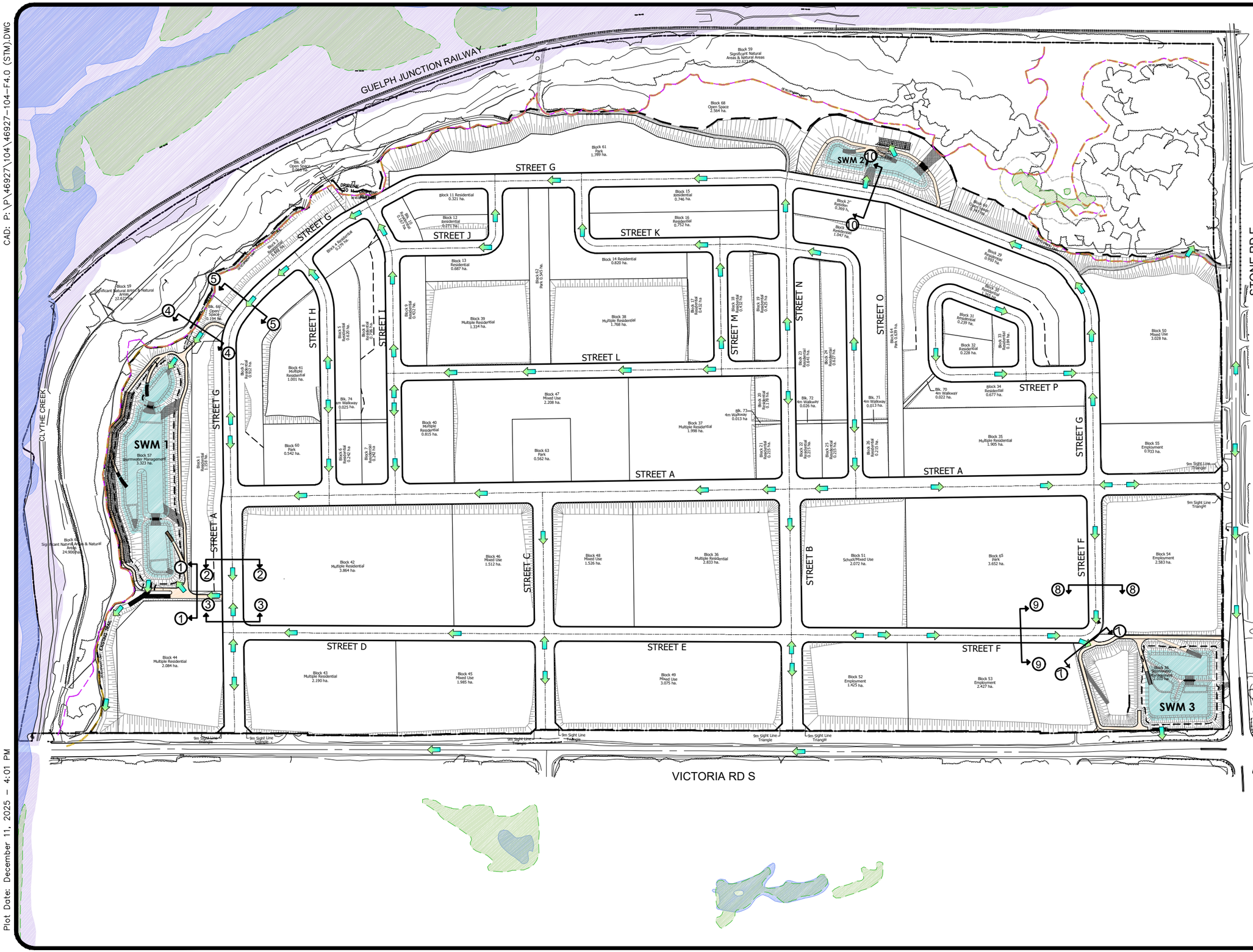
Project: 46927-104
Date: November 27, 2025
By: MPW

Section	Sewer Capacity (L/s) *from Rational Method	100yr Flow (L/s) *from Rational Method	100yr - Capacity (L/s)	100yr - Capacity (m^3/s)	Results: Flow Depth Above Centreline (m)	Results: Freeboard to R.O.W. Limit (m)	Notes
Section 1-1 (SWMF1 Block 58)	6800.391	9184.168	2383.777	2.384	n/a	n/a	Modified OPSD 600.110 300mm exposed barrier curb is required.
Section 2-2 (Street A)	2730.725	2958.302	227.577	0.228	-0.052	0.246	Flow is contained within the R.O.W.
Section 3-3 (Street A)	6800.391	8673.557	1873.165	1.873	0.134	0.060	Flow is contained within the R.O.W.
Section 4-4 (SWMF1 Block 67)	3774.113	4680.498	906.385	0.906	n/a	n/a	Modified OPSD 600.110 200mm exposed barrier curb is required.
Section 5-5 (Street G)	3774.113	4825.809	1051.696	1.052	0.104	0.070	Flow is contained within the R.O.W.
Section 6-6 (Street G)	1615.519	2535.084	919.566	0.920	0.058	0.116	Flow is contained within the R.O.W.
Section 7-7 (SWMF3 Access)	3487.130	4412.522	925.392	0.925	n/a	n/a	Standard OPSD 600.110 150mm barrier curb is required.
Section 8-8 (Street F)	2744.718	3915.889	1171.171	1.171	0.000	0.174	Flow is contained within the R.O.W.
Section 9-9 (Street F)	1619.192	2096.015	476.824	0.477	0.030	0.144	Flow is contained within the R.O.W.

* Overland Flows has been calculated using the Rational Method by substracting the 100% pipe capacity carried by the storm sewer in a minor system from total flow under the 100 year storm. The flow depth (m) has been calculated using FlowMaster software. The depth and extent of street flooding in new developments, including all road classifications, shall be limited to the right-of-way.

**26.0m wide cross sections for Street A are modelled using the current 26.0m wide standard cross section (5-49b). 18.0m wide cross sections are modelled using the proposed "complete streets" cross section.

CAD: P:\P\46927\104\46927-104-F4.0 (STM).DWG



MTE
Engineers, Scientists, Surveyors

PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
OVERLAND FLOW CONVEYANCE CROSS-SECTIONS

Drawn	Scale	Figure
AXL	1:4500	D-1
Checked: MPW	Project No. 46927-104	
Date: 2025-03-10	Rev No. 0	

Plot Date: December 11, 2025 – 4:01 PM

Worksheet for Section 1-1 (SWM1 Block 58)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.008 m/m
Discharge	2.384 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.260
0+00	0.260
0+00	-0.040
0+02	0.000
0+04	0.040
0+04	0.340
0+04	0.340

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.260)	(0+00, 0.260)	0.013
(0+00, 0.260)	(0+00, -0.040)	0.013
(0+00, -0.040)	(0+02, 0.000)	0.013
(0+02, 0.000)	(0+04, 0.040)	0.013
(0+04, 0.040)	(0+04, 0.340)	0.013
(0+04, 0.340)	(0+04, 0.340)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	281.1 mm
Roughness Coefficient	0.013
Elevation	0.241 m
Elevation Range	-0.040 to 0.340 m
Flow Area	1.0 m²
Wetted Perimeter	4.483 m
Hydraulic Radius	215.2 mm
Top Width	4.00 m
Normal Depth	281.1 mm

Worksheet for Section 1-1 (SWM1 Block 58)

Results		
Critical Depth	372.3	mm
Critical Slope	0.003	m/m
Velocity	2.47	m/s
Velocity Head	0.311	m
Specific Energy	0.59	m
Froude Number	1.607	
Flow Type	Supercritical	

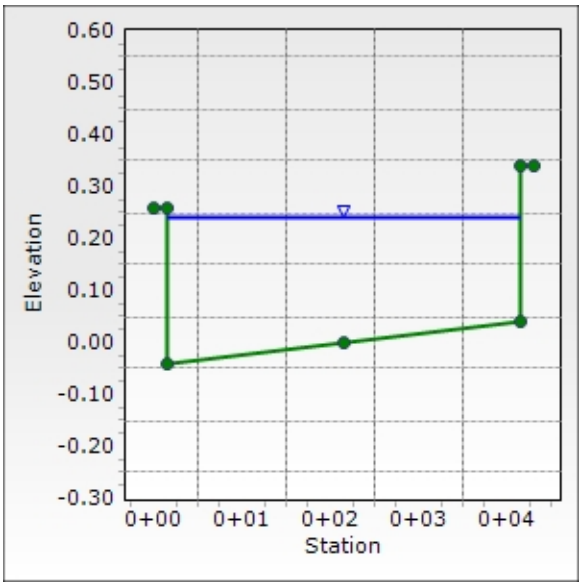
GVF Input Data		
Downstream Depth	0.0	mm
Length	0.000	m
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	mm
Profile Description	N/A	
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	281.1	mm
Critical Depth	372.3	mm
Channel Slope	0.008	m/m
Critical Slope	0.003	m/m

Cross Section for Section 1-1 (SWM1 Block 58)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.008 m/m
Normal Depth	281.1 mm
Discharge	2.384 m³/s



Worksheet for Section 2-2 (Street A)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.050 m/m
Discharge	0.228 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.194
0+02	0.164
0+03	0.134
0+08	0.044
0+08	0.044
0+08	-0.106
0+08	-0.100
0+13	0.000
0+18	-0.100
0+18	-0.106
0+18	0.044
0+19	0.044
0+23	0.134
0+25	0.164
0+26	0.194

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.194)	(0+02, 0.164)	0.030
(0+02, 0.164)	(0+03, 0.134)	0.013
(0+03, 0.134)	(0+08, 0.044)	0.030
(0+08, 0.044)	(0+08, 0.044)	0.013
(0+08, 0.044)	(0+08, -0.106)	0.013
(0+08, -0.106)	(0+08, -0.100)	0.013
(0+08, -0.100)	(0+13, 0.000)	0.013
(0+13, 0.000)	(0+18, -0.100)	0.013
(0+18, -0.100)	(0+18, -0.106)	0.013
(0+18, -0.106)	(0+18, 0.044)	0.013
(0+18, 0.044)	(0+19, 0.044)	0.013
(0+19, 0.044)	(0+23, 0.134)	0.030
(0+23, 0.134)	(0+25, 0.164)	0.013
(0+25, 0.164)	(0+26, 0.194)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method

Worksheet for Section 2-2 (Street A)

Options	
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	54.5 mm
Roughness Coefficient	0.013
Elevation	-0.052 m
Elevation Range	-0.106 to 0.194 m
Flow Area	0.1 m²
Wetted Perimeter	5.557 m
Hydraulic Radius	26.7 mm
Top Width	5.45 m
Normal Depth	54.5 mm
Critical Depth	84.2 mm
Critical Slope	0.005 m/m
Velocity	1.54 m/s
Velocity Head	0.120 m
Specific Energy	0.17 m
Froude Number	2.974
Flow Type	Supercritical

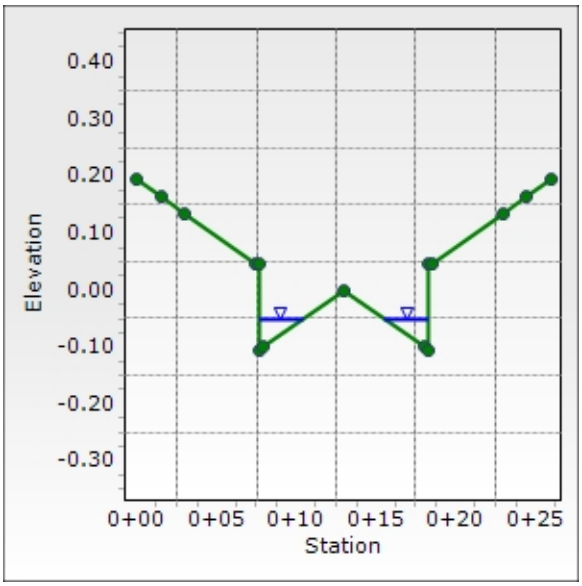
GVF Input Data	
Downstream Depth	0.0 mm
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	54.5 mm
Critical Depth	84.2 mm
Channel Slope	0.050 m/m
Critical Slope	0.005 m/m

Cross Section for Section 2-2 (Street A)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.050 m/m
Normal Depth	54.5 mm
Discharge	0.228 m³/s



Worksheet for Section 3-3 (Street A)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 m/m
Discharge	1.873 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.194
0+02	0.164
0+03	0.134
0+08	0.044
0+08	0.044
0+08	-0.106
0+08	-0.100
0+13	0.000
0+18	-0.100
0+18	-0.106
0+18	0.044
0+19	0.044
0+23	0.134
0+25	0.164
0+26	0.194

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.194)	(0+02, 0.164)	0.030
(0+02, 0.164)	(0+03, 0.134)	0.013
(0+03, 0.134)	(0+08, 0.044)	0.030
(0+08, 0.044)	(0+08, 0.044)	0.013
(0+08, 0.044)	(0+08, -0.106)	0.013
(0+08, -0.106)	(0+08, -0.100)	0.013
(0+08, -0.100)	(0+13, 0.000)	0.013
(0+13, 0.000)	(0+18, -0.100)	0.013
(0+18, -0.100)	(0+18, -0.106)	0.013
(0+18, -0.106)	(0+18, 0.044)	0.013
(0+18, 0.044)	(0+19, 0.044)	0.013
(0+19, 0.044)	(0+23, 0.134)	0.030
(0+23, 0.134)	(0+25, 0.164)	0.013
(0+25, 0.164)	(0+26, 0.194)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method

Worksheet for Section 3-3 (Street A)

Options	
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	240.1 mm
Roughness Coefficient	0.022
Elevation	0.134 m
Elevation Range	-0.106 to 0.194 m
Flow Area	2.4 m²
Wetted Perimeter	20.313 m
Hydraulic Radius	119.4 mm
Top Width	20.01 m
Normal Depth	240.1 mm
Critical Depth	206.8 mm
Critical Slope	0.010 m/m
Velocity	0.77 m/s
Velocity Head	0.030 m
Specific Energy	0.27 m
Froude Number	0.708
Flow Type	Subcritical

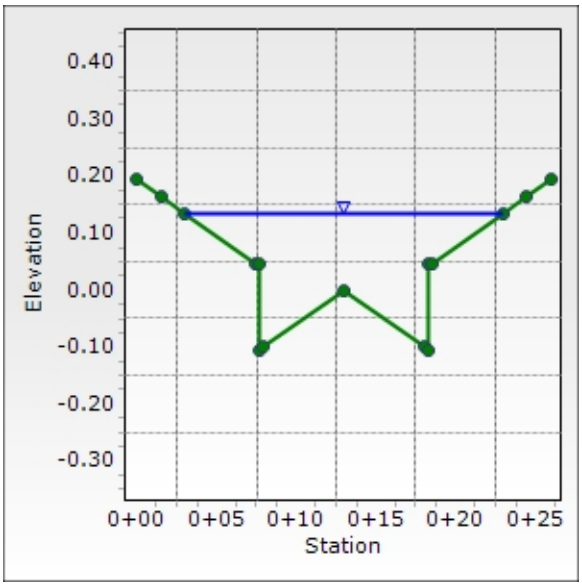
GVF Input Data	
Downstream Depth	0.0 mm
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	240.1 mm
Critical Depth	206.8 mm
Channel Slope	0.005 m/m
Critical Slope	0.010 m/m

