Mayfield Golf Club, Town of Caledon

Functional Servicing and Stormwater Management Report

October 2024

Submitted by:

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Submission History

Submission	Date	In Support Of	Distributed To
1st	October 2024	Draft Plan Approval and Official Plan Amendment	Town of Caledon Region of Peel TRCA

1.0 Introduction

SCS Consulting Group Ltd. has been retained by Mayfield Golf Course Inc. to prepare a Functional Servicing and Stormwater Management Report (FSSR) for a proposed residential development located on the west side of Torbram Road, north of Mayfield Road, located in the Town of Caledon.

1.1 Purpose of the Functional Servicing Report

The FSSR has been prepared in support of a Draft Plan of Subdivision for the proposed residential developments at 12580 and 12552 Torbram Road (currently Mayfield Golf Club) and Part of Lot 19, Concession 5 (hereafter referred to as the study area). The property located at 12306 Torbram Road, which is included in the study area, is currently a non-participating property with regard to the Draft Plan application, however the grading and servicing of this property has been included to provide a comprehensive analysis. The Draft Plan of Subdivision is provided in **Appendix A**.

It should be noted that existing single-detached properties fronting Torbram Road are not included in the study area. Additionally, the lands located at the southwest corner of the Draft Plan of Subdivision have been omitted from this report and will be addressed under separate cover.

The subject lands will consist of the following land uses:

- low density residential,
- medium density residential (street and laneway townhouses),
- medium density blocks,
- commercial,
- firehall,
- school block,
- parks,
- private natural feature/open space,
- SWM blocks
- Underground SWM Facilities with at-grade parkland, and
- proposed laneways and roads.

The purpose of this report is to demonstrate that the development can be graded and serviced in accordance with the Town of Caledon, TRCA, and the Ministry of Environment, Conservation and Parks (MECP) design criteria.

1.2 Study Area

The study area, including non-participant lands, is 103.02 ha in size and is bound by agricultural land and open space area to the north, west and south, and bound by

Torbram Road to the east (see **Figure 1.1**). The study area is part of the Mayfield Tullamore Secondary Plan.

The existing subject lands are comprised of a golf course (Mayfield Golf Course) and open space areas. The subject lands are located within the Humber River Watershed in the Town of Caledon.

1.3 Background Servicing Information

In preparation of the servicing and SWM strategies, the following reports, design guidelines and standards were used:

- Phase 1 Local Subwatershed Study (SWS) prepared by SCS Consulting Group Ltd., dated August 2024;
- High Level Servicing Memo prepared by SCS Consulting Group Ltd., dated August 29, 2024;
- Region of Peel Water and Wastewater Master Plan (2020);
- Region of Peel Sanitary Sewer Design Criteria (2017);
- Region of Peel Watermain Design Criteria (2010);
- Town of Caledon Development Standards Manual dated 2019;
- MNRF Guidance for Development Activities in Redside Dace Protected Habitat dated 2016;
- TRCA Erosion and Sediment Control Guideline for Urban Construction, dated December 2019;
- TRCA Crossings Guideline for Valley and Stream Corridors dated September 2015;
- TRCA Stormwater Management Criteria, dated April 2012 Version 1.0;
- TRCA Low Impact Development Stormwater Management Planning and Design Guide, dated 2010 Version 1.0;
- Final Report Humber River Hydrology Update, Civica Infrastructure Inc., dated June 2015;
- Ministry of Environment, Conservation and Parks (MECP) Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations Authorized under Environmental Compliance Approval dated January 2023, (V.1.2);
- Environmental Compliance Approval for a Municipal Stormwater Management System, Appendix A dated May 2022;
- Ministry of Environment, Conservation and Parks (MECP) Stormwater Management Planning and Design Manual dated March 2003; and
- Ministry of Transportation (MTO) Drainage Management Manual (1997).

The servicing and SWM strategies in this report are based on the following reports for this Draft Plan of Subdivision:

- Detailed Factual Geotechnical and Hydrogeological Subsurface Investigation Report, prepared by Gemtec, dated September 26, 2024;
- Preliminary Water and Wastewater Calculations, prepared by Municipal Engineering Solutions, dated September 13, 2024;
- Draft Natural Heritage Evaluation, prepared by Beacon Environmental Ltd., dated August 2023;
- Draft Geomorphic Assessment, prepared by Beacon Environmental Ltd., dated July 2023;
- Draft Preliminary Environmental Noise Study, prepared by Jade Acoustics Inc., dated August 2, 2023; and
- Functional Servicing and Stormwater Management Report, 12245 Torbram Road, prepared by C.F. Crozier and Associates Inc., dated April, 2023.

The servicing and SWM strategies are also based on the following approved Engineering Drawings:

- Torbram Road Proposed 200 mm Watermain – Sta. 0+000 – Sta. 2+040, prepared by the Region of Peel, dated August 1986.

Excerpts from the above listed documents are included in **Appendix B**.

2.0 Stormwater Management

2.1 Stormwater Runoff Control Criteria

The following stormwater runoff control criteria have been established based on the requirements of each of the design guidelines and standards listed in **Section 1.3** and as established in the Phase 1 Local SWS (2024). The stormwater runoff criteria are summarized below in **Table 2.1**:

Please note that the MECP CLI ECA retention criteria is superseded by the Final Report Humber River Hydrology Update prepared Civica Infrastructure Inc. dated June 2015.

Table 2.1: Stormwater Runoff Control Criteria

Criteria	Control Measure	Agency
Quantity Control	Per Table E.1 of the TRCA Stormwater Management Criteria, control post-development peak flow rates per unit flow Equation F Sub-Basin 36. Control proposed conditions to existing conditions peak flow for the Regional storm event.	TRCA, Town
Quality Control	MECP Enhanced Level Protection (80% TSS Removal).	TRCA, Town
Erosion Control	Minimum 5 mm on-site retention. Attenuation of the 25 mm rainfall runoff for a minimum of 48 hours.	TRCA TRCA, Town
Water Budget	Maintain existing groundwater recharge rates and appropriate distribution, ensuring the protection of related hydrology ecologic functions.	TRCA
Temperature Mitigation	SWM pond outflows should target discharge water temperatures below 24 degrees Celsius.	MECP

2.2 Existing Drainage

The existing surface drainage patterns are shown in **Figure 2.1**.

Runoff from Catchments 101 (42.69 ha), Catchment 102 (11.49 ha), Catchment 103 (14.83 ha), Catchment 104 (14.18 ha) and Catchment 105 (13.89 ha) is conveyed overland to Campbell Tributary K – Reach 1 and Campbell Tributary J – Reach 2 which ultimately confluence at the center of the subject lands into Campbell Tributary J –

Reach 1. Runoff from Catchment 106 (18.41 ha) is conveyed overland west towards Campbell Tributary J – Reach 1. Campbell Tributary J – Reach 1 combines with Campbell Tributary A – Reach 3 at the west edge of the Subject Lands, which flows southeast towards an existing culvert at Torbram Road. Runoff from Catchment 107 (19.58 ha) is conveyed overland east towards an existing culvert underneath Torbram Road, before ultimately joining Campbell Tributary A – Reach 3 downstream.

2.2.1 Existing Site Characterization

The soil classifications were identified in geotechnical and hydrogeological investigations undertaken by Gemtec Consulting Engineers and Scientists Ltd. The geotechnical investigation, dated July 25, 2023, identifies that the soils within the study limits are generally comprised of surficial topsoil and fill materials overlying interlayered deposits of glacial till and silty clay to clayey silt. The cohesive glacial till and clay deposits were typically found in the upland areas at higher elevations while the non-cohesive silt, sand and gravel and glacial till deposits were typically found in the valley lands underlying the cohesive deposits.

Hydraulic conductivity testing was conducted at several locations across the site, the lowest measured hydraulic conductivity was 1×10^{-6} cm/s which corresponds to an infiltration rate of approximately 14 mm/hr (per LID SWM Planning and Design Guide Table C1). The design infiltration rate will be confirmed with in-situ testing at the detailed design stage. Relevant excerpts from the geotechnical investigation are provided in **Appendix B.**

Groundwater measurements were conducted across the site in Spring 2023. The depth to groundwater was found to be in the order of 4 meters below ground surface (mbgs) more frequently, less during the period of spring high water levels in the areas north and south of the central tributary. Artesian conditions were encountered in BH23-28S/D in the northwest corner of 12580 Torbram Road. Relevant excerpts from the hydrogeological investigation are provided in **Appendix B**.

Per the Natural Heritage Evaluation prepared by Beacon, the Campbell Tributary A and J have been identified as contributing Redside Dace habitat.

2.2.2 Existing Hydrologic Modelling

Existing hydrologic modelling was undertaken using the Visual Otthymo Version 6.2 software (VO6) based on the Regional storm. The existing subject area has been divided into three different quadrants, each with a different outlet. As described in **Section 2.2**, runoff from Catchment 106 (18.41 ha) is conveyed overland west towards Campbell Tributary J – Reach 1 (Outlet #1). Runoff from Catchment 107 (19.58 ha) is conveyed overland east towards an existing culvert underneath Torbram Road, before ultimately joining Campbell Tributary A – Reach 3 downstream (Outlet #2). Runoff from Catchments 101-105 are conveyed from overland to Campbell Tributary K – Reach 1 and

Campbell Tributary J – Reach 2 which ultimately confluence at the center of the subject lands into Campbell Tributary J – Reach 1 (Outlet #3). The existing Regional Storm peak flows from the study area to the outlet locations are summarized in **Table 2.2**.

Table 2.2: Summary of Existing Regional Storm Peak Flows

Design Storm	To Outlet #1 (VO Node 1)	To Outlet #2 (VO Node 2)	To Outlet #3 (VO Node 3)
Regional (m^3/s)	2.588	2.547	12.115

2.3 Best Management Practices

In accordance with the Ministry of Environment, Conservation and Parks Stormwater Management Planning and Design Manual (2003), a review of stormwater management best practices was completed using a treatment train approach, which evaluated lot level, conveyance system and end-of-pipe alternatives. The potential best management practices were evaluated based on the stormwater management criteria listed in **Table 2.1**.

The following are examples of at-source, conveyance and end-of-pipe controls that were evaluated for use in the subject lands. While evaluating the following controls, cost, feasibility, groundwater and grading constraints were taken into consideration. Please note water budget calculations will be provided in future submissions following coordination with Town staff to confirm approvable municipal low impact development (LID) facilities.

Lot Level Controls

Lot-level controls are at-source measures that reduce runoff prior to stormwater entering the conveyance system, such as:

- Increased topsoil depth;
- Roof leaders to grassed areas;
- At-source storage (i.e. rooftop or parking lot storage);
- Permeable pavements; and
- Infiltration trenches/soak-away pits.

Conveyance Controls

Conveyance controls provide treatment of stormwater during the transport of runoff from individual lots to the receiving watercourse or end-of-pipe facility. Examples of conveyance controls include:

- Grassed Swales;
- Bioretention systems;
- Catchbasin infiltration/filtration systems;
- Permeable pavement;
- Grassed filter strip, and
- Pervious pipe systems.

End-of-Pipe Controls

End-of-pipe stormwater management facilities receive stormwater flows from a conveyance system (i.e., storm sewers or ditches) and provide treatment of stormwater prior to discharging flows to the receiving watercourse. Typical end-of-pipe controls include:

- Wet ponds;
- Wetlands;
- Dry ponds;
- Infiltration/filtration basins;
- Manhole insert treatment systems (i.e. oil-grit-separators and filters); and
- Underground wet SWM facility.

2.3.1 Lot-Level Controls

Lot-level controls are at-source measures that reduce runoff prior to stormwater entering the conveyance system. These controls are typically proposed on private properties. Incorporating controls that require minimal maintenance can be an effective method in the treatment train approach to SWM. The following lot-level controls have been evaluated for use in the subject lands:

Increased Topsoil Depth – An increase in the restored topsoil depth on lots can be used to promote lot level infiltration and evapotranspiration (up to 0.3 m depth). Increased topsoil depth will contribute to lot level quality and water balance control. This contribution is not quantified to address the stormwater runoff control criteria in **Table 2.1**. A minimum depth of 0.3 m is proposed in all landscaped areas.

Roof Leaders to Grassed Areas – Roof leaders will be discharged to grassed areas to promote lot level infiltration, thereby passively contributing to water quality and quantity control. This contribution is not quantified to address the stormwater runoff control criteria in **Table 2.1**.

Rear Yard At-Surface Infiltration Trenches – Infiltration trenches will be provided in the single detached and townhouse rear yards as able, thereby passively contributing to water quality and quantity control. This contribution is not quantified as part of the quality and quantity control requirement in **Table 2.1**. At-surface trenches will be

utilized to meet water balance and retention requirements. Adequate separation to the seasonally high groundwater will be provided to ensure functionality.

A summary of the suitability of potential lot level controls for the subject lands is provided in **Table 2.2**.

2.3.2 Conveyance Controls

Conveyance controls provide treatment of stormwater during the transport of runoff from individual lots to the receiving watercourse or end-of-pipe facility and present opportunities to distribute stormwater management techniques throughout a development. The use of conveyance controls to meet water balance and retention targets will be confirmed with Town staff.

2.3.3 End-of-Pipe Controls

Stormwater management facilities at the end-of-pipe receive stormwater flows from a conveyance system and provide treatment of stormwater prior to discharging flows to the receiving outlet. The following end-of-pipe controls have been evaluated for use in the subject lands:

Wet Ponds, Wetlands, Dry Ponds – Sized in accordance with the MECP criteria, these end-of-pipe facilities can provide water quality, quantity, and erosion control treatment.

Underground Wet SWM Facility – Sized in accordance with the MECP criteria, these end-of-pipe facilities can provide water quality, quantity, and erosion control treatment. A underground wet facilities are proposed to provide water quality, quantity, and erosion control treatment for the development.

2.3.4 Selection of Best Management Practices

Table 2.3 summarizes the proposed stormwater management controls identified for the subject lands.

Table 2.3: Proposed Stormwater BMP's

Stormwater Management Control	Recommended BMP
Lot-Level Controls	Increased Topsoil Depth
	Roof Leader to Grassed Areas
	Rear Yard At-Surface Infiltration Trenches
Conveyance System Controls	N/A
End-Of-Pipe Controls	Underground Wet SWM Facility Wet SWM Pond

2.4 Proposed Storm Drainage

The proposed storm drainage plan is shown on **Figure 2.2**. Runoff from the subject lands will be captured and conveyed to one of four SWM facilities (three underground wet SWM facilities (SWM Facilities 1, 2 and 4), and one wet SWM pond (SWM Pond 3)). The details of the SWM facilities are discussed further in **Sections 2.5.1.2** to **2.5.1.5**. It should be noted that the external drainage areas and hydrology parameters are based on anticipated proposed drainage boundaries determined through discussion with the Mayfield Tullamore Secondary Plan Local Subwatershed Study consultant team and therefore, are subject to change.

Runoff from Catchment 201 (16.36 ha) will be conveyed to SWM Facility 1 (located in Catchment 202). Overland flow will generally be conveyed to a low point on Street M adjacent to SWM Facility 1 (underground wet SWM facility). Overland flow conveyance is discussed further in **Section 2.9**.

Runoff from Catchment 204 (10.85 ha) will be conveyed to SWM Facility 2 (located in Catchment 205). Overland flow will generally be conveyed to a low point on Street B adjacent to SWM Facility 2 (underground wet SWM facility).

Runoff from Catchment 206 (8.99 ha), Catchment 207 (3.58 ha), and Catchment EXT1 (67.23 ha) will be conveyed to SWM Facility 3 (wet SWM pond) which is located in Catchment 207). Overland flow from Catchments 206 and EXT1 will generally be conveyed south to a low point in Street A adjacent to SWM Facility 3.

Runoff from Catchment 209 (2.39 ha), and Catchment EXT2 (11.91 ha) will be conveyed to SWM Facility 4 (underground wet SWM facility) which is located in Catchment 210). Overland flow from Catchment 209 will generally be conveyed south to a low point on Street D adjacent to SWM Facility 4.

Runoff from Catchments 202, 203, 205, 208, and 210 (rear yard, roof and parkland) will drain uncontrolled to the existing Campbell Tributary valley.

2.5 Proposed Stormwater Management Plan

The proposed wet SWM facilities will provide quantity control, erosion control, quality control, and temperature mitigation for the study area and tributary external development. The proposed SWM facilities will control proposed flows to the allowable peak flow rates for the 2 to 100 year and Regional storm events. A VO6 model was prepared to determine the required volumes and peak flow rates. The model parameters and a digital download link to access the VO6 hydrology model are provided in **Appendix C**.

It should be noted that the provided design volumes of the proposed underground wet SWM facilities outlined below are based on typical void space values for an underground wet facility. The actual facility volumes will be determined based on the design provided by the facility manufacturer at the detailed design stage, but will generally be within the range outlined below.

2.5.1 Quantity Control

2.5.1.1 Allowable Release Rate

The allowable release rates for the 2 to 100 year storm for the subject lands have been established based on unit flow Equation F Sub-Basin 36 per Table E.1 of the TRCA Stormwater Management Criteria (refer to **Appendix B**). The unit flow relationships for the watershed are summarized in **Table 2.4**. The allowable release rate for the Regional Storm for the study area has been established based on the existing Regional Storm peak flow rate. Since SWM facilities 3 and 4 share an outlet (Outlet #3), the allowable release rates for SWM facility 3 and 4 were calculated by area-weighting the existing Regional Storm peak flow to Outlet #3. Please refer to **Table 2.5** for the Regional Storm allowable release rates.

Table 2.4: Summary of Unit Flow Rate Equations

Return Period Storm	Unit Flow Rate Equation
2 Year	9.506-0.719*ln(A)
5 Year	14.652-1.136*ln(A)
10 Year	17.957-1.373*ln(A)
25 Year	22.639-1.741*ln(A)
50 Year	26.566-2.082*ln(A)
100 Year	29.912-2.316*ln(A)

The allowable release rates for each SWM facility to the Humber River subwatershed for each design storm are presented in **Table 2.5** below. It should be noted that the allowable Regional release rate accounts for uncontrolled areas conveyed directly to the receiving watercourse whereas the unit release rates are based solely on tributary area to the respective SWM Facility.

Table 2.5: Summary of Allowable Release Rates

Return Period Storm	SWM Facility 1 (m^3/s) – (16.36 ha, Outlet 1)	SWM Facility 2 (m^3/s) – (10.85 ha, Outlet 2)	SWM Facility 3 (m^3/s) – (79.80 ha, Outlet 3)	SWM Facility 4 (m^3/s) – (14.30 ha, Outlet 3)
2 Year	0.123	0.085	0.507	0.109
5 Year	0.188	0.130	0.772	0.166
10 Year	0.231	0.159	0.953	0.205
25 Year	0.291	0.201	1.198	0.258
50 Year	0.339	0.234	1.392	0.301
100 Year	0.383	0.265	1.578	0.340
Regional	2.588	2.547	10.201	1.914

Four SWM facilities connected to control maintenance holes will control proposed peak flows to the Campbell Tributary from the study area (and tributary external lands) to the allowable release rates for the 2 to 100 year storm events and the Regional Storm event. Each quantity control facility is discussed in greater detail below. Preliminary outlet control structure design and SWM facility parameters are provided in **Appendix D**.

2.5.1.2 SWM Facility 1

A 135 mm diameter extended detention orifice plate and a 365 mm diameter orifice plate are required to meet the design peak flow rates in **Table 2.5**. Multiple outlet design configuration and calculations are provided in **Appendix D**. The storage discharge characteristics of the underground wet SWM facility are provided below in **Table 2.6**. SWM Facility 1 does not require Regional Storm quantity controls as the uncontrolled proposed Regional Storm peak flow to Outlet 1 is less than the existing Regional Storm peak flow (refer to **Section 2.5.4**).

Table 2.6: SWM Facility 1 Operating Characteristics

Return Period Storm	Governing Design Storm	Stage (m)	Storage (m^3)	Discharge (m^3/s)	Allowable (m^3/s)
2 Year	12 Hour AES	246.19	3,384	0.070	0.123
5 Year	12 Hour AES	246.39	4,167	0.169	0.188
10 Year	12 Hour AES	246.55	4,789	0.216	0.231
25 Year	6 Hour AES	246.80	5,720	0.272	0.291
50 Year	6 Hour AES	247.00	6,485	0.309	0.339
100 Year	6 Hour AES	247.20	7,275	0.344	0.383
Regional	N/A	N/A	N/A	N/A	2.588

2.5.1.3 SWM Facility 2

A 100 mm diameter extended detention orifice plate and a 315 mm diameter orifice plate are required to meet the design peak flow rates in **Table 2.5**. Multiple outlet design configuration and calculations are provided in **Appendix D**. The storage discharge characteristics of the underground wet SWM facility are provided below in **Table 2.7**. SWM Facility 2 does not require Regional Storm quantity controls as the uncontrolled proposed Regional Storm peak flow to Outlet 2 is less than the existing Regional Storm peak flow (refer to **Section 2.5.4**).

Table 2.7: SWM Facility 2 Operating Characteristics

Return Period Storm	Governing Design Storm	Stage (m)	Storage (m^3)	Discharge (m^3/s)	Allowable (m^3/s)
2 Year	12 Hour AES	244.04	2,211	0.049	0.085
5 Year	12 Hour AES	244.23	2,694	0.116	0.130
10 Year	12 Hour AES	244.39	3,097	0.152	0.159
25 Year	6 Hour AES	244.64	3,703	0.192	0.201
50 Year	6 Hour AES	244.83	4,198	0.219	0.234
100 Year	6 Hour AES	245.04	4,712	0.244	0.265
Regional	N/A	N/A	N/A	N/A	2.560

2.5.1.4 SWM Facility 3

An 0.35 m wide by 0.60 m high rectangular extended detention orifice plate, a 1.40 m long weir and an 2.0 m long regional weir are required to meet the design peak flow rates in **Table 2.5**. Multiple outlet design configuration and calculations are provided in **Appendix D**. The storage discharge characteristics of the wet SWM pond are provided below in **Table 2.8**. The Regional storm peak flow comparison is discussed in **Section 2.5.4**.

Table 2.8: SWM Facility 3 Operating Characteristics

Return Period Storm	Governing Design Storm	Stage (m)	Storage (m^3)	Discharge (m^3/s)	Allowable (m^3/s)
2 Year	12 Hour AES	249.02	13,858	0.383	0.507
5 Year	12 Hour AES	249.29	19,617	0.496	0.772
10 Year	12 Hour AES	249.49	23,937	0.559	0.953
25 Year	12 Hour AES	249.70	28,665	0.832	1.198

Return Period Storm	Governing Design Storm	Stage (m)	Storage (m^3)	Discharge (m^3/s)	Allowable (m^3/s)
50 Year	6 Hour AES	249.83	31,585	1.131	1.392
100 Year	6 Hour AES	249.96	34,717	1.502	1.578
Regional	N/A	251.03	61,005	9.215	-

2.5.1.5 SWM Facility 4

A 170 mm diameter extended detention orifice plate, a 0.50 m wide by 0.60 m high rectangular orifice plate and a 0.70 m long regional weir are required to meet the design peak flow rates in **Table 2.5**. Multiple outlet design configuration and calculations are provided in **Appendix D**. The storage discharge characteristics of the underground wet SWM facility are provided below in **Table 2.9**. The Regional storm peak flow comparison is discussed in **Section 2.5.4**.

Table 2.9: SWM Facility 4 Operating Characteristics

Return Period Storm	Governing Design Storm	Stage (m)	Storage (m^3)	Discharge (m^3/s)	Allowable (m^3/s)
2 Year	12 Hour AES	253.00	2,686	0.036	0.109
5 Year	12 Hour AES	253.14	3,575	0.089	0.166
10 Year	12 Hour AES	253.22	4,106	0.136	0.205
25 Year	12 Hour AES	253.31	4,736	0.205	0.258
50 Year	6 Hour AES	253.39	5,284	0.264	0.301
100 Year	6 Hour AES	253.48	5,830	0.334	0.340
Regional	N/A	254.44	12,249	1.340	-

2.5.2 Quality Control

SWM Facilities 1-4 will provide quality control to meet MECP Enhanced Level Protection (80% TSS Removal) requirements for runoff conveyed to the SWM facilities (see Table 3.2, 2003 MOE Guidelines). The required permanent pool volumes are based on total developed area and catchment imperviousness draining to the facilities. The required and available/anticipated permanent pool storages for each SWM facility are listed in **Table 2.10** (see calculations in **Appendix D**).

Table 2.10: Quality Control Summary

	SWM Facility 1	SWM Facility 2	SWM Facility 3	SWM Facility 4
Drainage Area (ha)	16.36	10.85	79.80	14.30
Imperviousness (%)	69	69	63	63
Required Permanent Pool Volume (m^3)	2,988	1,982	13,529	2,412
Provided/Anticipated Permanent Pool Volume (m^3)	3,000	2,100	29,434	2,550

No quality control is proposed for Catchments 202, 203, 205, 207, 208, and 210 as these catchments are comprised of landscaped and rear roof area which is generally considered to be clean.

2.5.3 Erosion Control

SWM Facilities 1-4 will provide erosion control for runoff conveyed to the facilities. The extended detention volumes will be sized based on the detention of the 25 mm – 4-hour Chicago rainfall event. The volumes calculated for the extended detention will be attenuated for a minimum of 48 hours. The extended detention volumes, orifice sizes and peak extended detention release rates for SWM Facilities 1-4 are listed in **Table 2.11**.

Table 2.11: Erosion Control Summary

	SWM Facility 1	SWM Facility 2	SWM Facility 3	SWM Facility 4
Drainage Area (ha)	16.36	10.85	79.80	14.30
Orifice Size (mm)	135	100	350 x 600	170
Extended Detention Volume (m^3)	2,266	1,457	9.608	1,604
Detention Time (hr)	51.2	49.2	54.0	48.9
Peak Release Rate (m^3/s)	0.029	0.016	0.223	0.025

The calculations for the extended detention component of the proposed SWM facilities are provided in **Appendix D**.

2.5.4 Regional Storm Release Rates

As discussed in **Section 2.5.1.1**, the allowable release rate for the Regional Storm for the study area has been established based on the existing Regional Storm peak flow rate. Please note that SWM Facilities 1 and 2 (Outlet #1 and #2 respectively) did not require regional quantity controls, as the proposed Regional Storm peak flow rate into the SWM facilities was less than existing Regional Storm peak flow rate. The regional storm event for SWM Facility 3 (wet SWM pond) is controlled by a 2.0 m long broad crested weir. The regional storm event for SWM Facility 4 (underground wet SWM facility) is controlled by a 0.70 m long broad crested weir. **Table 2.12** below provides a comparison of existing and proposed Regional Storm peak flow rates for each outlet. Please refer to SWM facility calculations in **Appendix D**.

Table 2.12: Summary of Existing and Proposed Regional Storm Peak Flows

Design Storm	To Outlet #1 (VO Node 1)		To Outlet #2 (VO Node 2)		To Outlet #3 (VO Node 17)	
	Ex.	Prop.	Ex.	Prop.	Ex.	Prop.
Regional (m^3/s)	2.588	1.500	2.547	1.209	12.115	11.653

2.5.5 5 mm On-Site Retention

The total proposed development area for the study area is approximately 58.17 ha with an imperviousness of 56%. To retain the 5 mm over the proposed impervious area for the study area, approximately 1,630.0 m^3 of infiltration storage volume is required (refer to calculations provided in **Appendix D**).

Per **Section 2.3.4**, lot level infiltration facilities such as rear yard shallow infiltration trenches will be provided to meet the 5 mm on-site retention targets.

Preliminary lot-level infiltration facility sizing calculations have been completed based on the following assumptions:

- Lot-level infiltration facilities to be provided on split-draining single detached and townhouse lots;
- Lot-level infiltration facilities to capture 25 mm of runoff from 20% of the lot area (i.e. approximately half roof or the driveway plus one quarter of the roof area).

Based on the preliminary grading plan, lot-level infiltration facilities are proposed on approximately 186 single detached split draining residential lots. A total roof area of

approximately 1.13 ha can be directed to rear yard infiltration trenches assuming 20% of the lot area as roof is directed to an infiltration trench. The lot-level infiltration facilities will be sized to infiltrate a total runoff volume of approximately 307.8 m^3. Preliminary details for the rear yard infiltration trenches are provided in **Section 2.7**.

The school, firehall, commercial, and medium density blocks are proposed to provide onsite retention of the 5 mm storm event. The method to achieve the retention target volume will be determined at the site plan application stage. The anticipated retention volumes based on the assumed imperviousness are provided in **Table 2.13**.

Based on the groundwater levels throughout the tableland portion of study area, there is no opportunity to provide an infiltration gallery on the tableland downstream of the SWM Facilities or within park blocks. Therefore, the proposed measures are proposed as a "best efforts" solution. Refer to calculations in **Appendix D** for preliminary LID sizing and **Figure 2.2** for preliminary LID locations.

A summary of the proposed retention volumes are provided in **Table 2.13** below.

Table 2.13 – 5 mm Retention Volume Summary

Retention Measure	Preliminary Retention Volume (m^3)
Rear Yard Infiltration Trench	307.8
Assumed Rear Yard Infiltration Trench (Non-Participant Property)	163.6
School Block Retention System	102.5
Firehall Block Retention System	37.5
Commercial Block Retention System	22.5
Combined Medium Density Block Retention System	205.5
Total Proposed Retention Volume	**839.4**
Total Required Retention Volume	**1,630.0**

2.5.6 Water Budget

Where feasible, measures to minimize impacts on the water budget will be incorporated into the development design. As recommended in **Section 2.3**, low impact development measures, such as increased topsoil depths, roof runoff to grassed areas, and infiltration facilities such as rear yard infiltration trenches will be implemented, where feasible, to

maintain or increase existing infiltration rates. Water budget calculations will be provided in future submissions following coordination with Town staff to confirm approvable municipal LID facilities.

2.5.7 Temperature Mitigation

A permanent pool depth of 3.0 m with a bottom draw outlet is preferred for SWM ponds conveying runoff to Redside Dace Habitat. The proposed grading in the SWM Facility 3 aftbay (wet SWM pond) has been maximized to provide a permanent pool depth of 3.0 m. A bottom draw outlet is proposed and the invert will be set 0.5 m off the SWM Facility 3 bottom (244.25 m) to maximize the potential to discharge cool water from the permanent pool.

Temperature mitigation for SWM facilities 1, 2 and 4 will be provided by the 1.5 m deep underground concrete chamber permanent pool.

2.6 Underground Stormwater Management Facilities

SWM Facilities 1, 2, and 4 are proposed to provide quantity control, quality control, erosion control, and temperature mitigation. SWM facilities 1, 2 and 4 are proposed to be underground “Vault” SWM systems (hybrid plastic and concrete chamber system). For additional details, please refer to the manufacturer information provided in **Appendix D**. The facility design parameters and layout will be refined through further correspondence with Town staff including incorporating park programming.

All underground SWM facilities will have a permanent pool depth of 1.5 m and an active storage depth of 2.0 m (total internal height of 3.5 m). Preliminary park/SWM facility block layouts are provided on **Figures 2.3, 2.4** and **2.6** respectively with footprints based on typical underground SWM facility void space. Preliminary facility designs will be provided in future submissions following coordination with Town staff to confirm park programming and underground facility design requirements.

The facility block sizes were established based on the following general criteria including but not limited to:

- A 5.0 m wide maintenance access road will be provided from a proposed municipal road with a maximum longitudinal slope of 10% and a crossfall of 2% (max). It will be used to facilitate machinery to access the forebay during scheduled maintenance as well as to access the outlet structure for maintenance purposes;
- Access ports located throughout the underground SWM facility for access to key locations (inlet, outlet, forebay, etc); and
- A 1.5 m deep permanent pool and control maintenance hole will be provided for each underground SWM facility. The control maintenance

holes will be connected to an outlet storm sewer which will convey flows to the valley.

As shown on **Figure 8.1**, the Regional Storm Floodplain elevation at the proposed SWM facilities is well within the limits of the valley, therefore the existing floodplain will not impact the outlet control structure hydraulics. Regional Storm floodplain modelling is discussed further in **Section 8.0**.

An emergency overflow channel will be provided at each park/SWM block which will convey the uncontrolled 100 year and Regional storm event peak flow from the park/SWM block to the valley. These overflow channels will act as the emergency conveyance for the SWM facilities to avoid additional disturbance through the Campbell Tributary valley wall.

Access to SWM Facilities 1, 2 and 4 will be provided from local roads to facilitate maintenance and future cleanout of the SWM facilities. An access road and turning circle will be provided at each park/SWM block for access to the outlet control maintenance hole and SWM facility aftbay.

2.7 Wet Stormwater Management Pond

Preliminary wet pond grading is provided on **Figure 2.5**. The preliminary wet pond design was established based on the following general criteria:

- A maintenance access road in accordance with Caledon Development Standards will be provided from a proposed road with a maximum longitudinal slope of 8% and a crossfall of 2% (max). A maximum longitudinal slope of 5% will be used where pedestrian access is anticipated. The maintenance access road will be used to facilitate machinery to access the forebay during scheduled maintenance as well as to access the outlet structure for maintenance purposes;
- A minimum length-to-width ratio of 4:1 for the SWM pond;
- A permanent pool depth of 3.0 m to meet temperature criteria;
- An active storage depth of 3.0 m to provide sufficient volume to control Regional storm event peak flows;
- A safety shelf with a maximum slope of 7:1 from 0.5 m below the normal water level to the forebay berm elevation will be provided
- A maximum slope of 3:1 is proposed above the safety shelf. 3:1 sloping above the safety shelf is required to size the SWM pond for regional quantity controls without grading beyond the limits of development and onto non-participating property owners; and
- A maximum slope of 4:1 will be provided below the safety shelf.

2.8 Rear Yard Infiltration Trenches

As noted in **Section 4.5.4** and shown on **Figure 2.11** rear yard at-surface infiltration trenches may be provided on split-draining, single detached (non-laneway) lots to meet the 5 mm onsite retention and water balance targets. Where lots back toward the valley or golf course, overflow from the infiltration trenches will drain uncontrolled to the Campbell Tributaries. Within the development, overflows from the rear yard infiltration trenches will be directed via the storm sewer system to the proposed park/SWM blocks.