Cross Section for Section 3-3 (Street A)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 m/m
Normal Depth	240.1 mm
Discharge	1.873 m³/s



Worksheet for Section 4-4 (SWM1 - Block 67)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 m/m
Discharge	0.906 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.240
0+00	0.240
0+00	0.040
0+02	0.000
0+04	-0.040
0+04	0.160
0+04	0.160

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.240)	(0+00, 0.240)	0.013
(0+00, 0.240)	(0+00, 0.040)	0.013
(0+00, 0.040)	(0+02, 0.000)	0.013
(0+02, 0.000)	(0+04, -0.040)	0.013
(0+04, -0.040)	(0+04, 0.160)	0.013
(0+04, 0.160)	(0+04, 0.160)	0.013

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results	
Normal Depth	149.2 mm
Roughness Coefficient	0.013
Elevation	0.109 m
Elevation Range	-0.040 to 0.240 m
Flow Area	0.4 m²
Wetted Perimeter	4.219 m
Hydraulic Radius	103.5 mm
Top Width	4.00 m
Normal Depth	149.2 mm

Worksheet for Section 4-4 (SWM1 - Block 67)

Results		
Critical Depth	215.7	mm
Critical Slope	0.003	m/m
Velocity	2.07	m/s
Velocity Head	0.219	m
Specific Energy	0.37	m
Froude Number	2.005	
Flow Type	Supercritical	

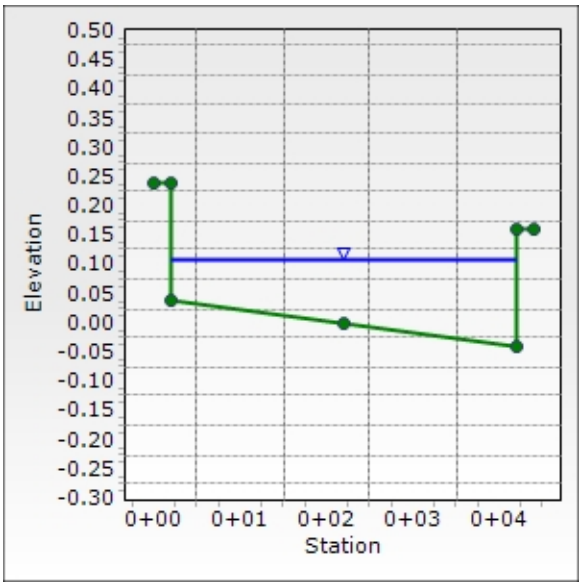
GVF Input Data		
Downstream Depth	0.0	mm
Length	0.000	m
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	mm
Profile Description	N/A	
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	149.2	mm
Critical Depth	215.7	mm
Channel Slope	0.015	m/m
Critical Slope	0.003	m/m

Cross Section for Section 4-4 (SWM1 - Block 67)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.015 m/m
Normal Depth	149.2 mm
Discharge	0.906 m³/s



Worksheet for Section 5-5 (Street G)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 m/m
Discharge	1.052 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.174
0+01	0.160
0+03	0.124
0+05	0.074
0+05	-0.076
0+06	-0.070
0+09	0.000
0+13	-0.070
0+13	-0.076
0+13	0.074
0+15	0.114
0+17	0.150
0+18	0.174

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.174)	(0+01, 0.160)	0.030
(0+01, 0.160)	(0+03, 0.124)	0.013
(0+03, 0.124)	(0+05, 0.074)	0.030
(0+05, 0.074)	(0+05, -0.076)	0.013
(0+05, -0.076)	(0+06, -0.070)	0.013
(0+06, -0.070)	(0+09, 0.000)	0.013
(0+09, 0.000)	(0+13, -0.070)	0.013
(0+13, -0.070)	(0+13, -0.076)	0.013
(0+13, -0.076)	(0+13, 0.074)	0.013
(0+13, 0.074)	(0+15, 0.114)	0.030
(0+15, 0.114)	(0+17, 0.150)	0.013
(0+17, 0.150)	(0+18, 0.174)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for Section 5-5 (Street G)

Results	
Normal Depth	180.5 mm
Roughness Coefficient	0.019
Elevation	0.104 m
Elevation Range	-0.076 to 0.174 m
Flow Area	1.2 m²
Wetted Perimeter	11.151 m
Hydraulic Radius	105.1 mm
Top Width	11.05 m
Normal Depth	180.5 mm
Critical Depth	166.8 mm
Critical Slope	0.008 m/m
Velocity	0.90 m/s
Velocity Head	0.041 m
Specific Energy	0.22 m
Froude Number	0.881
Flow Type	Subcritical

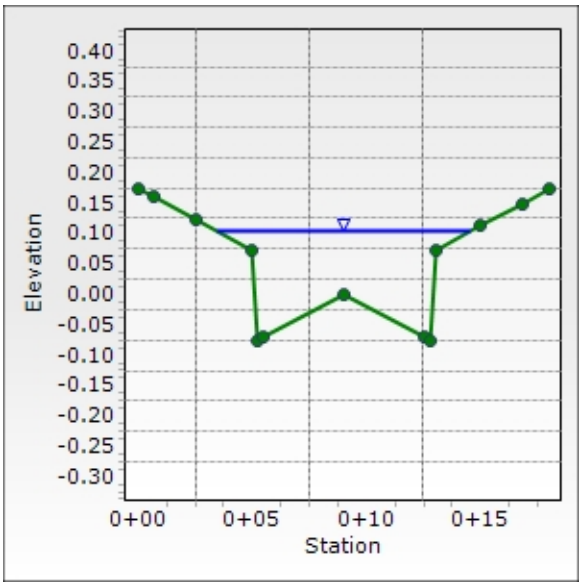
GVF Input Data	
Downstream Depth	0.0 mm
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	180.5 mm
Critical Depth	166.8 mm
Channel Slope	0.006 m/m
Critical Slope	0.008 m/m

Cross Section for Section 5-5 (Street G)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 m/m
Normal Depth	180.5 mm
Discharge	1.052 m³/s



Worksheet for Section 6-6 (Street G)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 m/m
Discharge	0.920 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.174
0+01	0.160
0+03	0.124
0+05	0.074
0+05	-0.076
0+06	-0.070
0+09	0.000
0+13	-0.070
0+13	-0.076
0+13	0.074
0+15	0.114
0+17	0.150
0+18	0.174

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.174)	(0+01, 0.160)	0.030
(0+01, 0.160)	(0+03, 0.124)	0.013
(0+03, 0.124)	(0+05, 0.074)	0.030
(0+05, 0.074)	(0+05, -0.076)	0.013
(0+05, -0.076)	(0+06, -0.070)	0.013
(0+06, -0.070)	(0+09, 0.000)	0.013
(0+09, 0.000)	(0+13, -0.070)	0.013
(0+13, -0.070)	(0+13, -0.076)	0.013
(0+13, -0.076)	(0+13, 0.074)	0.013
(0+13, 0.074)	(0+15, 0.114)	0.030
(0+15, 0.114)	(0+17, 0.150)	0.013
(0+17, 0.150)	(0+18, 0.174)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for Section 6-6 (Street G)

Results	
Normal Depth	133.7 mm
Roughness Coefficient	0.013
Elevation	0.058 m
Elevation Range	-0.076 to 0.174 m
Flow Area	0.8 m²
Wetted Perimeter	8.047 m
Hydraulic Radius	93.3 mm
Top Width	7.96 m
Normal Depth	133.7 mm
Critical Depth	150.6 mm
Critical Slope	0.004 m/m
Velocity	1.22 m/s
Velocity Head	0.076 m
Specific Energy	0.21 m
Froude Number	1.273
Flow Type	Supercritical

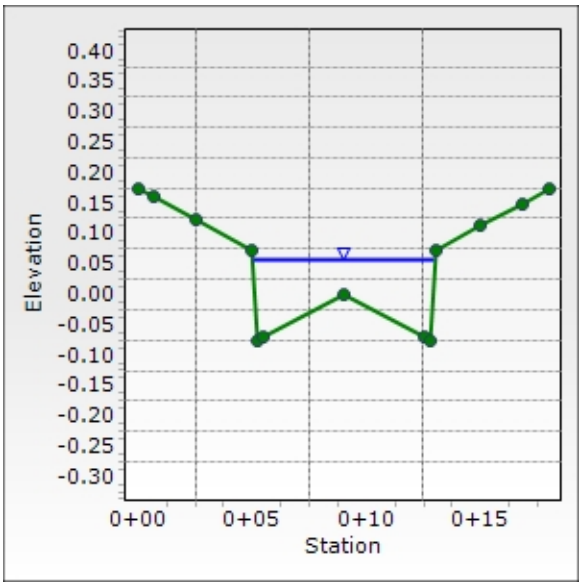
GVF Input Data	
Downstream Depth	0.0 mm
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	133.7 mm
Critical Depth	150.6 mm
Channel Slope	0.006 m/m
Critical Slope	0.004 m/m

Cross Section for Section 6-6 (Street G)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.006 m/m
Normal Depth	133.7 mm
Discharge	0.920 m³/s



Worksheet for Section 7-7 (SWM3 Access)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Channel Slope	0.020 m/m
Discharge	0.925 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.190
0+00	0.190
0+00	0.040
0+02	0.000
0+04	-0.040
0+04	0.110
0+04	0.110

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.190)	(0+00, 0.190)	0.013
(0+00, 0.190)	(0+00, 0.040)	0.013
(0+00, 0.040)	(0+02, 0.000)	0.013
(0+02, 0.000)	(0+04, -0.040)	0.013
(0+04, -0.040)	(0+04, 0.110)	0.013
(0+04, 0.110)	(0+04, 0.110)	0.013

Options

Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Results

Normal Depth	141.1 mm
Roughness Coefficient	0.013
Elevation	0.101 m
Elevation Range	-0.040 to 0.190 m
Flow Area	0.4 m²
Wetted Perimeter	4.203 m
Hydraulic Radius	96.3 mm
Top Width	4.00 m
Normal Depth	141.1 mm

Worksheet for Section 7-7 (SWM3 Access)

Results		
Critical Depth	215.6	mm
Critical Slope	0.003	m/m
Velocity	2.29	m/s
Velocity Head	0.267	m
Specific Energy	0.41	m
Froude Number	2.296	
Flow Type	Supercritical	

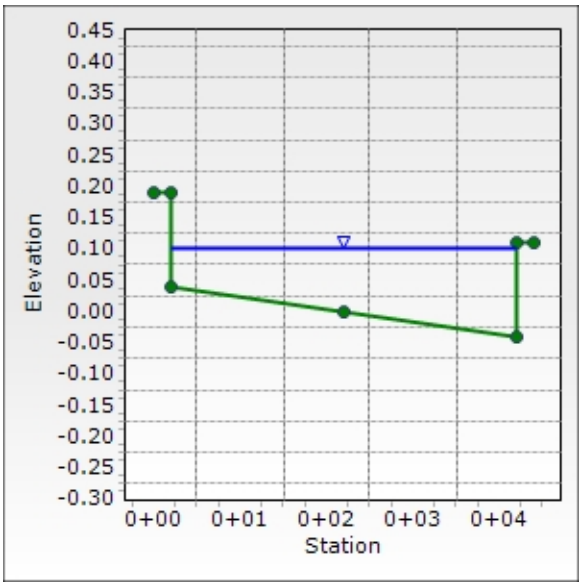
GVF Input Data		
Downstream Depth	0.0	mm
Length	0.000	m
Number Of Steps	0	

GVF Output Data		
Upstream Depth	0.0	mm
Profile Description	N/A	
Profile Headloss	0.00	m
Downstream Velocity	Infinity	m/s
Upstream Velocity	Infinity	m/s
Normal Depth	141.1	mm
Critical Depth	215.6	mm
Channel Slope	0.020	m/m
Critical Slope	0.003	m/m

Cross Section for Section 7-7 (SWM3 Access)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.020 m/m
Normal Depth	141.1 mm
Discharge	0.925 m³/s



Worksheet for Section 8-8 (Street F)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.200 m/m
Discharge	1.171 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.174
0+01	0.160
0+03	0.124
0+05	0.074
0+05	-0.076
0+06	-0.070
0+09	0.000
0+13	-0.070
0+13	-0.076
0+13	0.074
0+15	0.114
0+17	0.150
0+18	0.174

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.174)	(0+01, 0.160)	0.030
(0+01, 0.160)	(0+03, 0.124)	0.013
(0+03, 0.124)	(0+05, 0.074)	0.030
(0+05, 0.074)	(0+05, -0.076)	0.013
(0+05, -0.076)	(0+06, -0.070)	0.013
(0+06, -0.070)	(0+09, 0.000)	0.013
(0+09, 0.000)	(0+13, -0.070)	0.013
(0+13, -0.070)	(0+13, -0.076)	0.013
(0+13, -0.076)	(0+13, 0.074)	0.013
(0+13, 0.074)	(0+15, 0.114)	0.030
(0+15, 0.114)	(0+17, 0.150)	0.013
(0+17, 0.150)	(0+18, 0.174)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for Section 8-8 (Street F)

Results	
Normal Depth	76.4 mm
Roughness Coefficient	0.013
Elevation	0.000 m
Elevation Range	-0.076 to 0.174 m
Flow Area	0.3 m²
Wetted Perimeter	7.856 m
Hydraulic Radius	38.2 mm
Top Width	7.80 m
Normal Depth	76.4 mm
Critical Depth	178.4 mm
Critical Slope	0.004 m/m
Velocity	3.91 m/s
Velocity Head	0.778 m
Specific Energy	0.85 m
Froude Number	6.363
Flow Type	Supercritical

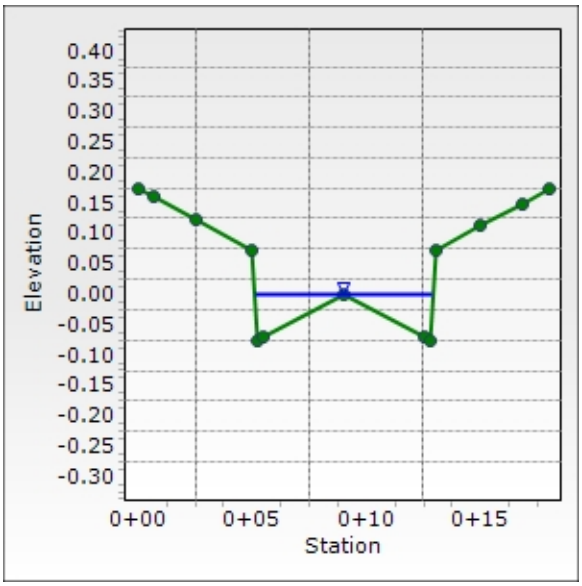
GVF Input Data	
Downstream Depth	0.0 mm
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	76.4 mm
Critical Depth	178.4 mm
Channel Slope	0.200 m/m
Critical Slope	0.004 m/m

Cross Section for Section 8-8 (Street F)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.200 m/m
Normal Depth	76.4 mm
Discharge	1.171 m³/s



Worksheet for Section 9-9 (Street F)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 m/m
Discharge	0.477 m³/s

Section Definitions

Station (m)	Elevation (m)
0+00	0.174
0+01	0.160
0+03	0.124
0+05	0.074
0+05	-0.076
0+06	-0.070
0+09	0.000
0+13	-0.070
0+13	-0.076
0+13	0.074
0+15	0.114
0+17	0.150
0+18	0.174

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00, 0.174)	(0+01, 0.160)	0.030
(0+01, 0.160)	(0+03, 0.124)	0.013
(0+03, 0.124)	(0+05, 0.074)	0.030
(0+05, 0.074)	(0+05, -0.076)	0.013
(0+05, -0.076)	(0+06, -0.070)	0.013
(0+06, -0.070)	(0+09, 0.000)	0.013
(0+09, 0.000)	(0+13, -0.070)	0.013
(0+13, -0.070)	(0+13, -0.076)	0.013
(0+13, -0.076)	(0+13, 0.074)	0.013
(0+13, 0.074)	(0+15, 0.114)	0.030
(0+15, 0.114)	(0+17, 0.150)	0.013
(0+17, 0.150)	(0+18, 0.174)	0.030

Options	
Current Roughness Weighted Method	Pavlovskii's Method
Open Channel Weighting Method	Pavlovskii's Method
Closed Channel Weighting Method	Pavlovskii's Method

Worksheet for Section 9-9 (Street F)

Results	
Normal Depth	106.1 mm
Roughness Coefficient	0.013
Elevation	0.030 m
Elevation Range	-0.076 to 0.174 m
Flow Area	0.5 m²
Wetted Perimeter	7.955 m
Hydraulic Radius	66.9 mm
Top Width	7.88 m
Normal Depth	106.1 mm
Critical Depth	110.6 mm
Critical Slope	0.004 m/m
Velocity	0.90 m/s
Velocity Head	0.041 m
Specific Energy	0.15 m
Froude Number	1.100
Flow Type	Supercritical

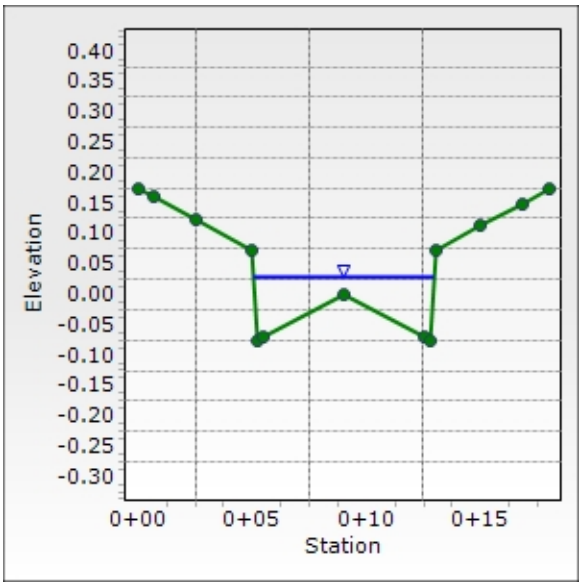
GVF Input Data	
Downstream Depth	0.0 mm
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.0 mm
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	Infinity m/s
Upstream Velocity	Infinity m/s
Normal Depth	106.1 mm
Critical Depth	110.6 mm
Channel Slope	0.005 m/m
Critical Slope	0.004 m/m

Cross Section for Section 9-9 (Street F)

Project Description	
Friction Method	Manning Formula
Solve For	Normal Depth

Input Data	
Channel Slope	0.005 m/m
Normal Depth	106.1 mm
Discharge	0.477 m³/s



GID

CITY OF GUELPH

STORM SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Project Number: **46927-104**
Date: November 24, 2025
Design By: OXR/ALN/MPW
Checked By: VAL
File: Q:\46927\104\STM\46927-104_Storm Sewer Design Sheet (Dec 25).xlsx

Drainage Area Plan No: 46927-104-F4.4

Design Parameters

5 YEAR STORM

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

MTE

LOCATION				STORMWATER FLOW 5 YEAR STORM								DESIGN						
STREET	AREA NUMBER	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME TOTAL	CONCENTRATION TIME IN PIPE	RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY	PIPE FULL
				ha		*ha*	*ha*	*min*	*min*	*mm/hr*	*L/s*	*mm*	*m*	*%*	*L/s*	*m/s*	*m/s*	*%*
SWM 1 NE FB																		
	101			2.870	0.65	1.8655	1.8655	10.0000	2.3822	114.87675	595.76118	750	280.0	0.50	787.20572	1.7819	1.9590	75.68
	102			1.150	0.65	0.7475	2.6130	12.3822	2.0679	98.05500	712.28528	825	255.0	0.50	1015.00629	1.8988	2.0552	70.18
								14.4501										
	103			3.660	0.66	2.4156	2.4156	10.0000	3.1113	114.87675	771.43967	825	390.0	0.50	1015.00629	1.8988	2.0892	76.00
								13.1113										
	104			1.900	0.54	1.0260	6.0546	14.4501	1.7050	87.45183	1471.97064	1050	270.0	0.60	2115.21065	2.4428	2.6393	69.59
								16.1550										
	105			3.390	0.73	2.4747	2.4747	5.0000	3.0288	191.99741	1320.87809	975	465.0	0.60	1735.91239	2.3250	2.5587	76.09
	106			2.910	0.66	1.9206	4.3953	8.0288	1.0698	135.17118	1651.64768	975	230.0	1.25	2505.57371	3.3559	3.5833	65.92
								9.0986										
	107			1.780	0.66	1.1748	1.1748	5.0000	1.4046	191.99741	627.05280	525	325.0	3.00	744.88970	3.4410	3.8563	84.18
								6.4046										
	108			1.770	0.65	1.1505	12.7752	16.1550	0.7760	80.51483	2859.48886	1350	135.0	0.50	3774.11318	2.6367	2.8994	75.77
								16.9311										
Flow to SWM 1 FB1	N/A			0.000	0.00	0.0000	12.7752	16.9311	0.0571	77.76373	2761.78338	1350	10.6	0.60	4134.33384	2.8883	3.0935	66.80
	N/A			0.000	0.00	0.0000	12.7752	16.9882	0.0927	77.56994	2754.90064	1350	17.2	0.60	4134.33384	2.8883	3.0917	66.63
	N/A			0.000	0.00	0.0000	12.7752	17.0809	0.2887	77.25770	2743.81143	1350	53.5	0.60	4134.33384	2.8883	3.0888	66.37
	N/A			0.000	0.00	0.0000	12.7752	17.3696	0.0871	76.30420	2709.94808	1350	16.1	0.60	4134.33384	2.8883	3.0802	65.55
SWM 1 SW FB																		
	401			1.720	0.65	1.1180	1.1180	10.0000	1.4880	114.87675	357.04155	525	210.0	1.15	461.19041	2.1305	2.3522	77.42
	402			3.890	0.73	2.8397	3.9577	11.4880	1.6943	103.65543	1140.45908	825	290.0	0.90	1361.77384	2.5475	2.8527	83.75
	403			3.120	0.65	2.0280	5.9857	13.1823	1.2428	93.60939	1557.68327	1050	185.0	0.50	1930.91431	2.2299	2.4809	80.67
	404			2.060	0.53	1.0918	7.0775	14.4251	0.9721	87.56397	1722.86060	1050	215.0	1.30	3113.50577	3.5957	3.6860	55.34
	405			0.770	0.66	0.5082	7.5857	15.3972	0.5721	83.43286	1759.45267	1050	115.0	1.00	2730.72521	3.1536	3.3502	64.43
								15.9693										
	406			2.270	0.75	1.7025	1.7025	5.0000	0.4746	191.99741	908.71416	750	80.0	1.00	1113.27700	2.5199	2.8093	81.63
	407			8.170	0.74	6.0458	7.7483	5.4746	2.5911	179.51954	3866.90012	1500	465.0	0.45	4741.94103	2.6834	2.9910	81.55
	408			10.460	0.74	7.7404	15.4887	8.0658	2.7318	134.71255	5800.53204	1800	520.0	0.40	7269.92411	2.8569	3.1725	79.79
	409			2.050	0.74	1.5170	17.0057	10.7976	0.3690	108.52686	5130.69912	1800	65.0	0.35	6800.39131	2.6724	2.9362	75.45
								11.1665										

LOCATION				STORMWATER FLOW 5 YEAR STORM								DESIGN						
STREET	AREA NUMBER	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME TOTAL	CONCENTRATION TIME IN PIPE	RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY	PIPE FULL
				ha		*ha*	*ha*	*min*	*min*	*mm/hr*	*L/s*	*mm*	*m*	*%*	*L/s*	*m/s*	*m/s*	*%*
Flow to SWM 1 FB2				0.000	0.00	0.0000	24.5914	*15.9693*	0.3953	81.20755	5551.68023	1950	71.4	0.35	8418.46390	2.8189	3.0102	65.95
				0.000	0.00	0.0000	24.5914	*16.3647*	0.0773	79.74931	5451.98894	1950	13.9	0.35	8418.46390	2.8189	2.9980	64.76
				0.000	0.00	0.0000	24.5914	*16.4419*	0.1207	79.47140	5432.99025	1950	21.7	0.35	8418.46390	2.8189	2.9956	64.54
SWM 2																		
	201			2.880	0.65	1.8720	1.8720	10.0000	2.0274	114.87675	597.83701	675	260.0	0.65	677.70383	1.8938	2.1374	88.22
	202			4.810	0.71	3.4151	5.2871	12.0274	2.6046	100.19002	1472.60672	1050	350.0	0.40	1727.06226	1.9945	2.2396	85.27
	203			1.780	0.55	0.9790	6.2661	14.6320	0.8649	86.64464	1509.32873	1050	110.0	0.35	1615.51882	1.8657	2.1198	93.43
								15.4969										
***Flow to SWM 2**				0.000	0.00	0.0000	6.2661	15.4969	0.2291	83.03494	1446.44859	1050	29.0	0.35	1615.51882	1.8657	2.1097	89.53
								15.7260										
SWM 3																		
	301			4.050	0.73	2.9565	2.9565	5.0000	1.2224	191.99741	1578.04019	900	270.0	1.40	2141.98904	3.3670	3.6813	73.67
	302			2.740	0.87	2.3838	5.3403	6.2224	0.7230	163.27152	2423.93452	975	180.0	1.50	2744.71848	3.6762	4.1495	88.31
								6.9454										
	303			7.260	0.56	4.0656	4.0656	10.0000	1.5908	114.87675	1298.37934	900	270.0	0.80	1619.19152	2.5452	2.8288	80.19
								11.5908										
Flow to SWM 3				0.000	0.00	0.0000	9.4059	11.5908	0.5173	102.97317	2692.58378	1200	105.6	0.80	3487.13037	3.0833	3.4026	77.21

*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).

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CITY OF GUELPH

STORM SEWER DESIGN SHEET

ENGINEERING AND PUBLIC WORKS

Project Number: **46927-104**
Date: November 24, 2025
Design By: OXR/ALN/MPW
Checked By:
File: Q:\46927\104\STM\46927-104_Storm Sewer Design Sheet (Dec 25).xlsx

Drainage Area Plan No: 46927-104-F4.4

Design Parameters

100 YEAR STORM

Q=kAIC, k=0.00278
Intensity (I) = $a(tc)^b$
a = 953.290
b = -0.711
c = 0

Manning's "n" 0.013
Min. Velocity 0.60 m/s
Max. Velocity 6.00 m/s

LOCATION				STORMWATER FLOW 100 YEAR STORM								DESIGN						
STREET	AREA NUMBER	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME TOTAL	CONCENTRATION TIME IN PIPE	RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY	PIPE FULL
				ha		*ha*	*ha*	*min*	*min*	*mm/hr*	*L/s*	*mm*	*m*	*%*	*L/s*	*m/s*	*m/s*	*%*
SWM 1 NE FB																		
	101			2.870	0.65	1.8655	1.8655	10.0000	2.1127	185.44923	961.75640	900	280.0	0.50	1280.08329	2.0122	2.2089	75.13
	103			1.150	0.65	0.7475	2.6130	12.1127	1.8622	161.82337	1175.50765	900	255.0	0.50	1280.08329	2.0122	2.2823	91.83
								13.9748										
	102			3.660	0.66	2.4156	2.4156	10.0000	2.7659	185.44923	1245.35983	975	390.0	0.50	1584.66395	2.1225	2.3501	78.59
								12.7659										
	104			1.900	0.54	1.0260	6.0546	13.9748	1.5122	146.17844	2460.44452	1200	270.0	0.60	3019.94349	2.6702	2.9758	81.47
								15.4870										
	105			3.390	0.73	2.4747	2.4747	5.0000	2.6899	303.56896	2088.45306	1200	465.0	0.60	3019.94349	2.6702	2.8812	69.16
	106			2.910	0.66	1.9206	4.3953	7.6899	0.9421	223.53028	2731.30172	1200	230.0	1.25	4358.91296	3.8541	4.0690	62.66
								8.6320										
	107			1.780	0.66	1.1748	1.1748	5.0000	1.2678	303.56896	991.43923	600	325.0	3.00	1063.49919	3.7614	4.2726	93.22
								6.2678										
	108			1.770	0.65	1.1505	12.7752	15.4870	0.6805	135.88065	4825.80884	1650	135.0	0.50	6444.88820	3.0141	3.3065	74.88
								16.1675										
Flow to SWM 1 FB1	N/A			0.000	0.00	0.0000	12.7752	16.1675	0.0500	131.78913	4680.49846	1650	10.6	0.60	7060.02130	3.3018	3.5301	66.30
	N/A			0.000	0.00	0.0000	12.7752	16.2176	0.0812	131.49985	4670.22460	1650	17.2	0.60	7060.02130	3.3018	3.5284	66.15
	N/A			0.000	0.00	0.0000	12.7752	16.2988	0.2529	131.03346	4653.66050	1650	53.5	0.60	7060.02130	3.3018	3.5255	65.92
	N/A			0.000	0.00	0.0000	12.7752	16.5517	0.0763	129.60669	4602.98902	1650	16.1	0.60	7060.02130	3.3018	3.5168	65.20
SWM 1 SW FB																		
	401			1.720	0.65	1.1180	1.1180	10.0000	1.3330	185.44923	576.38363	600	210.0	1.15	658.45402	2.3288	2.6257	87.54
	402			3.890	0.73	2.8397	3.9577	11.3330	1.5049	169.66251	1866.69580	975	290.0	0.90	2126.04979	2.8476	3.2118	87.80
	403			3.120	0.65	2.0280	5.9857	12.8379	1.1130	155.26971	2583.72616	1200	185.0	0.50	2756.81862	2.4376	2.7704	93.72
	404			2.060	0.53	1.0918	7.0775	13.9508	0.8572	146.35728	2879.64537	1200	215.0	1.30	4445.23645	3.9305	4.1804	64.78
	405			0.770	0.66	0.5082	7.5857	14.8080	0.5055	140.28203	2958.30197	1200	115.0	1.00	3898.73028	3.4472	3.7918	75.88
								15.3135										
	406			2.270	0.75	1.7025	1.7025	5.0000	0.4224	303.56896	1436.77671	900	80.0	1.00	1810.31115	2.8456	3.1568	79.37
	407			8.170	0.74	6.0458	7.7483	5.4224	2.3019	286.56058	6172.59337	1800	465.0	0.45	7710.91896	3.0302	3.3668	80.05
	408			10.460	0.74	7.7404	15.4887	7.7243	2.4280	222.82242	9594.41849	2100	520.0	0.40	10966.16181	3.1661	3.5694	87.49
	409			2.050	0.74	1.5170	17.0057	10.1523	0.3262	183.46698	8673.55658	2100	65.0	0.35	10257.90509	2.9616	3.3213	84.55
								10.4785										