The trenches will be located beneath the rear yard swales, covered by approximately 0.15 m of topsoil. Due to the proximity of the seasonally high groundwater, the maximum trench depth will be limited to 0.5 m and the runoff in the trench will be infiltrated within 48 hours, given the design infiltration rate of 14 mm/hr. Based on the hydrogeological investigation and the preliminary grading plan, the recommended minimum 1 m separation from the bottom of the trench will be achieved. The rear yard infiltration trenches will provide sufficient storage volume to infiltrate the 25 mm storm event over the rear roof area of the lot (approximately 20% of lot area). Preliminary maximum infiltration trench dimensions based on lot frontage are provided in **Table 2.14** below. Refer to **Figure 2.7** for rear yard at-surface infiltration trench details and **Appendix D** for preliminary sizing calculations.

Table 2.14: Rear Yard At-Surface Infiltration Trench Dimensions

Maximum Trench Dimensions				
Minimum Lot Frontage (m)	**Depth (m)**	**Length (m)**	**Width (m)**	**Maximum Infiltration Volume Provided (m^3)***
9.75	0.5	8.75	1.0	1.8
11.60	0.5	9.00	1.0	1.8
13.40	0.5	11.00	1.0	2.2

*Note: assumes a porosity of 0.4

2.9 Storm Servicing

The storm sewer system (minor system) will be designed for the 10 year return storm as per the Town of Caledon standards. The major system flow drainage (up to the 100 year and Regional storm events) will generally be conveyed overland along the road rights-of-way and easements. Preliminary storm design sheets are provided in **Appendix D**.

The storm sewer system will typically be designed with grades between 0.5% and 2%. Throughout the subject lands, the storm sewer will be constructed at a minimum depth of 1.5 m to provide frost protection and a minimum of 1.0 m below basement floor elevations where gravity foundation connections are proposed. It is anticipated that all storm sewers will have sufficient depth to service foundation connections by gravity.

The preliminary layout for the proposed storm sewer within the subject lands is provided on **Figure 2.8**.

The storm drainage system will be designed in accordance with the Town of Caledon and MECP guidelines, including the following:

- Pipes to be sized to accommodate runoff from a 10 year storm event,
- Minimum Pipe Size: 300 mm diameter,
- Maximum Flow Velocity: 4.0 m/s,
- Minimum Flow Velocity: 0.75 m/s,
- Minimum Pipe Depth: 1.0 m below basement floor elevations for gravity service connections,
- Minimum Pipe Depth: 1.5 m to obvert.

The rainfall intensity will be calculated as follows, where 'i' is the rainfall intensity (mm/hour) and A, B, and C are as per **Table 2.15**:

$I = A / (T_c + B)^c$

Table 2.15: Rainfall Intensity Parameters

Return Period Storm	A	B	C
2 Year	1070	7.85	0.8759
5 Year	1593	11	0.8789
10 Year	2221	12	0.9080
25 Year	3158	15	0.9335
50 Year	3886	16	0.9495
100 Year	4688	17	0.9624

2.10 Overland Flow

Major system flows (greater than the 10 year up to the 100 year and Regional storm events) will be conveyed within the road rights-of-way to the SWM facilities. Right-of-way capacity calculations are provided in **Appendix D** and show that the major system flows can be safely conveyed within the proposed road rights-of-way. Major system flows will be captured at low points adjacent to the underground SWM Facility blocks. Major system capture sizing calculations will be provided at the detailed design stage.

3.0 Sanitary Servicing

3.1 Existing Sanitary Sewer System

There is no existing sanitary sewer system within the immediate vicinity of the subject lands.

In accordance with the Region of Peel Water and Wastewater Master Plan and the Mayfield Tullamore Secondary Plan High Level Background Servicing and Stormwater Management Analysis (SCS, 2024), the Subject Lands are anticipated to be serviced by Regional trunk sanitary sewer ST-178 which will be constructed as part of the proposed development immediately to the east (Tullamore). Two connections will be provided to service the study area. The future connection locations are identified on **Figure 3.1**, relevant excerpts are provided in **Appendix B**.

3.2 External Sanitary Sewer System

Per the High-Level Background Servicing and Stormwater Management Analysis (SCS 2024), It is anticipated that external sanitary flows will be conveyed through the study area (refer to **Figure 3.2**). Approximately 324.88 ha of future residential sanitary drainage will be conveyed to the Street A trunk sanitary sewer at the western limit of the subject lands. Approximately 12.02 ha of external sanitary drainage will be conveyed to a connection at the northeast corner of the study area.

An additional sanitary servicing connection is proposed as part of this application to temporarily service development south of the study area due to the delayed timing of individual properties to the south which could impede the immediate servicing of this area. The external development to be temporarily serviced extends along Mayfield Road from Bramalea Road to Torbram Road (Pt Lot 17, 18, 19, Conc 5), refer to Catchments EXT9 and EXT10 on **Figure 3.2**.

Per the High-Level Background Servicing and Stormwater Management Analysis (SCS 2024), the external development south of the study area (Catchments EXT9 and EXT10) are intended to be serviced by Regional trunk sanitary sewers ST-012 and ST-136. The external development can be serviced immediately via a temporary pumping station with a forcemain connecting to the proposed southern sanitary sewer connection for the Subject Lands. The proposed forcemain can connect to the proposed sanitary sewer by either conveying flows internally to the external development with a crossing underneath Campbell Tributary A or conveying flows via Mayfield Road and Torbram Road. Refer to **Figure 3.2** for preliminary temporary sanitary pumping station and forcemain locations.

3.3 Proposed Sanitary Sewer System

Two sanitary connections are proposed to service the study area at Torbram Road. Flows from 28.00 ha of the Subject Lands will be conveyed to the proposed north sanitary connection at Street A and 11.04 ha will be conveyed to the proposed south sanitary connection at Street B. A total drainage area of 352.88 ha is conveyed to the Street A connection when accounting for the external drainage areas outlined above.

Two crossings underneath Campbell Tributaries are required to service the study area. As discussed in **Section 8.1**, the Street A crossing consists of a proposed 14.9 m wide open bottom arch concrete culvert. To avoid conflicts with the open bottom culvert footings, the proposed sanitary sewer is to cross under Campbell Tributary J north of the proposed crossing, as shown on **Figure 2.8**. A minimum cover of 2.0 m will be provided from the tributary invert to the sanitary sewer obvert.

As discussed in **Section 8.2**, the Street C crossing consists of a proposed 6.4 m wide by 1.5 m tall by 25.2 m long concrete box culvert. The proposed crossings underneath Campbell Tributary J and K will have a minimum clearance of 0.5 m provided from the obvert of the sanitary sewer to the underside of the culvert. Should footings be required for the proposed culvert, the sanitary alignment will be directed around the culvert and a minimum cover of 2.0 m will be provided to the tributary invert. The preliminary layout for the proposed sanitary sewer within the study area is provided on **Figure 2.8**.

The local sanitary sewers within the study area will have slopes ranging between 0.5% and 2% (typically) and will be provided at 3 m to 5 m deep.

The trunk sanitary sewer on Street A is much deeper than typical with cover ranging from approximately 10 m to 14 m deep and a slope of 0.5%. The depth of the sanitary sewer is required to facilitate the gravity connection underneath Campbell Tributary J and to accommodate the anticipated depth of upstream sanitary services.

The sanitary sewer system will be designed in accordance with the Region of Peel and MECP criteria, including but not limited to:

- Residential Sanitary Generation Rate: 290 L/c/d,
- Commercial Sanitary Generation Rate: 270 L/emp/ha,
- Population Density: 4.2 people/unit,
- Peaking Factor: Harmon (Max. 4.0),
- Infiltration Rate: 0.26 L/s/ha,
- Minimum Pipe Size: 200 mm diameter,
- Minimum Pipe Cover: 2.5 m,
- Minimum Actual Velocity: 0.75 m/s, and
- Maximum Velocity: 3.0 m/s.

A preliminary sanitary sewer design sheet is provided in **Appendix E**. The peak flow conveyed to the Street A and Street C connections are approximately 377.7 L/s and 17.0 L/s which is 9.5 L/s and 6.3 L/s less than the flow at these locations in the High-Level Background Servicing and Stormwater Management Analysis (SCS 2024) sanitary design sheet respectively (relevant excerpts providing in **Appendix B**). Therefore, the flows from the study area are in conformance with the High-Level Servicing Analysis and will not result in capacity constraints in the downstream sanitary sewers.

3.4 Interim Sanitary Servicing

In the event that the development lands south of Mayfield Road are delayed, an interim sanitary servicing solution concept is proposed to service the study area.

A sanitary sewer is proposed on the Tullamore Industrial lands to the east of the study area which will outlet directly to the Airport Road trunk sewer (refer to relevant excerpts in **Appendix B**). With the installation of a temporary lift station on the Tullamore Industrial lands, the sanitary flows from the study area that outlet to the proposed connection at Street A and a portion of the Tullamore Industrial lands can potentially be conveyed directly to the Airport Road trunk sewer.

The sanitary flows from the study area that outlet to the proposed connection at Street C can also potentially be serviced by the direct connection to the Airport Road trunk sewer via a temporary gravity sanitary sewer on the Tullamore Industrial lands.

The interim sanitary servicing options are illustrated on **Figure 3.2**. When the servicing of the development lands south of Mayfield Road is complete, the sanitary flows will be directed to their ultimate outlet. The potential interim servicing options will be discussed in further detail with Region staff as the draft plan application process proceeds.

4.0 Water Supply and Distribution

A Water System Analysis report for the subject lands was prepared by Municipal Engineering Solutions, dated September 2024, which outlines the existing and proposed external and internal infrastructure of the Subject Lands. A summary of the information in the report is provided below. The report has been provided in **Appendix F** for reference.

4.1 Existing Water Distribution

In the vicinity of the Subject Lands, an existing 200 mm diameter watermain currently extends from the intersection of Mayfield Road and Torbram Road to north of the existing golf course access along Torbram Road. Per the Peel Water and Wastewater Master Plan, the Subject Lands are within Pressure Zone 6 which has a serviceable elevation of 214.5 m – 259.1 m.

The existing watermain system is illustrated on **Figure 4.1**.

4.2 External Water System

In accordance with the High-Level Background Servicing and Stormwater Management Analysis (SCS 2024), the study area is anticipated to be serviced by Regional trunk watermains D-180 and D-181. Watermain D-181 will be constructed as part of the Tullamore development to the east which is approved and is currently under development. Watermain D-180 is proposed to upsize the existing 200 mm diameter watermain to a 400 mm diameter watermain on Torbram Road.

The location of watermains D-180 and D-181 are illustrated on **Figure 4.1**.

4.3 Proposed Water System

The study area is proposed to be serviced via the future 400 mm diameter watermain on Torbram Road. The Subject Lands are anticipated to be within the serviceable elevation range therefore no additional infrastructure is required to provide adequate pressure, refer to **Section 5.2** for proposed grading information. The preliminary layout for the proposed watermain system is provided on **Figure 4.1.**

The watermain system will be designed in accordance with the Region of Peel and MECP criteria including:

- Residential water usage rate: 280 L/c/d,
- Commercial water usage rate: 300 L/emp/ha,
- Population Density: 4.2 people/unit,
- Minimum Pipe Size: 150 mm diameter,
- Minimum Pipe Depth: 1.7 m, and

- Maximum Hydrant Spacing: 150 m.

As discussed in the memo prepared by Municipal Engineering Solutions, the design of the internal and external watermain system will be finalized once the building design criteria (ie. required fire flows) has been confirmed and a hydrant test is completed. A watermain hydraulic modelling analysis will be prepared subsequently to ensure that the minimum required fire flows can be met at each of the hydrants within the development.

5.0 Grading

5.1 Existing Grading Conditions

Per the topographic survey shown on **Figure 2.1**, the subject lands are comprised of three distinct areas: the tableland, the valley wall, and the valleyland. The characteristics of the tableland are fairly distinct and are described in further detail below. The valley wall is comprised of steep slopes with a grade range of approximately 25% to more typically 50%, with a maximum valley wall height of approximately 7 m. Campbell Tributaries meander through the valleyland and convey flows from north to south. In the locations where the Campbell Tributaries are not immediately adjacent to the valley wall, the valleyland is moderately sloped with a grade range of approximately 1% to 10%.

The tableland of the subject lands are comprised of rolling golf course lands with a grade range of less than 1% to approximately 15%. The topographic elevations of the tableland vary from approximately 260.0 m in the northwest corner of the subject lands to approximately 237.5 m at the southern limit of the subject lands within the valley. The southeastern quadrant of the subject lands is divided in two by an existing high point. The west half slopes west towards Campbell Tributary J and Campbell Tributary A. The east half slopes east towards the existing Torbram Road ditch, and are ultimately slopes to an existing Torbram Road existing culvert.

5.2 Proposed Grading Concept

In general, the study area will be graded in a manner which will satisfy the following goals:

- Satisfy the Town of Caledon lot and road grading criteria including:
  - Minimum Road Grade: 0.75%
  - Maximum Road Grade: 6.0%
  - Minimum Lot Grade (split lots): 2%
  - Minimum Lot Grade (front draining lots): 3%
  - Maximum Lot Grade: 5%
  - Maximum slope between houses in any direction: 4:1
  - Provide a 0.6 m wide gently sloped area at 2.0% away from the house on at least one side of the building where side yard setbacks permits
- Provide continuous road grades for overland flow conveyance;
- Minimize the need for retaining walls;
- Minimize the volume of earth to be moved and minimize cut/fill differential;
- Minimize the need for rear lot catchbasins; and

- Achieve the stormwater management objectives required for the subject lands.

A minimum road grade of 0.5% has been utilized as necessary to achieve continuous overland drainage towards the proposed SWM facilities, due to the relatively flat tableland within the study area. A preliminary grading plan is provided on **Figure 5.1**.

At the detailed design stage, the preliminary grading shown on **Figure 5.1** will be subject to a more in-depth analysis in an attempt to balance the cut and fill volumes and minimize slopes and walls.

6.0 Rights-of-way and Sidewalks

The road network of the subject lands will be comprised of 16.0 m, 18.0 m and 22.0 m ROWs, and 8.0 m laneways.

The 8.0 m laneway will the Town of Caledon standard drawing No. 200.

The 16.0 m ROW will the Town of Caledon standard drawing No. 201.

The 18.0 m ROW will the Town of Caledon standard drawing No. 202.

The 22.0 m ROW will the Town of Caledon standard drawing No. 205.

The proposed right-of-way cross-sections are provided in **Appendix G**.

For the areas where sidewalk will be provided along one side of the street, sidewalks will be typically be located on north or east side of the boulevard or the boulevard side where the larger number of frontages can be serviced.

7.0 Erosion and Sediment Control During Construction

During the detailed design stage, erosion and sediment control measures will be designed with a focus on erosion control practices (such as stabilization, track walking, staged earthworks, etc.) as well as sediment controls (such as fencing, mud mats, catchbasin sediment control devices, rock check dams and temporary sediment control ponds). These measures will be designed and constructed as per the “Erosion and Sediment Control Guide for Urban Construction” document (TRCA, 2019). A detailed erosion and sediment control plan will be prepared for review and approval by the Municipality and Conservation Authority prior to any proposed grading being undertaken. This plan will address phasing, inspection and monitoring aspects of erosion and sediment control. All reasonable measures will be taken to ensure sediment loading to the adjacent watercourses and properties are minimized both during and following construction.

8.0 Proposed Crossings and Floodplain Modifications

The TRCA HEC-RAS model (West Humber), as refined through the Phase 1 local subwatershed study (SCS, GEI, 2024), was used to quantify the hydraulic characteristics of the Campbell Tributaries based on the proposed development. The TRCA HEC-RAS model geometry has been updated based on a detailed topographic survey of the site. The model was run using HEC-RAS version 6.4.1. Results of the modelling and a copy of the HEC-RAS model are provided in a digital download link in **Appendix H**.

Under existing conditions, Campbell Tributary K, J, and A drain southwards through the centre of the study area through several golf cart crossings and exit the site along the south limit of property. The updated existing Regional Storm floodlines have been plotted on **Figure 8.1**.

Two road crossings are required for the proposed development – one through the centre of the study area as Street A crosses Campbell Tributary J, and one along the north limit of property as Street C crosses Campbell Tributary K. The design of the crossings are outlined below and incorporate recommendations from the Geomorphic Assessment prepared by Beacon**,** relevant excerpts provided in **Appendix B**. Additional cross-sections have been included in the HEC-RAS model upstream and downstream of the proposed crossings to produce more accurate floodline elevations. The proposed Regional Storm floodlines have been plotted on **Figure 8.2** (HEC-RAS Plan ID SCS Proposed).

8.1 Street A Crossing Design

As Street A extends through the centre of the subject lands, a proposed crossing is required over the Campbell Tributary J. The following design criteria has been established:

- Design flow return period of 50 year storm (Collector Road, Section 1.2.1 of MTO Drainage Design Standards);
- Span the 100 year erosion limit (14.0 m);
- Maintain Regional Storm Event (Hurricane Hazel) flooding condition external to the Subject Lands (unless otherwise approved); and
- Accommodate passage of fish.

To meet the criteria listed above, the watercourse will be conveyed via a 14.9 m wide arch open bottom culvert (O-Series 0949).

The proposed crossing will be able to convey the 50 year storm event with a water surface elevation of 246.94 m (refer to **Appendix H** for HEC-RAS model results). The Regional Storm event will be fully conveyed by the proposed crossing without overtopping. Refer to **Table 8.1** for a summary of the existing and proposed Regional Storm floodline elevations at the proposed crossing.

The existing golf cart crossing will be removed and restored as part of the construction of the proposed development. The proposed Regional Storm floodlines have been plotted on **Figure 8.2**.

Table 8.1: Regional Storm Flood Elevations – Street A Crossing

HEC-RAS Section	Existing Floodline Elevation (m)	Proposed Floodline Elevation (m)
867.84	247.04	248.79
Culvert (U/S)	N/A	248.79
790.77	246.58	246.83

As shown above, the Regional Storm flooding condition increases in elevation upstream of the proposed culvert. The floodline elevation increase does not impact upstream landowners or limits of development.

A low flow channel will be provided within the 14.9 m wide arch open bottom culvert to reflect the existing conditions where the watercourse displayed discernible bed and banks and to allow for passage of fish. The design of the low flow channel will be prepared at the detailed design stage.

8.2 Street C Crossing Design

As Street C extends along the north limit of the study area, a proposed crossing is required over the Campbell Tributary K. The following design criteria has been established:

- Design flow return period of 25 year storm (Local Road, Section 1.2.1 of MTO Drainage Design Standards); and
- Maintain Regional Storm Event (Hurricane Hazel) flooding condition eternal to the subject lands unless otherwise approved.

It should be noted that a 100 year erosion limit and fish passage is not required for this tributary. To meet the criteria listed above, the watercourse will be conveyed via a 6.4 m wide by 1.5 m high by 40.6 m long concrete box culvert.

The proposed crossing will be able to convey the 25 year storm event with a water surface elevation of 254.90 m (refer to **Appendix H** for HEC-RAS model results). The Regional Storm event will be fully conveyed by the proposed crossing without overtopping. Refer

to **Table 8.2** for a summary of the existing and proposed Regional Storm floodline elevations at the proposed crossing.

The proposed Regional Storm floodlines have been plotted on **Figure 8.2**.

Table 8.2: Regional Storm Flood Elevations – Street 'C' Crossing

HEC-RAS Section	Existing Floodline Elevation (m)	Proposed Floodline Elevation (m)
499.49	256.12	255.98
451.42	255.57	255.51
422.55	N/A	255.21
Culvert (U/S)	N/A	255.21
392.99	N/A	254.39
364.98	253.99	253.92

The Regional Storm flood elevations generally return to existing conditions by Section 499.49 and do not impact external properties. The proposed floodlines have been plotted on **Figure 8.2**.

Since the Regional Storm is fully conveyed by the proposed crossing without overtopping, there are no safe ingress/egress concerns.

9.0 Utility Considerations

The utility companies (hydro, natural gas, and telecommunications) have been contacted to circulate the proposed draft plan of subdivision to confirm whether there is sufficient servicing capacity.

9.1 Hydro

An existing hydro pole line is located in the east boulevard of Torbram Road with local connections. Confirmation is required from Hydro One regarding the proposed connection location(s). Modifications to the existing hydro poles and guy wires will not be required as part of the grading along the interface with Torbram Road.

9.2 Gas

Confirmation is required from Enbridge regarding the proposed connection(s) location to the site.

9.3 Bell

Existing Bell telephone lines and pedestals are located on the west side of Torbram Road. Confirmation is required from Bell regarding the proposed connection(s) location to the site. Modifications to existing Bell lines may be required due to the proposed intersections with Torbram Road.

9.4 Cable

Existing Rogers cable lines and pedestals are located on the west and east sides of Torbram Road. Confirmation is required from Rogers regarding the proposed connection(s) location to the site. Modifications to existing Rogers lines may be required due to the proposed intersections with Torbram Road.

10.0 Summary

This Functional Servicing and Stormwater Management Report has been prepared in support of the Draft Plan of Subdivision and Official Plan Amendment applications for a proposed residential development in the Town of Caledon. This report outlines the means by which the study area can be graded and serviced in accordance with the Town of Caledon, Toronto and Region Conservation Authority, Region of Peel, and the Ministry of Environment, Conservation and Parks design criteria and policies.

General Information

- The existing land use is primarily golf course and open space;
- The study area is located in the Humber River Watershed; and
- The study area consists of low and medium density residential (detached, townhomes and medium density blocks), proposed municipal roads and laneways, park blocks, SWM blocks, school block, firehall block and commercial blocks.

Stormwater Management and Storm Servicing

- Quality Control: MECP Enhanced (Level 1) water quality protection can be provided by three (3) wet underground SWM facilities and one (1) wet SWM pond;
- Erosion Control: The runoff volume from a 25 mm rainfall event will be detained over 48 hours by three (3) wet underground SWM facilities and one (1) wet SWM pond;
- Erosion Control: The retention of the first 5 mm of rainfall will be provided through the mitigation measures, such as at-surface rear yard infiltration trenches;
- Quantity Control: Quantity control will be provided via three (3) wet underground SWM facilities and one (1) wet SWM pond to control proposed runoff rates in the 2 through 100 year storm events and existing regional peak flows;
- Water Budget: A water budget will be provided in future submissions, the proposed retention measures are anticipated to match existing annual infiltration volumes;
- Storm Servicing:
    - Storm runoff will be conveyed by storm sewers designed in accordance with Town of Caledon and MECP criteria;
    - Storm sewers will generally be designed for the 10 year storm event; and
    - Adequate 100 year overland flow routes will be provided.

Sanitary Servicing

- The sanitary sewer system will be designed in accordance with the Town of Caledon criteria;
- The study area will convey a peak sanitary flow of approximately 377.7 L/s to the north servicing connection and a peak flow of approximately 17.0 L/s to the south servicing connection which is in conformance with the Secondary Plan high-level servicing analysis;
- External flows from future development lands northwest of the study area are anticipated to be conveyed through the site; and
- An additional sanitary servicing connection for lands along Mayfield Road is proposed via forcemain due to delayed timing in the development of individual properties to the south.

Water Supply and Distribution

- The study area is proposed to be serviced via connections to the future 400 mm diameter watermain on Torbram Road;
- Preliminary demand calculations have been generated for the Region to incorporate into the water system model; and
- Water supply allocation is required from the Town of Caledon.

Grading

- The study area will be graded in accordance with the Town of Caledon criteria;
- The study area grading has been developed to match to the existing surrounding grades, and provide conveyance of stormwater runoff, including external drainage; and
- The site grading will be subject to further grading design at the detailed design stage.

Rights-of-Way

- The proposed municipal roads and laneways will follow the Town of Caledon standards.

Erosion and Sediment Control during Construction

- An erosion and sediment control plan will be prepared at the detailed engineering stage, in accordance with the “Erosion and Sediment Control Guideline for Urban Construction” document (TRCA 2019).

Proposed Crossings and Floodplain Modifications

- Two crossings of Campbell Tributary are proposed to facilitate access to the study area, one for Street A as it crosses Campbell Tributary J through the center of the study area, and one from the northwest portion of the study area to the northeast portion of the site for Street C as it crosses Campbell Tributary J; and
- The Regional flood condition of Campbell Tributary J will be maintained or improved by the proposed crossings.

Utility Considerations

- The presence of and location of existing hydro, Bell and cable utilities on Torbram Road have been confirmed.
- Confirmation is required from Enbridge, Hydro One, Bell and Rogers regarding the proposed connection(s) location to the site.

Respectfully Submitted:

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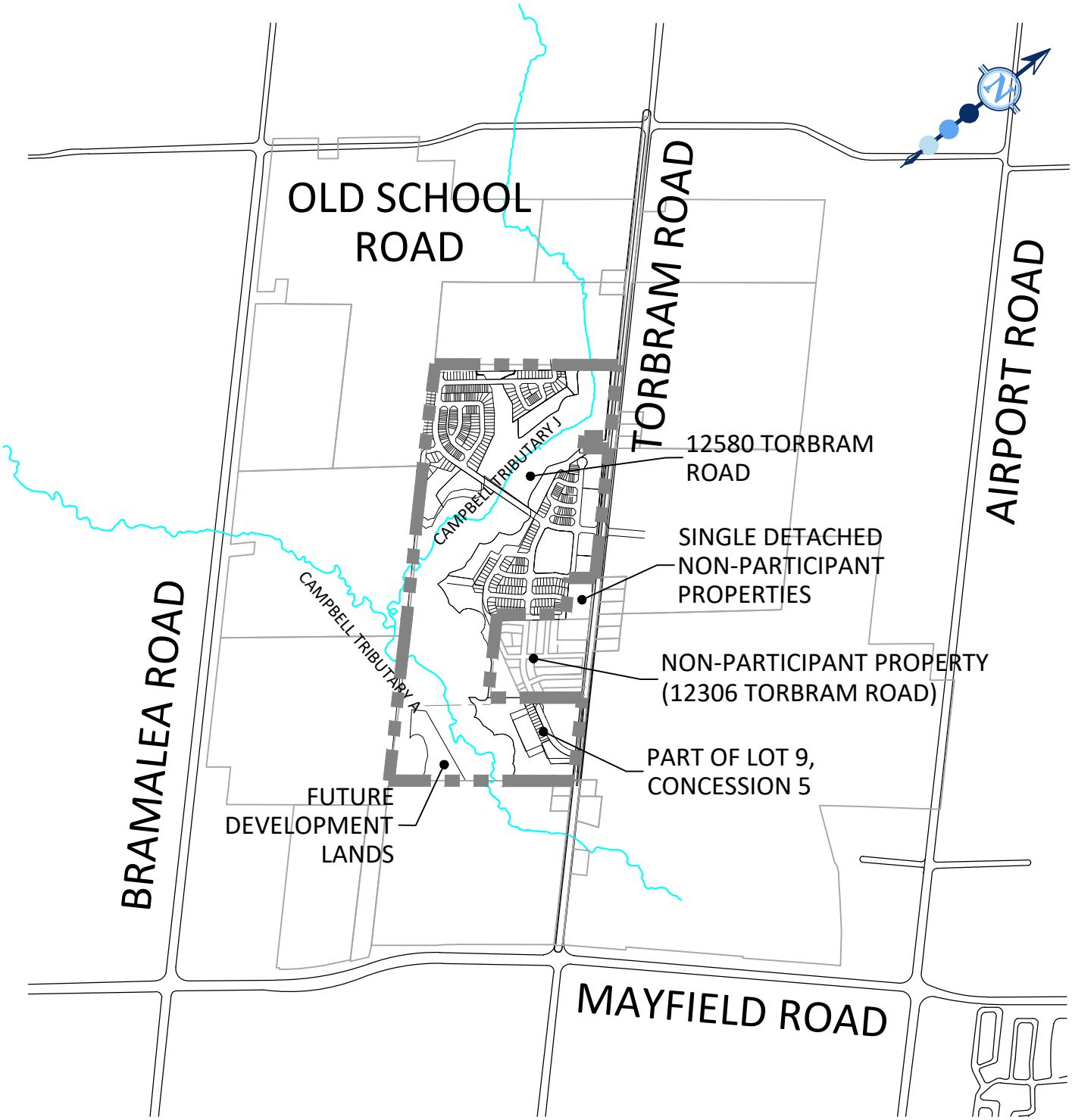

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MAYFIELD GOLF CLUB

SITE LOCATION PLAN

DESIGNED BY:	N.D.M.	CHECKED BY:	S.E.K.	PROJECT No:	FIGURE No:
SCALE:	N.T.S.	DATE:	OCTOBER 2024	2539	1.1

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OLD SCHOOL ROAD

TORBRAM ROAD

271.50EX
L=775m
262.00EX
267.55EX
265.00EX
259.35EX
L=345m
L=530m
L=567m
39.59ha | 101 | 1%
16.98ha | 105 | 1%
11.49ha | 102 | 1%
14.83ha | 103 | 1%
14.18ha | 104 | 1%
255.26EX
258.10EX
262.45EX
L=371m
255.75EX
L=135m
L=332m
L=646m
247.94EX
251.38EX
GOLF CART CROSSING (RIVER STATION: 383)
GOLF CART CROSSING (RIVER STATION: 380)
GOLF CART CROSSING (RIVER STATION: 226)
GOLF CART CROSSING (RIVER STATION: 154)
GOLF CART CROSSING (RIVER STATION: 39.1)
GOLF CART CROSSING (RIVER STATION: 25.8)
CAMPBELL TRIBUTARY (RIVER STATION: K - REACH 1)
CAMPBELL TRIBUTARY J - REACH 2
CAMPBELL TRIBUTARY J - REACH 1
CAMPBELL TRIBUTARY A - REACH 3
APPROXIMATE LOCATION OF EXISTING 600mm DIAMETER CSP CULVERT
18.41ha | 106 | 10%
253.67EX
L=314m
249.22EX
252.50EX
L=331m
19.58ha | 107 | 3%
249.93EX
L=359m
245.59EX
APPROXIMATE LOCATION OF EXISTING 350mm DIAMETER CSP CULVERT
LIMIT OF DEVELOPMENT TO BE CONFIRMED ON NON-PARTICIPANT PROPERTIES
DRIPLINE (BEACON, 2024)
DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)

CONSTRAINTS LEGEND:

- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT BOUNDARY
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 30m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (GEMTEC, 2023)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK (GEMTEC, 2023)
- EXISTING REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODLINE+10m BUFFER

*NOTE: LAYOUT IS SCHEMATIC ONLY. DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE

LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- HUMBER RIVER TRIBUTARY
- MAJOR SYSTEM - OVERLAND FLOW
- 252.00 — EXISTING CONTOUR AND ELEVATION
- STORM DRAINAGE BOUNDARY
- L=314m — TIME OF PEAK FLOW PATH AND LENGTH
- 7.26ha | 205 | 18% — DRAINAGE AREA (HECTARES); PERCENT (%) IMPERVIOUS; CATCHMENT ID
- 6.76ha | ID | % — EXTERNAL STORM DRAINAGE AREA (HECTARES); PERCENT (%) IMPERVIOUS; CATCHMENT ID

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MAYFIELD GOLF CLUB

EXISTING STORM DRAINAGE PLAN

DESIGNED BY:	N.D.M.	CHECKED BY:	S.E.K.
SCALE:	1:3500	DATE:	OCTOBER 2024

PROJECT No: 2539

FIGURE No: 2.1

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OLD SCHOOL ROAD

0.16ha | EXT6 | 15%

0.99ha | EXT5 | 15%

67.23ha | EXT1 | 63%

11.91ha | EXT2 | 62%

1.67ha | EXT4 | 15%

TORBRAM ROAD

PROPOSED 6.4m WIDE BY 1.5m TALL BY 40.6m LONG CONCRETE BOX CULVERT. REFER TO DETAILS ON FIGURE 2.10.
U/S INV. 254.40m
D/S INV. 253.64m

STREET C

2.39ha | 209 | 63%

STREET I

STREET H

8.99ha | 206 | 71%

STREET D

2.80ha | 210 | 23%

APPROXIMATE LOCATION OF EXISTING 600mm DIAMETER CSP CULVERT

5.33ha | EXT3 | 15%

ST. G

STREET A

CAMPBELL TRIBUTARY J - REACH 2

SWM FACILITY 4
NWL=252.60m

1.66ha | 203 | 19%

CAMPBELL TRIBUTARY
(RIVER STATION: K - REACH 1)

0.55ha | 208 | 52%

PROPOSED 14.9m WIDE BY 53.2m LONG CONCRETE ARCH OPEN-BOTTOM CULVERT (DECAST O-SERIES 0949). REFER TO DETAILS ON FIGURE 2.9.
U/S INV. 245.34m
D/S INV. 244.64m

3.58ha | 207 | 50%

SWM POND 3
NWL=248.25m

CAMPBELL TRIBUTARY J - REACH 1

STREET J

STREET A

STREET M

STREET B

ST. N

STREET O

STREET P

STREET Q

3.99ha | 202 | 19%

16.36ha | 201 | 69%

SWM FACILITY 1
NWL=245.30m

CAMPBELL TRIBUTARY A - REACH 3

10.85ha | 204 | 69%

TORBRAM ROAD

DRIPLINE (BEACON, 2024)
DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)

LIMIT OF DEVELOPMENT TO BE CONFIRMED ON PARCELS SOUTH OF GOLF COURSE

SWM FACILITY 2
NWL=243.15m

CAMPBELL TRIBUTARY A - REACH 3

APPROXIMATE LOCATION OF EXISTING 350mm DIAMETER CSP CULVERT

5.26ha | 205 | 19%

CONSTRAINTS LEGEND:

- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT BOUNDARY
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 15m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY 30m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK
- PROPOSED REGIONAL FLOODLINE
- RPOPOSED REGIONAL FLOODLINE+10m BUFFER
- EXISTING REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODLINE+10m BUFFER

*NOTE: LAYOUT IS SCHEMATIC ONLY. DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE

LEGEND:

- STORM DRAINAGE BOUNDARY
- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- STORM SEWER AND MAINTENANCE HOLE
- HUMBER RIVER TRIBUTARY
- MAX 3:1 SLOPE
- EXISTING CONTOUR AND ELEVATION (252.00)
- 100 YEAR CAPTURE LOCATION
- MAJOR SYSTEM - OVERLAND FLOW
- 7.26ha | 205 | 18% — DRAINAGE AREA (HECTARES); PERCENT (%) IMPERVIOUS; CATCHMENT ID
- 6.76ha | ID | % — EXTERNAL STORM DRAINAGE AREA (HECTARES); PERCENT (%) IMPERVIOUS; CATCHMENT ID

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MAYFIELD GOLF CLUB

PROPOSED STORM DRAINAGE PLAN

DESIGNED BY: N.D.M.	CHECKED BY: S.E.K.	PROJECT No: 2539	FIGURE No: 2.2
SCALE: 1:3500	DATE: OCTOBER 2024		

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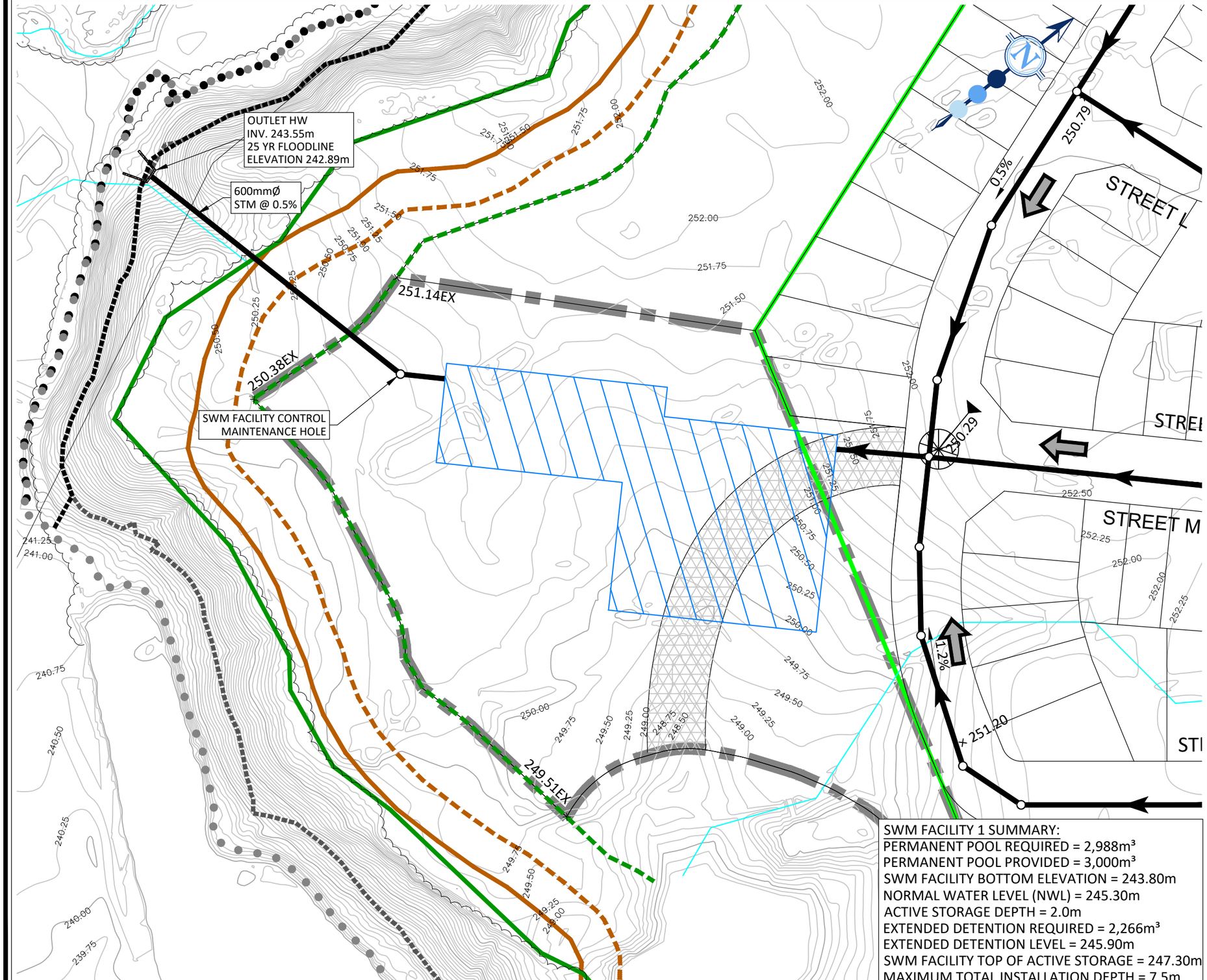

SWM FACILITY 1 SUMMARY:
PERMANENT POOL REQUIRED = 2,988m³
PERMANENT POOL PROVIDED = 3,000m³
SWM FACILITY BOTTOM ELEVATION = 243.80m
NORMAL WATER LEVEL (NWL) = 245.30m
ACTIVE STORAGE DEPTH = 2.0m
EXTENDED DETENTION REQUIRED = 2,266m³
EXTENDED DETENTION LEVEL = 245.90m
SWM FACILITY TOP OF ACTIVE STORAGE = 247.30m
MAXIMUM TOTAL INSTALLATION DEPTH = 7.5m

LEGEND:

- LIMIT OF SWM FACILITY/ PARK BLOCK
- 252.00 — EXISTING CONTOUR AND ELEVATION
- PROPOSED STORM SEWER
- × 220.00 — PROPOSED ELEVATION
- × 221.27 EX — EXISTING ELEVATION
- OVERLAND FLOW DIRECTION
- UNDERGROUND SWM FACILITY
- EMERGENCY CONVEYANCE CHANNEL
- 100 YEAR CAPTURE POINT
- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT
- LONG TERM STABLE TOP OF SLOPE (GEMTEC, 2023)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK (GEMTEC, 2023)
- EXISTING FLOODLINE +10m SETBACK
- EXISTING REGULATORY FLOODLINE
- PROPOSED REGULATORY FLOODLINE
- PROPOSED REGULATORY FLOODLINE+10m SETBACK
- HUMBER RIVER TRIBUTARY

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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MAYFIELD GOLF CLUB

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STORMWATER MANAGEMENT FACILITY 1

DESIGNED BY:	G.M.	CHECKED BY:	N.D.M.
SCALE:	1:1000	DATE:	OCTOBER 2024
PROJECT No:	2539	FIGURE No:	2.3

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-POND-2.3.dwg – Revised by <CMAIER-DOWNING> : Tue, Oct 08 2024 – 8:02pm

SWM FACILITY 2 SUMMARY:
PERMANENT POOL REQUIRED = 1,982m³
PERMANENT POOL PROVIDED = 2,100m³
SWM FACILITY BOTTOM ELEVATION = 241.65m
NORMAL WATER LEVEL (NWL) = 243.15m
ACTIVE STORAGE DEPTH = 2.0m
EXTENDED DETENTION REQUIRED = 1,457m³
EXTENDED DETENTION LEVEL = 243.73m
SWM FACILITY TOP OF ACTIVE STORAGE = 245.15m
MAXIMUM TOTAL INSTALLATION DEPTH = 4.6m

SWM FACILITY CONTROL MANHOLE

600mmØ STM @ 0.5%

OUTLET HW INV. 239.00m 25 YR FLOODLINE ELEVATION 238.86m

HUMBER RIVER TRIBUTARY

STREET B

0.5%

1.0%

1.0%

248.45

248.76

248.62

250.25

248.20

247.95

248.09

248.15

248.29

LEGEND:

- LIMIT OF SWM FACILITY/ PARK BLOCK
- EXISTING CONTOUR AND ELEVATION
- PROPOSED STORM SEWER
- × 220.00 PROPOSED ELEVATION
- × 221.27 EX EXISTING ELEVATION
- OVERLAND FLOW DIRECTION
- UNDERGROUND SWM FACILITY
- EMERGENCY CONVEYANCE CHANNEL
- 100 YEAR CAPTURE POINT
- DRIPLINE (BEACON, 2022)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2022)
- GREENBELT
- STAKED TOP OF BANK (BEACON, 2022)
- STAKED TOP OF BANK 30m SETBACK (BEACON, 2022)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2022)
- LONG TERM STABLE TOP OF SLOPE (GEMTEC, 2023)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK (GEMTEC, 2023)
- EXISTING FLOODLINE +10m SETBACK
- EXISTING REGULATORY FLOODLINE
- PROPOSED REGULATORY FLOODLINE
- PROPOSED REGULATORY FLOODLINE+10m SETBACK
- HUMBER RIVER TRIBUTARY

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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MAYFIELD GOLF CLUB

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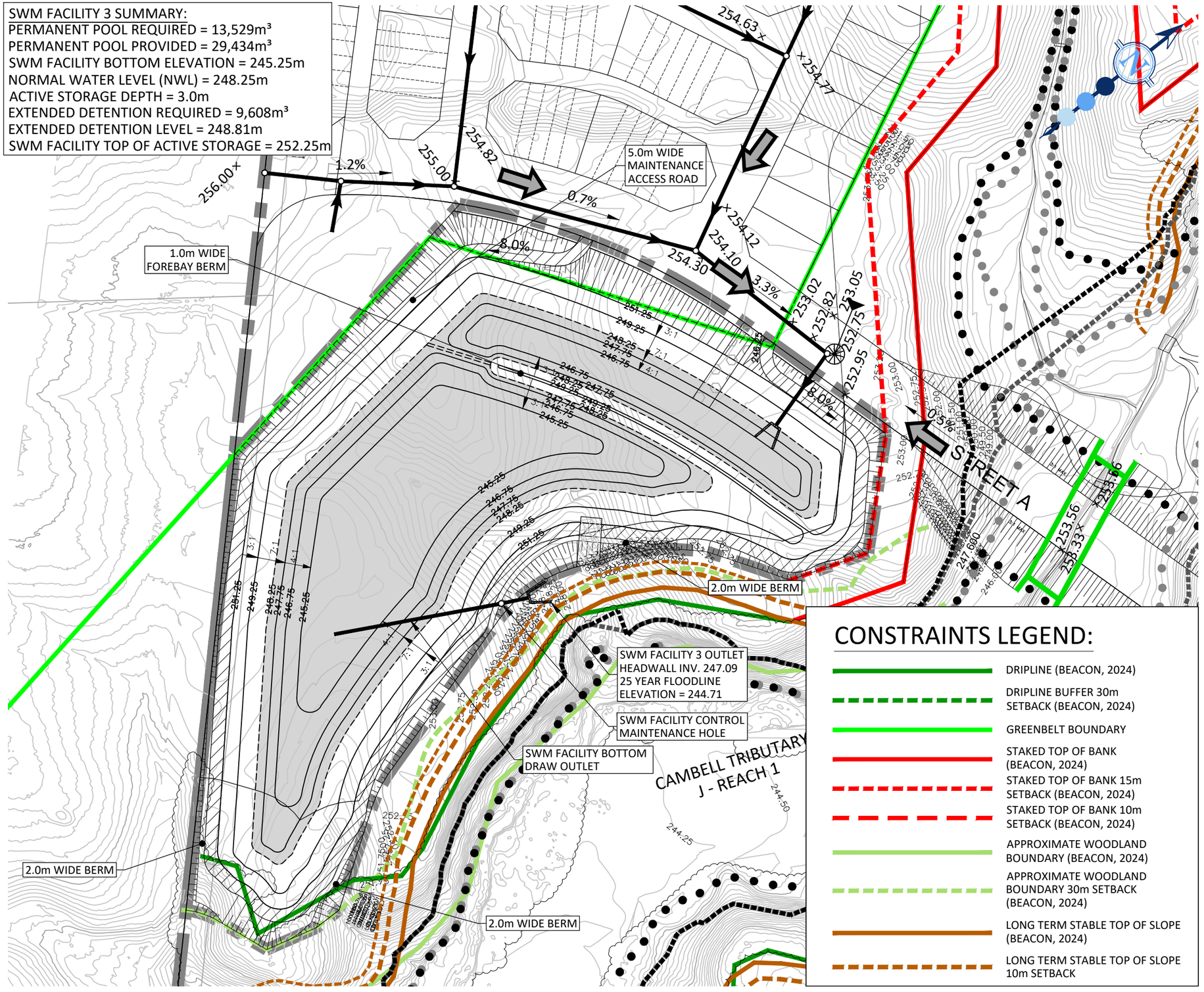
STORMWATER MANAGEMENT FACILITY 2

DESIGNED BY:	G.M.	CHECKED BY:	N.D.M.
SCALE:	1:1000	DATE:	OCTOBER 2024
PROJECT No:	2539	FIGURE No:	2.4

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-POND-2.4.dwg – Revised by <CMAIER-DOWNING> : Tue, Oct 08 2024 – 8:09pm

SWM FACILITY 3 SUMMARY:
PERMANENT POOL REQUIRED = 13,529m³
PERMANENT POOL PROVIDED = 29,434m³
SWM FACILITY BOTTOM ELEVATION = 245.25m
NORMAL WATER LEVEL (NWL) = 248.25m
ACTIVE STORAGE DEPTH = 3.0m
EXTENDED DETENTION REQUIRED = 9,608m³
EXTENDED DETENTION LEVEL = 248.81m
SWM FACILITY TOP OF ACTIVE STORAGE = 252.25m



LEGEND:

- LIMIT OF SWM FACILITY PARK BLOCK
- 252.00 — EXISTING CONTOUR AND ELEVATION
- 250.25 — POND/NORMAL WATER LEVEL POND CONTOUR
- PROPOSED STORM SEWER
- × 220.00 — PROPOSED ELEVATION
- × 221.27 EX — EXISTING ELEVATION
- OVERLAND FLOW DIRECTION
- EMERGENCY CONVEYANCE CHANNEL
- MAINTENANCE ACCESS ROAD
- OVERLAND FLOW ROUTE
- PERMANENT POOL
- 3:1 SLOPE (MAX)
- 100 YEAR CAPTURE POINT
- PROPOSED CULVERT
- HUMBER RIVER TRIBUTARY
- PROPOSED REGIONAL FLOODLINE
- RPOPOSED REGIONAL FLOODLINE+10m BUFFER
- EXISTING REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODLINE+10m BUFFER

CONSTRAINTS LEGEND:

- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT BOUNDARY
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 15m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY 30m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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MAYFIELD GOLF CLUB

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STORMWATER MANAGEMENT FACILITY 3

DESIGNED BY:	C.M.D.	CHECKED BY:	N.D.M.
SCALE:	1:1500	DATE:	OCTOBER 2024
PROJECT No:	2539	FIGURE No:	2.5

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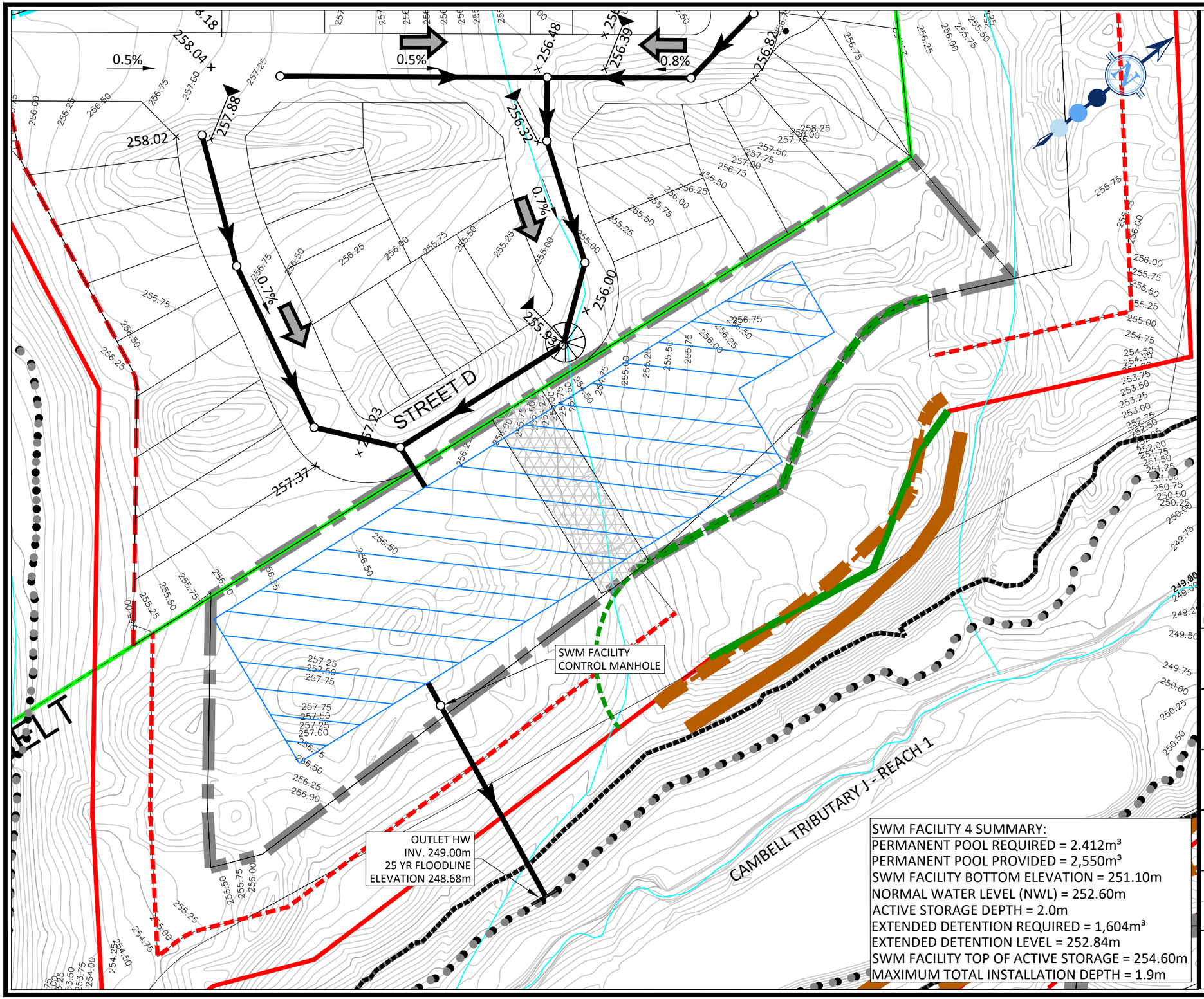

LEGEND:

- LIMIT OF SWM FACILITY/ PARK BLOCK
- 252.00 — EXISTING CONTOUR AND ELEVATION
- PROPOSED STORM SEWER
- × 220.00 — PROPOSED ELEVATION
- × 221.27 EX — EXISTING ELEVATION
- OVERLAND FLOW DIRECTION
- UNDERGROUND SWM FACILITY
- EMERGENCY CONVEYANCE CHANNEL
- 3:1 MAX — 3:1 SLOPE (MAX)
- 100 YEAR CAPTURE POINT
- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 30m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (GEMTEC, 2023)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK (GEMTEC, 2023)
- EXISTING FLOODLINE +10m SETBACK
- EXISTING REGULATORY FLOODLINE
- PROPOSED REGULATORY FLOODLINE
- PROPOSED REGULATORY FLOODLINE+10m SETBACK
- PROPOSED CULVERT
- HUMBER RIVER TRIBUTARY

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

SWM FACILITY 4 SUMMARY:
PERMANENT POOL REQUIRED = 2.412m³
PERMANENT POOL PROVIDED = 2,550m³
SWM FACILITY BOTTOM ELEVATION = 251.10m
NORMAL WATER LEVEL (NWL) = 252.60m
ACTIVE STORAGE DEPTH = 2.0m
EXTENDED DETENTION REQUIRED = 1,604m³
EXTENDED DETENTION LEVEL = 252.84m
SWM FACILITY TOP OF ACTIVE STORAGE = 254.60m
MAXIMUM TOTAL INSTALLATION DEPTH = 1.9m

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MAYFIELD GOLF CLUB

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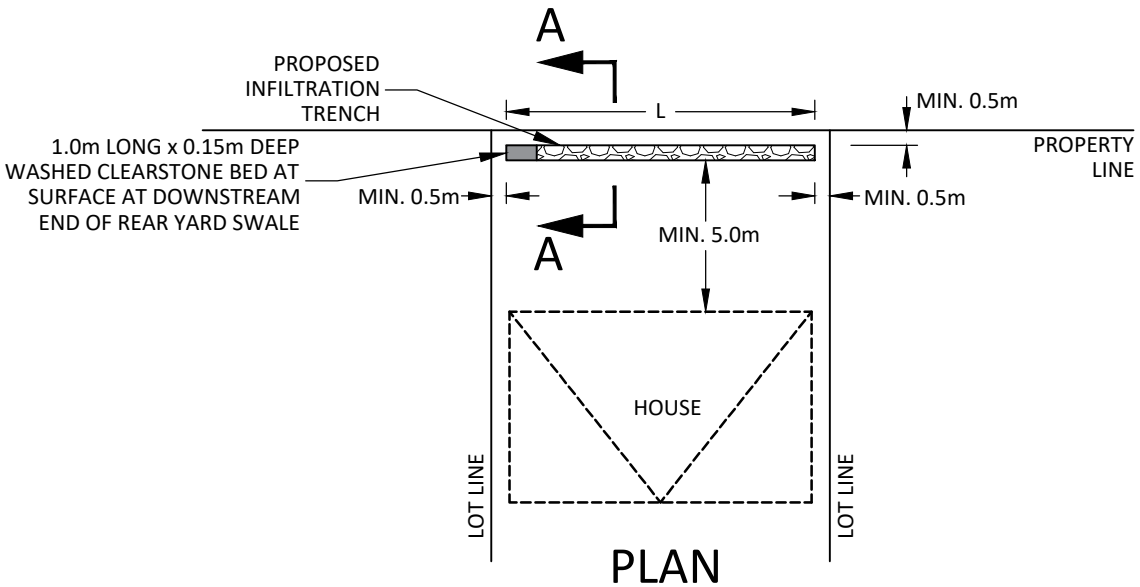
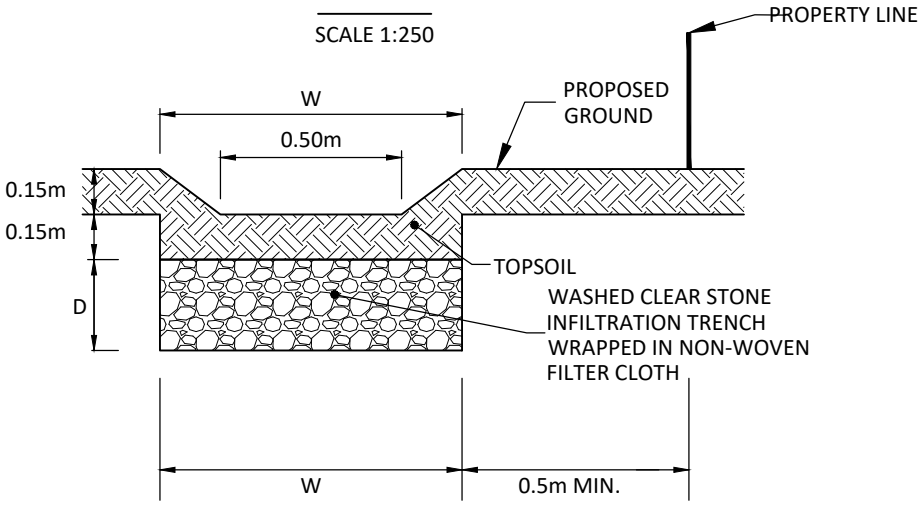
STORMWATER MANAGEMENT FACILITY 4

DESIGNED BY:	C.M.D.	CHECKED BY:	N.D.M.
SCALE:	1:1000	DATE:	OCTOBER 2024
PROJECT No:	2539	FIGURE No:	2.6



PLAN

SCALE 1:250



CROSS - SECTION A-A

SCALE: N.T.S.

MAXIMUM TRENCH DIMENSIONS:				
MINIMUM TYPICAL LOT FRONTAGE (m)	DEPTH (m)	LENGTH (m)	WIDTH (m)	MAXIMUM INFILTRATION VOLUME PROVIDED (m^3)
9.75	0.5	8.75	1.0	1.8
11.60	0.5	9.00	1.0	1.8
13.40	0.5	11.00	1.0	2.2

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MAYFIELD GOLF CLUB

REAR YARD INFILTRATION TRENCH DETAIL

DESIGNED BY: N.D.M.	CHECKED BY: S.E.K.	PROJECT No: 2539	FIGURE No: 2.7
SCALE: N.T.S.	DATE: OCTOBER 2024		

PROPOSED SERVICING PLAN

MAYFIELD GOLF CLUB

DESIGNED BY:	N.D.M.	CHECKED BY:	S.E.K.
SCALE:	1:2000	DATE:	OCTOBER 2024

PROJECT No: 2539

FIGURE No: 2.8

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LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- CULVERT
- EXISTING CULVERT
- HUMBER RIVER TRIBUTARY
- SANITARY SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- STORM SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE

CONSTRAINTS LEGEND:

- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT BOUNDARY
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 15m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY 30m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK
- PROPOSED REGIONAL FLOODLINE
- RPOPOSED REGIONAL FLOODLINE+10m BUFFER
- EXISTING REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODLINE+10m BUFFER

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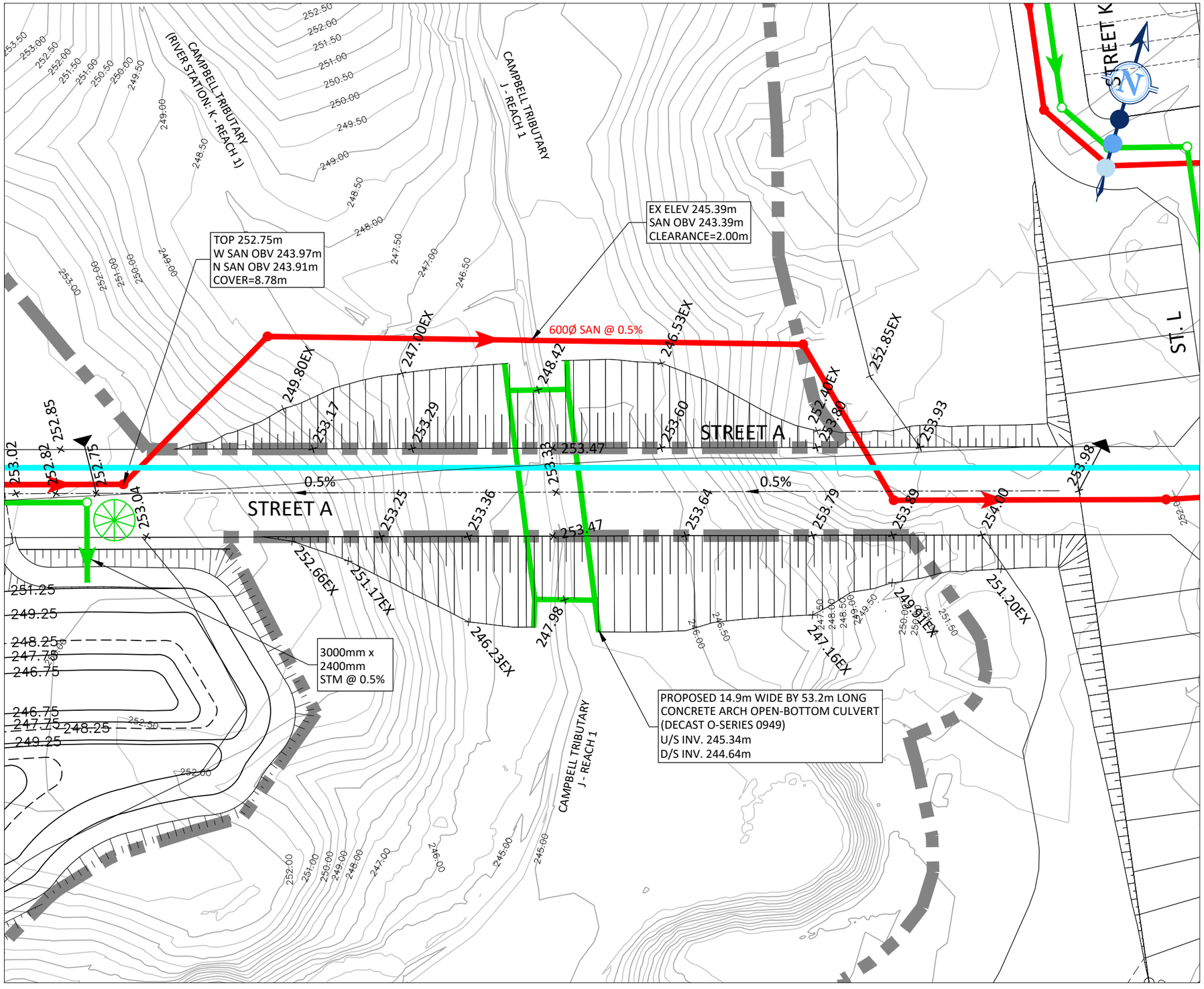

LEGEND:

- LIMIT OF DEVELOPMENT
- CULVERT
- MAX 3:1 SLOPE
- × 223.91 — PROPOSED ELEVATION
- × 224.35EX — EXISTING ELEVATION
- 270.25 — EXISTING CONTOUR AND ELEVATION
- STORM SEWER AND MAINTENANCE HOLE
- SANITARY SEWER AND MAINTENANCE HOLE
- WATERMAIN
- 100 YEAR CAPTURE LOCATION

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

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MAYFIELD GOLF CLUB

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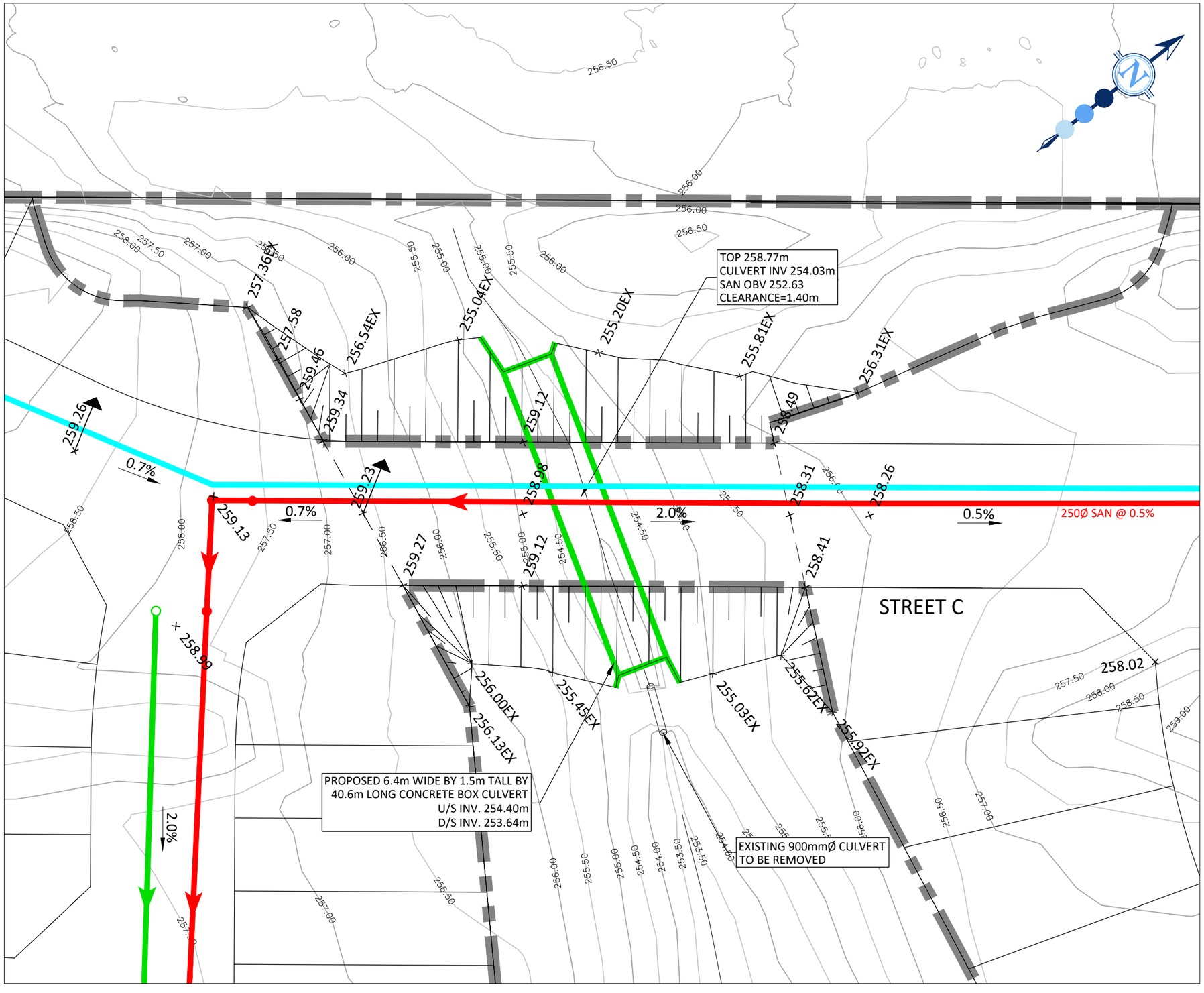
STREET A CULVERT CROSSING

DESIGNED BY:	G.M.	CHECKED BY:	N.D.M.
SCALE:	1:1000	DATE:	OCTOBER 2024
PROJECT No:	2539	FIGURE No:	2.9



LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- CULVERT
- MAX 3:1 SLOPE
- × 223.91 — PROPOSED ELEVATION
- × 224.35EX — EXISTING ELEVATION
- 270.25 — EXISTING CONTOUR AND ELEVATION
- STORM SEWER AND MAINTENANCE HOLE
- SANITARY SEWER AND MAINTENANCE HOLE
- WATERMAIN

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

FSSR

STREET C CULVERT CROSSING

DESIGNED BY:	G.M.	CHECKED BY:	N.D.M.
SCALE:	1:500	DATE:	OCTOBER 2024
PROJECT No:	2539	FIGURE No:	2.10

STREET C
STREET I
STREET H
STREET F
ST. G
STREET A
STREET E
STREET C
STREET D
TORBRAM ROAD
STREET A
STREET K
STREET J
ST. L
LANEWAY 'B'
STREET A
STREET M
ST. N
STREET B
STREET J
STREET O
STREET P
STREET Q
STREET M
STREET Q
TORBRAM ROAD
STREET B

*NOTE: LAYOUT IS SCHEMATIC ONLY. DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE

LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- HUMBER RIVER TRIBUTARY
- 252.00 EXISTING CONTOUR AND ELEVATION
- PROPOSED SINGLE LOTS WITH SHALLOW REAR YARD INFILTRATION TRENCHES
- 5mm ON-SITE RETENTION