LOCATION				STORMWATER FLOW 100 YEAR STORM								DESIGN						
STREET	AREA NUMBER	MANHOLE LOCATION FROM MH	MANHOLE LOCATION TO MH	AREA (A)	RUNOFF COEFF. (C)	A x C	CUMUL. A x C	CONCENTRATION TIME TOTAL	CONCENTRATION TIME IN PIPE	RAIN INTENSITY (I)	FLOW (Q)	PIPE SIZE	LENGTH	SLOPE	CAPACITY	FULL FLOW VELOCITY	ACTUAL VELOCITY	PIPE FULL
				ha		*ha*	*ha*	*min*	*min*	*mm/hr*	*L/s*	*mm*	*m*	*%*	*L/s*	*m/s*	*m/s*	*%*
Flow to SWM 1 FB2				0.000	0.00	0.0000	24.5914	*15.3135*	0.3545	136.97376	9364.08698	2100	71.4	0.35	10257.90509	2.9616	3.3573	91.29
				0.000	0.00	0.0000	24.5914	*15.6679*	0.0691	134.76328	9212.96919	2100	13.9	0.35	10257.90509	2.9616	3.3502	89.81
				0.000	0.00	0.0000	24.5914	*15.7371*	0.1080	134.34199	9184.16806	2100	21.7	0.35	10257.90509	2.9616	3.3489	89.53
SWM 2																		
	201			2.880	0.65	1.8720	1.8720	10.0000	1.7888	185.44923	965.10747	825	260.0	0.65	1157.28523	2.1649	2.4225	83.39
	202			4.810	0.71	3.4151	5.2871	11.7888	2.2738	164.97232	2424.78586	1350	350.0	0.40	3375.66945	2.3583	2.5654	71.83
	203			1.780	0.55	0.9790	6.2661	14.0626	0.7476	145.52926	2535.08449	1350	110.0	0.35	3157.64963	2.2060	2.4523	80.28
								14.8102										
***Flow to SWM 2**				0.000	0.00	0.0000	6.2661	14.8102	0.1985	140.26718	2443.42033	1350	29.0	0.35	3157.64963	2.2060	2.4354	77.38
								15.0087										
SWM 3																		
	301			4.050	0.73	2.9565	2.9565	5.0000	1.0928	303.56896	2495.05454	1050	270.0	1.40	3231.03764	3.7314	4.1178	77.22
	302			2.740	0.87	2.3838	5.3403	6.0928	0.6369	263.76667	3915.88899	1200	180.0	1.50	4774.94991	4.2220	4.7105	82.01
								6.7297										
	303			7.260	0.56	4.0656	4.0656	10.0000	1.4194	185.44923	2096.01546	1050	270.0	0.80	2442.43487	2.8207	3.1704	85.82
								11.4194										
Flow to SWM 3				0.000	0.00	0.0000	9.4059	11.4194	0.4650	168.74921	4412.52219	1350	105.6	0.80	4773.91752	3.3352	3.7853	92.43

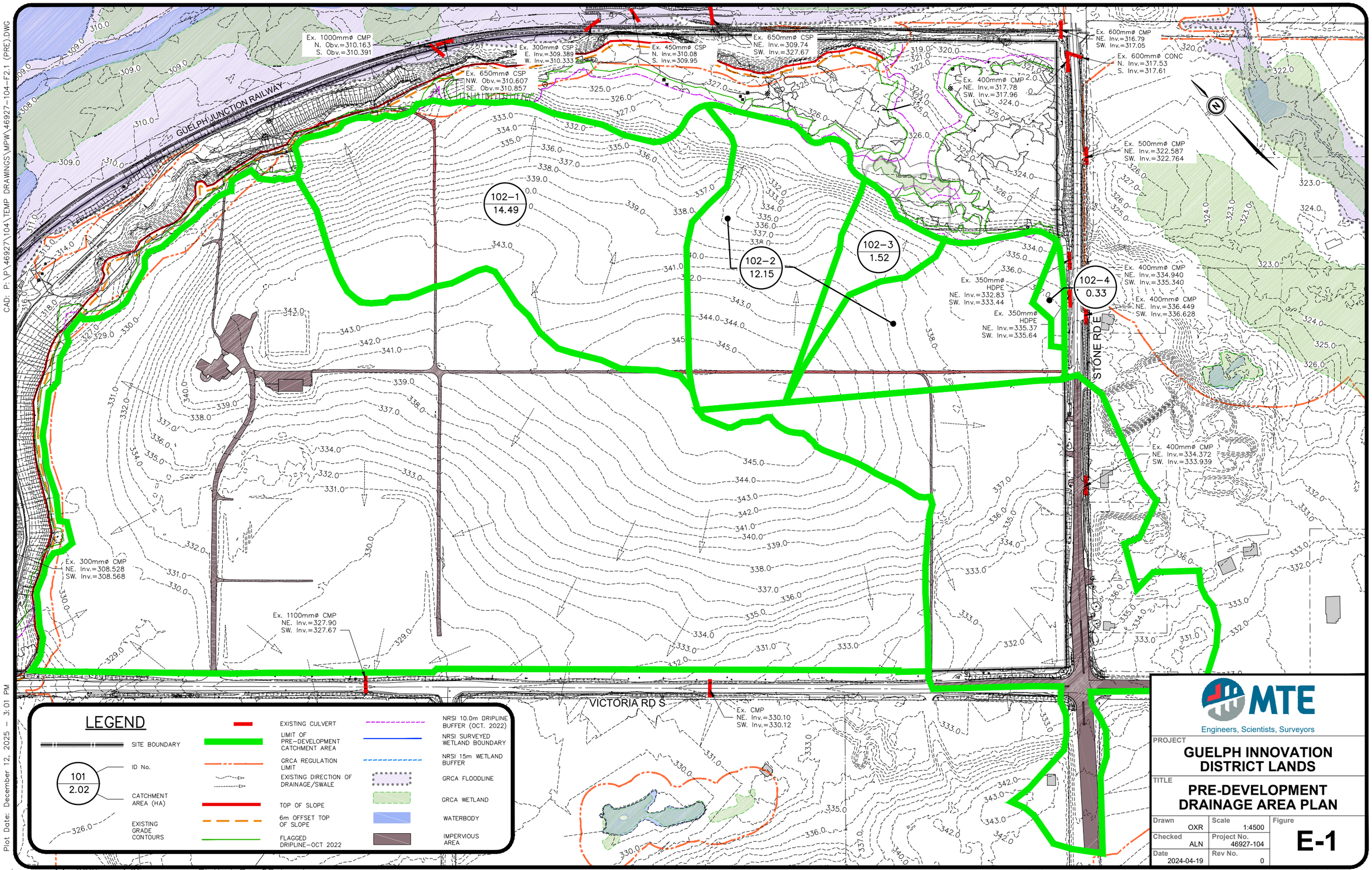
*All storm sewers are to be designed using 5-year design storm outlined on the City of Guelph Intensity-Duration Frequency Curves and shall operate without surcharge.Parks and single detached residential shall use a 10-minute time of concentration. All other land uses shall use a 5-minute time of concentration.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

Appendix E

Water Balance Calculations

EXISTING CULVERT DRAINAGE MODELLING

(EXISTING CONDITIONS)



MTE
Engineers, Scientists, Surveyors

PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
PRE-DEVELOPMENT DRAINAGE AREA PLAN

Drawn	Scale	Figure
OXR	1:4500	E-1
Checked	Project No.	
ALN	46927-104	
Date	Rev No.	
2024-04-19	0	

CAD: P:\P\46927\104\TEMP DRAWINGS\MPW\46927–104–F2.1 (PRE).DWG

Plot Date: December 12, 2025 – 3:01 PM

January 14, 2025 — 4:05 p.m. — Plotted By: ORahmaty

P:\P\46927\104\TEMP DRAWINGS\MPW\46927–104–F2.1 (PRE).dwg

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==============================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999    999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9  9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ##  9   9  9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999   9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9      9   =========
                                                         9   9  9   9   # 3053466
        StormWater Management HYdrologic Model           999    999    =========

 ****************************************************************************
 **************************** SWMHYMO Ver/4.05  ****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                  OTTHYMO-83 and OTTHYMO-89.                 *********
 ****************************************************************************
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 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 ****************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: MTE Consultants Inc.                        +++++++++
 +++++++++                Burlington            SERIAL#:3053466       +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 ****************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++             *********
 *********           Maximum value for ID numbers  :     10             *********
 *********           Max. number of rainfall points: 105408             *********
 *********           Max. number of flow points    : 105408             *********
 ****************************************************************************

 ***** DESCRIPTION SUMMARY TABLE HEADERS (units depend on METOUT in START) *****
 *****-------------------------------------------------------------------*****
 *****    ID:  Hydrograph IDentification numbers, (1-10).                 *****
 *****  NHYD:  Hydrograph reference numbers, (6 digits or characters).    *****
 *****  AREA:  Drainage area associated with hydrograph, (ac.) or (ha.).  *****
 ***** QPEAK:  Peak flow of simulated hydrograph, (ft^3/s) or (m^3/s).    *****
 ***** TpeakDate_hh:mm is the date and time of the peak flow.             *****
 *****  R.V.:  Runoff Volume of simulated hydrograph, (in) or (mm).       *****
 *****  R.C.:  Runoff Coefficient of simulated hydrograph, (ratio).       *****
 *****     *:  see WARNING or NOTE message printed at end of run.         *****
 *****    **:  see  ERROR  message printed at end of run.                 *****
 ****************************************************************************
 ****************************************************************************

::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::

 ****************************************************************************

 **********************   S U M M A R Y   O U T P U T   **********************
 ****************************************************************************
 *         DATE: 2025-11-27     TIME: 10:35:53     RUN COUNTER: 000139      *
 ****************************************************************************
 * Input   filename: C:\SWMHYMO\Projects\SWMHYMO\pre.dat                    *
 * Output  filename: C:\SWMHYMO\Projects\SWMHYMO\pre.out                    *
 * Summary filename: C:\SWMHYMO\Projects\SWMHYMO\pre.sum                    *
 * User comments:                                                           *
 * 1:_______________________________________________________________________*
 * 2:_______________________________________________________________________*
 * 3:_______________________________________________________________________*
 ****************************************************************************
```

```
#*************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-27-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*************************************************************************
# EXISTING CONDITIONS ANALYSIS - WETLAND #3 ONLY
#*************************************************************************
 RUN:COMMAND#
 001:0001-----------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   1 ]
 001:0002-----------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   3.00:PTOT=  40.47]
#*************************************************************************
# Existing Catchment 102-1 - Existing drainage east to Eramosa River via Culver
#*************************************************************************
 001:0003--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      01:102-1         14.49     .276 No_date    1:27    8.70 .215
      [CN= 65.2: N= 3.00]
      [Tp=  .38:DT= 1.00]
#*************************************************************************
# Existing Catchment 102-2 - Existing drainage east to Eramosa River via Culver
#*************************************************************************
 001:0004--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:102-2         12.15     .253 No_date    1:24    8.79 .217
      [CN= 65.5: N= 3.00]
      [Tp=  .34:DT= 1.00]
#*************************************************************************
# Existing Catchment 102-3 - Existing drainage to Wetland #6
#*************************************************************************
 001:0005--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:102-3          1.52     .032 No_date    1:22    8.64 .214
      [CN= 65.0: N= 3.00]
      [Tp=  .32:DT= 1.00]
#*************************************************************************
# Existing Catchment 102-4 - Existing drainage east to Eramosa River via Culver
#*************************************************************************
 001:0006--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      04:102-4           .33     .010 No_date    1:12    8.64 .214
      [CN= 65.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
#*************************************************************************
# Total Flow Off-Site to Eramosa River
#*************************************************************************
 001:0007--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:102-1         14.49     .276 No_date    1:27    8.70  n/a
                      +  02:102-2         12.15     .253 No_date    1:24    8.79  n/a
                      +  03:102-3          1.52     .032 No_date    1:22    8.64  n/a
                      +  04:102-4           .33     .010 No_date    1:12    8.64  n/a
      [DT= 1.00]  SUM=  05:Total         28.49     .566 No_date    1:25    8.74  n/a
#*************************************************************************
# Total Flow Off-Site to Wetland #3 / Culvert #2
#*************************************************************************
 001:0008--------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            02:102-2         12.15     .253 No_date    1:24    8.79  n/a
      [DT=  .00]  SUM=  06:Total           .00     .000 No_date    0:00     .00  n/a
#*************************************************************************
  ** END OF RUN :   1
```

```
*****************************************************************************

 RUN:COMMAND#
 002:0001-----------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   2 ]
#*****************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-27-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*****************************************************************************
# EXISTING CONDITIONS ANALYSIS - WETLAND #3 ONLY
#*****************************************************************************
 002:0002-----------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   3.00:PTOT=  57.18]
#*****************************************************************************
# Existing Catchment 102-1 - Existing drainage east to Eramosa River via Culver
#*****************************************************************************
 002:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      01:102-1         14.49     .509 No_date    1:27   16.21 .283
      [CN= 65.2: N= 3.00]
      [Tp=  .38:DT= 1.00]
#*****************************************************************************
# Existing Catchment 102-2 - Existing drainage east to Eramosa River via Culver
#*****************************************************************************
 002:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:102-2         12.15     .466 No_date    1:24   16.36 .286
      [CN= 65.5: N= 3.00]
      [Tp=  .34:DT= 1.00]
#*****************************************************************************
# Existing Catchment 102-3 - Existing drainage to Wetland #6
#*****************************************************************************
 002:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:102-3          1.52     .060 No_date    1:22   16.11 .282
      [CN= 65.0: N= 3.00]
      [Tp=  .32:DT= 1.00]
#*****************************************************************************
# Existing Catchment 102-4 - Existing drainage east to Eramosa River via Culver
#*****************************************************************************
 002:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      04:102-4           .33     .019 No_date    1:12   16.11 .282
      [CN= 65.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
#*****************************************************************************
# Total Flow Off-Site to Eramosa River
#*****************************************************************************
 002:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:102-1         14.49     .509 No_date    1:27   16.21  n/a
                      + 02:102-2         12.15     .466 No_date    1:24   16.36  n/a
                      + 03:102-3          1.52     .060 No_date    1:22   16.11  n/a
                      + 04:102-4           .33     .019 No_date    1:12   16.11  n/a
      [DT= 1.00]  SUM=  05:Total         28.49    1.043 No_date    1:25   16.27  n/a
#*****************************************************************************
```