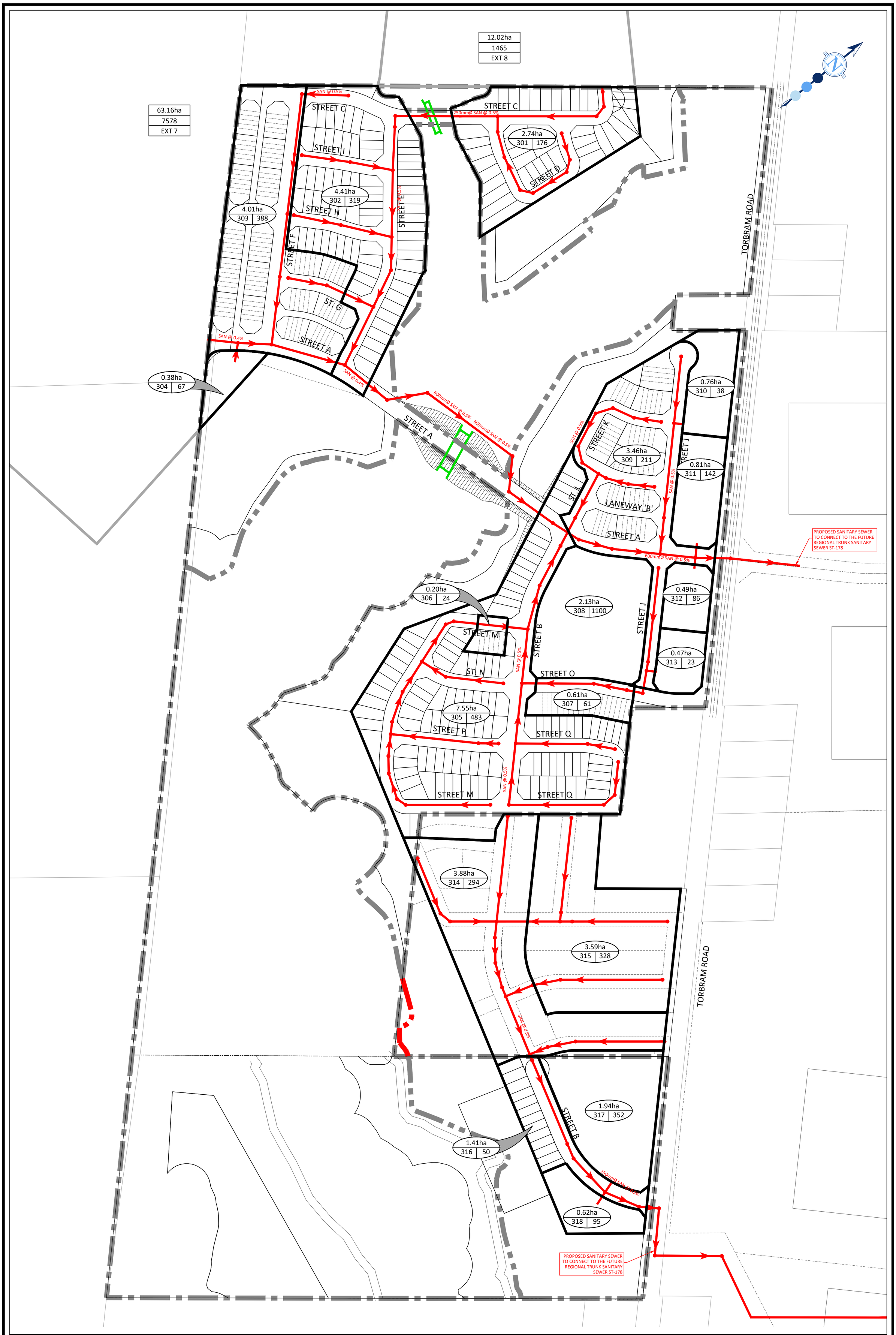
SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

LID LOCATION PLAN

DESIGNED BY: N.D.M.	CHECKED BY: S.E.K.	PROJECT No: 2539	FIGURE No: 2.11
SCALE: 1:2000	DATE: OCTOBER 2024		

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-LID-2.11.dwg – Revised by <NMCINTOSH> : Tue, Oct 08 2024 – 7:31pm



LEGEND:

- LIMIT OF PARTICIPATING PROPERTY / LIMIT OF DEVELOPMENT
- SANITARY DRAINAGE BOUNDARY
- EXTERNAL SANITARY DRAINAGE BOUNDARY
- SANITARY SEWER AND MANHOLE
- 3.46ha / 606 — DRAINAGE AREA (HECTARES) / POPULATION
- 0.55ha / 314 | 99 — DRAINAGE AREA (HECTARES) / POPULATION / CATCHMENT ID
- 102.5ha — EXTERNAL SANITARY DRAINAGE AREA (ha)
- 50p/ha — POPULATION DENSITY (PERSONS PER HECTARE)
- EXT 1 — CATCHMENT ID

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

PROPOSED SANITARY DRAINAGE PLAN

DESIGNED BY:	N.D.M.	CHECKED BY:	S.E.K.
SCALE:	1:2000	DATE:	OCTOBER 2024

PROJECT No: 2539

FIGURE No: 3.1

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-SANI-PROP-3.1.dwg – Revised by <NMCINTOSH> : Tue, Oct 08 2024 – 7:53pm

125.96ha
8817
EXT 1+2

64.44ha
4511
EXT 3+4

OLD SCHOOL ROAD

OLD SHCOOL ROAD

10.86ha
3187
EXT 6

48.44ha
7902
EXT 5

BRAMALEA ROAD

TORBRAM ROAD

63.16ha
7578
EXT 7

12.02ha
1465
EXT 8

OPTION 1
CONVEY SANITARY FLOWS
INTERNAL TO DG GROUP LANDS
UNDER HUMBER WEST
TRIBUTARY VIA FORCEMAIN

OPTION 2
CONVEY SANITARY FLOWS IN
MAYFIELD ROAD AND TORBRAM
ROAD ROW VIA FORCEMAIN

LOCATION OF INTERIM LIFT
STATION

POTENTIAL INTERIM GRAVITY
CONNECTION TO SANITARY SEWER

AIRPORT ROAD

AIRPORT ROAD
SANITARY TRUNK SEWER
CONTINUES NORTH

MAYFIELD ROAD

SANDRINGHAM
SERVICING PLAN
EXTERNAL 4
155ha
POP 7750

FLOWS CONVEYED
TO AIRPORT ROAD
SANITARY SEWER

AIRPORT ROAD
SANITARY TRUNK SEWER
CONTINUES SOUTH

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

LEGEND:

- LIMIT OF MZO
- BLOCK 48-2 SANITARY SEWER
- ULTIMATE TRUNK SANITARY SEWER
- SANITARY DRAINAGE BOUNDARY
- EXISTING SANITARY SEWER
- 23.18ha — EXTERNAL SANITARY DRAINAGE AREA (HECTARES)
- 4498 — POPULATION
- EXT 12 — CATCHMENT ID

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

EXTERNAL SANITARY SERVICING PLAN

DESIGNED BY: N.D.M.	CHECKED BY: S.M.S.	PROJECT No: 2539	FIGURE No: 3.2
SCALE: 1:6000	DATE: OCTOBER 2024		

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-SANI-PROP-3.2.dwg – Revised by <NMCINTOSH> : Tue, Oct 08 2024 – 7:57pm

STREET C
STREET I
STREET H
STREET F
ST. G
STREET A
STREET E
STREET C
STREET D
TORBRAM ROAD
STREET A
STREET K
STREET J
ST. L
LANEWAY 'B'
STREET A
FUTURE 400mm (dia) WATERMAIN PER PEEL REGION MASTER PLAN Project D-181
STREET M
STREET B
STREET J
ST. N
STREET O
STREET P
STREET Q
FUTURE 400mm (dia) WATERMAIN PER PEEL REGION MASTER PLAN Project D-180
STREET M
STREET Q
TORBRAM ROAD
STREET B

LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- PROPOSED WATERMAIN
- FUTURE WATERMAIN
- PROPOSED WATERMAIN PLUG

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

PROPOSED WATER DISTRIBUTION PLAN

DESIGNED BY: N.D.M.	CHECKED BY: S.E.K.	PROJECT No: 2539	FIGURE No: 4.1
SCALE: 1:2000	DATE: OCTOBER 2024		

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-WTRM-4.1.dwg – Revised by <NMCINTOSH> : Tue, Oct 08 2024 – 8:03pm

PROPOSED 6.4m WIDE BY 1.5m TALL BY 40.6m LONG CONCRETE BOX CULVERT. REFER TO DETAILS ON FIGURE 2.10. U/S INV. 254.40m D/S INV. 253.64m

APPROXIMATE LOCATION OF EXISTING 600mm DIAMETER CSP CULVERT

SWM FACILITY 4 NWL=252.60m

PROPOSED 14.9m WIDE BY 53.2m LONG CONCRETE ARCH OPEN-BOTTOM CULVERT (DECAST O-SERIES 0949). REFER TO DETAILS ON FIGURE 2.9. U/S INV. 245.34m D/S INV. 244.64m

SWM POND 3 NWL=248.25m

SWM FACILITY 1 NWL=245.30m

SWM FACILITY 2 NWL=243.15m

TORBRAM ROAD

STREET A
STREET B
STREET C
STREET D
STREET E
STREET F
STREET G
STREET H
STREET J
STREET K
STREET JJ
STREET M
STREET O
STREET P
STREET Q
ST. L
ST. N
LANEWAY 'B'

CONSTRAINTS LEGEND:

- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT BOUNDARY
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 15m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY 30m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK
- PROPOSED REGIONAL FLOODLINE
- RPOPOSED REGIONAL FLOODLINE+10m BUFFER
- EXISTING REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODLINE+10m BUFFER

LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- × 223.91 PROPOSED ELEVATION
- × 224.35EX EXISTING ELEVATION
- 0.5% ROAD SLOPE
- 223.71 PROPOSED ROAD ELEVATION
- 270.00 EXISTING CONTOUR AND ELEVATION
- HUMBER RIVER TRIBUTARY

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

PRELIMINARY GRADING PLAN

DESIGNED BY:	N.D.M.	CHECKED BY:	S.E.K.
SCALE:	1:2000	DATE:	OCTOBER 2024

PROJECT No: 2539

FIGURE No: 5.1

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-GRAD-5.1.dwg – Revised by <NMCINTOSH> : Tue, Oct 08 2024 – 8:09pm

256.63 552.11
256.12 499.49
255.57 451.42
255.18 393.57
255.17 387.77
254.34 378.92
253.99 364.98
253.45 330.80
252.80 285.49
249.96 149.42
248.96 108.21
247.83 54.60
247.79 43.08
247.31 33.99
247.26 16.40
241.58 808.44
808.51 241.72
506.08 244.68
403.10 244.09
292.60 243.66
179.29 242.80
117.41 242.35
39.72 241.72
808.38 241.21
808.21 240.75
808.06 240.02
807.91 239.43
807.69 238.93
807.61 238.86
807.47 238.78
252.51 669.97
251.61 566.49
251.20 463.38
234.70 252.42
229.83 252.42
220.94 251.71
209.88 251.46
399.55 251.08
382.88 250.94
376.03 250.62
337.65 250.25
279.27 250.13
212.05 250.04
170.59 249.81
156.28 249.66
150.47 249.16
121.06 248.75
52.39 247.91
34.43 247.77
29.60 247.75
20.10 247.34
12.34 247.19
867.84 247.04
846.68 246.93
840.45 246.88
790.77 246.58
728.54 245.87
630.96 245.28

GOLF CART CROSSING (RIVER STATION: 383)
GOLF CART CROSSING (RIVER STATION: 380)
GOLF CART CROSSING (RIVER STATION: 226)
GOLF CART CROSSING (RIVER STATION: 154)
GOLF CART CROSSING (RIVER STATION: 39.1)
GOLF CART CROSSING (RIVER STATION: 25.8)
CAMPBELL TRIBUTARY (RIVER STATION: K - REACH 1)
APPROXIMATE LOCATION OF EXISTING 600mm DIAMETER CSP CULVERT
APPROXIMATE LOCATION OF EXISTING 350mm DIAMETER CSP CULVERT
CAMPBELL TRIBUTARY J - REACH 2
CAMPBELL TRIBUTARY J - REACH 1
CAMPBELL TRIBUTARY A - REACH 3
CAMPBELL TRIBUTARY A - REACH 2
CAMPBELL TRIBUTARY A - REACH 1

CONSTRAINTS LEGEND:

- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT BOUNDARY
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 15m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY 30m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK
- PROPOSED REGIONAL FLOODLINE
- RPOPOSED REGIONAL FLOODLINE+10m BUFFER
- EXISTING REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODLINE+10m BUFFER

LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- 252.00 EXISTING CONTOUR AND ELEVATION
- HEC-RAS CROSS-SECTION (CAMPBELL TRIBUTARIES J & K)
- HEC-RAS CROSS-SECTION (CAMPBELL TRIBUTARY A)
- 252.84 / 15563 — EXISTING REGIONAL FLOOD ELEVATION; HYDRAULIC SECTION ID; FLOODLINE ELEVATION LEADER
- HUMBER RIVER TRIBUTARY

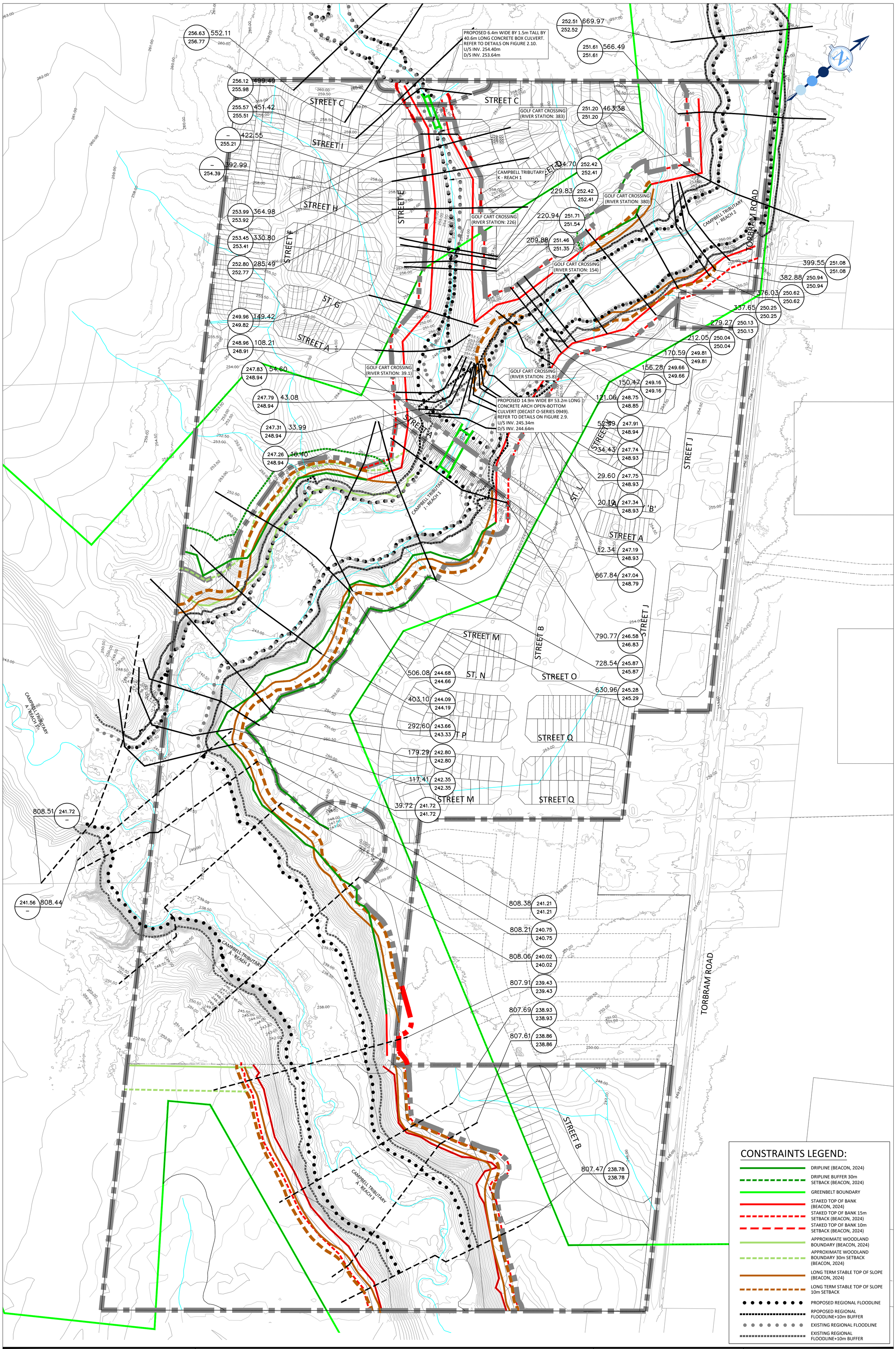
SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

EXISTING FLOODPLAIN MAPPING

DESIGNED BY: N.D.M.	CHECKED BY: S.E.K.	PROJECT No: 2539	FIGURE No: 8.1
SCALE: 1:2000	DATE: OCTOBER 2024		

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-FLOD-EXST-8.1.dwg – Revised by <NMCINTOSH> : Tue, Oct 08 2024 – 8:26pm



CONSTRAINTS LEGEND:

- DRIPLINE (BEACON, 2024)
- DRIPLINE BUFFER 30m SETBACK (BEACON, 2024)
- GREENBELT BOUNDARY
- STAKED TOP OF BANK (BEACON, 2024)
- STAKED TOP OF BANK 15m SETBACK (BEACON, 2024)
- STAKED TOP OF BANK 10m SETBACK (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY (BEACON, 2024)
- APPROXIMATE WOODLAND BOUNDARY 30m SETBACK (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE (BEACON, 2024)
- LONG TERM STABLE TOP OF SLOPE 10m SETBACK
- PROPOSED REGIONAL FLOODLINE
- RPOPOSED REGIONAL FLOODLINE+10m BUFFER
- EXISTING REGIONAL FLOODLINE
- EXISTING REGIONAL FLOODLINE+10m BUFFER

LEGEND:

- LIMIT OF PARTICIPATING PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- HUMBER RIVER TRIBUTARY
- 252.00 EXISTING CONTOUR AND ELEVATION
- HEC-RAS CROSS-SECTION (CAMPBELL TRIBUTARIES J & K)
- HEC-RAS CROSS-SECTION (CAMPBELL TRIBUTARY A)
- 247.47 / 249.19 16.40 EXISTING REGIONAL FLOOD ELEVATION / HYDRAULIC SECTION ID / FLOODLINE ELEVATION LEADER / PROPOSED REGIONAL FLOOD ELEVATION

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

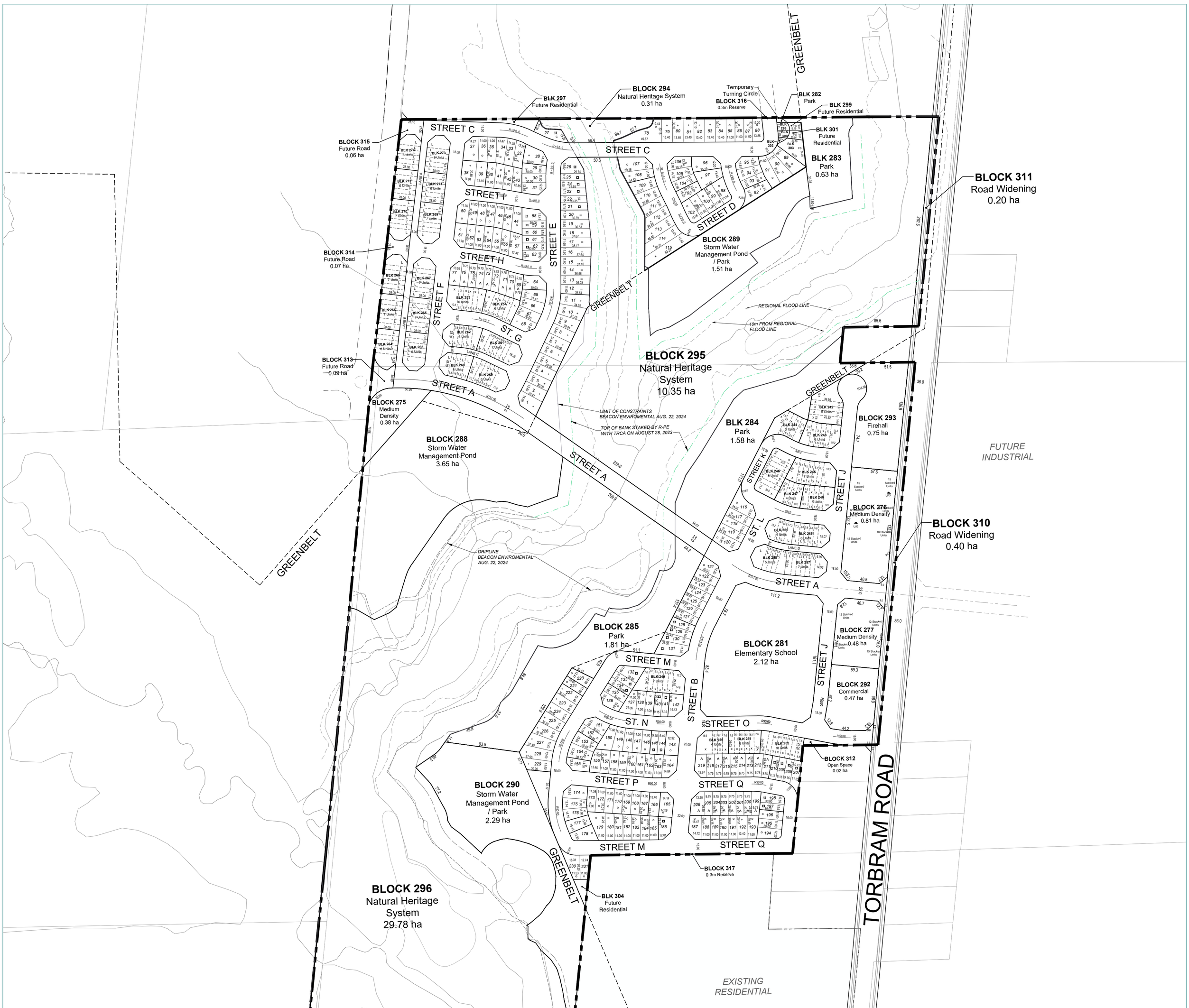
PROPOSED FLOODPLAIN MAPPING

DESIGNED BY: N.D.M.	CHECKED BY: S.E.K.	PROJECT No: 2539	FIGURE No: 8.2
SCALE: 1:2000	DATE: OCTOBER 2024		

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-FLOD-PROP-8.2.dwg – Revised by <SOZDEMIR> : Tue, Oct 08 2024 – 11:33am

APPENDIX A

DRAFT PLAN

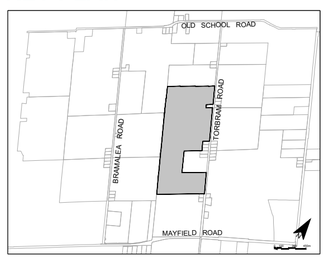


DRAFT - FOR DISCUSSION PURPOSES ONLY

DRAFT PLAN OF SUBDIVISION

Part of Lots 19, 20 and 21
Concession 5,
East of Hurontario Street
Town of Caledon
Regional Municipality of Peel

KEY PLAN



SUBJECT PROPERTY

SCHEDULE OF LAND USE

LOT/BLOCK	LAND USE		UNITS	AREA (ha)
1-241	Single Detached Min. 13.40m	+	47	9.23
	Single Detached Min. 11.60m	=	13	
	Single Detached Min. 11.00m	o	124	
	Single Detached Min. 9.45m	^	26	
	Single Detached Min. 9.15m	□	31	
242-254	Street Townhouse Min 6.10m	X	77	1.79
255-274	Lane Townhouse Min. 5.80m	L	124	2.50
275-280	Medium Density Residential			4.13
281	Elementary School			2.12
282-287	Park			6.46
288	Storm Water Management Pond			3.65
289-291	Storm Water Management Pond/Park			4.65
292	Commercial			0.47
293	Firehall			0.76
294-296	Natural Heritage System			40.44
297-308	Future Residential			3.73
309-311	Road Widening			0.82
312	Open Space			0.02
313-315	Future Road			0.21
316-318	0.3m Reserve			0.01
Streets A-B	22.0m Right of Way	1,281 m		2.84
Streets C-Q	18.0m Right of Way	3,685 m		6.92
Lane A-D	8.0m Right of Way	463 m		0.43
	TOTAL	5,429 m	442	91.18

OWNER'S AUTHORIZATION

I hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the Town of Caledon.

Mayfield Golf Course Inc. — Date

Tullamore Industrial GP Inc. — Date

Tullamore Industrial GP Inc. — Date

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided as shown on this Plan and their relationship to the adjacent lands are accurately and correctly shown.

RPE — Date

ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13(R.S.O. 1990).
(a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.
(b),(c) - As shown on the Draft and Key Plan.
(d) - Land to be used in accordance with the Schedule of Land Use.
(i) - Soil is silt and clay loam.
(h),(k) - Full municipal services to be provided.

Date	Revision	By

MGP File No.: 22-3154
Date: May 31, 2024
Revised: October 1, 2024

Prepared For:

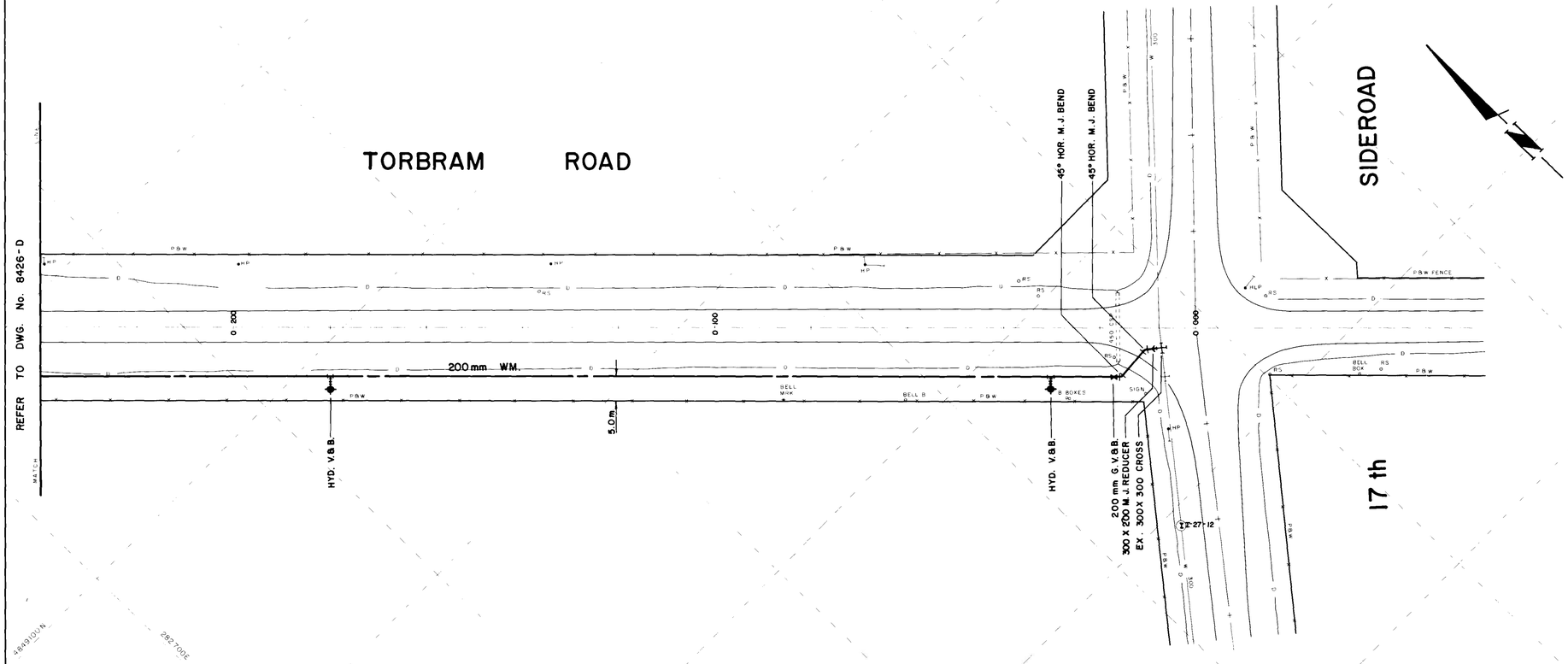
Mayfield Golf Course Inc. &
Tullamore Industrial GP Inc.

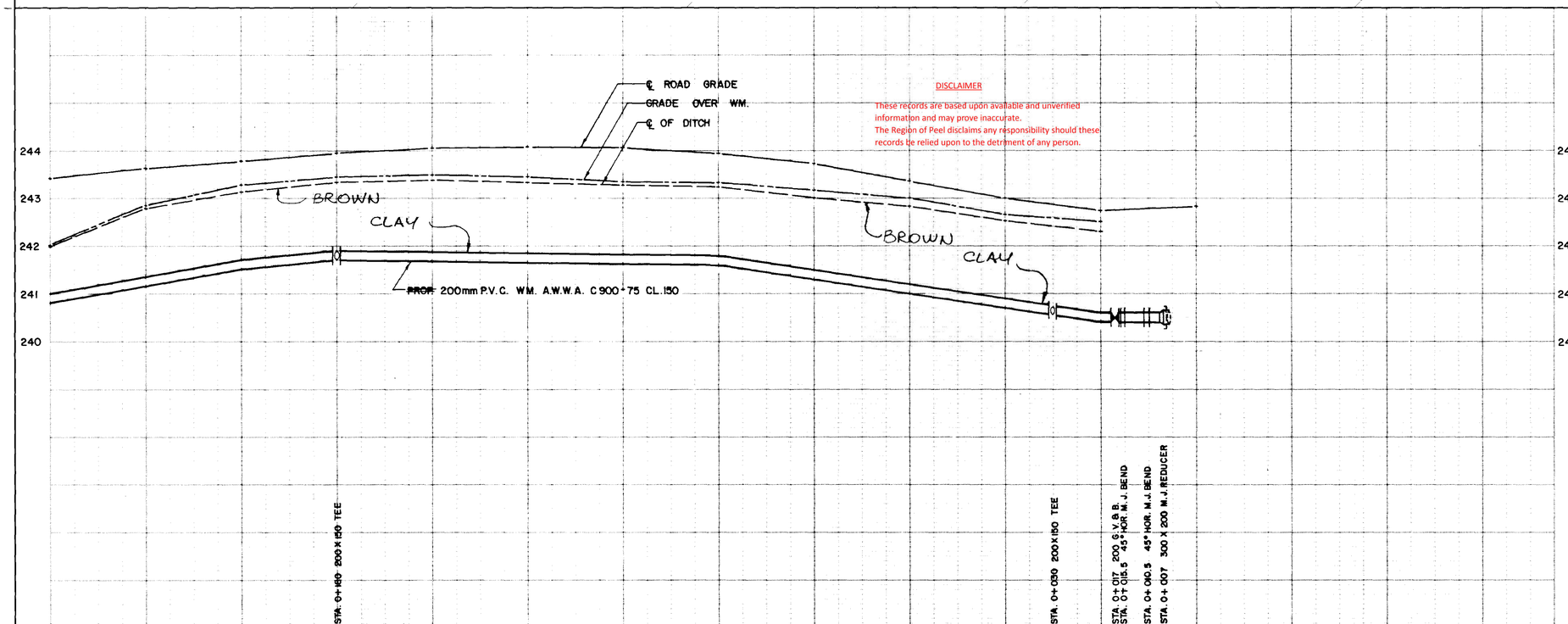
Malone Given Parsons.
140 Renfrew Drive, Suite 201 | Markham, ON | L3R 6B3
905 513 0170 | mgp.ca

APPENDIX B

RELEVANT EXCERPTS

SCS consulting group ltd





DISCLAIMER

These records are based upon available and unverified information and may prove inaccurate.
The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.

240.80	241.15	241.50	241.70	241.675	241.65	241.625	241.60	241.30	241.00	240.70	240.40			BOT. EL. OF WM.
0+240	0+220	0+200	0+180	0+160	0+140	0+120	0+100	0+080	0+060	0+040	0+020	0+000	+	+ RD. CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	IN
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
APRIL 3, 1987	AS CONSTRUCTED	Y.C.

General Notes

- All Driveways Gravel Unless Otherwise Noted.
- All Service Locations Are Approximate And Must Be Located Accurately In Field.
- Denotes Building – Not Located
- Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN.)

B.M. N° Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

REGISTERED PROFESSIONAL ENGINEER K. P. HO PROVINCE OF ONTARIO
Designed by 86-09-02
chkd.

REGISTERED PROFESSIONAL ENGINEER PROVINCE OF ONTARIO
Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

TORBRAM ROAD

~~PROP.~~ 200 mm WATERMAIN

Sta. 0+000 **To Sta.** 0+240

Lots 18	Area C-5	Project No. 86-1030
Scale Hor. 1:500 Ver. 1:50	Drawn by Y.C.	Checked by
Date AUGUST 1986	Sheet 1 of 7	Plan No. 8425-D

8425-D

TORBRAM ROAD

REFER TO DWG. No. 8427-D

REFER TO DWG. No. 8425-D

DISCLAIMER

These records are based upon available and unverified information and may prove inaccurate.
The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	IN
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
APRIL 3, 1987	AS CONSTRUCTED	Y.C.

General Notes

- – All Driveways Gravel Unless Otherwise Noted.
- – All Service Locations Are Approximate And Must Be Located Accurately In Field.
- ● Denotes Building - Not Located
- ▭ Denotes Building Located
  Type 'B' Bedding Unless Otherwise Noted (SAN)

B.M. N° Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

Designed by K. P. HO 96-05-02 chkd.

Approved by G. J. SAVAGE 96-09-03

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

TORBRAM ROAD

~~PROP.~~ 200mm WATERMAIN

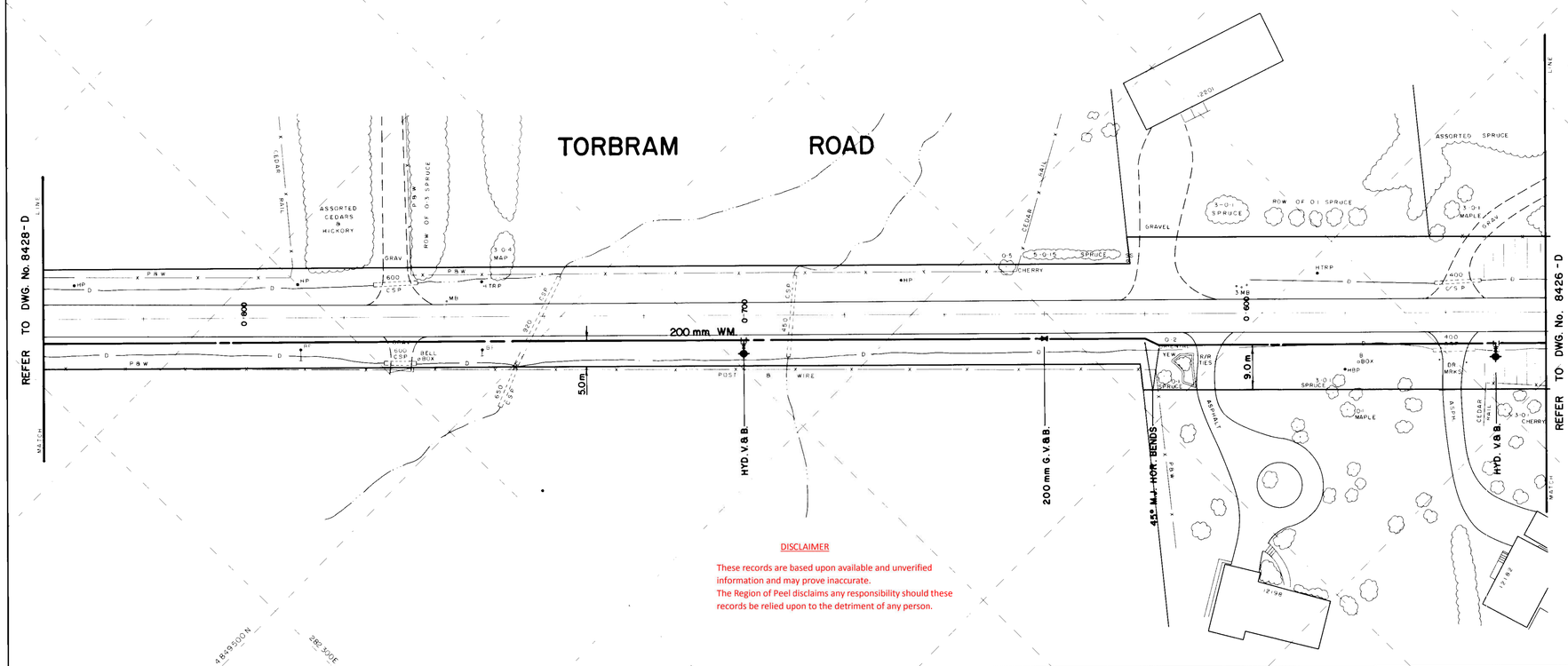
Sta. 0+240 **To Sta.** 0+540

Lots 18	Area C-5	Project No. 86-1030
Scale Hor. 1:500 Ver. 1:50	Drawn by Y.C.	Checked by
Date AUGUST 1986	Sheet 2 of 7	Plan No. 8426-D

8426-D

240.70	239.20	237.70	236.65	236.60	236.60	236.60	236.65	237.30	238.10	238.85	239.55	239.65	239.65	239.75	240.80	BOT. EL. OF WM.
0+540	0+520	0+500	0+480	0+460	0+440	0+420	0+400	0+380	0+360	0+340	0+320	0+300	0+280	0+260	0+240	RD. CHAINAGE

TORBRAM ROAD



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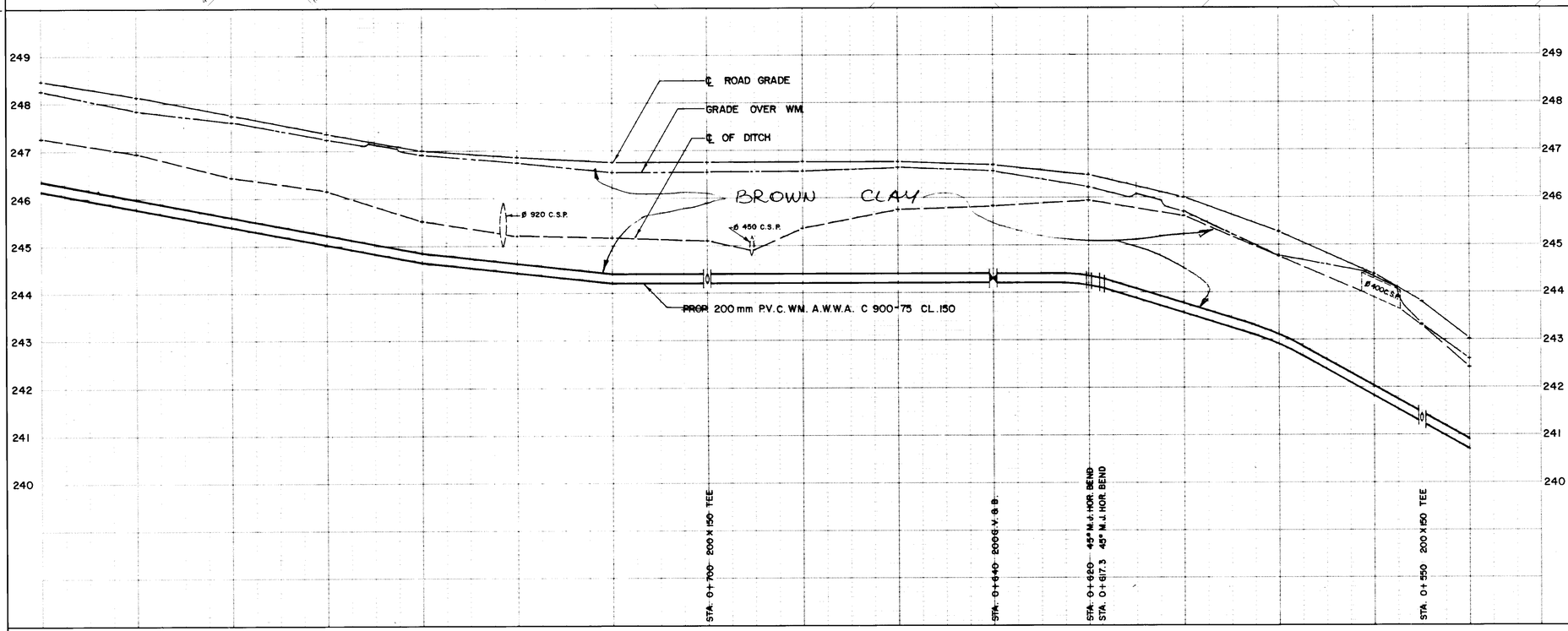


246.15	245.80	245.40	245.00	244.65	244.40	244.20	244.20	244.20	244.20	244.20	244.15	243.60	242.90	241.80	240.70	BOT. EL. OF WM.
0+840	0+820	0+800	0+780	0+760	0+740	0+720	0+700	0+680	0+660	0+640	0+620	0+600	0+580	0+560	0+540	RD. CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	IN
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
APRIL 3, 1987	AS CONSTRUCTED	Y.C.

General Notes

- All Driveways Gravel Unless Otherwise Noted.
- All Service Locations Are Approximate And Must Be Located Accurately In Field.
- Denotes Building - Not Located
- Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN.)

B.M. N° Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

REGISTERED PROFESSIONAL ENGINEER — K. H. HO — PROVINCE OF ONTARIO — Designed by — chkd.

REGISTERED PROFESSIONAL ENGINEER — P. G. SAVAGE — 90403 — PROVINCE OF ONTARIO — Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

TORBRAM ROAD

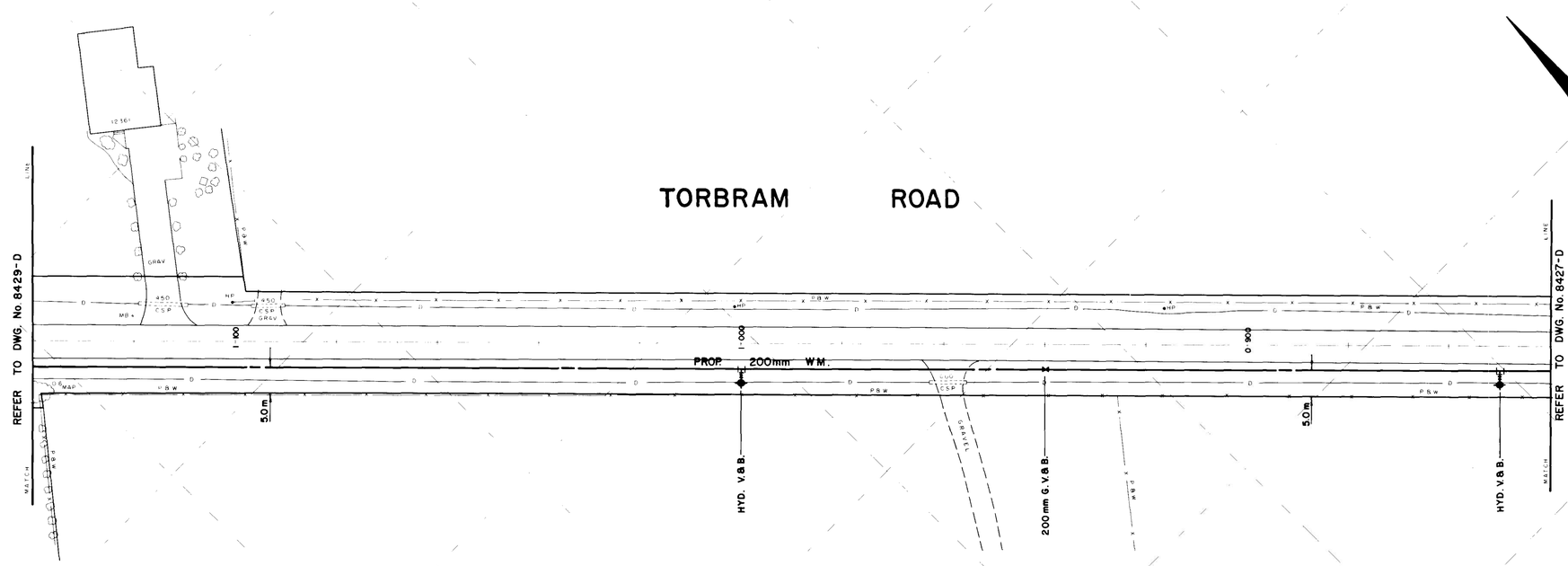
~~PROP~~ 200mm WATERMAIN

Sta. 0+540 **To Sta.** 0+840

Lots 18 & 19	Area C-5	Project No. 86-1030
Scale Hor. 1:500 Ver. 1:50	Drawn by Y.C.	Checked by
Date AUGUST 1986	Sheet 3 of 7	Plan No. 8427 - D

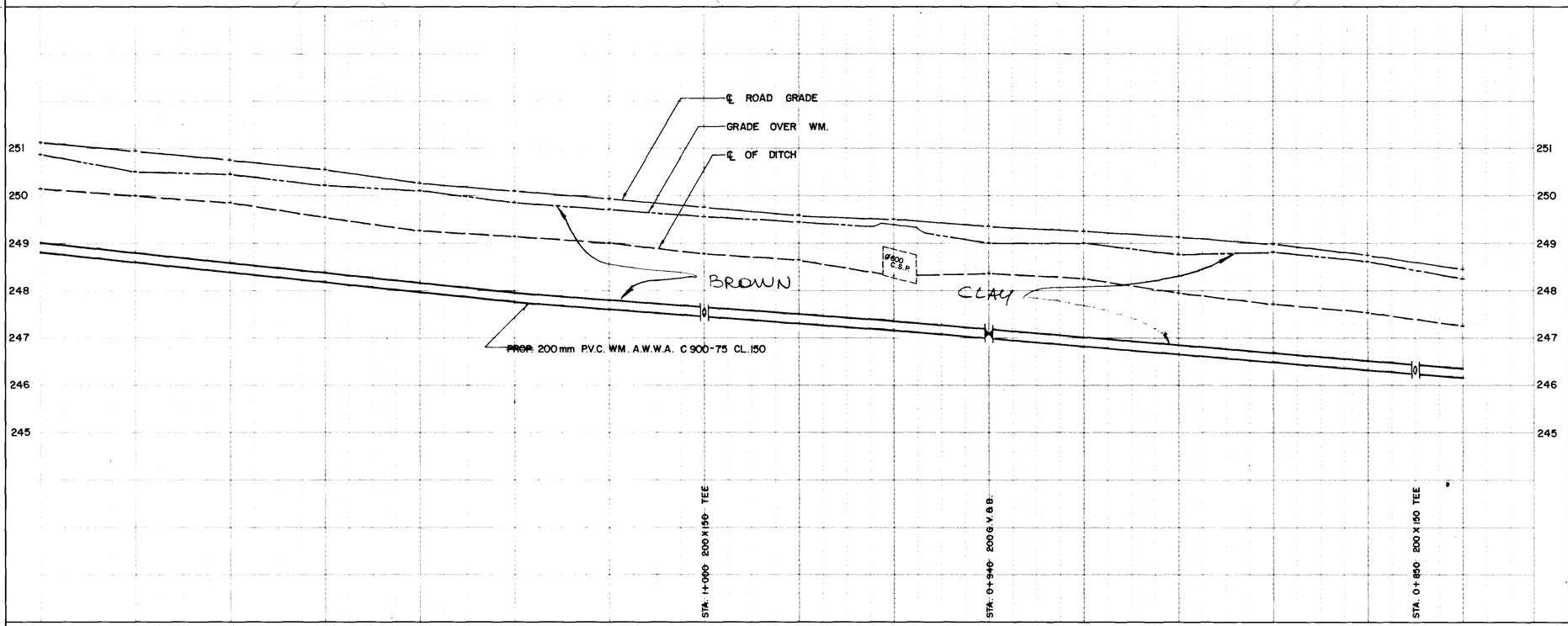
8427-D

TORBRAM ROAD



4849 700N 282 100E

4849 500N 282 300E



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1+140	1+120	1+100	1+080	1+060	1+040	1+020	1+000	0+980	0+960	0+940	0+920	0+900	0+880	0+860	0+840	RD. CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	IN
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
APRIL 3, 1987	AS CONSTRUCTED -	Y.C.

General Notes

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- ▭ Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN.)

B.M. N° Elev.

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REGISTERED PROFESSIONAL ENGINEER K. P. HO PROVINCE OF ONTARIO — Designed by — chkd. — 88-09-01

REGISTERED PROFESSIONAL ENGINEER D. G. KWAGA PROVINCE OF ONTARIO — Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
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MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
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HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

TORBRAM ROAD

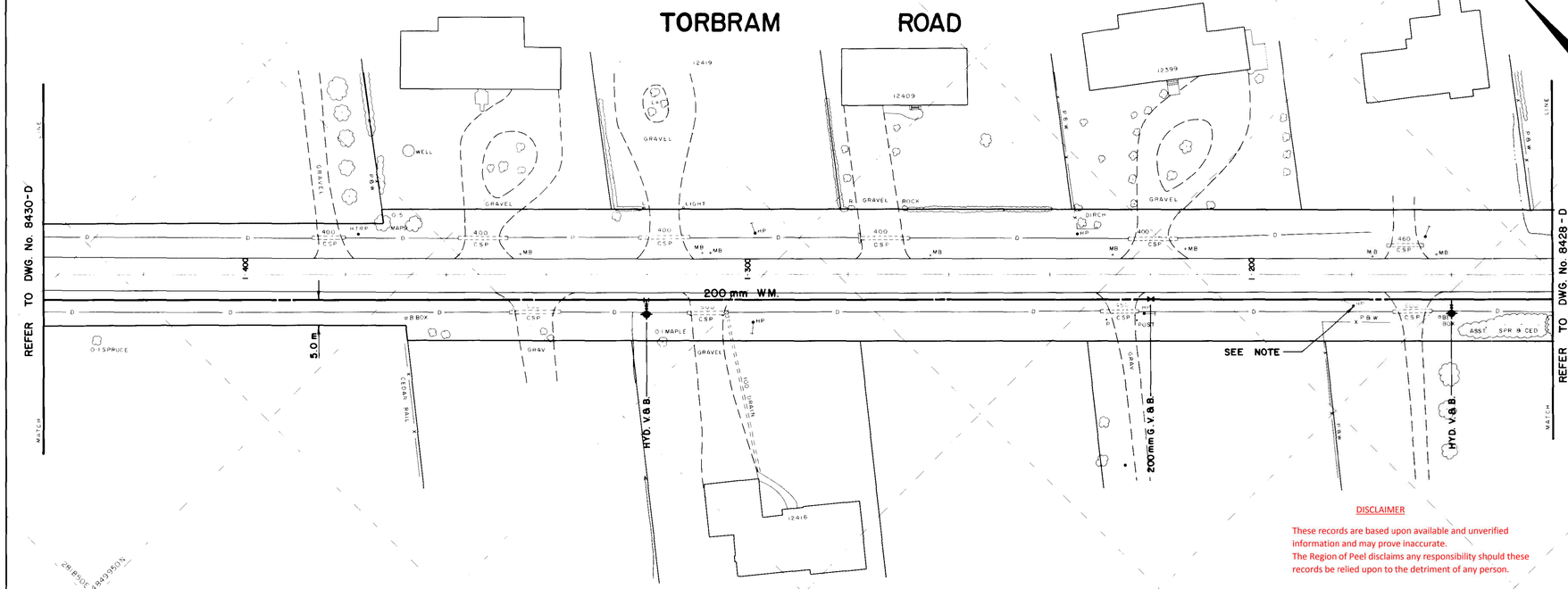
~~PROP.~~ 200mm WATERMAIN

Sta. 0+840 **To Sta.** 1+140

Lots 19		Area C-5	Project No. 86-1030
Scale	Hor. 1:500 Ver. 1:50	Drawn by Y.C.	Checked by
Date AUGUST 1986		Sheet 4 of 7	Plan No. 8428-D

8428-D

TORBRAM ROAD



DISCLAIMER

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The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.

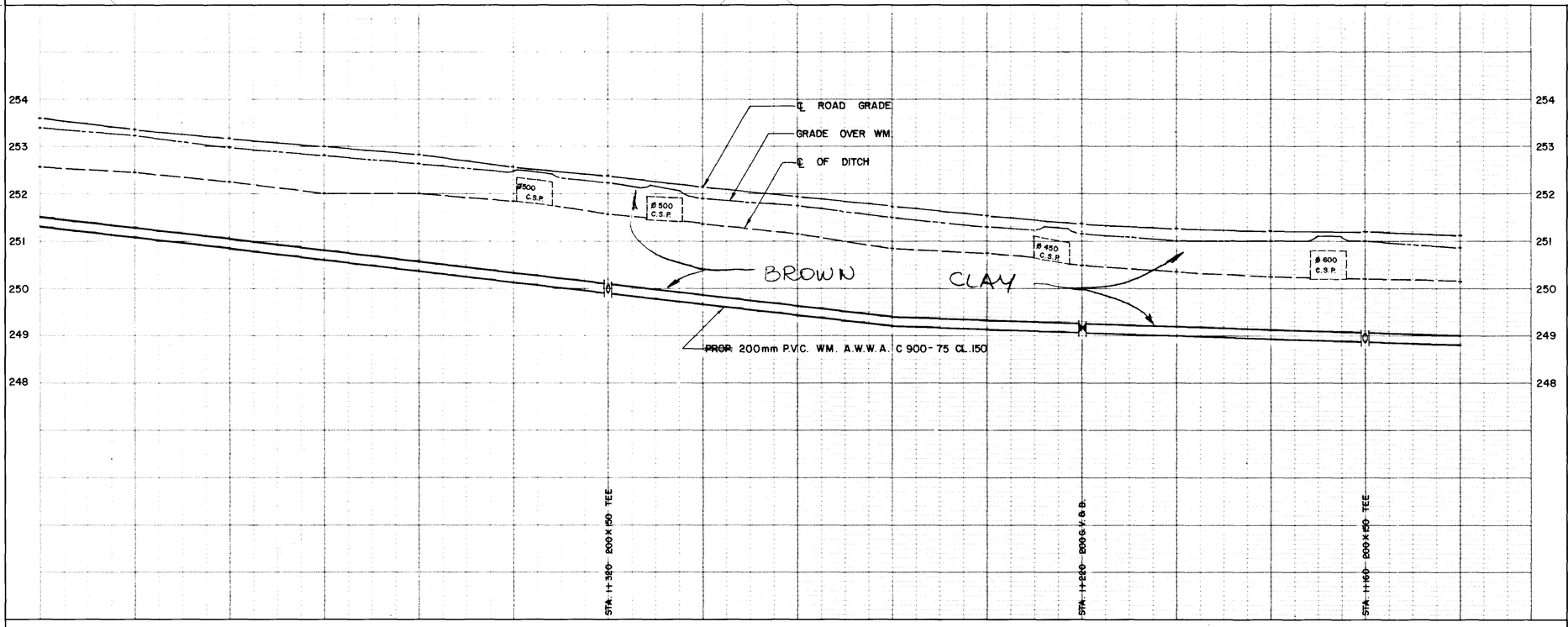
NOTE: THE CONTRACTOR IS TO SUPPORT THE HYDRO POLE TO THE SATISFACTION OF THE AUTHORITY.

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	IN
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
APRIL 3, 1987	AS CONSTRUCTED	Y.C.



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1+440	1+420	1+400	1+380	1+360	1+340	1+320	1+300	1+280	1+260	1+240	1+220	1+200	1+180	1+160	1+140

General Notes

- All Driveways Gravel Unless Otherwise Noted.
- All Service Locations Are Approximate And Must Be Located Accurately In Field.
- Denotes Building – Not Located
- Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN.)

B.M. N° Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction Location of Existing Utilities Approximate Only, To Be Verified In Field By Contractor.

REGISTERED PROFESSIONAL ENGINEER K. P. HO PROVINCE OF ONTARIO
Designed by 16.09.87 chkd.

REGISTERED PROFESSIONAL ENGINEER B. J. SAUNDERS 36[illegible] PROVINCE OF ONTARIO
Approved by 87-09-03

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

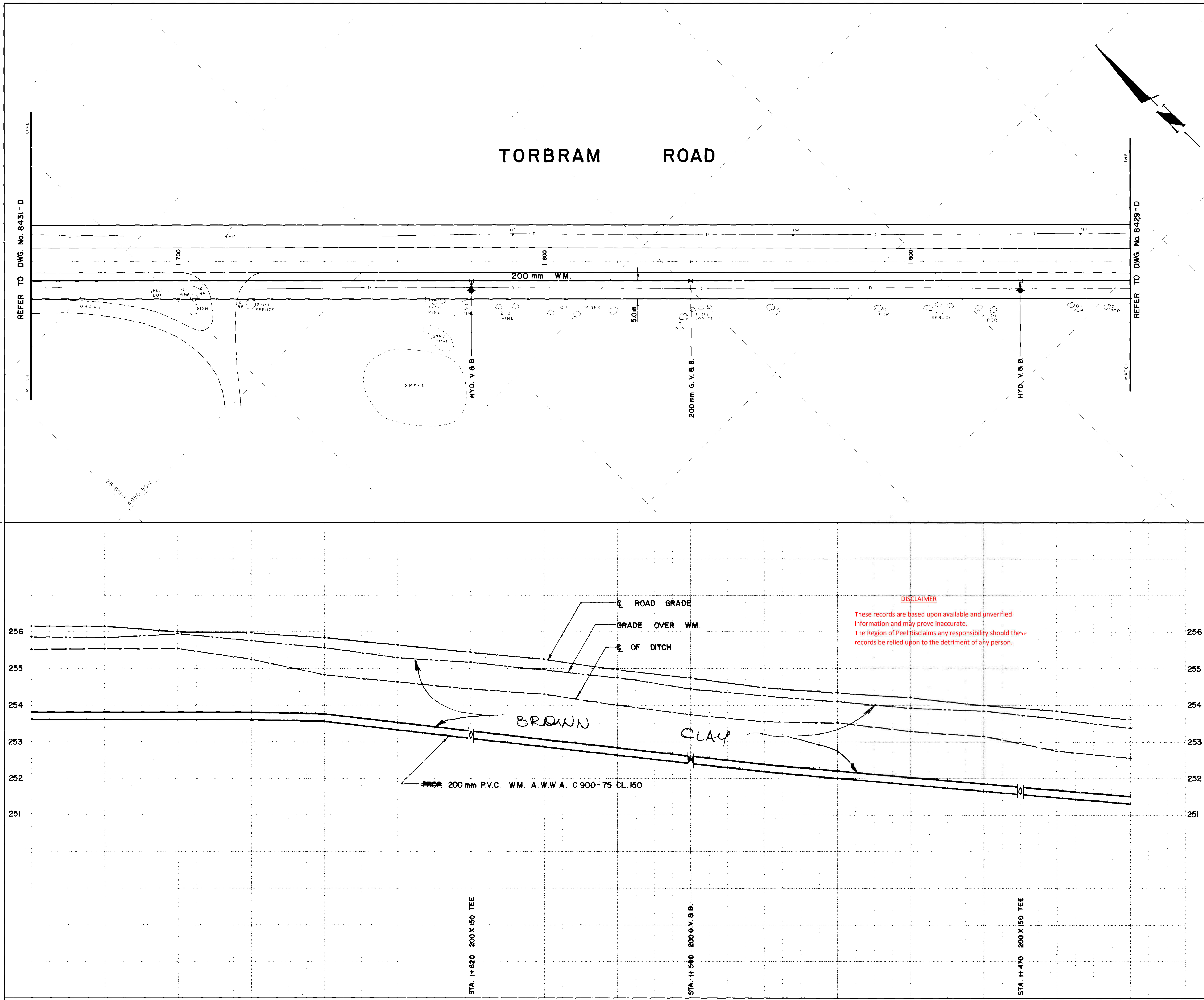
TORBRAM ROAD

~~PROP.~~ 200mm WATERMAIN

Sta. 1+140 **To Sta.** 1+440

Lots 19 & 20	Area C-5	Project No. 86-1030
Scale Hor. 1:500 Ver. 1:50	Drawn by Y.C.	Checked by
Date AUGUST 1986	Sheet 5 of 7	Plan No. 8429-D

8429-D



253.60	253.60	253.60	253.60	253.55	253.30	253.10	252.85	252.65	252.40	252.20	252.00	251.80	251.65	251.50	251.30	BOT. EL. OF WM.
1+740	1+720	1+700	1+680	1+660	1+640	1+620	1+600	1+580	1+560	1+540	1+520	1+500	1+480	1+460	1+440	RD. CHAINAGE

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN. SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
APRIL 3, 1987	AS CONSTRUCTED	Y. C.

General Notes

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B.M. N° Elev.

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REGISTERED PROFESSIONAL ENGINEER K. P. HO PROVINCE OF ONTARIO 86-08-02
Designed by
chkd.

REGISTERED PROFESSIONAL ENGINEER G. J. SAVAGE PROVINCE OF ONTARIO 9-03
Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
HYDRO ELECTRIC POWER COMM. OF ONTARIO
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HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

TORBRAM ROAD

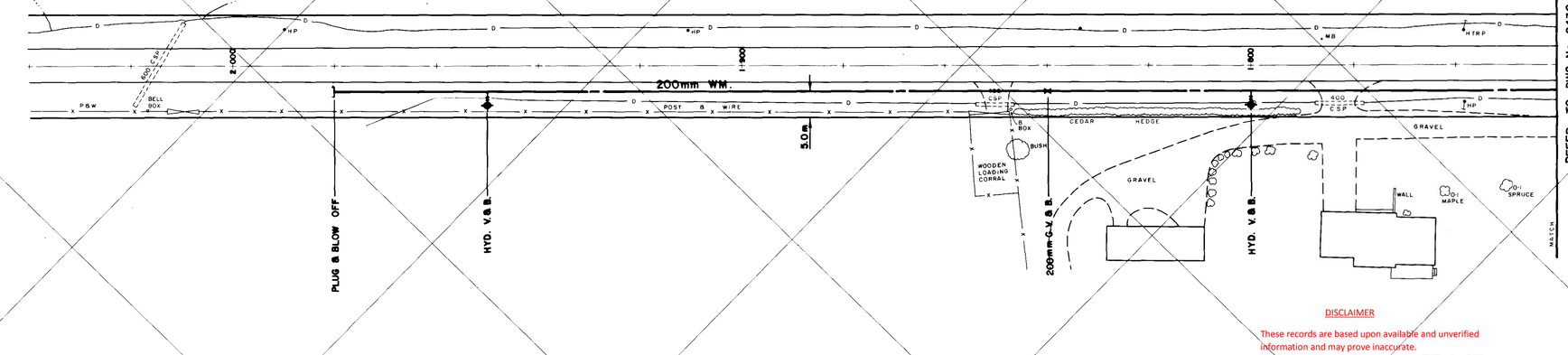
~~PROP.~~ 200 mm WATERMAIN

Sta. 1+440 To Sta. 1+740

Lots 20	Area C-5	Project No. 86-1030
Scale Hor. 1:500 Ver. 1:50	Drawn by Y.C.	Checked by
Date AUGUST 1986	Sheet 6 of 7	Plan No. 8430-D

8430-D

TORBRAM ROAD



281 450E & 850 350N

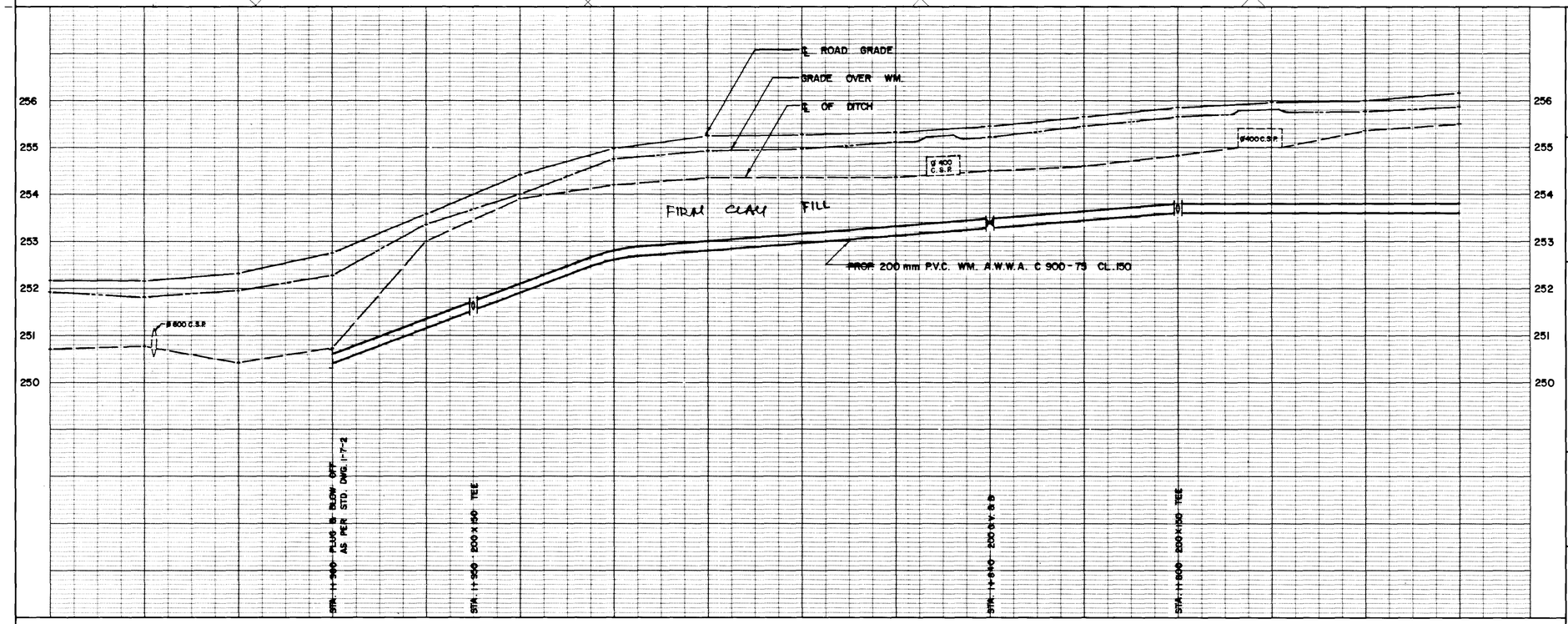
281 650E & 850 150N

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	IN
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		

REVISIONS

DATE	DETAILS	INIT.
APRIL 3, 1987	AS CONSTRUCTED	Y.C.



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  Type 'B' Bedding Unless Otherwise Noted (SAN)

B.M. N° Elev.

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REGISTERED PROFESSIONAL ENGINEER K. P. HO PROVINCE OF ONTARIO 86.08.07

Designed by chkd.