```
# Total Flow Off-Site to Wetland #3 / Culvert #2
#*****************************************************************************
 002:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            02:102-2         12.15     .466 No_date    1:24   16.36  n/a
      [DT=  .00]  SUM=  06:Total           .00     .000 No_date    0:00     .00  n/a
#*****************************************************************************
  ** END OF RUN :   2

*****************************************************************************

 RUN:COMMAND#
 003:0001-----------------------------------------------------------------------------
     START
      [TZERO =    .00 hrs on        0]
      [METOUT=   2    (1=imperial, 2=metric output)]
      [NSTORM=   1 ]
      [NRUN  =   3 ]
#*****************************************************************************
#  Project Name: [Guelph Innovation District]    Project Number: [46927-104]
#  Date        : 11-27-2025
#  Modeller    : [MPW]
#  Company     : MTE Consultants Ltd.
#  License #   : 3057174
#*****************************************************************************
# EXISTING CONDITIONS ANALYSIS - WETLAND #3 ONLY
#*****************************************************************************
 003:0002-----------------------------------------------------------------------------
     READ STORM
      Filename = STORM.001
      Comment  =
      [SDT= 5.00:SDUR=   3.00:PTOT=  71.25]
#*****************************************************************************
# Existing Catchment 102-1 - Existing drainage east to Eramosa River via Culver
#*****************************************************************************
 003:0003---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      01:102-1         14.49     .735 No_date    1:27   23.69 .333
      [CN= 65.2: N= 3.00]
      [Tp=  .38:DT= 1.00]
#*****************************************************************************
# Existing Catchment 102-2 - Existing drainage east to Eramosa River via Culver
#*****************************************************************************
 003:0004---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      02:102-2         12.15     .672 No_date    1:24   23.90 .335
      [CN= 65.5: N= 3.00]
      [Tp=  .34:DT= 1.00]
#*****************************************************************************
# Existing Catchment 102-3 - Existing drainage to Wetland #6
#*****************************************************************************
 003:0005---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      03:102-3          1.52     .086 No_date    1:22   23.56 .331
      [CN= 65.0: N= 3.00]
      [Tp=  .32:DT= 1.00]
#*****************************************************************************
# Existing Catchment 102-4 - Existing drainage east to Eramosa River via Culver
#*****************************************************************************
 003:0006---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     DESIGN NASHYD      04:102-4           .33     .027 No_date    1:12   23.56 .331
      [CN= 65.0: N= 3.00]
      [Tp=  .19:DT= 1.00]
```