REGISTERED PROFESSIONAL ENGINEER G. A. SWANCE PROVINCE OF ONTARIO

Approved by

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
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MINISTRY OF TRANSPORTATION
MINISTRY OF ENVIRONMENT
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HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
HYDRO ELECTRIC COMM. PORT CREDIT
HYDRO ELECTRIC COMM. STREETSVILLE
CABLE TELEVISION

Region of Peel

Department of Public Works

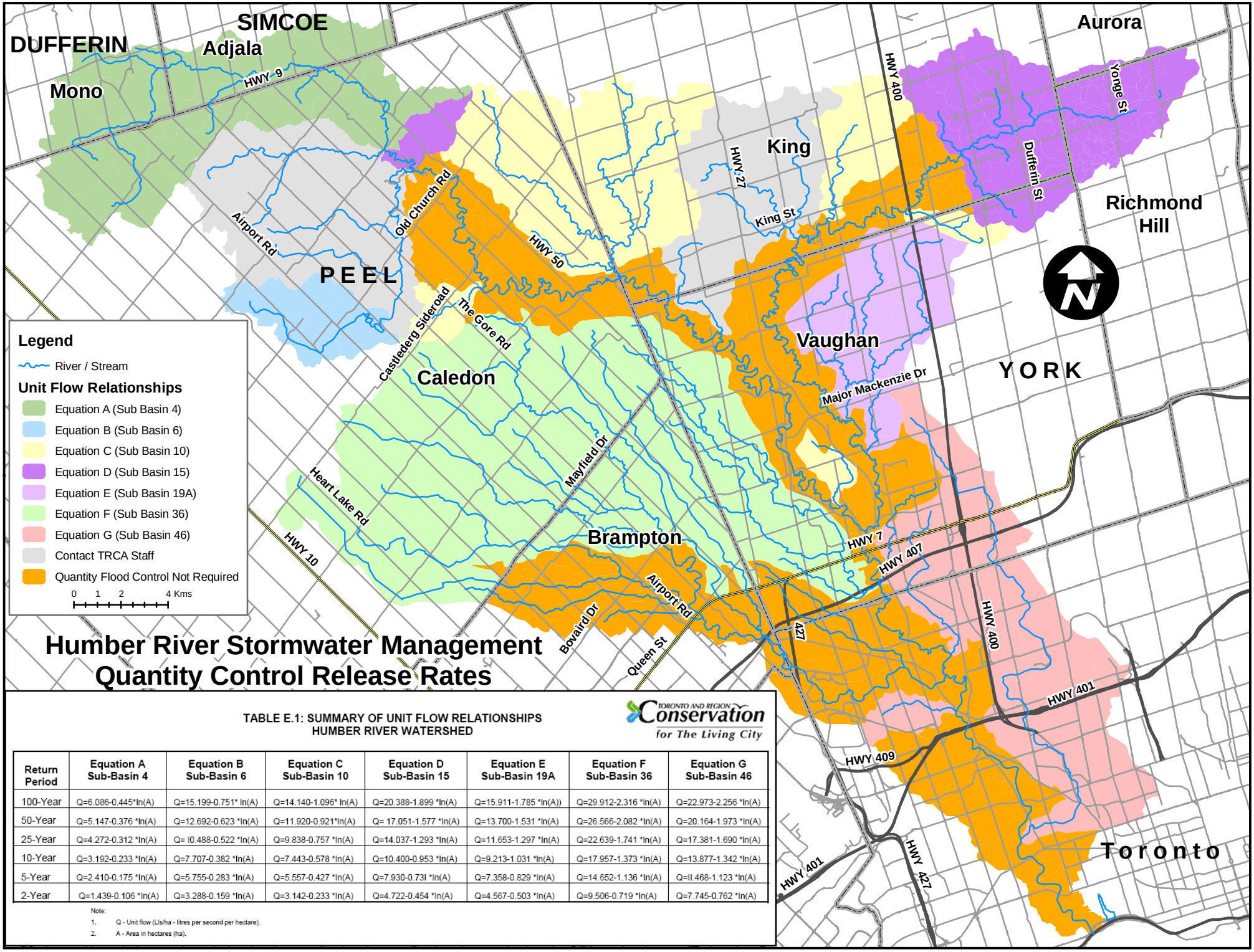
TORBRAM ROAD

~~PROP~~ 200mm WATERMAIN

Sta. 1+740 To Sta. 2+040

Lots 21		Area C-5	Project No. 86-1030
Scale	Hor. 1:500 Ver. 1:50	Drawn by Y.C.	Checked by
Date AUGUST 1986		Sheet 7 of 7	Plan No. 8431-D

8431-D



Humber River Stormwater Management Quantity Control Release Rates

TABLE E.1: SUMMARY OF UNIT FLOW RELATIONSHIPS
HUMBER RIVER WATERSHED

Return Period	Equation A Sub-Basin 4	Equation B Sub-Basin 6	Equation C Sub-Basin 10	Equation D Sub-Basin 15	Equation E Sub-Basin 19A	Equation F Sub-Basin 36	Equation G Sub-Basin 46
100-Year	Q=6.086-0.445*ln(A)	Q=15.199-0.751* ln(A)	Q=14.140-1.096* ln(A)	Q=20.388-1.899 *ln(A)	Q=15.911-1.785 *ln(A))	Q=29.912-2.316 *ln(A)	Q=22.973-2.256 *ln(A)
50-Year	Q=5.147-0.376 *ln(A)	Q=12.692-0.623 *ln(A)	Q=11.920-0.921*ln(A)	Q= 17.051-1.577 *ln(A)	Q=13.700-1.531 *ln(A)	Q=26.566-2.082 *ln(A)	Q=20.164-1.973 *ln(A)
25-Year	Q=4.272-0.312 *ln(A)	Q= l0.488-0.522 *ln(A)	Q=9.838-0.757 *ln(A)	Q=14.037-1.293 *ln(A)	Q=11.653-1.297 *ln(A)	Q=22.639-1.741 *ln(A)	Q=17.381-1.690 *ln(A)
10-Year	Q=3.192-0.233 *ln(A)	Q=7.707-0.382 *ln(A)	Q=7.443-0.578 *ln(A)	Q=10.400-0.953 *ln(A)	Q=9.213-1.031 *ln(A)	Q=17.957-1.373 *ln(A)	Q=13.877-1.342 *ln(A)
5-Year	Q=2.410-0.175 *ln(A)	Q=5.755-0.283 *ln(A)	Q=5.557-0.427 *ln(A)	Q=7.930-0.73l *ln(A)	Q=7.358-0.829 *ln(A)	Q=14.652-1.136 *ln(A)	Q=ll.468-1.123 *ln(A)
2-Year	Q=1.439-0.106 *ln(A)	Q=3.288-0.159 *ln(A)	Q=3.142-0.233 *ln(A)	Q=4.722-0.454 *ln(A)	Q=4.567-0.503 *ln(A)	Q=9.506-0.719 *ln(A)	Q=7.745-0.762 *ln(A)

Note:
1. Q - Unit flow (Lls/ha - litres per second per hectare).
2. A - Area in hectares (ha).

TORONTO AND REGION Conservation for The Living City

3.1.2 Pressure Zones

The Region of Peel transmission and distribution systems deliver water to users through seven pressure zones separated by approximately 30-metre intervals of elevation. **Table 3** presents a summary of the lake-base water system pressure zones.

Table 3 – Lake-based water system pressure zones.

Pressure Zone	Top Water Level	Hydraulic Grade Line	Serviceable Elevation
Zone 1	144.8 m	152.4 m	75.0 – 106.7 m
Zone 2	175.3 m	182.9 m	87.8 – 137.2 m
Zone 3	205.7 m	213.4 m	135.9 – 167.6 m
Zone 4	236.2 m	243.8 m	166.4 – 210.6 m
Zone 5	266.7 m	274.3 m	182.4 – 236.2 m
Zone 6	297.2 m	304.8 m	214.5 – 259.1 m
Zone 7	327.7 m	335.3 m	243.4 – 289.6 m

3.1.3 Transmission Mains

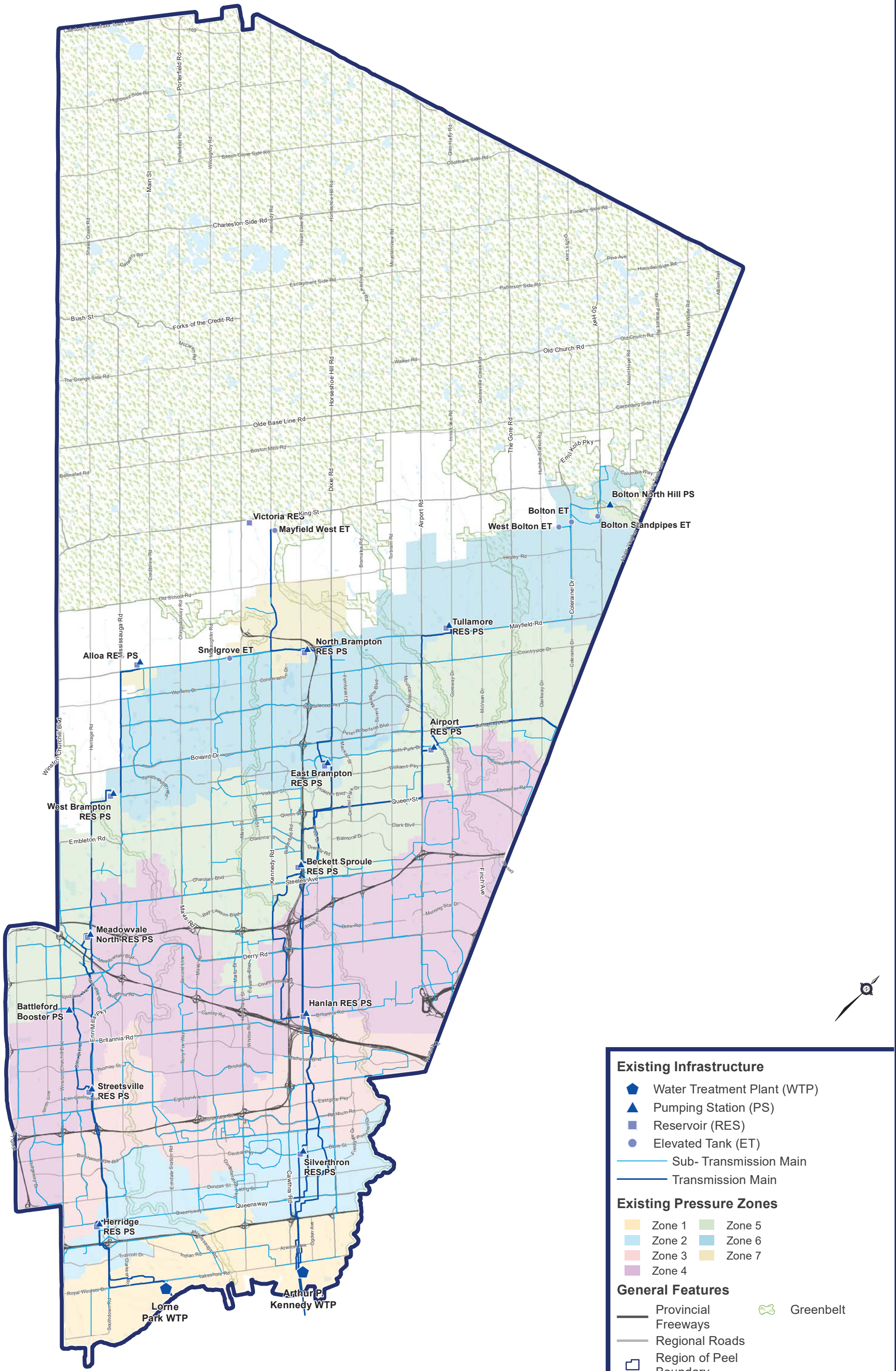
The Region Peel transmission system is divided into three main trunk systems: West, Central and East. In reviewing the flow transfer capability of the transmission main, two important factors are considered; theoretical capacity and actual capacity. The capacity of the transmission main is defined based on the watermain characteristics as follows:

Theoretical capacity

- Size of the transmission main,
- Expected resistance (or energy loss) of the transmission main, and
- Standard/assumed roughness coefficient for a new transmission main.

Actual capacity

- Size of the transmission main,
- Expected resistance (or energy loss) of the transmission main, and
- Roughness coefficient obtained from the calibrated hydraulic model.



Region of Peel
working with you

2020 WATER AND WASTEWATER MASTER PLAN

Existing Water System

BluePlan ENGINEERING

June 2020
715022-139-W-PIC 2
NAD 1983 UTM Zone 17N

Document Path: W:\GTA\715000\715022 - Region of Peel W WW MP\3_WP\3_GIS\715022-139-W-Existing Water System (MSP).mxd

SEE DWG. SAN–02

BLOCK 1
EMPLOYMENT LANDS
GFA = 10.44 ha
BLOCK AREA EXCL.
BLK 1 | 37.3 | 731

BLOCK 2
EMPLOYMENT LANDS
GFA = 3.62 ha
BLK 2 | 10.7 | 253

BLOCK 5
EMPLOYMENT LANDS
GFA = 9.07 ha
BLOCK AREA EXCL.
BLK 5 | 17.4 | 635

STREET A

BLOCK 10
FUTURE COMMUNITY BLOCK

BLOCK 11
GREENBELT

BLOCK 12
EPA

BLOCK 13
SWMP

BLOCK 14
SWMP

BLOCK 16

BLOCK 17

TORBRAM ROAD

MAYFIELD ROAD

EAST OF HURONTARIO

COUNTRY SIDE VILLAGES BLOCK 48–2
SECONDARY PLAN AREA
OZS–2019–0013/21T–1902
SANDRINGHAM EAST

STREET '2'
STREET '10'
STREET '11'

MH103A	115.3m–300mmø SAN @ 1.30%	MH50A
MH50A	120.0m–300mmø SAN @ 0.50%	MH104A
MH104A	13.0m–250mmø SAN @ 2.00%	MH53A
MH53A	96.9m–300mmø SAN @ 0.50%	MH54A
MH54A	114.6m–300mmø SAN @ 0.50%	MH55A
MH55A	22.9m–300mmø SAN @ 0.50%	MH56A
MH56A		MH57A
MH18A	89.2m–600mmø SAN @ 0.35%	MH19A
MH19A	71.4m–600mmø SAN @ 0.35%	MH20A
MH20A	71.2m–600mmø SAN @ 0.35%	MH21A
MH21A	101.4m–600mmø SAN @ 0.35%	MH22A
MH22A	116.8m–600mmø SAN @ 0.35%	MH23A
MH23A	102.1m–600mmø SAN @ 0.35%	MH24A
MH24A	13.0m–250mmø SAN @ 2.00%	MH106A
MH106A	75.8m–600mmø SAN @ 0.35%	MH25A
MH25A	105.1m–600mmø SAN @ 0.35%	MH26A
MH26A	107.0m–600mmø SAN @ 0.35%	MH27A
MH27A	110.9m–600mmø SAN @ 0.35%	MH28A
MH28A	29.3m–600mmø SAN @ 0.35%	MH29A
MH29A	108.0m–600mmø SAN @ 0.35%	MH30A
MH30A	65.7m–600mmø SAN @ 0.35% FUTURE (B.O.)	
MH50A	35.0m–300mmø SAN @ 1.00%	
MH51A	120.2m–300mmø SAN @ 0.50%	MH52A
MH52A	17.0m–250mmø SAN @ 2.00%	MH105A
MH105A	68.6m–300mmø SAN @ 0.50%	

ID	AP
112	0.2 | 0
113	0.2 | 0
114	0.2 | 0
115	0.3 | 0
116	0.3 | 0
117	0.3 | 0
118	0.2 | 0
119	0.3 | 0
120	0.3 | 0
121	0.1 | 0
122	0.1 | 0
123	0.1 | 0
124	0.3 | 0
125	0.3 | 0
126	0.3 | 0
127	0.3 | 0
128	0.3 | 0
129	0.2 | 0

EX. 750mmø SAN @ 0.30%

KEY PLAN
SCALE: N.T.S.

SITE LOCATION

LEGEND

- PROPERTY LINE
- GREENBELT BOUNDARY
- PROPOSED SANITARY DRAINAGE CATCHMENT
- EXISTING SANITARY SEWER & MANHOLE
- FUTURE SANITARY SEWER BY OTHERS
- SANITARY BLOCK OUTLET
- ID / AP — CATCHMENT I.D. / AREA (ha)/POPULATION

50 0m 50 100 150 200
SCALE: 1:2500

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BENCHMARKS

ELEVATIONS HEREON ARE GEODETIC IN ORIGIN AND WERE DERIVED FROM GPS OBSERVATIONS USING THE "TOPNET" GPS NETWORK AND ARE REFERRED TO CGVD–1928: 1978 DATUM.

SITE BENCHMARK:
A CUT CROSS HAVING ELEVATION 242.51m WAS SET ON THE NORTHEAST CORNER OF THE INTERSECTION BETWEEN MAYFIELD ROAD AND TORBRAM RD.

SURVEY COMPLETED BY YOUNG & YOUNG SURVEYING INC. (2021/OCT/07) REFERENCE NO. 21–B7601–4

Town: TOWN OF CALEDON

No.	ISSUE	DATE: MMM/DD/YYYY
0	ISSUED FOR PLAN OF SUBDIVISION	MAR/28/2024

Engineer: LICENSED PROFESSIONAL ENGINEER — J. M. SCOTT — 100214964 — MAR 28 2024 — PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER — PAVEL FILIPTSEV — 100146817 — MAR.28.2024 — PROVINCE OF ONTARIO

Project: TULLAMORE INDUSTRIAL GP LTD. – TULLAMORE LANDS
MAYFIELD ROAD & AIRPORT ROAD & TORBRAM ROAD
TOWN OF CALEDON

Drawing: SANITARY DRAINAGE AREA PLAN

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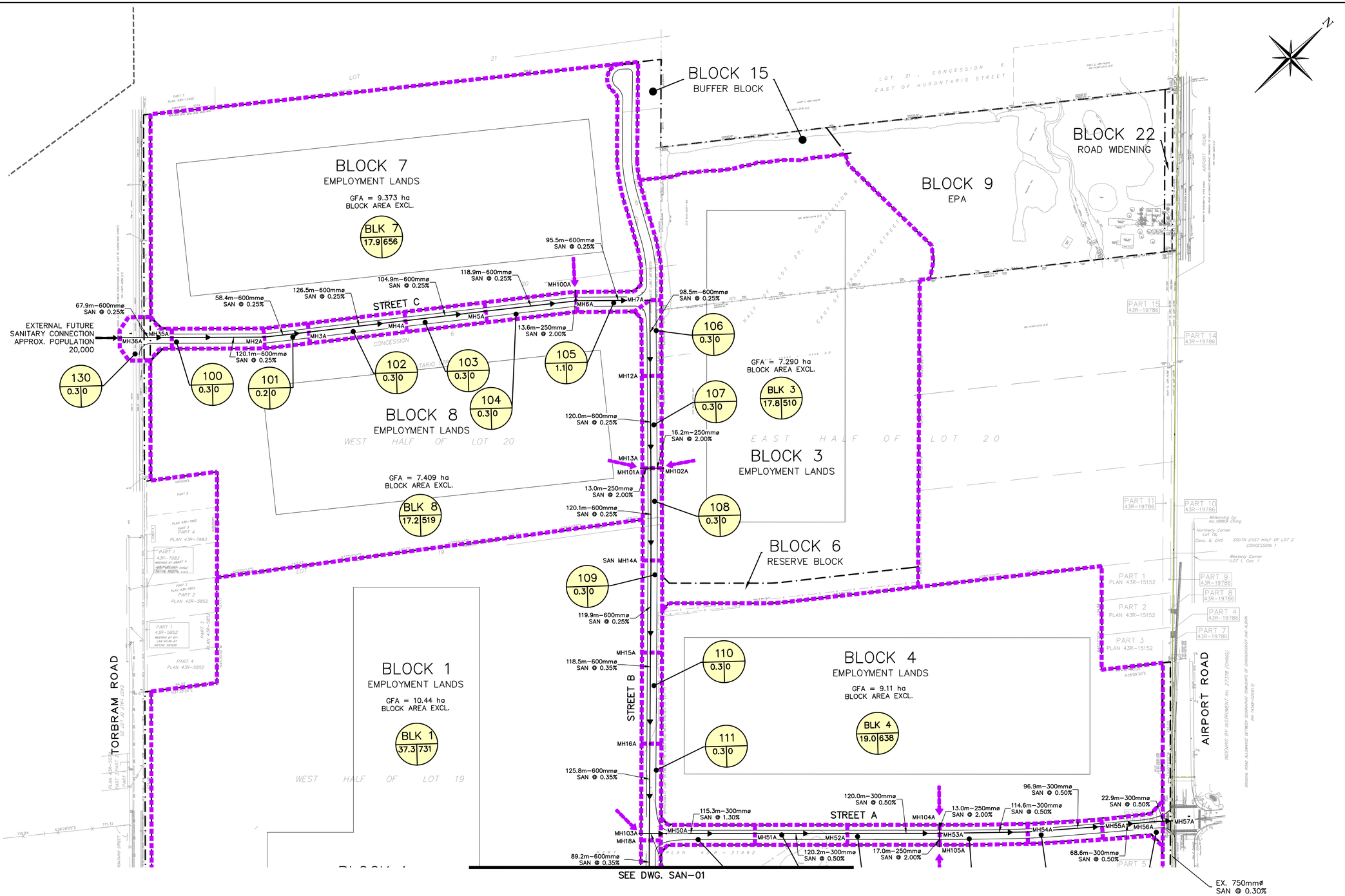
Drawn By	Design By	Scale	Project
V.M.	V.M./P.F.	1: 2500	2022–5842
Check By	Check By	Sheet	Drawing
P.F./J.S.	J.S./P.F.	13 OF 119	SAN–01



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0	ISSUED FOR PLAN OF SUBDIVISION	MAR/28/2024

Engineer: LICENSED PROFESSIONAL ENGINEER — J. M. SCOTT — 100214864 — MAR 28 2024 — 2022-5842-2 — PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER — PAVEL FILIPTSEV — 100146817 — MAR.28,2024 — PROVINCE OF ONTARIO

Project: TULLAMORE INDUSTRIAL GP LTD. – TULLAMORE LANDS
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Check By	Check By	Sheet	Drawing
P.F./J.S.	J.S./P.F.	14 OF 119	SAN–02

GEMTEC
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Submitted to:

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Markham, Ontario
L3R 1G9

Detailed Factual Geotechnical and Hydrogeological Subsurface Investigation Report Mayfield Golf Course Redevelopment Golf Course Lands and South Lands

Caledon, Ontario

September 26, 2024
GEMTEC Project: 101987.001

tributaries and the staff gauges were installed within the tributaries, both of which were installed using a fencepost driver. The drive-point piezometers were installed to depths ranging from about 1.3 m to 1.7 m bgs, each of which extended below the adjacent tributary bed.

To provide continuous record of water level monitoring from spring to fall 2023, a Van Essen TD-Diver datalogger was installed at each drive-point piezometer and staff gauge location. Hydrographs for the water level data obtained to date are provided as Figures G-1 to G-4 in Appendix G.

3.2.2 Hydraulic Response Testing

In-situ hydraulic response testing was carried out in twelve of the monitoring wells (i.e., Boreholes BH23-2, BH23-5, BH23-6D, BH23-9, BH23-10D, BH23-11, BH23-12, BH23-21S, BH23-21D, BH23-23S, BH23-23D and BH23-26) to estimate the bulk horizontal hydraulic conductivity (K_b) of the overburden and/or bedrock materials adjacent to the screened intervals. The testing consisted of creating an instantaneous change through rapid purging in the well by removing a known volume of water, followed by recording the time taken for the water level to return to static conditions (i.e., rising head test). The data was analyzed using the Hvorslev (1951) solution. Sheets summarizing the test data, analysis interval, input parameters and estimated bulk hydraulic conductivity for each test location are provided as Figures H-1 to H-12 in Appendix H.

4.0 SUBSURFACE CONDITIONS

As previously indicated, the soil and groundwater conditions identified in the boreholes are presented on the Record of Borehole sheets in Appendix C. The Record of Borehole sheets indicate the subsurface conditions at the specific borehole locations only. Boundaries between zones on the Record of Borehole sheets are often not distinct, but rather are transitional and have been interpreted from discontinuous drilling observations. The precision with which subsurface conditions are indicated depends on the method of drilling, the frequency and recovery of samples, the method of sampling, and the uniformity of the subsurface conditions. Subsurface conditions at locations other than the boreholes may vary from the conditions encountered in the boreholes, both laterally and with depth. In addition to soil variability, fill of variable physical and chemical composition is present in portions of the Site associated with previous construction activities (i.e., parking areas, buildings, etc.).

The groundwater conditions described in this report refer only to those measured at the place and time of observation, as noted in the report. These conditions may vary seasonally and annually, or as a result of groundwater takings in the area.

The soil descriptions in this report are based on commonly accepted methods of classification and identification employed in geotechnical practice. Classification and identification of soil and rock involves judgement and GEMTEC does not guarantee descriptions as exact but infers accuracy to the extent that is common in current geotechnical practice.

The subsurface soil conditions at the Site generally comprise of surficial topsoil and fill materials overlying interlayered deposits of glacial till (cohesive and non-cohesive) and silty clay to clayey silt, as well as silt, sand and gravel, all underlain by bedrock consisting of interbedded limestone and shale. The cohesive glacial till and clay deposits were typically found in the upland areas at higher elevations while the non-cohesive silt, sand and gravel and glacial till deposits were typically found in the valley lands, underlying the cohesive deposits. The following presents an overview of the subsurface conditions encountered in the boreholes advanced during the current geotechnical Site investigation, in consideration of the conditions reported in the previous geotechnical investigations (GEMTEC 2022).

4.1 Topsoil and Organic Materials

A surficial layer of topsoil ranging in thickness from about 80 mm to 690 mm was encountered across the majority of the Site outside of the roadways, cart paths and parking areas. Additionally, organic soil materials were encountered in Boreholes BH23-E1, BH23-4, BH23-5 and BH23-16 at depths ranging from about 0.3 m to 2.1 m and ranged in thickness from about 0.3 m to 2.1 m. The organic materials were fully penetrated in all boreholes where they were encountered to depths ranging from about 0.6 m to 4.0 m.

Please note that the topsoil and organic materials encountered during the investigation were not tested for soil fertility and may not be able to support the long-term growth of new or existing plant life as part of the proposed development work.

4.2 Fill Materials

Various fill materials were found at surface in Boreholes BH23-1 to BH23-6, BH23-13 and BH23-E2 extending to depths of up to about 2.9 m. The fill materials are assumed to be associated with the construction of maintenance areas and grade raise fill within the northern portion of the Mayfield Golf Course Lands from the previous development(s). The fill materials were typically comprised of sandy gravel or silty sand (non-cohesive) and silty clay (cohesive). Most of the fill materials at the Site were observed to contain organic inclusions.

Standard penetration tests carried out in the non-cohesive sandy gravel or silty sand fill materials gave SPT N-values ranging from about 17 blows to 24 blows per 0.3 m of penetration, which generally indicates a compact state of compactness.

Standard penetration tests carried out in the cohesive silty clay fill materials gave SPT N-values ranging from about 4 blows to 33 blows per 0.3 m of penetration, which generally suggests a soft to hard consistency.

The single water content value measured on a sample of the non-cohesive fill material was about 19 per cent. The water content values measured on samples of the cohesive fill materials ranged

from about 18 per cent to 33 per cent. No additional laboratory testing was carried out on the fill materials.

4.3 Non-Cohesive Sand, Silt and Gravel Deposits

Native deposits of gravel, silty gravel, sand, silty sand, silt, silt of slight plasticity and deposits containing mixtures of sand and gravel or silt and sand were encountered in all boreholes except Boreholes BH23-E1, BH23-E3, BH23-1, BH23-4, BH23-5, BH23-8, BH23-11 to BH23-14, BH23-17, BH23-20, BH23-22 to BH23-24 and BH23-25. The non-cohesive deposits were frequently associated with rock fragments and slow auger advancement resulting from grinding against presumed cobbles and boulders. The deposits were typically encountered below and interlayered with the finer grained glacial till and cohesive soils (as described below).

Standard penetration tests carried out in the non-cohesive deposits gave SPT N-values ranging from about 16 blows per 0.3 m of penetration to 50 blows per 0.08 m of penetration, which generally indicates a compact to very dense compactness condition.

The water content values measured on samples of the non-cohesive deposits ranged from about 4 per cent to 21 per cent with higher water content values encountered below the water table.

Fourteen grain size distribution tests were undertaken on the non-cohesive deposits and the detailed results are presented in Appendix D.

4.4 Silty Clay to Clayey Silt or Silty Sand to Sandy Silt Glacial Till

Cohesive and non-cohesive glacial till deposits were encountered in all boreholes except Borehole BH23-3 and were generally interlayered with each other as well as with the silty clay deposits. The cohesive glacial till deposits were typically comprised of silty clay or silty clay to clayey silt, were frequently observed to contain rock fragments and be sandy and/or gravelly with isolated sand pockets and sand seams present within the deposits. The non-cohesive glacial till typically comprised of silty sand to sandy silt with frequent rock fragments and occasional silt seams. The cohesive glacial till deposits were typically found at higher elevations overlying the non-cohesive sand, silt and gravel deposits, and the non-cohesive glacial till was typically encountered near the overburden/bedrock contact. All of the glacial till deposits were frequently associated with slow auger advancement resulting from grinding against presumed cobbles and boulders.

Standard penetration tests carried out in the cohesive till deposits gave SPT N-values ranging from about 12 blows to 98 blows per 0.3 m of penetration, which suggests a stiff to hard consistency. However, most SPT N-values were approximately 20 blows or more per 0.3 m of penetration, suggesting a very stiff to hard consistency.

Standard penetration tests carried out in the non-cohesive till deposits gave SPT N-values ranging from about 30 blows per 0.3 m of penetration to 50 blows per 0.08 m of penetration, which indicates a dense to very dense compactness condition with greater values encountered at depth.

The water content values measured on samples of the cohesive glacial till ranged from about 8 per cent to 18 per cent, but were generally between about 10 per cent to 15 per cent. The water content values measured on samples of the non-cohesive glacial till ranged from about 7 per cent to 10 per cent.

Seven grain size distribution tests were undertaken on the glacial till deposits and the detailed results are presented in Appendix D.

Atterberg limits testing was carried out on selected samples of the cohesive glacial till deposits and returned plastic limits ranging from about 14 per cent to 16 per cent, liquid limits ranging from about 20 per cent to 27 per cent, and plasticity indices ranging from about 6 per cent to 11 per cent; indicating that the deposits have low plasticity.

4.5 Silty Clay

Cohesive deposits of silty clay were encountered in all boreholes except Boreholes BH23-11, BH23-12, BH23-16 and BH23-21 and were generally interlayered with the glacial till deposits (described above). Oxidation staining was noted in isolated portions of the deposits and organic inclusions were noted within about the upper 1.5 m of the deposits in Boreholes BH23-E1, BH23-E2 and BH23-23. The deposits contained isolated sand seems and sand pocket as well as rock fragments which were typically encountered at greater depth near the interface with the non-cohesive deposits or underlying bedrock. The deposits were interlayered with the glacial till deposits and were typically found at higher elevations overlying the non-cohesive sand, silt and gravel deposits.

Standard penetration tests carried out in the silty clay deposits gave SPT N-values ranging from about 5 blows per 0.3 m of penetration to 50 blows per 0.13 m of penetration, suggesting a firm to hard consistency. However, the SPT N-Values typically ranged from about 15 blows to 45 blows per 0.3 m of penetration, suggesting a very stiff to hard consistency. Field shear vane testing was not carried out due to the high relative in situ stiffness of the materials.

The water content values measured on samples of the silty clay deposits ranged from about 9 per cent to 27 per cent.

Three grain size distribution tests were undertaken on the silty clay deposits and the detailed results are presented in Appendix D.

Atterberg limits testing was carried out on selected samples of the silty clay deposits and returned plastic limits ranging from about 17 per cent to 22 per cent, liquid limits ranging from about

28 per cent to 38 per cent, and plasticity indices ranging from about 12 per cent to 18 per cent; indicating that the deposits have low plasticity.

4.6 Slightly Weathered to Fresh Bedrock

Bedrock coring was undertaken at Boreholes BH23-11, BH23-12 and BH23-17 at depths ranging from about 7.3 m to 18.3 m bgs. The encountered bedrock generally consisted of grey, weathered to fresh LIMESTONE bedrock of the Georgian Bay Formation with interbedded SHALE layers. Cobbles and boulders of both the native bedrock and transported rock material (i.e., not native to the Site) were encountered overlying the bedrock in Borehole BH23-11 between approximately 3 m and 7.8 m bgs. Auger/SPT refusal on presumed bedrock contact was also encountered in Boreholes BH23-5, BH23-8, BH23-18, BH23-23 and BH23-28. Details of the depths at which bedrock was encountered in each borehole are provided below in Table 0.

Table 0 – Estimated Bedrock Depths and Elevations.

Borehole No.	Overburden Depth (m bgs)	Surface of Bedrock (El. m)
BH23-5[1]	10.7	247.5
BH23-8[1]	7.3	245.7
BH23-11	7.8	238.2
BH23-12	7.9	247.0
BH23-17	13.3	239.7
BH23-18[1]	16.2	238.3
BH23-23[1]	14.4	235.5
BH23-28[1]	18.3	237.6

Note: 1. Denotes inferred bedrock contact based on SPT and auger refusal without bedrock coring.

Rock Quality Designation (RQD) values between about 38 per cent and 97 per cent were measured. However, below the upper 0.5 m to 1.0 m of bedrock, RQD values of 89 per cent to 97 percent were typically encountered. The measured RQD values generally indicate that the quality of the bedrock is poor to fair in the upper 0.5 m to 1.0 m and excellent below the upper 1.0 m according to the classification system provided in Section 3.2.4.5 of the Canadian Foundation Engineering Manual (CFEM).

Unconfined compressive strength (UCS) testing of two bedrock core samples within the lower, higher quality bedrock was undertaken and resulted in UCS values of about 62 MPa and 74 MPa, indicating the bedrock strength can be classified as strong according to the classification system provided in Section 3.2.4.1 of CFEM. Details of the UCS testing results are presented in Appendix D. It should be noted that UCS testing tends to provide results more typical of the

stronger portions of the bedrock core due to the test requirements for specimen dimensions (i.e., intact specimens with roughly a 1:1 to 2:1 height to width ratio). Bedrock core photographs are provided in Appendix E indicating the sections of the core which were submitted for laboratory testing.

4.7 Groundwater and Surface Water Conditions

Details of the monitoring well installations are summarized in Table F-1 in Appendix F. Groundwater and surface water levels were measured in the monitoring wells between April 11 and 14, 2023 and on May 18, 2023. The water level data are provided in Table F-2, Appendix F. The groundwater levels were measured relative to the top of the PVC standpipe (top of steel pipe for drive-point piezometers) at each monitoring well location and drive-point piezometer, and the surface water levels were measured relative to the top of the T-bar fencepost. Groundwater conditions may not have stabilized at all monitoring well and drive-point piezometer locations on the dates measured. The groundwater conditions described in this report refer only to those measured at the place and time of observation. Seasonal and annual fluctuations should be anticipated.

On May 18, 2023, the depth to groundwater ranged from about -0.55 m bgs (i.e., 0.55 m above grade (Borehole BH23-1) to 6.91 m bgs (Borehole BH23-26), and from approximate elevations of El. 258.5 m above sea level (asl) (Borehole BH23-1) to El. 241.8 m asl (Borehole BH23-26). The groundwater elevation data measured on May 18, 2023 are presented on Figure 6 in Appendix B. An exception occurred at BH23-28S/D where flowing artesian conditions were encountered on the measurement dates. Static groundwater levels and elevations have not been assessed at this location at the time of reporting.

On May 18, 2023, the vertical hydraulic gradients at the drive-point piezometer and staff gauge pairs were downward (i.e., recharging conditions) at DP23-1/SG23-1, DP23-3/SG23-3 and DP23-4/SG23-4, and upward (i.e., discharging conditions) at DP23-2/SG23-2. The hydrographs presented in Appendix G typically show similar vertical hydraulic gradient directions over the current monitoring period (i.e., April 17 to May 18, 2023), although some vertical gradient direction changes are recorded at DP23-3/SG23-3 and DP23-4/SG23-4.

At the bi-level monitoring well locations (i.e., Boreholes BH23-6S/D, BH23-10S/D, BH23-17S/D, BH23-21S/D, BH23-23S/D, and BH23-28S/D), vertical hydraulic gradients were assessed from the groundwater elevations measured on May 18, 2023. The approximate vertical hydraulic gradients for the bi-level monitoring wells were as follows:

- BH23-6S/D: -0.40 m/m
- BH23-10S/D: -0.21 m/m
- BH23-17S/D: -0.08 m/m
- BH23-21S/D: 0.04 m/m

- BH23-23S/D: -0.33 m/m
- BH23-28S/D: Undetermined due to flowing artesian conditions in both wells.

The majority of the vertical hydraulic gradients are negative, indicating downward gradients (i.e., recharging conditions). The vertical hydraulic gradient at BH23-21S/D is positive, indicating an upward gradient (i.e., discharging conditions) at this location. Flowing artesian conditions were observed at both BH23-28S and BH23-28D. As such, the vertical hydraulic gradient could not be estimated at this location. Artesian conditions were also observed at Borehole BH23-1.

4.8 Hydraulic Response Test Results

The results of the hydraulic response testing carried out in the monitoring wells are presented as Figures H-1 to H-12, Appendix H. The hydraulic conductivity values estimated from the rising head tests are presented in Table G-3, Appendix G. The following provides a summary of the test results:

Table 4.7 – Summary Hydraulic Conductivity Estimates

Predominant Unit	No. of Tests	Minimum K_b [m/s]	Maximum K_b [m/s]	Geomean K_b [m/s]
Silt and/or Sand, Silt and/or Sand Till	7	9×10^{-8}	3×10^{-6}	3×10^{-7}
Silty Clay & Silty Clay Till	3	1×10^{-8}	4×10^{-8}	2×10^{-8}
Sand & Silt Till & Bedrock	1	1×10^{-7}	1×10^{-7}	1×10^{-7}
Bedrock	1	2×10^{-8}	2×10^{-8}	2×10^{-8}

Notes: K_b = bulk hydraulic conductivity; m/s = metres per second

The hydraulic conductivity of the silt and/or sand and silt and/or sand tills ranged from approximately 9×10^{-8} m/s to 3×10^{-6} m/s with a geometric mean of 3×10^{-7} m/s (n=7). These hydraulic conductivity values fall within the literature range for silty sand to glacial till of 10^{-8} m/s to 10^{-5} m/s (Fetter, 1994).

The hydraulic conductivity of the silty clay and silty clay till materials ranged from approximately 1×10^{-8} m/s to 4×10^{-8} m/s with a geometric mean of 2×10^{-8} m/s. These hydraulic conductivity values fall within the literature range for clay of 10^{-11} m/s to 10^{-8} m/s and glacial till of 10^{-8} to 10^{-6} m/s (Fetter, 1994).

The hydraulic conductivity of the sand and silt till and bedrock was 1×10^{-7} m/s. This hydraulic conductivity value falls within the literature range for glacial till of 10^{-8} m/s to 10^{-6} m/s (Fetter, 1994) and limestone of 5×10^{-9} to 5×10^{-6} m/s (Freeze & Cherry, 1979).

The hydraulic conductivity of the limestone bedrock was 2 x 10^{-8} m/s. This hydraulic conductivity value falls within the literature range for limestone of 5 x 10^{-9} to 5 x 10^{-6} m/s (Freeze & Cherry, 1979).

4.9 South Lands Western Half

No boreholes were advanced within the west half of the South Lands as part of previous or current site investigations. As such, the material within this portion of the Site has been inferred based on the nearby boreholes on the east half of the parcel and publicly available geological data for the area.

Based on the geotechnical boreholes, provincial overburden mapping by the Ontario Geological Survey (OGS) and well records available from the Ministry of Environment, Conservation and Parks (MECP), the soils within the western half of the South Lands are anticipated to be consistent with the soils encountered within the remainder of the parcel (i.e., interlayered cohesive glacial till and silty clay generally overlying non-cohesive deposits of silt, sand, gravel and glacial till, all underlain by an inferred bedrock contact).

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Table F-2 Groundwater Depths and Elevations - Mayfield Golf Course Development

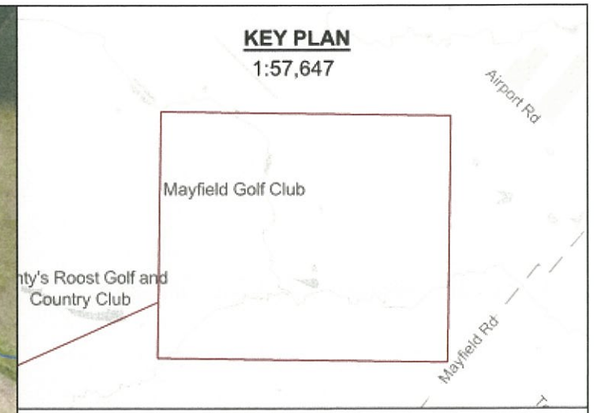
Monitoring Location	Ground Surface Elevation*	Top of Casing or Gauge Elevation*	Top of Screen	Bottom of Screen	Screened Lithology	April 11-14, 2023		May 18, 2023	
						Depth	Elevation	Depth	Elevation
	(m amsl)	(m amsl)	(m amsl)	(m amsl)		(m bgs)	(m amsl)	(m bgs)	(m amsl)
Monitoring Wells									
BH23-1	257.98	258.83	251.88	250.36	(ML) Silt	-0.38	258.36	-0.55	258.53
BH23-2	256.42	257.20	247.28	245.75	(SM) Silty Sand Till; (ML) Sandy Silt	1.02	255.41	1.17	255.25
BH23-4	257.98	258.83	251.88	250.36	(CL) Silty Clay; (CL-ML) Silty Clay to Clayey Silt and Sand Till	3.44	254.54	3.77	254.21
BH23-5	257.83	258.57	250.21	247.16	(CL) Silty Clay	2.67	255.16	2.95	254.88
BH23-6S	256.66	257.42	250.56	249.04	(CL) Gravelly Sandy Silty Clay Till	2.70	253.97	2.09	254.58
BH23-6D	256.73	257.60	246.06	244.54	(ML) Gravelly Sandy Silt	3.76	252.97	3.95	252.78
BH23-7	251.92	252.60	245.82	244.30	(SM) Silty Sand; (SP) Gravelly Sand	1.18	250.74	1.46	250.46
BH23-8	253.06	253.88	247.27	245.74	(SM) Silty Sand Till	3.83	249.23	3.38	249.68
BH23-9	254.29	255.15	245.15	243.62	(ML) Silt	0.18	254.11	0.74	253.55
BH23-10S	252.93	253.91	248.36	246.83	(ML) Sandy Silt Till; (ML) Silt	1.90	251.03	2.55	250.38
BH23-10D	252.82	253.79	242.15	240.63	(ML) Silt; (GP-GM) Sandy Silty Gravel Till	3.27	249.56	3.72	249.10
BH23-11	245.98	246.97	241.41	239.88	(GP-GM) Sandy Silty Gravel Till	0.24	245.74	0.45	245.53
BH23-12	245.78	246.73	237.86	236.03	Limestone	-0.29	246.08	0.05	245.73
BH23-15	253.31	254.18	247.21	245.69	(SM) Gravelly Silty Sand Till; (ML) Silt	0.17	253.14	0.77	252.54
BH23-17S	253.04	253.94	242.07	240.54	(GM/GP) Sandy Silty Gravel Till	1.21	251.83	1.23	251.81
BH23-17D	253.03	253.75	239.16	237.03	Limestone	1.53	251.51	1.48	251.55
BH23-18	254.41	255.18	239.17	237.65	(SM/ML) Gravelly Silty Sand Till; (SM/ML) Silt and Sand Till; Shale	2.18	252.23	2.14	252.27
BH23-19	250.43	251.29	241.29	239.76	(SM) Gravelly Silty Sand	3.35	247.09	3.61	246.82
BH23-21S	249.28	250.02	246.23	244.71	(CL) Sandy Silty Clay Till	0.23	249.05	0.64	248.64
BH23-21D	249.24	250.10	240.10	238.57	(SM) Silty Sand Till	0.10	249.14	0.37	248.87
BH23-22	252.92	253.79	246.82	245.30	(CL) Sandy Silty Clay	0.54	252.38	0.77	252.15
BH23-23S	249.89	250.64	244.71	243.18	(CL) Sandy Silty Clay Till	2.10	247.79	2.15	247.74
BH23-23D	249.95	250.67	236.23	234.71	(SM/ML) Gravelly Sand and Silt Till; Shale	4.78	245.17	5.04	244.91
BH23-24	249.09	249.92	246.04	242.99	(CL) Silty Clay; (CL) Sandy Silty Clay	0.62	248.47	0.88	248.21
BH23-26	248.75	249.54	235.64	234.12	(SM/ML) Sand and Silt	6.63	242.12	6.91	241.84
BH23-28S	255.32	256.34	247.70	246.18	(ML) Sandy Silt	Flowing	>256.34	Flowing	>256.34
BH23-28D	255.21	256.24	239.97	238.45	(SM/GM) Silty Sand and Gravel	Flowing	>256.24	Flowing	>256.24
BH23-E1	254.51	254.43	249.94	246.89	(CL) Sandy Silty Clay; (CL) Silty Clay; (ML) Sandy Silt Till	0.06	254.45	1.09	253.42
BH23-E2	254.01	253.91	249.44	246.39	(CL) Silty Clay; (ML) Silt	0.08	253.93	1.42	252.59
BH23-E3	254.11	254.86	249.54	246.49	(CL) Silty Clay; (SM) Silty Sand Till	1.71	252.40	1.84	252.27
2022 Monitoring Wells (GEMTEC)									
BH22-02	256.30	257.28	250.20	248.68	(SM) Silty Sand Till	- -	- -	0.19	256.11
BH22-05	251.20	252.20	245.10	243.58	(ML) Silt	- -	- -	2.79	248.41
BH22-06	253.50	253.39	247.40	245.88	(CL) Silty Clay; (CL) Silty Clay Till	- -	- -	1.01	252.49
Drive-Point Piezometers and Staff Gauges									
DP23-1	250.20	251.82	248.82	248.52	N/A	1.26	248.94	0.72	249.48
SG23-1	N/A	250.79	N/A	N/A	N/A	- -	249.87	- -	249.80
DP23-2	254.47	255.96	253.29	252.99	N/A	0.02	254.45	0.03	254.44
SG23-2	N/A	255.60	N/A	N/A	N/A	- -	254.41	- -	254.40
DP23-3	247.27	248.31	246.28	245.98	N/A	Dry	<245.98	0.11	247.16
SG23-3	N/A	248.40	N/A	N/A	N/A	- -	247.18	- -	247.17
DP23-4	244.81	245.93	243.86	243.56	N/A	Dry	<243.56	0.23	244.58
SG23-4	N/A	245.67	N/A	N/A	N/A	- -	244.65	- -	244.63

Notes:

- - Not Measured
- Negative values indicate that water levels are above the ground surface.
Elev. - Elevation
m - meter
m amsl - meters above mean sea level
m bgs - meters below ground surface
m toc - meters below top of casing
* = UTM coordinates and elevations surveyed by R-PE Surveying Ltd.

KEY PLAN

1:57,647



Legend

- BH # — BOREHOLE ID (DEEP - D; SHALLOW - S)
- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE MONITORING WELL (MW) LOCATION
- APPROXIMATE MONITORING WELL NEST (MW NEST) LOCATION
- APPROXIMATE ENVRONMENTAL (E) MONITORING WELL LOCATION
- APPROXIMATE DRIVE-POINT PIEZOMETER & STAFF GAUGE (DP/SG) LOCATION
- APPROXIMATE MONITORING WELL LOCATION (GEMTEC, 2022)
- APPROXIMATE BOREHOLE LOCATION (GEMTEC, 2022)
- APPROXIMATE MAYFIELD GOLF COURSE LANDS BOUNDARY
- APPROXIMATE SOUTH LANDS BOUNDARY

NOTES:

1. Coordinate system: NAD83/ UTM zone 17N.
2. Geographic dataset source: Ontario GeoHub.
3. Contains information licensed under the Open Government Licence – Ontario.
4. Parcel information obtained through the Ministry of Natural Resources and Forestry

Scale

1:6,750

0 50 100 200 300 400 500 Meters

Drawing

BOREHOLE, MONITORING WELL, STAFF GAUGE, AND DRIVE POINT PIEZOMETER LOCATION PLAN

Client:

MAYFIELD GOLF COURSE INC.

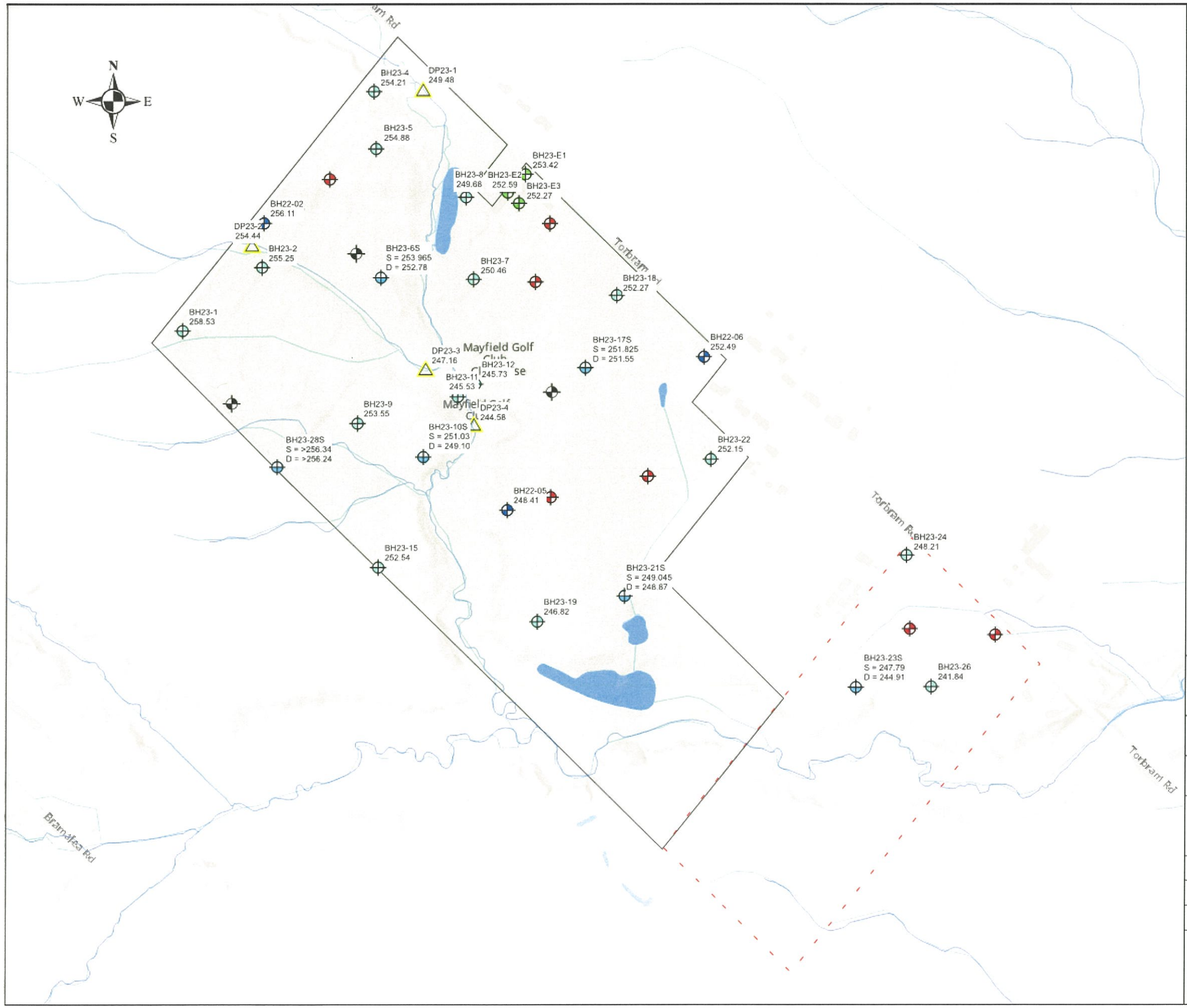
Project

MAYFIELD GOLF COURSE REDEVELOPMENT
12552 AND 12580 TORBRAM ROAD
CALEDON, ONTARIO

Drwn By:	S.J.	Chkd By:	A.W.
Project No.	101987.001	Revision No.	0
Date	JUNE 2023		**FIGURE: 1**

GEMTEC
Consulting Engineers and Scientists
32 Steacie Drive,
Ottawa, ON K2K 2A9
T: (613) 836-1422
www.gemtec.ca
ottawa@gemtec.ca

Folder: N:\Projects\101900\101987.001\Drafting\1. Drawings\Factual_R0_2023_05\



Legend

BH # — BOREHOLE ID (DEEP - D; SHALLOW - S)
XX.XX — GROUNDWATER ELEVATIONS, IN METERS ABOVE MEAN SEA LEVEL

- APPROXIMATE BOREHOLE LOCATION
- APPROXIMATE MONITORING WELL (MW) LOCATION
- APPROXIMATE MONITORING WELL NEST (MW NEST) LOCATION
- APPROXIMATE ENVRONMENTAL (E) MONITORING WELL LOCATION
- APPROXIMATE DRIVE-POINT PIEZOMETER & STAFF GAUGE (DP/SG) LOCATION
- APPROXIMATE MONITORING WELL LOCATION (GEMTEC, 2022)
- APPROXIMATE BOREHOLE LOCATION (GEMTEC, 2022)
- WATERCOURSE
- WATERBODY
- APPROXIMATE MAYFIELD GOLF COURSE LANDS BOUNDARY
- APPROXIMATE SOUTH LANDS BOUNDARY

NOTES:

1. The ground surface elevation at each borehole was estimate from a Site topography map provided by the client. As such elevation measurements are considered approximate.
2. Coordinate system: NAD83/ UTM zone 17N.
3. Geographic dataset source: Ontario GeoHub.
4. Contains information licensed under the Open Government Licence – Ontario.
5. Parcel information obtained through the Ministry of Natural Resources and Forestry.
6. Service Layer Credits: World Topographic Map: Esri Community Maps Contributors, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCan, Parks Canada
World Hillshade: Esri, NASA, NGA, USGS, FEMA
World Imagery: Maxar

Scale
1:6,750
0 50 100 200 300 400 500 Meters

Drawing: GROUNDWATER ELEVATIONS MAY 18, 2023

Client: MAYFIELD GOLF COURSE INC.

Project: MAYFIELD GOLF COURSE REDEVELOPMENT
12552 AND 12580 TORBRAM ROAD
CALEDON, ONTARIO

Drwn By:	S.J.	Chkd By:	A.W.
Project No.	101987.001	Revision No.	0
Date	JUNE 2023	**FIGURE: 6**	

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Folder: N:\Projects\101900\101987.001\Drafting\1. Drawings\Factual_R0_2023_05\

BEACON ENVIRONMENTAL

GUIDING SOLUTIONS IN THE NATURAL ENVIRONMENT

DRAFT

Geomorphic Assessment

Part of Lots 19, 20 and 21 Concession 5, Town of Caledon West Humber River Subwatershed

Prepared For:

Geranium Corporation

Prepared By:

Beacon Environmental Limited

Date:	*Project:*
July 2023	**222239**

5. Analysis

5.1 Meander Belt

The meander belt width is generally defined as the lateral extent that a meandering channel has historically occupied and will likely occupy in the future. Where the watercourse is confined, such as sections of the West Humber River Tributarywithin the subject lands, the valley wall acts a constraint to channel migration along portions of the corridor.

According to the *Technical Guide – Rivers and Streams: Erosion Hazard Limit* document (MNR 2002), in the case of unconfined river systems, the meander belt width plus an erosion access allowance is defined to determine the erosion hazard limit. Conversely, in the case of confined valley systems, the erosion hazard is governed by geotechnical considerations, including the stable slope allowance and an applicable toe erosion allowance (i.e., channel migration component). As Ontario Regulation 242/08 does not distinguish between confined and unconfined systems, delineation of the meander belt referenced historical and current channel processes, but also considered valley floor (floodplain dimensions).

Following the TRCA (2004) *Belt Width Delineation Procedures* document, the meander belt for Reaches WHT-1 and WHT-1A were delineated based on the lateral extent of the outermost meander bends along the reach over the available historical record. The resultant dimensions (40 m and 55 m for Reaches WHT-1 and WHT-1A, respectively) were then reviewed relative to available topographic mapping and field observations to ensure that it considered valley floor dimensions and was sufficient to capture the active (bankfull) channel as well as evidence of lateral occupation of the floodplain at the reach scale. **Figure 3** illustrates the recommended meander belts for Reaches WHT-1 and WHT-1A.

5.2 Redside Dace Habitat

Figure 3 identifies all lands within 30 m of the meander belt of Reach WHT-1 as they pertain to the subject lands.

6. Proposed Development

The description of the proposed redevelopment is based on the Draft Plan of Subdivision prepared by Malone Given Parsons (MGP 2023) and the Functional Servicing Report prepared by SCS Consulting Group Ltd. (SCS 2023).

The redevelopment of the north parcel (Mayfield Golf Course), outside of the Greenbelt, proposes 196 Single Detached Residential Units (8.27 ha), 385 Townhouse Units (6.13 ha), an Elementary School Block (3.36 ha), Parkland (0.9 ha), a Commercial Block (0.6 ha) and a Firehall (0.81 ha). Approximately 8 ha will be designated for Roads and Laneways. Lands inside the Greenbelt have been designated for Parkland (5 ha), three (3) Stormwater Management (SWM) Blocks (3.77 ha), the Street A and Street C Road crossings of the NHS (0.69 ha), the widening of Torbram Road (0.22 ha) and the NHS (32.4 ha).

Meander Belt

Figure 3

12522 & 12306 Torbram Road
Geomorphic Assessment

Legend

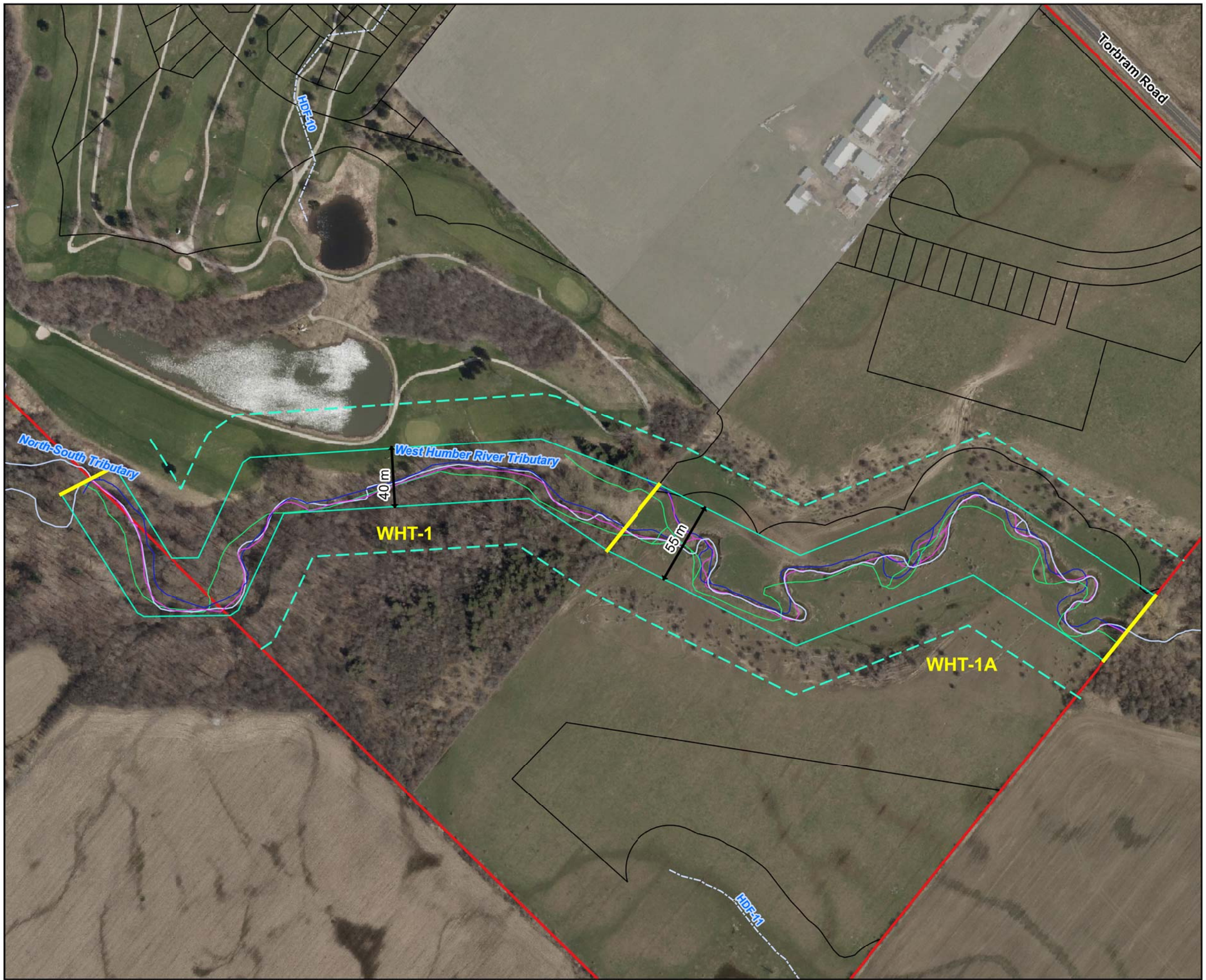
- Subject Lands
- Future Development Area
- Proposed Development
- Meander Belt
- Meander Belt + 30 m
- Reach Break

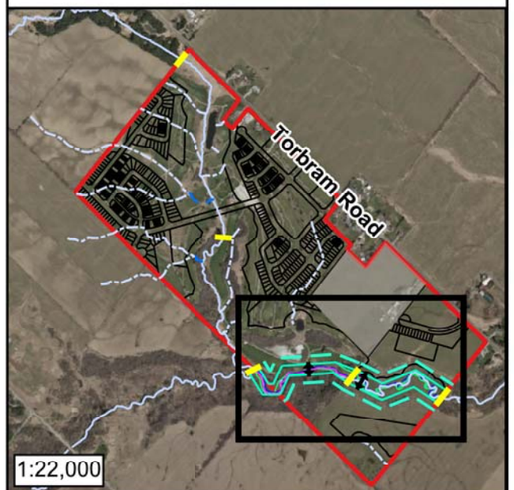
Aquatic Features (Beacon 2023)

- Ephemeral

Historical Watercourses (Beacon 2023)

- 2022 Watercourse
- 2002 Watercourse
- 1991 Watercourse
- 1978 Watercourse





BEACON ENVIRONMENTAL

Project: 222239
Last Revised: July 2023

Client: Geranium Corporation

Prepared by: SZ
Checked by: MA

DRAFT

N

1:2,500

0 50 100 m

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The development of the south parcel, outside of the Greenbelt, will be developed into 10 Single Detached Residential Units (0.43 ha), an unknown amount of Townhouse Units (1.99 ha) and approximately 0.88 ha will be designated for Roads and Laneways. Lands inside the Greenbelt have been designated for Parkland (4.32 ha), a Stormwater Management (SWM) Block (0.95 ha), the widening of Torbram Road (0.6 ha) and the NHS.

7. Impact Assessment

In order to understand the potential impacts of the proposed development plan, an impact assessment was undertaken with respect to channel morphology, including proposed watercourse crossings.

7.1 Stormwater Management

As described in the Functional Servicing and Stormwater Management Report (FSSR) prepared by SCS Consulting Group (SCS 2023) for the Subject Lands, end-of-pipe and lot level controls will be implemented to manage stormwater runoff from the proposed development. End-of-pipe control will be provided by four (4) underground wet stormwater management facilities to meet stormwater erosion control, quantity and quality objectives. Erosion control for the subject lands will be achieved through extended detention of the 25 mm, 4-hour rainfall event for a minimum of 48 hours. In addition, rear yard infiltration trenches were evaluated as lot level controls to meet 5 mm on-site retention and water balance targets for the subject property. Low impact development opportunities will be further reviewed at the detailed design stage.

7.2 Road Crossings

Two road crossings of the Natural Heritage System (NHS) are proposed for connectivity, neighborhood structure and traffic flow: Street A will cross the North-South Tributary and Street C will cross drainage feature HDF-3 (refer to **Figure 4**).

7.2.1 Street A

The proposed Street A road alignment is also considered to be optimal from a geomorphic perspective, as the road crosses the NHS on a relatively straight section of the North-South Tributary at an angle that is perpendicular to the watercourse. In order to provide recommendations with respect to crossing span, existing geomorphic conditions along Reach WHT-3 were considered. Results of the field assessment noted minor evidence of channel instability (RGA score of 0.26, state of transition) along Reach WHT-3, and an average bankfull width of 3.5 m.

Given the historically modified nature of Reach WHT-3, the determination of a geomorphic span recommendation referenced an upstream section of the reach that had retained a more natural, sinuous planform. The meander amplitude (inclusive of the historic record and bankfull channel) associated with this section of channel was measured to be 11.5 m (**Figure 4**). As lateral migration rates could not be determined, a 20% factor of safety (2.3 m) was applied to this amplitude, resulting in a 100-year erosion

limit span recommendation of 14 m. The proposed 14.9 m span arch open bottom culvert identified in the FSSR (SCS 2023) is sufficient to accommodate this recommendation, which should be reviewed and refined, as appropriate, through subsequent detail design stages.

7.2.2 Street C

As drainage feature HDF-3 lacks a defined channel, geomorphic span recommendations have not been provided for this structure. Crossing span requirements will be determined based on relevant hydraulic and ecological design considerations. This approach is consistent with the TRCA (2015) *Crossings Guideline for Valley and Stream Corridors* guideline which notes that that geomorphic studies are not required for very small (drainage area approximately 1 km^2 or less), rural, vegetation-dominated watercourses. That stated, the proposed road Street C alignment is considered to be optimal from a geomorphic perspective as it crosses HDF-3 at an angle that is perpendicular to the drainage feature. The FSSR (SCS 2023) proposes to convey HDF-3 via a 6.4 m wide by 1.5 m high concrete box culvert.

8. Policy Conformance

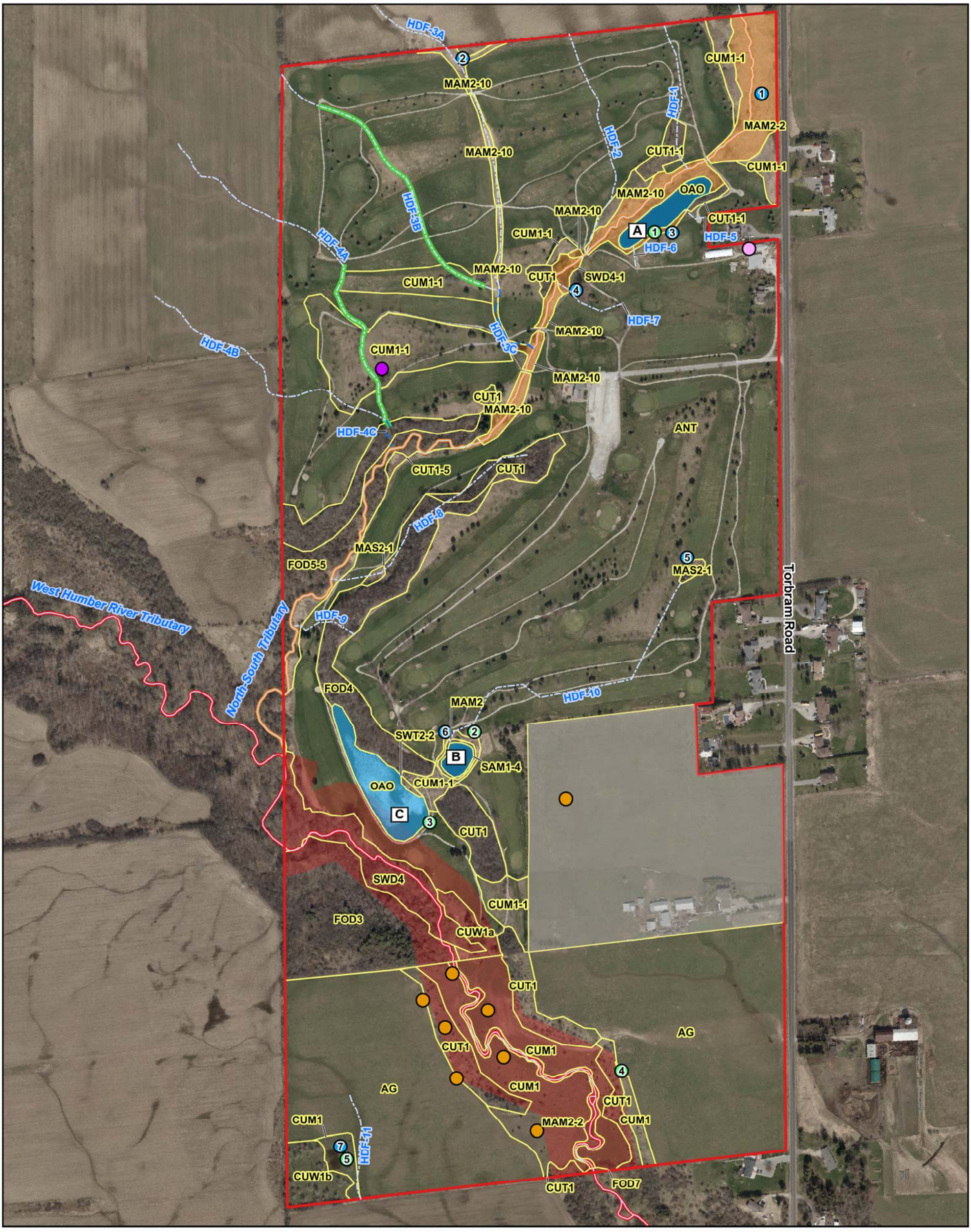
It is our opinion that the findings of this report are in conformance with the Provincial Policy Statement (2020), Ontario Regulation 166/06, TRCA Belt Width Delineation Procedures (2004) and Ontario Regulation 242/08.