```
#*****************************************************************************
# Total Flow Off-Site to Eramosa River
#*****************************************************************************
 003:0007---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            01:102-1         14.49     .735 No_date    1:27   23.69  n/a
                      +  02:102-2         12.15     .672 No_date    1:24   23.90  n/a
                      +  03:102-3          1.52     .086 No_date    1:22   23.56  n/a
                      +  04:102-4           .33     .027 No_date    1:12   23.56  n/a
      [DT= 1.00]  SUM=  05:Total         28.49    1.506 No_date    1:25   23.77  n/a
#*****************************************************************************
# Total Flow Off-Site to Wetland #3 / Culvert #2
#*****************************************************************************
 003:0008---------------ID:NHYD-----------AREA----QPEAK-TpeakDate_hh:mm----R.V.-R.C.-
     ADD HYD            02:102-2         12.15     .672 No_date    1:24   23.90  n/a
      [DT=  .00]  SUM=  06:Total           .00     .000 No_date    0:00     .00  n/a
#*****************************************************************************
 003:0002-------------------------------------------------------------------------
      FINISH
-------------------------------------------------------------------------------------
*************************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2025-11-27     at 10:35:54
=====================================================================================
```

Guelph Innovation District
Stormwater Mangement - Culvert #2 Water Balance Analysis
City of Guelph

Project Number: 46927-104
Date: November 27, 2025
Design By: MPW
File: Q:\46927\104\SWM\SWMF 2\Wetland #3 Balance\12-15-25 - FSR-SWM Submission\46927-104_SWMF 2 - Culvert #2.xlsx

HYDROLOGIC PARAMETERS

Pre-Development Conditions

Sub-Catchment Number	Area	Overland Slope	Overland Length	SCS Curve Number		Percent Impervious	Weighted Curve Number	Runoff Coefficient		Weighted Runoff Coefficient	Time of Concentration	Time to Peak	Land Use	Design Command	Comment
				Pervious (AMC II)	Impervious		CN	Pervious	Impervious	RC	ToC	Tp			
	(ha)	*(%)*	*(m)*			*(%)*					*(hr)*	*(hr)*			
102-1	14.49	3.0	350	65.0	98.0	0.5	65.2	0.20	0.90	0.20	0.63	0.38	Agricultural	NASHYD	Existing drainage east to Eramosa River via Culvert #1
102-2	12.15	4.0	350	65.0	98.0	1.5	65.5	0.20	0.90	0.21	0.57	0.34	Agricultural	NASHYD	Existing drainage east to Eramosa River via Culvert #2
102-3	1.52	4.0	300	65.0	98.0	0.0	65.0	0.20	0.90	0.20	0.54	0.32	Agricultural	NASHYD	Existing drainage to Wetland #6
102-4	0.33	4.0	100	65.0	98.0	0.0	65.0	0.20	0.90	0.20	0.31	0.19	Agricultural	NASHYD	Existing drainage east to Eramosa River via Culvert #3
Total	**28.49**														

SWMHYMO OUTPUTS

Pre-Development Conditions

Storm Event	Peak Flow per Catchment				Total Peak Flow Eramosa River	Total Peak Flow to Culvert #2*	SWMF Release Rate (See Table 5.7 of SWM Report)
	102-1	102-2	102-3	102-4			
	(m^3/s)	*(m^3/s)*	*(m^3/s)*	*(m^3/s)*	*(m^3/s)*	*(m^3/s)*	*(m^3/s)*
5-year	0.276	0.253	0.032	0.010	0.566	0.253	0.149
25-year	0.509	0.466	0.060	0.019	1.043	0.466	0.357
100-year	0.735	0.672	0.086	0.027	1.506	0.672	0.580

*Note: 1. SWMF 2 release rates from Table 5.7 of the Preliminary SWM Report are governed by the above peak flows to culvert #2.

Infiltration Calculations and GWMS and Block/Lot Level Gallery Sizing

Infiltration Analysis
Guelph Innovation District, City of Guelph

Project: 46927-104
Date: 11/24/2025
By: MPW

Reduced Infiltration Volume Criteria				
Catchment	**Total Area (ha.)**	**Area with High GW (ha)***	**Area outside High GW (ha)**	**20.25mm Rainfall Depth Volume (cu.m)**
201	60.92	34.45	26.47	12,335.47
202	14.90	4.41	10.49	3,017.29
203	24.09	7.99	16.10	4,878.37
			Total Infiltration Volume Criteria	**20,231.1 cu.m**
			Less Volume Directed to Wetland #6 from Block 50	-40.1 cu.m
			Total Infiltration Volume To Be Provided	**20,191.0 cu.m**

*Active infiltration via the end of pipe galleries or SWM infiltration cell (orange), and lot/block level galleries (yellow). Red italics denote impervious areas that do not drain towards a SWMF and therefore cannot be captured to infiltrate.

							Area within High GW				**Area outside High GW**			
							Areas				Areas			
Drainage Area	Area (ha)	Type	Area (ha)	Area with High GW (ha)*	Area outside High GW (ha)	Impervious %	Pervious Area (ha.)	Impervious Area (ha.)	Pervious - Passive Infiltration Volume (cu.m)	Impervious - Active Infiltration Volume (cu.m)	Pervious Area (ha.)	Impervious Area (ha.)	Pervious - Passive Infiltration Volume (cu.m)	Impervious - Active Infiltration Volume (cu.m)
201-1	20.11 ha	Low Density Res.	9.97	7.79	2.18	65%	2.73	5.07	557.99	1036.27	0.76	1.41	155.80	289.34
		Med. Density Res.	3.78	3.78	0.00	80%	0.76	3.02	154.58	618.30	0.00	0.00	0.00	0.00
		R.O.W.	5.36	3.78	1.58	66%	1.28	2.49	262.72	509.99	0.54	1.04	109.85	213.24
		Open Space	0.11	0.00	0.11	7%	0.00	0.00	0.00	0.00	0.10	0.01	20.51	1.54
		Park	0.55	0.42	0.12	7%	0.39	0.03	80.75	6.08	0.11	0.01	23.38	1.76
		G.M. Frost Building	0.22	0.22	0.00	24%	0.17	0.05	34.24	10.81	0.00	0.00	0.00	0.00
		SWM (Slope Only)	0.12	0.00	0.12	0%	0.00	0.00	0.00	0.00	0.12	0.00	24.32	0.00
201-2	35.05 ha	Low Density Res.	2.64	1.78	0.86	65%	0.62	1.16	127.74	237.23	0.30	0.56	61.35	113.93
		Med. Density Res.	13.43	5.64	7.79	80%	1.13	4.52	230.88	923.51	1.56	6.23	318.68	1274.72
		Mixed Use	9.73	3.73	5.99	80%	0.75	2.99	152.74	610.96	1.20	4.80	245.18	980.73
		Employment	0.03	0.02	0.01	100%	0.00	0.02	0.00	3.76	0.00	0.01	0.00	2.97
		R.O.W.	5.66	4.02	1.65	66%	1.37	2.65	279.26	542.09	0.56	1.09	114.45	222.17
		School	2.07	2.07	0.00	80%	0.41	1.66	84.63	338.51	0.00	0.00	0.00	0.00
		Park	1.10	1.09	0.02	7%	1.01	0.08	206.53	15.55	0.01	0.00	2.91	0.22
		G.M. Frost Building	0.10	0.10	0.00	24%	0.08	0.02	16.04	5.07	0.00	0.00	0.00	0.00
		SWM (Slope Only)	0.27	0.00	0.27	0%	0.00	0.00	0.00	0.00	0.27	0.00	55.96	0.00
201-3	2.61 ha	Med. Density Res. (Slope Only)	0.37	0.00	0.37	0%	0.00	0.00	0.00	0.00	0.37	0.00	75.10	0.00
		Mixed Use (Slope Only)	0.57	0.00	0.57	0%	0.00	0.00	0.00	0.00	0.57	0.00	117.50	0.00
		Employment (Slope Only)	0.55	0.00	0.55	0%	0.00	0.00	0.00	0.00	0.55	0.00	113.00	0.00
		R.O.W.	0.71	0.00	0.71	66%	0.00	0.00	0.00	0.00	0.24	0.47	49.46	*96.00*
		SWM (Overland Oulet)	0.40	0.00	0.40	23%	0.00	0.00	0.00	0.00	0.31	0.09	63.36	*18.93*
201-4	0.78 ha	Low Density Res.	0.49	0.00	0.49	65%	0.00	0.00	0.00	0.00	0.17	0.32	35.26	65.48
		Open Space (Slope Only)	0.14	0.00	0.14	0%	0.00	0.00	0.00	0.00	0.14	0.00	29.17	0.00
		SWM (Slope Only)	0.14	0.00	0.14	0%	0.00	0.00	0.00	0.00	0.14	0.00	28.53	0.00
201-5	2.39 ha	SWM	2.39	0.00	2.39	59%	0.00	0.00	0.00	0.00	0.98	1.41	200.14	288.01
202-1	10.16 ha	Low Density Res.	4.55	3.21	1.34	65%	1.12	2.09	229.63	426.45	0.47	0.87	95.92	178.13
		Mixed Use	2.63	0.00	2.63	80%	0.00	0.00	0.00	0.00	0.53	2.11	107.76	431.04
		R.O.W.	1.77	0.76	1.01	66%	0.26	0.50	52.58	102.07	0.34	0.67	70.38	136.62
		Open Space	0.02	0.00	0.02	7%	0.00	0.00	0.00	0.00	0.02	0.00	3.27	0.25
		Park	0.45	0.41	0.05	7%	0.38	0.03	77.23	5.81	0.05	0.00	9.24	0.70
		SWM	0.73	0.00	0.73	55%	0.00	0.00	0.00	0.00	0.33	0.40	67.53	82.54
202-2	2.68 ha	Park	1.64	0.04	1.60	7%	0.03	0.00	7.00	*0.53*	1.49	0.11	304.70	*22.93*
		Open Space	1.04	0.00	1.04	7%	0.00	0.00	0.00	0.00	0.96	0.07	197.10	*14.84*
202-3	2.07 ha	Med. Density Res. (Slope Only)	0.38	0.00	0.38	0%	0.00	0.00	0.00	0.00	0.38	0.00	78.21	0.00
		Open Space	1.06	0.00	1.06	7%	0.00	0.00	0.00	0.00	0.99	0.07	201.63	*15.18*
		SWM (Slope Only)	0.63	0.00	0.63	5%	0.00	0.00	0.00	0.00	0.60	0.03	121.89	*6.42*
Wetland #6		Mixed Use (Block 50 Roofs)	-0.20	0.00	-0.20	100%	0.00	0.00	0.00	0.00	0.00	-0.20	0.00	-40.09
203	24.1 ha	Low Density Res.	0.19	0.17	0.02	65%	0.06	0.11	12.11	22.49	0.01	0.01	1.43	2.66
		Med. Density Res.	1.90	1.90	0.00	80%	0.38	1.52	77.71	310.84	0.00	0.00	0.05	0.20
		Employment	6.77	0.59	6.18	100%	0.00	0.59	0.00	121.39	0.00	6.18	0.00	1263.10
		R.O.W.	2.08	1.50	0.58	66%	0.51	0.99	104.44	202.73	0.20	0.38	40.16	77.96
		Park	3.84	3.82	0.01	7%	3.56	0.27	727.49	54.76	0.01	0.00	2.26	0.17
		SWM	2.00	0.00	2.00	44%	0.00	0.00	0.00	0.00	1.12	0.88	229.50	180.32
		External Lands	7.31	0.00	7.31	78%	0.00	0.00	0.00	0.00	1.61	5.70	329.02	1166.51
									3,476.3 cu.m	**6,105.2 cu.m**			**3,704.0 cu.m**	**7,108.5 cu.m**

Total Passive Infiltration Volume	**7,180.2 cu.m**
Total Lot/Block Level Infiltration Volume	**4,659.1 cu.m**
Total End of Pipe Infiltration Volume	**8,351.7 cu.m**
Total Infiltration Volume	**20,191.0 cu.m**

Guelph Innovation District
Summary of Lot/Block Level Infiltration Galleries
Conceptual Design
City of Guelph

Date: November 27, 2025 **0.02025** m **Active Infiltration**
Project: 46927-104
File: Q:\46927\104\Water Balance\20mm Criteria\12-15-25 Revised Block Plan\46927-104_Infiltration Gallery Designs.xls

Locations referenced from Draft Plan dated December 10, 2025 by MHBC Planning Ltd.

Lot/Block Level Infiltration Galleries

Facility No.	Within Pond Catchment	Location	Borehole Ref.#'s	Estimated Groundwater Elevation (m)	Estimated Road CL (m)	Estimated Finished Grade Over Chamb. (m)	Estimated Facility Invert (m)	Existing Soil Type Below Inv.	Estimated Perc. Rate (mm/hr) **	Design Depth (mm)	Estimated Drawdown Time (hr)	Drainage Area (ha)	Percentage Impervious (%)	Impervious Area to Infiltration (ha)	Volume Required* (m^3)	Volume Provided (m^3)	Contact Area (m^2)	Estimated Configuration	
																		Width (m)	Length (m)
Catchment 201																			
1	201-2	Multi-Residential (Block 44)	MW601-22 MW501-22	323.4	331.00	331.50	330.29	Sand	40	1414	35	1.853	80	1.482	300.14	301.10	386.43	4.80	80.50
2	201-2	Multi-Residential (Block 42)	MW1-17 MW12-17	327.4	332.00	332.40	331.19	n/a (Fill Area)	40	1414	35	3.864	80	3.091	626.02	625.54	795.24	6.25	128.28
3	201-2	Multi-Residential (Block 43)	BH516-22	322.1	331.20	331.40	330.19	Sand	40	1414	35	2.073	80	1.659	335.86	338.49	432.06	6.25	69.65
4	201-2	Mixed Use (Block 45)	n/a (Fill Area)	324.6	332.00	332.50	331.29	n/a (Fill Area)	40	1414	35	1.806	80	1.444	292.49	368.10	469.58	6.25	76.16
5	201-2	Mixed Use (Block 46)	n/a (Fill Area)	328.50	332.50	333.00	331.79	n/a (Fill Area)	40	1414	35	1.513	80	1.210	245.03	308.87	394.54	6.25	63.14
6	201-2	Mixed Use (Block 49)	n/a (Fill Area)	329.9	333.50	334.00	332.79	n/a (Fill Area)	40	1414	35	2.676	80	2.141	433.46	541.96	689.27	6.25	110.81
Lot Level Galleries	201-1	Residential (Block 1)	BH502-22	324.2	332.50	330.70	327.70	Gravelly Silt Till	40	1500	38	0.464	65	0.302	61.06	61.06	n/a	n/a	n/a
Lot Level Galleries	201-1	Residential (Block 2)	n/a (Fill Area)	332.2	335.50	335.70	332.70	n/a (Fill Area)	40	1500	38	0.138	65	0.090	18.12	18.12	n/a	n/a	n/a
Lot Level Galleries	201-1	Residential (Block 3)	BH615-22	323.00	332.00	329.80	326.80	Sand	40	1500	38	0.681	65	0.443	89.62	89.62	n/a	n/a	n/a
Lot Level Galleries	201-1	Residential (Block 13)	BH429-20 BH206-19	332.00	335.00	336.00	333.00	Sand and Gravel	40	1500	38	0.122	65	0.079	15.99	15.99	n/a	n/a	n/a
Lot Level Galleries	201-1	Residential (Block 14)	BH429-20 BH206-19	332.00	335.20	336.90	333.90	Sand and Gravel	40	1500	38	0.170	65	0.111	22.38	22.38	n/a	n/a	n/a
Lot Level Galleries	201-1	Residential (Block 15)	BH635-22	332.00	336.50	336.90	333.90	Sand and Gravel	40	1500	38	0.329	65	0.214	43.32	43.32	n/a	n/a	n/a
Lot Level Galleries	201-2	Residential (Block 1)	BH502-22	324.2	330.60	330.70	327.70	Gravelly Silt Till	40	1500	38	0.694	65	0.451	91.32	91.32	n/a	n/a	n/a
Lot Level Galleries	201-2	Residential (Block 2)	n/a (Fill Area)	332.2	335.80	337.60	334.60	n/a (Fill Area)	40	1500	38	0.163	65	0.106	21.47	21.47	n/a	n/a	n/a
Catchment 202																			
7	202-1	Mixed Use (Block 50)	n/a (Fill Area)	334.50	339.30	339.60	338.39	n/a (Fill Area)	40	1414	35	2.634	80	2.107	426.76	534.16	679.54	6.25	108.75
Lot Level Galleries	202-1	Residential (Block 29)	BH508-22	335	339.30	339.75	336.75	Gravelly Silt Till	40	1500	38	0.821	65	0.534	108.06	108.06	n/a	n/a	n/a
Catchment 203																			
8	203	Employment (Block 56)	n/a (Fill Area)	336.00	339.85	340.60	339.39	n/a (Fill Area)	40	1414	35	0.933	100	0.933	188.89	194.44	250.26	6.25	41.56
9	203	Employment (Block 55)	MW4-11, MW1-11 MW217-19, MW3-11	332.4	336.20	336.50	335.29	Sand and Gravel	40	1414	35	2.574	100	2.574	521.24	523.06	665.31	6.25	106.48
10	203	Employment (Block 54)	BH519-22	332.1	336.20	336.50	335.29	Sandy Silt Till	40	1414	35	2.201	100	2.201	445.60	448.58	571.42	6.25	91.45
11	203	Employment (Block 53)	BH519-22	332.1	335.00	337.65	336.44	Sandy Silt Till	40	1414	35	1.062	100	1.062	214.99	216.79	279.16	4.80	58.80

1. Infiltration facilities assume roof capture runoff during the 75% (20.25mm) of the 27mm summer storm event.
2. Estimated percolation rates for sandy (40 mm/hr) and silty (15 mm/hr) soils.
3. Estimated drawdown time is calculated using Equation 4.3 from the MOE Stormwater Management Planning and Design Manual.
4. Design dimensions for block level galleries (area, depth, etc) based on using ADS DC-780 (1414 mm depth incl. stone). Stone below the ADS chambers is 500mm thick.
5. Design dimensions (area, depth, etc) for lot level infiltration galleries will be determined based on proposed house size.
6. No borehole information in noted locations due to fill operations significantly above existing subgrade.

Guelph Innovation District Subdivision

SWM #1 and SWM #2- End-of-pipe StormTank Infiltration Galleries Sizing

Guelph, Ontario

Project Number:	46927-104
Date:	November 24, 2025
Design By:	ALN/MPW
File:	Q:\46927\104\Water Balance\20mm Criteria\12-15-25 Revised Block Plan\46927-104_Infiltration Analysis.xlsx

SWM #1 - Infiltration Gallery

MOE Infiltration Trench Bottom Area

A =1,000V/(PnDT) MOE SWMP&DM Eq. 4.3

Runoff V (m^3)	**5,581**
*Inf. Rate P (mm/h)	49.4
Void Ratio (storage) n	0.96
Retention Time t (h)	48
Min Bottom Area A (m^2)	2,452
Provided Surface Contact Area (m2)	2,461
Provided Storage Volume (m3)	4,319

Contact Area Calculation

SWM #1-Gallery Size-Minimum Required Contact Area Used for Infiltration

Length (m)	Width (m)	Side Perimeter (m)	Height (m)	Total Contact Area (sq.m)
214	11.46	450.9158879	1.828	2,452

SWM #1-Gallery Size-Provided Contact Area Used for Infiltration

Length	Width	Side Perimeter	Height	Total Contact Area
214	11.5	451	1.828	2,461

Gallery is positioned under the SWM Facility embakment at/below permanent pool elevation to receive by gravity clean water for infiltration.

SWM #2 - Infiltration Gallery

MOE Infiltration Trench Bottom Area

A =1,000V/(PnDT) MOE SWMP&DM Eq. 4.3

Runoff V (m^3)	**755**
*Inf. Rate P (mm/h)	49.4
Void Ratio (storage) n	0.96
Retention Time t (h)	48
Min Bottom Area A (m^2)	332
Provided Surface Contact Area (m2)	333
Provided Storage Volume (m3)	292

Contact Area Calculation

SWM #2-Gallery Size-Minimum Required Contact Area Used for Infiltration

Length (m)	Width (m)	Side Perimeter (m)	Height (m)	Total Contact Area (sq.m)
37	8.97	91.94594595	0.914	332

SWM #2-Gallery Size-Provided Contact Area Used for Infiltration

Length	Width	Side Perimeter	Height	Total Contact Area
37	9	92	0.914	333

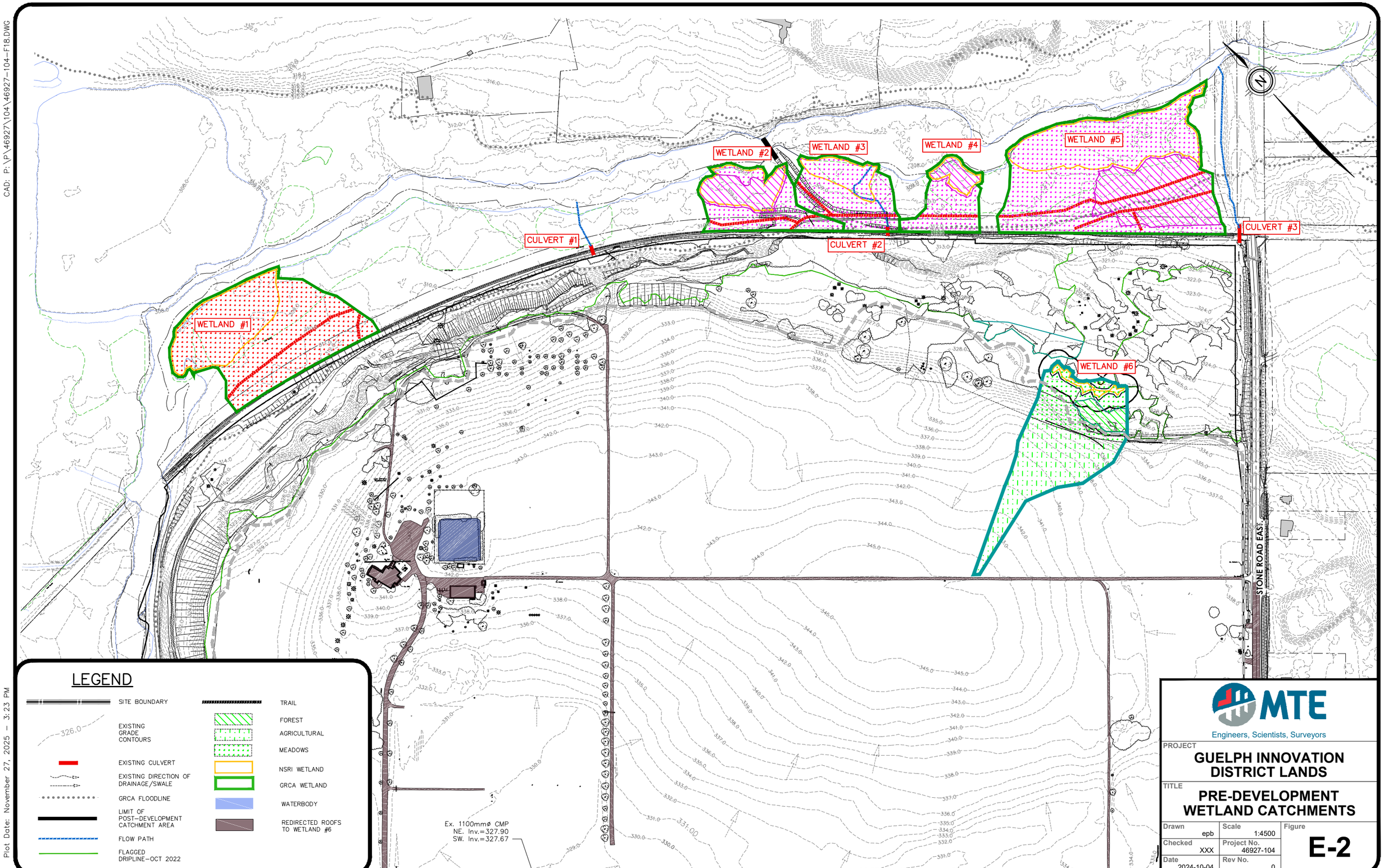
Gallery is positioned under the SWM Facility embakment at/below permanent pool elevation to receive by gravity clean water for infiltration.

Notes: Infiltration gallery is sized based on contact area of the bottom gallery, assuming the installation of Brentwood Stormtank or approved equivalent.

** Applied 2.5 Safety Factor for Infiltration Rate.*

Wetland 6 Water Balance Calculations

CAD: P:\P\46927\104\46927-104-F18.DWG



MTE
Engineers, Scientists, Surveyors

PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
PRE-DEVELOPMENT WETLAND CATCHMENTS

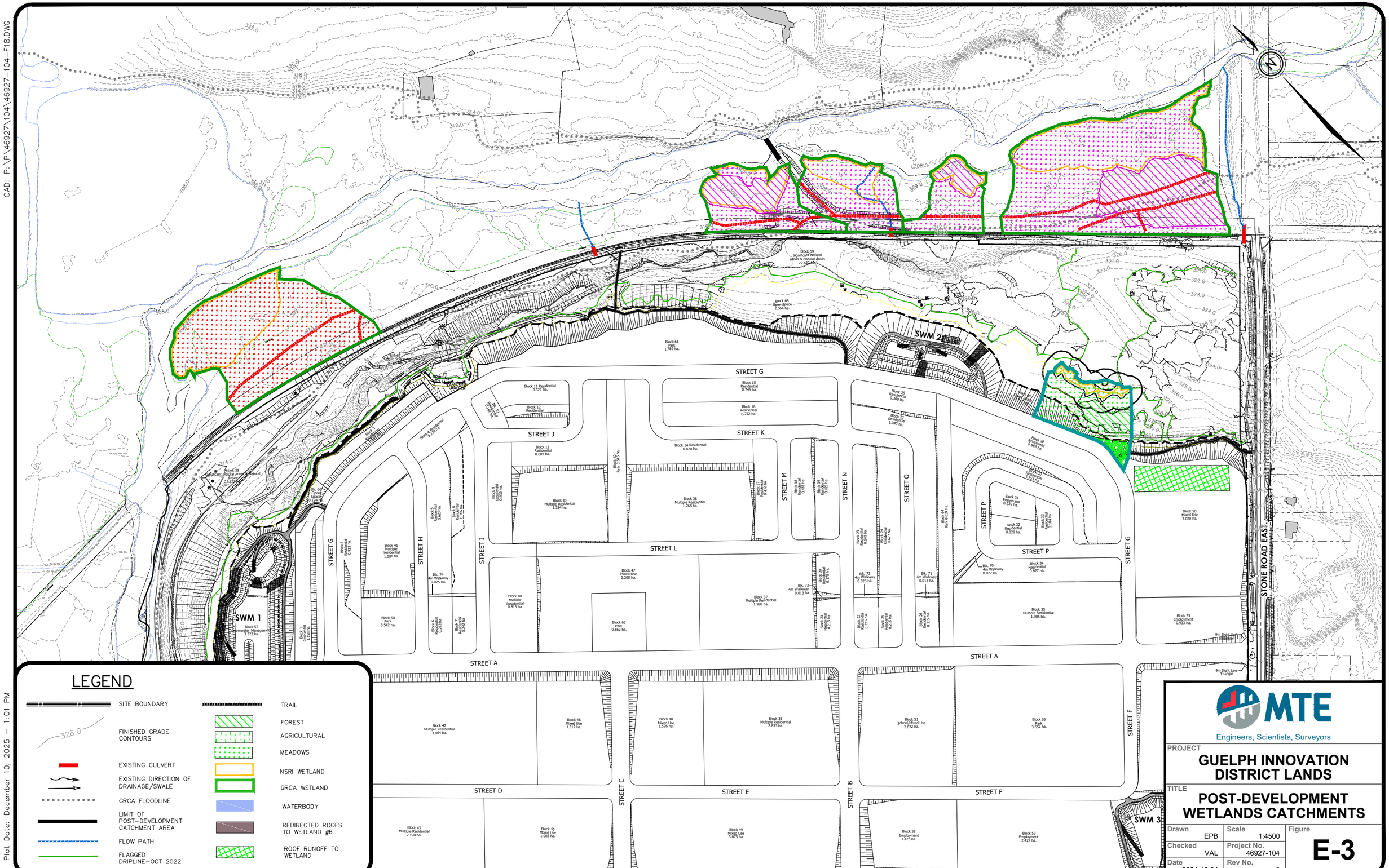
Drawn	Scale	Figure
epb	1:4500	E-2
Checked	Project No.	
XXX	46927-104	
Date	Rev No.	
2024-10-04	0	

Plot Date: November 27, 2025 – 3:23 PM

February 27, 2025 — 1:29 p.m. — Plotted By: ALee

P:\P\46927\104\46927-104-F18.dwg

CAD: P:\P\46927\104\46927-104-F18.DWG



LEGEND

- SITE BOUNDARY
- FINISHED GRADE CONTOURS (326.0)
- EXISTING CULVERT
- EXISTING DIRECTION OF DRAINAGE/SWALE
- GRCA FLOODLINE
- LIMIT OF POST-DEVELOPMENT CATCHMENT AREA
- FLOW PATH
- FLAGGED DRIPLINE-OCT 2022
- TRAIL
- FOREST
- AGRICULTURAL
- MEADOWS
- NSRI WETLAND
- GRCA WETLAND
- WATERBODY
- REDIRECTED ROOFS TO WETLAND #6
- ROOF RUNOFF TO WETLAND

MTE
Engineers, Scientists, Surveyors

PROJECT
GUELPH INNOVATION DISTRICT LANDS

TITLE
POST-DEVELOPMENT WETLANDS CATCHMENTS

Drawn	Scale	Figure
EPB	1:4500	E-3
Checked	Project No.	
VAL	46927-104	
Date	Rev No.	
2024-10-04	0	

Plot Date: December 10, 2025 - 1:01 PM

February 27, 2025 — 1:29 p.m. — Plotted By: ALee

P:\P\46927\104\46927-104-F18.dwg

GID LANDS - WETLAND #6
WATER BALANCE (ANNUAL - SURFACE RUNOFF) ANALYSIS
Guelph, Ontario

			Pre-Development	Post Development
Project Number:	46927-104			
Date:	November 20, 2025	Topography:	Various	Various
Design By:	mpw	Coverage:	Various	Various
File:	Q:\46927\104\Water Balance\Wetlands\46927-104_Wetlands 3 & 6	Soil Type:	Various	Various

Weather Station: Guelph SWM Master Plan App F Table 4.1
Total Precipitation: 844.3 mm

SURFACE RUNOFF

Location	Pre-development			Post-development						Comments
				Pervious			Impervious			
	Area Draining to Location	Runoff Rate	Runoff Volume	Area Draining to Location	Runoff Rate	Runoff Volume	Area Draining to Location	Runoff Rate	Runoff Volume	
	ha	*mm/yr/m²*	*m³/yr*	*ha*	*mm/yr/m²*	*m³/yr*	*ha*	*mm/yr/m²*	*m³/yr*	
Wetland	0.066	96	63	0.066	96	63	0.000	0	0	Flat, pasture, Type C soils
Natural drainage area	0.668	150	1,002	0.611	150	917	0.026	719	187	Hilly, meadows, Type C soils
Natural drainage area	0.190	135	257	0.194	135	262	0.000	0	0	Hilly, forest, Type C soils
Agricultural	1.260	138	1,739	0.000	138	0	0.000	0	0	Rolling, crops, Type C soils
Open space block	0.000	128	0	0.074	128	95	0.018	719	129	Flat, urban lawn, Type C soils
Mixed use (Block 50) roofs							0.196	719	1,408	Portion of mixed use roof area re-directed to feed wetland #6
Total	**2.184**		**3,061**	**0.945**		**1,336**	**0.240**		**1,724**	

SUMMARY

Post-development Runoff Volume

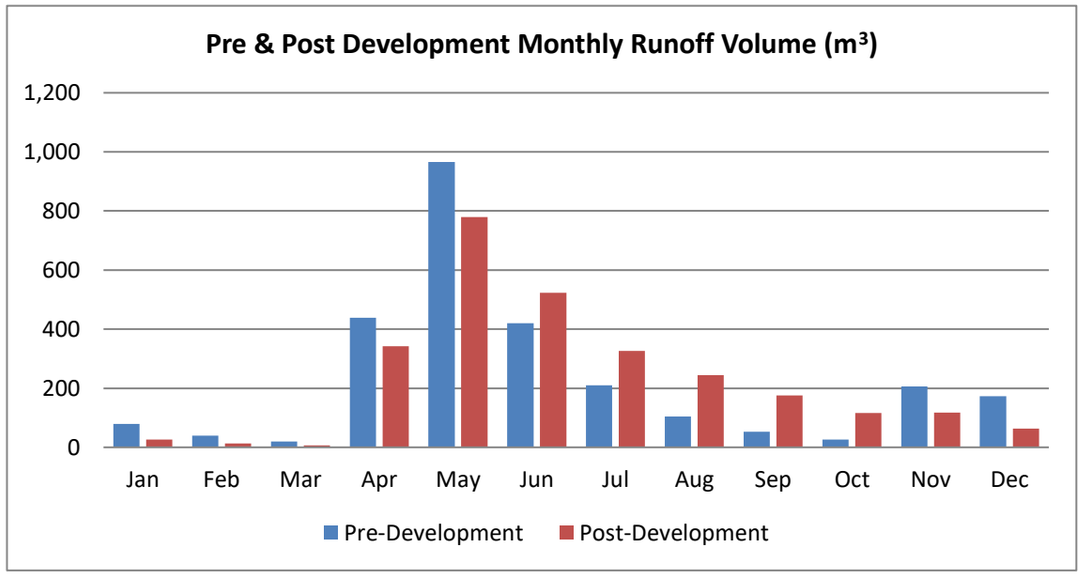
Pervious		1,336	*m³/yr*
Impervious	+	1,724	*m³/yr*
		3,061	*m³/yr*
Pre-development Runoff Volume	-	3,061	*m³/yr*
Net Loss of Surface Runoff to Wetland #6		**0**	***m³/yr***

GID LANDS - WETLAND #6
WATER BALANCE (MONTHLY - SURFACE RUNOFF) ANALYSIS
Guelph, Ontario

Project Number:	46927-104
Date:	November 20, 2025
Design By:	mpw
File:	Q:\46927\104\Water Balance\Wetlands\46927-104 Wetland_6_Water Balance(Thornthwaite-Mather) - New Draft Plan 11-6-25.xlsx

Month	Total Runoff Volume (m^3)			
	Pre-development	Post-development	Difference	Change %
Jan	80	27	-53	-66.4
Feb	40	13	-26	-66.4
Mar	20	7	-13	-66.4
Apr	439	342	-97	-22.1
May	965	780	-185	-19.2
Jun	420	523	103	24.6
Jul	210	327	117	55.8
Aug	105	244	139	132.5
Sep	52	176	123	235.3
Oct	26	116	90	342.0
Nov	206	117	-89	-43.2
Dec	172	63	-109	-63.3
Total	**2,735**	**2,735**	**0**	**0.0**

Note: Negative sign indicate a decrease under post-development conditions.



GID LANDS - WETLAND #6
WATER BALANCE ANALYSIS
Guelph, Ontario

Project Number: 46927-104
Date: November 20, 2025
Design By: mpw
File: Q:\46927\104\Water Balance\Wetlands\46927-104 Wetland_6_Water Balance(Thornthwaite-Mather) - New Draft Plan 11-6-25.xlsx

PRE-DEVELOPMENT CONDITION

Contributing Catchments:	Wetland #6	Soil Type:	Silty sand till	Runoff Factor:	0.51
Contributing Areas:	2.184 ha	Vegetation:	Varies	Evapotranspiration	
Percent Impervious	0.0 %	Topography:	Varies	Factor for Impervious	
Weather Station:	Guelph SWM Master Plan App F Table 4.1	Soil Moisture Retention Capacity:	234 mm	Surfaces:	0.33

Month	Daily Average Temperature (C°)	Monthly Heat Index	Unadjusted Daily PE (mm)	Correction Factor	Adjusted PE (mm)	Average Precipitation (mm)	P-PE (mm)	Accum. Pot. Water Loss (mm)	Storage (mm)	ΔS (mm)	Pervious ET (mm)	Actual ET (mm)	Moisture Surplus (mm)	Water Runoff (mm)	Snow Melt Runoff (mm)	Total Recharge & Runoff (mm)	Total Recharge & Runoff (m^3)	Total Infiltration Depth (mm)	Total Infiltration Volume (m^3)	Actual Runoff (mm)	Runoff Volume (m^3)
Jan	-7.4	0.00	0.0	24.3	0.0	57.7	57.7	0.0	358.7	0.0	0.0	0.0	0.0	7.1	0.0	7.1	156	3.5	76	3.6	80
Feb	-6.5	0.00	0.0	24.5	0.0	50.9	50.9	0.0	409.6	0.0	0.0	0.0	0.0	3.6	0.0	3.6	78	1.7	38	1.8	40
Mar	-1.7	0.00	0.0	30.6	0.0	61.8	61.8	0.0	471.4	0.0	0.0	0.0	0.0	1.8	0.0	1.8	39	0.9	19	0.9	20
Apr	5.6	1.19	0.9	33.6	29.9	73.4	43.5	0.0	234.2	0.0	29.9	29.9	43.5	22.7	16.7	39.3	859	19.3	420	20.1	439
May	12	3.76	2.0	38.0	74.9	75	0.1	0.0	234.2	0.0	74.9	74.9	0.1	11.4	75.1	86.5	1,890	42.3	925	44.2	965
Jun	17.1	6.43	2.9	38.6	110.1	75.2	-34.9	-34.9	146.0	-88.2	163.4	163.4	0.0	0.1	37.6	37.6	822	18.4	402	19.2	420
Jul	19.6	7.91	3.3	38.9	127.9	80.4	-47.5	-82.4	132.0	-14.0	94.4	94.4	0.0	0.0	18.8	18.8	411	9.2	201	9.6	210
Aug	18.7	7.37	3.1	36.0	112.7	80.5	-32.2	-114.6	145.0	13.0	112.7	112.7	0.0	0.0	9.4	9.4	205	4.6	100	4.8	105
Sep	14.6	5.07	2.4	31.2	75.44	75.40	-0.04	-114.6	170.0	25.0	75.4	75.4	0.0	0.0	4.7	4.7	103	2.3	50	2.4	52
Oct	8.5	2.23	1.4	28.5	39.2	71	31.8	0.0	201.8	31.8	39.2	39.2	0.0	0.0	2.3	2.4	51	1.2	25	1.2	26
Nov	2.5	0.35	0.4	24.2	9.3	76.2	66.9	0.0	234.2	32.4	9.3	9.3	34.5	17.3	1.2	18.4	403	9.0	197	9.4	206
Dec	-3.7	0.00	0.0	23.0	0.0	66.8	66.8	0.0	301.0	0.0	0.0	0.0	0.0	14.3	1.2	15.5	337	7.6	165	7.9	172
Total		34.3	16.3		579.3	**844.3**	**265.0**					**599.1**	**78.2**	**78.2**	**167.0**	**245.2**	**5,354**	**119.9**	**2,620**	**125.2**	**2,735**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration

GID LANDS - WETLAND #6
WATER BALANCE ANALYSIS
Guelph, Ontario

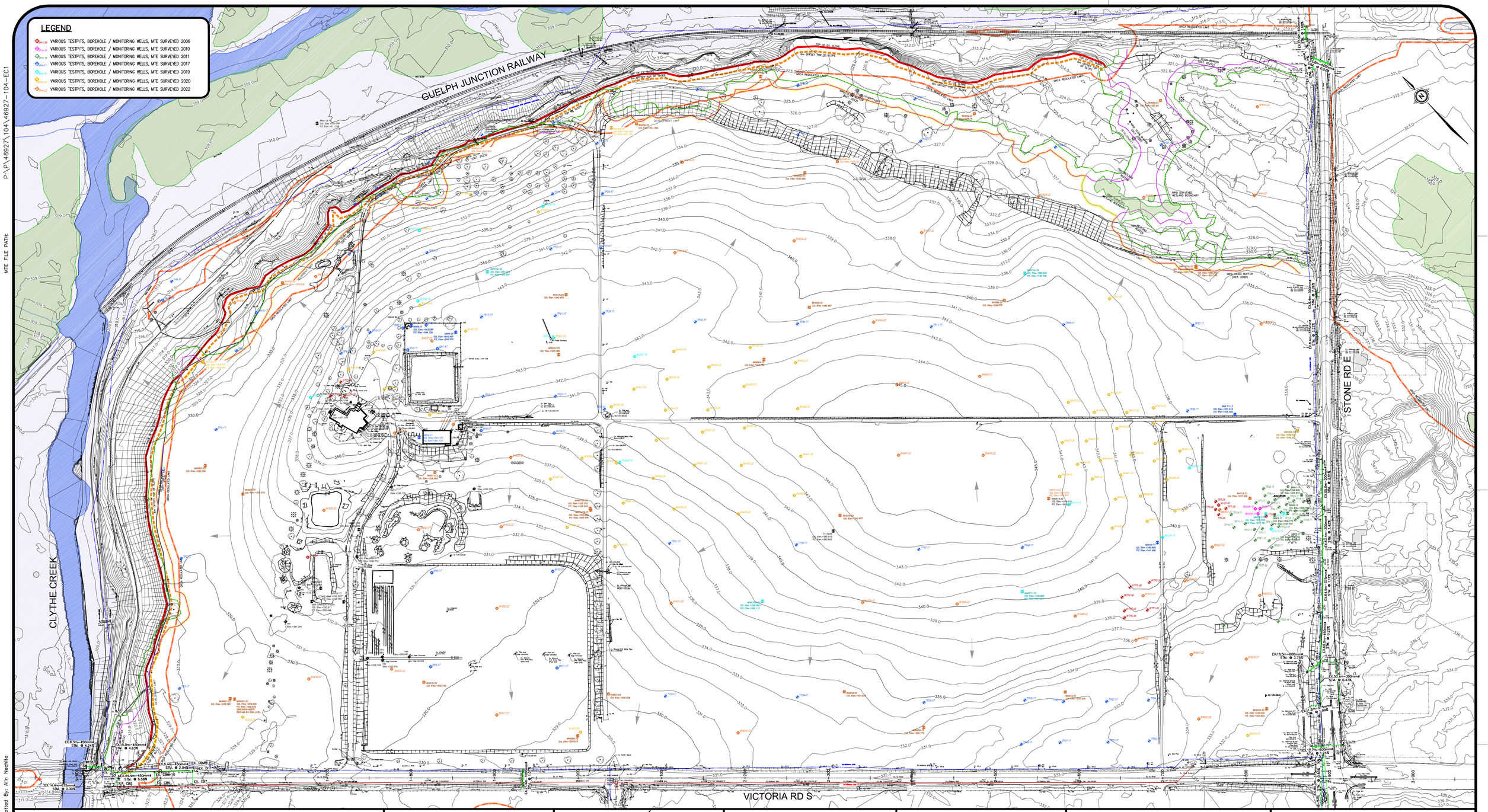
Project Number: 46927-104
Date: November 20, 2025
Design By: mpw
File: Q:\46927\104\Water Balance\Wetlands\46927-104 Wetland_6_Water Balance(Thornthwaite-Mather) - New Draft Plan 11-6-25.xlsx

POST-DEVELOPMENT CONDITION

Contributing Catchments:	Wetland #6	Soil Type:	Silty sand till			Runoff Factor	0.64
Contributing Areas:	1.276 ha	Vegetation:	Varies			Evapotranspiration	
Percent Impervious	26.0 %	Topography:	Varies			Factor for Impervious	
Weather Station:	Guelph SWM Master Plan App F Table 4.1	Soil Moisture Retention Capacity		271	mm	Surfaces	0.33

Month	Daily Average Temperature (C°)	Monthly Heat Index	Unadjusted Daily PE (mm)	Correction Factor	Adjusted PE (mm)	Average Precipitation (mm)	P-PE (mm)	Accum. Pot. Water Loss (mm)	Storage (mm)	ΔS (mm)	Pervious ET (mm)	Actual ET (mm)	Moisture Surplus (mm)	Water Runoff (mm)	Snow Melt Runoff (mm)	Total Recharge & Runoff (mm)	Total Recharge & Runoff (m^3)	Total Infiltration Depth (mm)	Total Infiltration Volume (m^3)	Actual Runoff Volume (mm)	Actual Runoff (m^3)
Jan	-7.4	0.00	0.0	24.3	0.0	57.7	57.7	0.0	395.5	0.0	0.0	0.0	0.0	3.3	0.0	3.3	42	1.2	15	2.1	27
Feb	-6.5	0.00	0.0	24.5	0.0	50.9	50.9	0.0	446.4	0.0	0.0	0.0	0.0	1.6	0.0	1.6	21	0.6	7	1.0	13
Mar	-1.7	0.00	0.0	30.6	0.0	61.8	61.8	0.0	508.2	0.0	0.0	0.0	0.0	0.8	0.0	0.8	10	0.3	4	0.5	7
Apr	5.6	1.19	0.9	33.6	29.9	73.4	43.5	0.0	271.0	0.0	29.9	24.7	48.7	24.8	16.9	41.7	532	14.9	190	26.8	342
May	12	3.76	2.0	38.0	74.9	75.0	0.1	0.0	271.0	0.0	74.9	61.8	13.2	19.0	76.0	95.0	1,213	33.9	433	61.1	780
Jun	17.1	6.43	2.9	38.6	110.1	75.2	-34.9	-34.9	160.0	-111.0	186.2	153.8	32.4	25.7	38.0	63.7	813	22.7	290	41.0	523
Jul	19.6	7.91	3.3	38.9	127.9	80.4	-47.5	-82.4	149.0	-11.0	91.4	75.5	15.9	20.8	19.0	39.8	508	14.2	181	25.6	327
Aug	18.7	7.37	3.1	36.0	112.7	80.5	-32.2	-114.6	159.0	10.0	112.7	93.1	19.6	20.2	9.5	29.7	379	10.6	135	19.1	244
Sep	14.6	5.07	2.4	31.2	75.4	75.4	0.0	-114.6	185.0	26.0	75.4	62.3	13.1	16.7	4.8	21.4	273	7.6	98	13.8	176
Oct	8.5	2.23	1.4	28.5	39.2	71.0	31.8	0.0	216.8	31.8	39.2	32.4	6.8	11.7	2.4	14.1	180	5.0	64	9.1	116
Nov	2.5	0.35	0.4	24.2	9.3	76.2	66.9	0.0	271.0	54.2	9.3	7.7	14.4	13.1	1.2	14.2	182	5.1	65	9.2	117
Dec	-3.7	0.00	0.0	23.0	0.0	66.8	66.8	0.0	337.8	0.0	0.0	0.0	0.0	6.5	1.2	7.7	98	2.8	35	5.0	63
Total		34.3	16.3		579.3	**844.3**	**265.0**					**511.2**	**164.1**	**164.1**	**169.0**	**333.1**	**4,252**	**118.9**	**1,517**	**214.2**	**2,735**

Note: P - Precipitation, PE - Potential Evapotranspiration, ΔS- Change in Soil Moisture Storage, ET - Evapotranspiration



LEGEND

- SITE BOUNDARY
- EXISTING CONTOURS
- EXISTING EMBANKMENT (SLOPE AS NOTED)
- EXISTING WATERMAIN
- EXISTING SANITARY
- EXISTING STORM
- EXISTING FENCE
- EXISTING DRAINAGE DIRECTION
- EXISTING DRIPLINE
- GRCA REGULATION LIMIT
- TOP OF SLOPE
- 6m OFFSET TOP OF SLOPE
- FLAGGED DRIPLINE–OCT 2022
- DEVELOPMENT LIMIT
- NRSI 10.0m BUFFER (OCT. 2022)
- NRSI SURVEYED WETLAND BOUNDARY
- NRSI 30m WETLAND BUFFER
- GRCA FLOODLINE (CGVD28 DATUM)
- GRCA WETLAND
- WATERBODY
- HAND HOLE
- MONITORING WELL
- WELL
- BOREHOLE

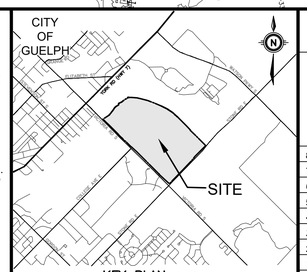
NOTE TO CONTRACTOR :

DO NOT SCALE DRAWINGS.

CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND REPORT ANY DISCREPANCIES TO THE ENGINEER BEFORE PROCEEDING WITH THE WORK.

ALL DRAWINGS REMAIN THE PROPERTY OF THE ENGINEER AND SHALL NOT BE REPRODUCED OR REUSED WITHOUT THE ENGINEER'S WRITTEN PERMISSION.

THE OWNER/ARCHITECT/CONTRACTOR IS ADVISED THAT M.T.E. CONSULTANTS INC. CANNOT CERTIFY ANY COMPONENT OF THE SITE WORKS NOT INSPECTED DURING CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO NOTIFY M.T.E. CONSULTANTS INC. PRIOR TO COMMENCEMENT OF CONSTRUCTION TO ARRANGE FOR INSPECTION.



KEY PLAN N.T.S.

CITY of GUELPH

No.	REVISION	BY	DATE
8.			
7.			
6.			
5.			
4.	ISSUED FOR DRAFT PLAN APPROVAL	DFH	2025-12-12
3.	3RD BLOCK PLAN SUBMISSION	DFH	2025-07-16
2.	2ND BLOCK PLAN SUBMISSION–1ST DRAFT PLAN SUBMISSION	DFH	2025-03-11
1.	1ST BLOCK PLAN SUBMISSION	DFH	2024-04-19

GEODETIC BM ELEV. = m

SITE BENCHMARK ELEV. = 341.866m
CUT CROSS PN CONCRETE TRANSFORMER PAD LOCATED AT SOUTHEAST CORNER OF ADMINISTRATION BUILDING
MTE PNO 9205

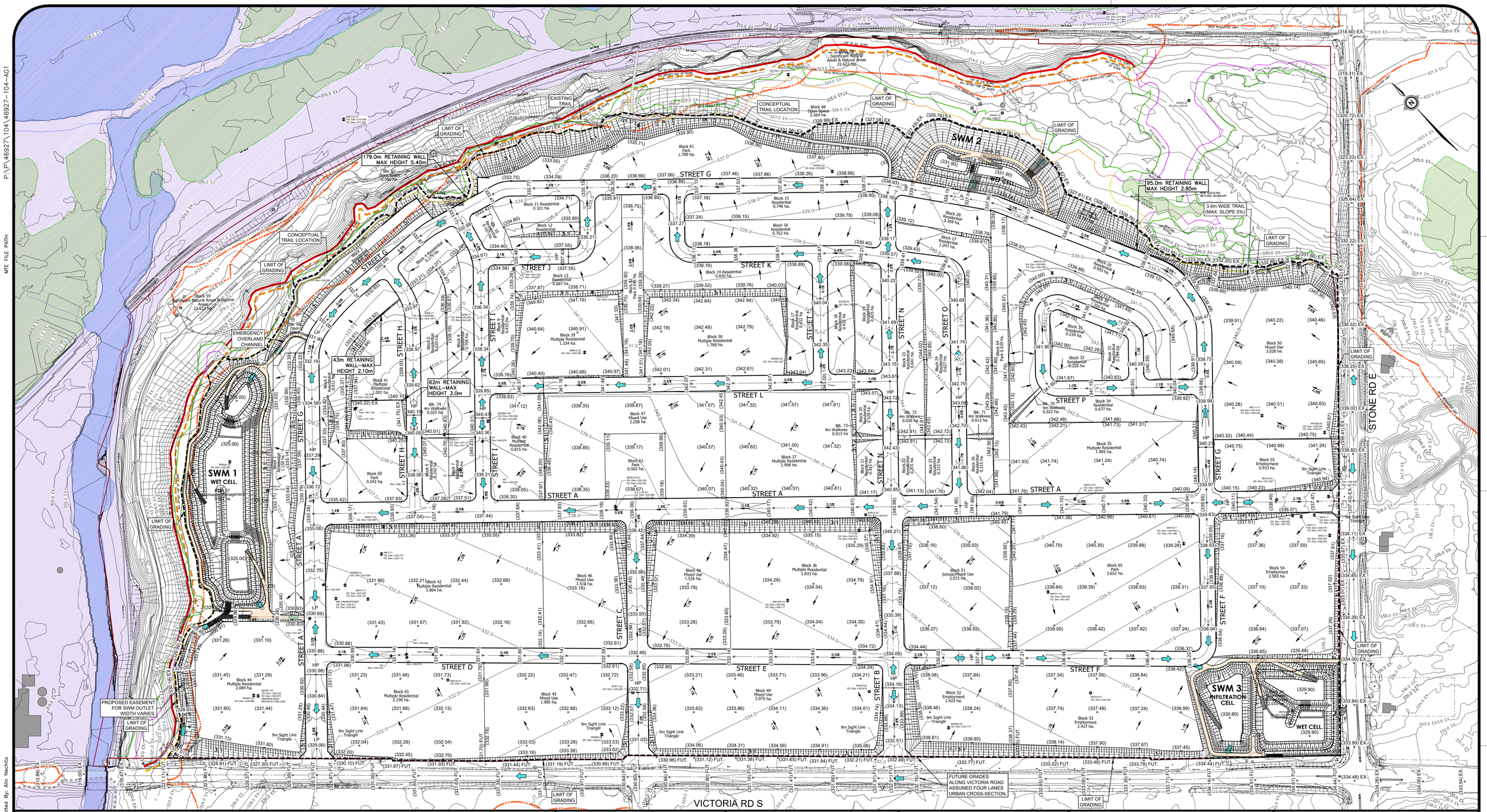
OWNER
FUSION HOMES
500 HANLON CREEK BOULEVARD GUELPH, ONTARIO

PROJECT
GUELPH INNOVATION DISTRICT LANDS
588 STONE ROAD EAST GUELPH, ONTARIO

DRAWING
EXISTING CONDITIONS PLAN

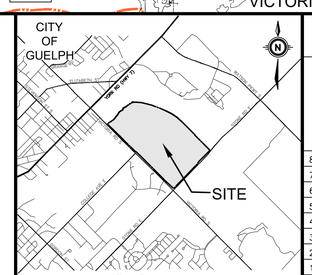
MTE
Engineers, Scientists, Surveyors
519-743-6500

Project Manager: D.HICKS	Project No.: 46927-104
Design By: ALN	Checked By: VAL
Drawn By: AXB	Checked By: ALN/CVP
Surveyed By: MTE	Drawing No.: EC1.1
Date: 11/7/2024	
Scale: 1:2000	Sheet of



LEGEND

- SITE BOUNDARY
- LIMIT OF GRADING
- (337.29) PROPOSED FINISHED GRADE
- (337.29)FUT. FUTURE FINISHED GRADE
- LP (337.29) PROPOSED FINISHED GRADE (LOW/HIGH POINT)
- (TOP) / (BOTTOM) EXISTING EMBANKMENT (SLOPE AS NOTED)
- (TOP) 3:1 (BOTTOM) PROPOSED EMBANKMENT
- EXISTING FENCE
- EXISTING DRIPLINE
- 326.0 EXISTING GRADE CONTOURS
- 333 PROPOSED GRADE CONTOURS
- MAJOR OVERLAND FLOW
- EXISTING DIRECTION OF DRAINAGE/SWALE
- PROPOSED DIRECTION OF DRAINAGE/SWALE
- GRCA FLOODLINE (CGVD28 DATUM)
- GRCA WETLAND
- WATERBODY
- GRCA REGULATION LIMIT
- TOP OF EXISTING SLOPE
- 6m OFFSET TOP OF SLOPE
- FLAGGED DRIPLINE–OCT 2022
- NRSI 10.0m BUFFER (OCT. 2022)
- NRSI SURVEYED WETLAND BOUNDARY
- NRSI 30m WETLAND BUFFER
- BH101 BOREHOLE
- EX WELL
- HH HANDHOLE
- MW8 MONITORING WELL



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GUELPH INNOVATION DISTRICT LANDS
588 STONE ROAD EAST GUELPH, ONTARIO

DRAWING
PRELIMINARY GRADING CONTOUR PLAN

MTE
Engineers, Scientists, Surveyors
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Project Manager: D.HICKS	Project No.: 46927-104
Design By: ALN	Checked By:
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P:\PA46927\104\46927-104-AG1

MTE FILE PATH:

December 11, 2025 – 3:47:16 PM – Plotted By: Alin Nechita