9. Conclusion

Beacon was retained by Geranium Corporation to undertake a geomorphic assessment for the lands known municipally as Part of Lots 19, 20 and 21 Concession 5, in the Town of Caledon, Regional Municipality of Peel. The subject lands include the former Mayfield Golf Course (12580 and 12552 Torbram Road), in addition to lands located at 12306 Torbram Road that have been identified as a future development area.

The purpose of this geomorphic assessment is to characterize existing geomorphic conditions for the portions of watercourse relevant to the subject lands, contribute to the determination of development limits through the delineation of Redside Dace occupied habitat limits (referencing 30 m from the meander belt), evaluate potential impacts associated with the proposed development plan and provide recommended mitigation measures to address potential impacts. The following points summarize the findings of this study:

- A review of available mapping indicated that Reaches WHT-1A, WHT-1, WHT-2 and WHT-3 consist of a well-defined channel situated within a confined valley system;
- An historical assessment of land use and channel planform identified evidence of significant modification (straightening) along the North-South Tributary over the available historical record;
- Rapid geomorphic assessment results identified Reaches WHT-1A, WHT-1, WHT-2 and WHT-3 as being in a transitional state (RGA scores of 0.29, 0.28, 0.22 and 0.26, respectively) with observed evidence of widening;



Legend

- Subject Lands
- Future Development Area (Owned by others)

Terrestrial Resources

- Ecological Communities
- Barn Swallow Locations
- BoboLink Locations
- Eastern Meadowlark Locatons
- Turtle Survey Locations
- Amphibian Survey Locations

Aquatic Features (Beacon 2023)

- Intermittent
- Ephemeral
- Permanent
- Waterbody (Pond)
- Tiled (Underground)

Regulated Redside Dace Habitat

- Contributing Watercourse
- Contributing Wetland
- Occupied Watercourse
- Meander Belt + 30 m

Code	Cultural Communities
CUM1	Mineral Cultural Meadow
CUM1-1	Dry - Moist Old Field Meadow
CUT1	Mineral Cultural Thicket
CUT1-1	Sumac Cultural Thicket
CUT1-5	Raspberry Cultural Thicket
CUW1	Mineral Cultural Woodland

Code	Aquatic Communities
OAO	Open Aquatic
SAM1-4	Pondweed Mixed Shallow Aquatic
	Forest Communities
FOD3	Dry - Fresh Poplar - White Birch Deciduous Forest
FOD4	Dry - Fresh Deciduous Forest
FOD5-5	Dry - Fresh Sugar Maple - Hickory Deciduous Forest
FOD7	Fresh - Moist Lowland Deciduous Forest
	Wetland Communities
MAM2	Mineral Meadow Marsh
MAM2-10	Forb Mineral Meadow Marsh
MAM2-2	Reed-canary Grass Mineral Meadow Marsh
MAS2-1	Cattail Mineral Shallow Marsh
SWD4	Mineral Deciduous Swamp
SWD4-1	Willow Mineral Deciduous Swamp
SWT2-2	Willow Mineral Thicket Swamp
	Other Communities
AG	Agricultural Crop
ANT	Anthropogenic

Existing Conditions

Figure 2

Natural Heritage Evaluation - Part of Lots 19, 20 and 21 Concession 5, Town of Caledon, Region or Peel

BEACON ENVIRONMENTAL

Project: 222239

Last Revised: August 2023

Client: Geranium Corporation

Prepared by: BD
Checked by: DF

DRAFT

1:5,000

0 100 200 m

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Table 2. Summary of Drainage Feature Management Recommendations

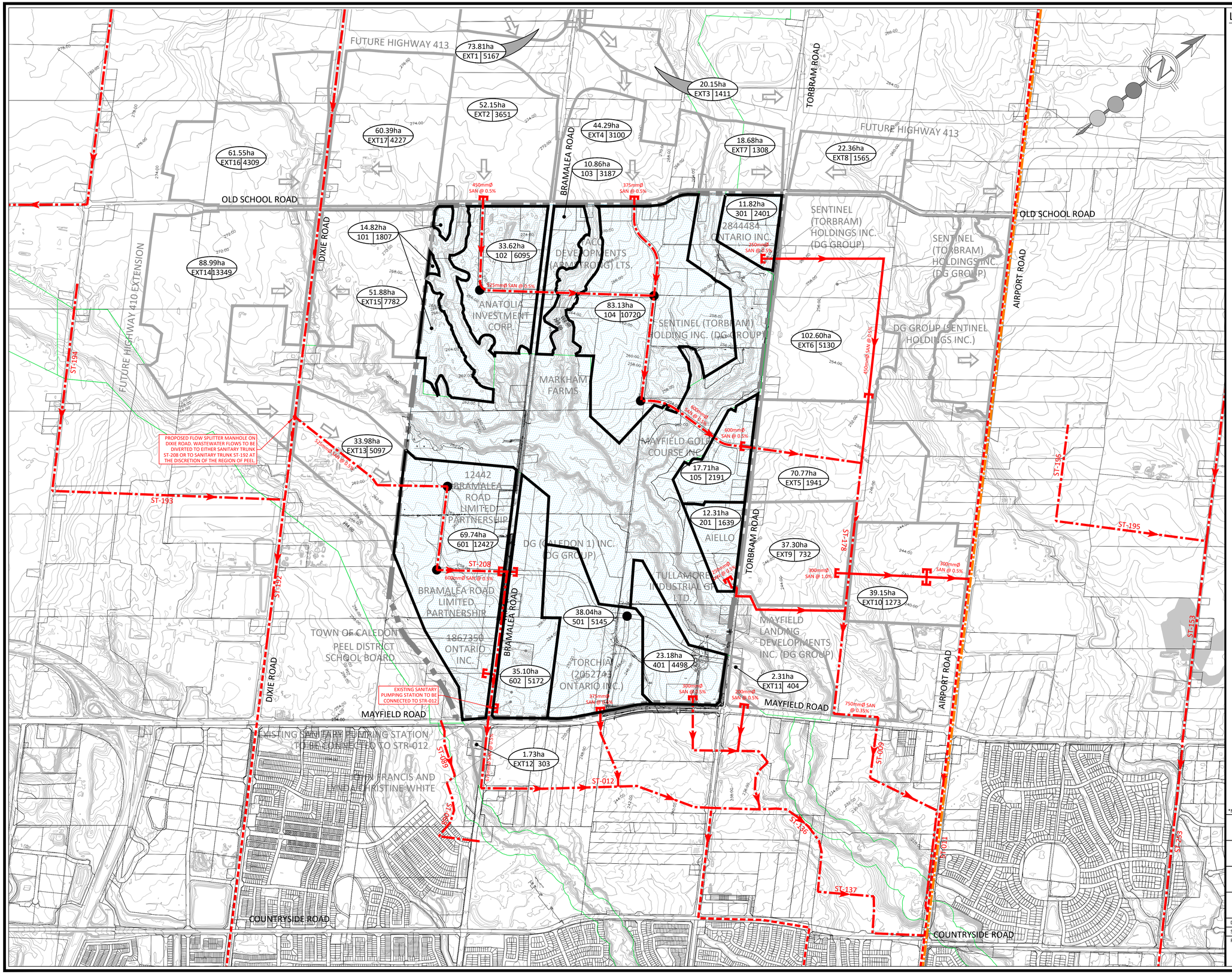
Drainage Feature Segment	Output from HDFA	Final Management Recommendations	Comments/Rationale
HDF 1	Mitigation	No Management	Minimal flow, no riparian vegetation, no fish or fish habitat and no amphibian habitat. Function of feature to be maintained through LID measures.
HDF 2	Mitigation	No Management	Minimal flow, no riparian vegetation, no fish or fish habitat and no amphibian habitat. Function of feature to be maintained through LID measures.
HDF 3A	Conservation	Conservation	Minimal flow, wetland riparian vegetation contributing fish habitat and no amphibian habitat. Feature will be retained within the NHS.
HDF 3B	Mitigation	Mitigation	Artesian conditions identified in surrounding boreholes. Indicative of potential groundwater discharge. Function of feature to be maintained through LID measures.
HDF 3C	Protection	Protection	Perennial flow conditions, wetland riparian vegetation. seasonal fish habitat and partially within habitat of threatened and endangered species. Feature will be retained within the NHS.
HDF 4A	Mitigation	Mitigation	Minimal to no flow, minimal riparian vegetation, no fish or fish habitat and no amphibian habitat. Artesian conditions identified in surrounding boreholes. Indicative of potential groundwater discharge. Function of feature to be maintained through LID measures.
HDF 4B	Maintain Recharge	Maintain Recharge	No flow, riparian vegetation, no fish or fish habitat and no amphibian habitat. Artesian conditions identified in surrounding boreholes. Indicative of potential groundwater discharge. Function of feature to be maintained through LID measures.
HDF 4C	Conservation	Conservation	Intermittent flow conditions, seasonal fish habitat and partially within habitat of threatened and endangered species. Feature will be retained within the NHS.
HDF 5	No Management	No Management	No flow, no riparian vegetation, no fish or fish habitat and no amphibian habitat. Feature will be retained within the NHS.
HDF 6	No Management	No Management	No flow, no riparian vegetation, no fish or fish habitat and no amphibian habitat.

Drainage Feature Segment	Output from HDFA	Final Management Recommendations	Comments/Rationale
			Feature will be retained within the NHS.
HDF 7	No Management	No Management	No flow, no riparian vegetation, no fish or fish habitat and no amphibian habitat. Feature will be retained within the NHS.
HDF 8	Conservation	Mitigation	Minimal flow, thicket riparian vegetation, no fish or fish habitat and no amphibian habitat. Feature will be retained within the NHS.
HDF 9	Maintain/ Replicate Terrestrial	Maintain/ Replicate Terrestrial	Minimal flow, thicket riparian vegetation, no fish or fish habitat and no amphibian habitat. Feature will be retained within the NHS.
HDF 10	Mitigation	Mitigation	No flow, some wetland riparian vegetation, no fish or fish habitat and no amphibian habitat. Function of feature to be maintained through LID measures.
HDF 11	No Management	No Management	No flow, no riparian vegetation, no fish or fish habitat and no amphibian habitat. Function of feature to be maintained through LID measures.

4.1.6 Assessment of Fish Habitat

The West Humber River Tributary and the North-South Tributary support a warmwater thermal regime with a cool to warm species assemblage. Although no fish were observed in HDF 3C and 4C, it was determined that the downstream reaches of these features may provide direct, both permanent and seasonal, habitat for the more tolerant species identified for the West Humber River Tributaries based the presence of refuge pools, seasonal flow, and connection to a fish bearing watercourse. The ephemeral (i.e., dry after spring freshet) flow conditions, dense vegetative growth (in the late spring and summer) and/ or the prevalence of tiled reaches limit fish movement into the upstream reaches of these features. All other HDFs provide indirect habitat through the contribution of exported food (detritus/ invertebrates) to downstream fish-bearing reaches based on the fish habitat definition within the *Fisheries Act.* The fish and fish habitat protection provisions of the *Fisheries Act* apply to direct and indirect habitat.

The three offline ponds within the subject lands may support fish populations. However, the protection prohibitions of the *Fisheries Act* do not include artificial waterbodies (including ponds associated with golf course irrigation) that are not connected to a waterbody that contains fish at any time during any given year. Review of the historical aerial imagery, provided in the Geomorphic Assessment (Beacon 2023), the ponds within the subject lands appear to have originated naturally as depressions or wetland features. However, they have been historically modified (e.g., dug) to support the golf course irrigation requirements for over 45 years. Although the ponds have been identified as offline to the surrounding fish bearing waterbodies, Pond A and C likely contain fish as they are either partially or fully with the



LEGEND:

- LIMIT OF SECONDARY PLAN
- EXISTING WASTEWATER MAIN (REGION, 2024)
- REGION DC MAPPING PROPOSED LOCAL WASTEWATER MAIN >2024
- PROPOSED LOCAL WASTEWATER MAIN EXTENSION >2024
- REGION DC MAPPING PROPOSED PRIMARY WASTEWATER MAIN >2024
- SANITARY DRAINAGE BOUNDARY
- EXTERNAL SANITARY DRAINAGE BOUNDARY
- 14.82ha / 101 | 1807 — DRAINAGE AREA (HECTARES); POPULATION; CATCHMENT ID
- GREENBELT
- 270.00 — EXISTING CONTOUR AND ELEVATION

*NOTE: LAYOUT IS SCHEMATIC ONLY, DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD TULLAMORE LANDOWNER GROUP

MASTER SANITARY DRAINAGE PLAN

DESIGNED BY:	C.M.D.	CHECKED BY:	N.D.M.
SCALE:	1:10000	DATE:	AUGUST 2024
PROJECT No:	2699	FIGURE No:	2

File: P:\2699 Mayfield Tullamore Landowner Group\Drawings\MESP\Fig\Report Figures\2699P-MSTR-SAN-2.dwg – Revised by <GMURRIA> : Fri, Aug 09 2024 – 3:11pm

Sanitary Design Sheet
Mayfield Tullamore Landowner Group
MESP
Town of Caledon, Region of Peel

Minimum Sewer Diameter (mm) =	**200**	**Avg. Domestic Flow (l/cap/day) =**	**290**
Mannings n =	**0.013**	**Avg. Non-Residential Flow (l/emp/day) =**	**270**
Minimum Velocity (m/s) =	**0.75**	**Infiltration Rate (l/s/ha) =**	**0.26**
Maximum Velocity (m/s) =	**3**	**Max. Harmon Peaking Factor =**	**4.0**
Minimum Pipe Slope (%) =	**0.50**	**Min. Harmon Peaking Factor =**	**2.0**
		NOMINAL PIPE SIZE USED	

Notes:
1. Population Density based on discussions with Region staff
2. Per capita sanitary flow of 285 L/day per Region of Peel standards
3. Area and population per Sanitary Drainage Plan (Drawing SAN-01) and Pipe Design Sheet dated March 28, 2024 prepared by Crozier Consulting Engineers

Project: Mayfield Tullamore Landowner Group
Project No. 2699
Date: 9-Aug-24
Designed By: G.M.
Reviewed By: N.D.M.

P:\2699 Mayfield Tullamore Landowner Group\Design\Pipe Design\Sanitary\2024 07(Jul) 17 - Prelim Sani Sizing\[2699 - Sanitary Sheet Design.xlsm]Design

LOCATION			RESIDENTIAL							INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE		AREA	ACCUM. AREA	UNITS	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	AREA	ACCUM. AREA	POPULATION DENSITY	FLOW RATE	ACCUM. EQUIV. POPULATION	INFILTRATION	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW	ACCUM. AVG. DOMESTIC FLOW	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW	ICI FLOW	TOTAL FLOW	LENGTH	PIPE DIAMETER	SLOPE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
	FROM	TO				PER UNIT	PER HA																				
			(ha)	(ha)	(#)	(p/unit)	(p/ha)			(ha)	(ha)	(p/ha)	(l/s/ha)		(L/s)		(L/s)	(L/s)		(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(L/s)	
CATCHMENT 101			14.82	0.00																							
Single/Semi-Detached	101-1	101-2	10.97	10.97	274	4.20		1152	1152	0.00	0.00	0.00	0.00	0	2.85	1152	3.87	3.87	3.76	14.53	0.00	17.39	100.00	200.00	0.50	23.18	UNDER
Street Townhouses	101-2	102-1	3.85	14.82	193	3.40		655	1807	0.00	0.00	0.00	0.00	0	3.85	1807	2.20	6.07	3.62	21.95	0.00	25.81	100.00	250.00	0.50	42.03	0.86
Catchment EXT1[1,2]	EXT1-1	EXT2-1	73.81	73.81	0		70.00	5167	5167	0.00	0.00	0.00	0.00	0	19.19	5167	17.04	17.04	3.23	55.08	0.00	74.27	100.00	375.00	0.50	123.91	1.12
Catchment EXT2[1,2]	EXT2-1	102-4	52.15	125.96	0		70.00	3651	8817	0.00	0.00	0.00	0.00	0	32.75	8817	12.04	29.08	3.01	87.51	0.00	120.26	100.00	450.00	0.50	201.50	1.27
CATCHMENT 102			33.62	0.00																							
Apartments (NC)	102-1	102-2	3.27	18.09	491	2.70		1324	3131	0.00	0.00	0.00	0.00	0	4.70	3131	4.45	10.51	3.43	36.01	0.00	40.72	100.00	300.00	0.50	68.34	0.97
Stacked Townhouses (UC)	102-2	102-3	4.91	23.00	491	3.40		1669	4801	0.00	0.00	0.00	0.00	0	5.98	4801	5.60	16.11	3.26	52.55	0.00	58.53	100.00	300.00	0.50	68.34	0.97
Single/Semi-Detached	102-3	102-4	18.83	41.83	471	4.20		1977	6778	0.00	0.00	0.00	0.00	0	10.88	6778	6.64	22.75	3.12	70.98	0.00	81.85	100.00	375.00	0.50	123.91	1.12
Street Townhouses	102-4	103-1	6.61	174.41	331	3.40		1125	16719	0.00	0.00	0.00	0.00	0	45.35	16719	3.77	55.61	2.73	151.85	0.00	197.20	100.00	525.00	0.50	303.95	1.40
CATCHMENT 103			10.86	0.00																							
Apartments (NC)	103-1	103-2	1.96	176.37	294	2.70		794	17513	0.00	0.00	0.00	0.00	0	45.85	17513	2.66	58.27	2.71	157.94	0.00	203.80	100.00	525.00	0.50	303.95	1.40
Stacked Townhouses (UC)	103-2	103-3	6.00	182.37	600	3.40		2040	19553	0.00	0.00	0.00	0.00	0	47.41	19553	6.85	65.12	2.66	173.37	0.00	220.78	100.00	525.00	0.50	303.95	1.40
Single/Semi-Detached	103-3	103-4	2.15	184.51	54	4.20		225	19778	0.00	0.00	0.00	0.00	0	47.97	19778	0.76	65.88	2.66	175.05	0.00	223.03	100.00	525.00	0.50	303.95	1.40
Street Townhouses	103-4	104-1	0.75	185.27	38	3.40		128	19907	0.00	0.00	0.00	0.00	0	48.17	19907	0.43	66.31	2.65	176.01	0.00	224.18	100.00	525.00	0.50	303.95	1.40
Catchment EXT3[1,2]	EXT3-1	EXT4-1	20.15	20.15	0		70.00	1411	1411	0.00	0.00	0.00	0.00	0	5.24	1411	4.65	4.65	3.70	17.21	0.00	22.45	100.00	250.00	0.50	42.03	0.86
Catchment EXT4[1,2]	EXT4-1	104-4	44.29	64.44	0		70.00	3100	4511	0.00	0.00	0.00	0.00	0	16.75	4511	10.23	14.88	3.29	48.90	0.00	65.65	100.00	375.00	0.50	123.91	1.12
CATCHMENT 104			83.13	0.00																							
Schools	104-1	104-2	0.00	185.27	0			0	19907	5.60	5.60	160.71	0.00	900	49.62	20807	2.81	69.12	2.64	182.14	0.00	231.77	100.00	525.00	0.50	303.95	1.40
Stacked Townhouses (UC)	104-2	104-3	1.69	186.96	169	3.40		575	20481	0.00	5.60	0.00	0.00	900	50.06	21381	1.93	71.05	2.62	186.38	0.00	236.45	100.00	525.00	0.50	303.95	1.40
Single/Semi-Detached	104-3	104-4	56.12	243.08	1403	4.20		5893	26374	0.00	5.60	0.00	0.00	900	64.66	27274	19.78	90.83	2.52	228.71	0.00	293.36	100.00	600.00	0.50	433.95	1.53
Street Townhouses	104-4	105-6	19.72	327.24	986	3.40		3352	34237	0.00	5.60	0.00	0.00	900	86.54	35137	11.25	116.96	2.41	281.89	0.00	368.43	100.00	600.00	0.50	433.95	1.53
CATCHMENT 105			17.71	0.00																							
Schools	105-1	105-2	0.00	0.00	0			0	0	2.10	2.10	214.29	0.00	450	0.55	450	1.41	1.41	4.00	5.62	0.00	6.17	100.00	200.00	0.50	23.18	UNDER
Medium Density	105-2	105-3	1.46	1.46	0		175.00	256	256	0.00	2.10	0.00	0.00	450	0.93	706	0.86	2.26	3.89	8.81	0.00	9.74	100.00	200.00	0.50	23.18	UNDER
Firehall	105-3	105-4	0.00	1.46	0			0	256	1.00	3.10	50.00	0.00	500	1.19	756	0.16	2.42	3.88	9.38	0.00	10.56	100.00	200.00	0.50	23.18	UNDER
Commercial	105-4	105-5	0.00	1.46	0			0	256	0.50	3.60	50.00	0.00	525	1.32	781	0.08	2.50	3.87	9.66	0.00	10.98	100.00	200.00	0.50	23.18	UNDER
Single/Semi-Detached	105-5	105-6	9.36	10.82	234	3.64		852	1107	0.00	3.60	0.00	0.00	525	3.75	1632	2.86	5.36	3.65	19.57	0.00	23.32	100.00	250.00	0.50	42.03	0.86
Street Townhouses	105-6	EXT5-1	3.29	341.35	164	3.40		559	35904	0.00	9.20	0.00	0.00	1425	91.14	37329	1.84	124.16	2.38	296.10	0.00	387.24	100.00	600.00	0.50	433.95	1.53
CATCHMENT 201			12.31	0.00																							
Medium Density	201-1	201-2	2.60	2.60	0		175.00	455	455	0.00	0.00	0.00	0.00	0	0.68	455	1.53	1.53	3.99	6.10	0.00	6.78	100.00	200.00	0.50	23.18	UNDER
Single/Semi-Detached	201-2	201-3	7.19	9.79	180	4.20		754	1209	0.00	0.00	0.00	0.00	0	2.54	1209	2.53	4.06	3.75	15.20	0.00	17.75	100.00	200.00	0.50	23.18	UNDER
Street Townhouses	201-3	EXT5-1	2.52	12.31	126	3.40		429	1639	0.00	0.00	0.00	0.00	0	3.20	1639	1.44	5.50	3.65	20.08	0.00	23.28	100.00	250.00	0.50	42.03	0.86
Catchment EXT7[1,2]	EXT7-1	EXT6-1	18.68	18.68	0		70.00	1308	1308	0.00	0.00	0.00	0.00	0	4.86	1308	4.31	4.31	3.72	16.05	0.00	20.91	100.00	250.00	0.50	42.03	0.86
Catchment EXT8[1,2]	EXT8-1	EXT6-1	0.00	0.00	0			0	0	22.36	22.36	70.00	0.00	1565	5.81	1565	5.16	5.16	3.67	18.93	0.00	24.74	100.00	250.00	0.50	42.03	0.86

Street A

Street C

Sanitary Design Sheet
Mayfield Tullamore Landowner Group
MESP
Town of Caledon, Region of Peel

Minimum Sewer Diameter (mm) =	**200**	**Avg. Domestic Flow (l/cap/day) =**	**290**
Mannings n =	**0.013**	**Avg. Non-Residential Flow (l/emp/day) =**	**270**
Minimum Velocity (m/s) =	**0.75**	**Infiltration Rate (l/s/ha) =**	**0.26**
Maximum Velocity (m/s) =	**3**	**Max. Harmon Peaking Factor =**	**4.0**
Minimum Pipe Slope (%) =	**0.50**	**Min. Harmon Peaking Factor =**	**2.0**
		NOMINAL PIPE SIZE USED	

Notes:
1. Population Density based on discussions with Region staff
2. Per capita sanitary flow of 285 L/day per Region of Peel standards
3. Area and population per Sanitary Drainage Plan (Drawing SAN-01) and Pipe Design Sheet dated March 28, 2024 prepared by Crozier Consulting Engineers

Project: Mayfield Tullamore Landowner Group
Project No. 2699
Date: 9-Aug-24
Designed By: G.M.
Reviewed By: N.D.M.

P:\2699 Mayfield Tullamore Landowner Group\Design\Pipe Design\Sanitary\2024 07(Jul) 17 - Prelim Sani Sizing\[2699 - Sanitary Sheet Design.xlsm]Design

LOCATION			RESIDENTIAL							INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE		AREA	ACCUM. AREA	UNITS	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	AREA	ACCUM. AREA	POPULATION DENSITY	FLOW RATE	ACCUM. EQUIV. POPULATION	INFILTRATION	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW	ACCUM. AVG. DOMESTIC FLOW	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW	ICI FLOW	TOTAL FLOW	LENGTH	PIPE DIAMETER	SLOPE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
	FROM	TO				PER UNIT	PER HA																				
			(ha)	(ha)	(#)	(p/unit)	(p/ha)			(ha)	(ha)	(p/ha)	(l/s/ha)		(L/s)		(L/s)	(L/s)		(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(L/s)	
CATCHMENT 301			11.82	0.00																							
Apartments (NC)	301-1	301-2	3.39	3.39	509	2.70		1373	1373	0.00	0.00	0.00	0.00	0	0.88	1373	4.61	4.61	3.71	17.08	0.00	17.96	100.00	200.00	0.50	23.18	UNDER
Single/Semi-Detached	301-2	301-3	6.24	9.63	156	4.20		655	2028	0.00	0.00	0.00	0.00	0	2.50	2028	2.20	6.81	3.58	24.38	0.00	26.88	100.00	250.00	0.50	42.03	0.86
Street Townhouses	301-3	EXT6-1	2.19	11.82	110	3.40		373	2401	0.00	0.00	0.00	0.00	0	3.07	2401	1.25	8.06	3.52	28.39	0.00	31.46	100.00	250.00	0.50	42.03	0.86
Catchment EXT6	EXT6-1	EXT5-1	0.00	30.50	0			0	3708	102.60	124.96	50.00	0.00	6695	40.42	10404	16.03	33.57	2.94	98.60	0.00	139.02	100.00	450.00	0.50	201.50	1.27
Catchment EXT5[3]	EXT5-1	ST-009	0.00	384.16	0			0	41251	70.77	204.93	27.43	0.00	10061	153.16	51312	6.07	169.29	2.25	381.60	0.00	534.77	100.00	750.00	0.35	658.29	1.49
Catchment EXT9	EXT9-1	EXT10-1	0.00	0.00	0			0	0	37.30	37.30	19.62	0.00	732	9.70	732	2.29	2.29	3.88	8.88	0.00	18.58	100.00	300.00	1.00	96.65	1.37
Catchment EXT10[3]	EXT10-1	Airport Road	0.00	0.00	0			0	0	39.15	76.45	32.51	0.00	2005	19.88	2005	3.98	6.26	3.58	22.46	0.00	42.34	100.00	300.00	0.50	68.34	0.97
Catchment EXT11[3]	EXT11-1	Block 48-2	2.31	2.31	0		175.00	404	404	0.00	0.00	0.00	0.00	0	0.60	404	1.36	1.36	4.00	5.43	0.00	6.03	100.00	200.00	0.50	23.18	UNDER
CATCHMENT 401			23.18	0.00																							
Apartments (NC)	401-1	401-2	5.91	5.91	887	2.70		2394	2394	0.00	0.00	0.00	0.00	0	1.54	2394	8.03	8.03	3.52	28.31	0.00	29.85	100.00	250.00	0.50	42.03	0.86
Single/Semi-Detached	401-2	401-3	12.78	18.69	319	4.20		1342	3735	0.00	0.00	0.00	0.00	0	4.86	3735	4.50	12.54	3.36	42.12	0.00	46.98	100.00	300.00	0.50	68.34	0.97
Street Townhouses	401-3	Block 48-2	4.49	23.18	224	3.40		763	4498	0.00	0.00	0.00	0.00	0	6.03	4498	2.56	15.10	3.29	49.63	0.00	55.66	100.00	300.00	0.50	68.34	0.97
CATCHMENT 501			38.04	0.00																							
Stacked Townhouses (UC)	501-1	501-2	2.33	2.33	233	3.40		792	792	0.00	0.00	0.00	0.00	0	0.61	792	2.66	2.66	3.86	10.27	0.00	10.88	100.00	200.00	0.50	23.18	UNDER
Single/Semi-Detached	501-2	501-3	26.43	28.76	661	4.20		2775	3567	0.00	0.00	0.00	0.00	0	7.48	3567	9.31	11.97	3.38	40.44	0.00	47.91	100.00	300.00	0.50	68.34	0.97
Street Townhouses	501-3	Block 48-2	9.28	38.04	464	3.40		1578	5145	0.00	0.00	0.00	0.00	0	9.89	5145	5.30	17.27	3.23	55.84	0.00	65.73	100.00	375.00	0.50	123.91	1.12
Catchment EXT17[1,2]	EXT17-1	Dixie Road	0.00	0.00	0			0	0	60.39	60.39	70.00	0.00	4227	15.70	4227	13.94	13.94	3.31	46.18	0.00	61.88	100.00	375.00	0.50	123.91	1.12
Catchment EXT16[1,2]	EXT16-1	Dixie Road	0.00	0.00	0			0	0	61.55	61.55	70.00	0.00	4309	16.00	4309	14.21	14.21	3.30	46.96	0.00	62.96	100.00	375.00	0.50	123.91	1.12
Catchment EXT15[1]	EXT15-1	EXT13-1	0.00	0.00	0			0	0	51.88	51.88	150.00	0.00	7782	13.49	7782	24.32	24.32	3.06	74.46	0.00	87.95	100.00	375.00	0.50	123.91	1.12
Catchment EXT14[1]	EXT14-1	EXT13-1	0.00	0.00	0			0	0	88.99	88.99	150.00	0.00	13349	23.14	13349	41.71	41.71	2.83	118.02	0.00	141.16	100.00	450.00	0.50	201.50	1.27
Catchment EXT13[1]	EXT13-1	601-5	0.00	0.00	0			0	0	33.98	174.85	150.00	0.00	26228	45.46	26228	15.93	81.96	2.53	207.76	0.00	253.22	100.00	525.00	0.50	303.95	1.40
CATCHMENT 601			69.74	0.00																							
Schools	601-1	601-2	0.00	0.00	0			0	0	2.40	2.40	187.50	0.00	450	0.62	450	1.41	1.41	4.00	5.62	0.00	6.25	100.00	200.00	0.50	23.18	UNDER
Apartments (NC)	601-2	601-3	6.28	6.28	942	2.70		2543	2543	0.00	2.40	0.00	0.00	450	2.26	2993	8.54	9.94	3.44	34.24	0.00	36.49	100.00	250.00	0.50	42.03	0.86
Stacked Townhouses (UC)	601-3	601-4	9.13	15.41	913	3.40		3104	5648	0.00	2.40	0.00	0.00	450	4.63	6098	10.42	20.36	3.16	64.43	0.00	69.06	100.00	375.00	0.50	123.91	1.12
Single/Semi-Detached	601-4	601-5	38.43	53.84	961	4.20		4035	9682	0.00	2.40	0.00	0.00	450	14.62	10132	13.54	33.90	2.95	99.99	0.00	114.61	100.00	450.00	0.50	201.50	1.27
Street Townhouses	601-5	ST-208	13.50	67.34	675	3.40		2295	11978	0.00	177.25	0.00	0.00	26678	63.59	38655	7.70	123.57	2.37	292.89	0.00	356.48	100.00	600.00	0.50	433.95	1.53
CATCHMENT 602			35.10	0.00																							
Existing Schools	602-1	602-2	0.00	0.00	0			0	0	10.86	10.86	110.50	0.00	1200	2.82	1200	3.75	3.75	3.75	14.05	0.00	16.88	100.00	200.00	0.50	23.18	UNDER
Existing Rec Centre	602-2	602-3	0.00	0.00	0			0	0	3.93	14.79	50.00	0.00	1397	3.85	1397	0.61	4.36	3.70	16.15	0.00	20.00	100.00	250.00	0.50	42.03	0.86
Community Centre	602-3	602-4	0.00	0.00	0			0	0	5.00	19.79	50.00	0.00	1647	5.15	1647	0.78	5.15	3.65	18.78	0.00	23.93	100.00	250.00	0.50	42.03	0.86
Stacked Townhouses (UC)	602-4	602-5	5.41	5.41	541	3.40		1839	1839	0.00	19.79	0.00	0.00	1647	6.55	3486	6.17	11.32	3.39	38.33	0.00	44.88	100.00	300.00	0.50	68.34	0.97
Single/Semi-Detached	602-5	602-6	10.23	15.64	256	4.20		1075	2914	0.00	19.79	0.00	0.00	1647	9.21	4560	3.61	14.93	3.28	48.98	0.00	58.20	100.00	300.00	0.50	68.34	0.97
Street Townhouses	602-6	ST-208	3.60	19.24	180	3.40		611	3525	0.00	19.79	0.00	0.00	1647	10.15	5172	2.05	16.98	3.23	54.86	0.00	65.01	100.00	375.00	0.50	123.91	1.12

Sanitary Design Sheet
Mayfield Tullamore Landowner Group
MESP
Town of Caledon, Region of Peel

Minimum Sewer Diameter (mm) =	**200**	**Avg. Domestic Flow (l/cap/day) =**	**290**
Mannings n =	**0.013**	**Avg. Non-Residential Flow (l/emp/day) =**	**270**
Minimum Velocity (m/s) =	**0.75**	**Infiltration Rate (l/s/ha) =**	**0.26**
Maximum Velocity (m/s) =	**3**	**Max. Harmon Peaking Factor =**	**4.0**
Minimum Pipe Slope (%) =	**0.50**	**Min. Harmon Peaking Factor =**	**2.0**
		NOMINAL PIPE SIZE USED	

Notes:
1. Population Density based on discussions with Region staff
2. Per capita sanitary flow of 285 L/day per Region of Peel standards
3. Area and population per Sanitary Drainage Plan (Drawing SAN-01) and Pipe Design Sheet dated March 28, 2024 prepared by Crozier Consulting Engineers

Project: Mayfield Tullamore Landowner Group
Project No. 2699
Date: 9-Aug-24
Designed By: G.M.
Reviewed By: N.D.M.

P:\2699 Mayfield Tullamore Landowner Group\Design\Pipe Design\Sanitary\2024 07(Jul) 17 - Prelim Sani Sizing\[2699 - Sanitary Sheet Design.xlsm]Design

LOCATION			RESIDENTIAL							INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE		AREA	ACCUM. AREA	UNITS	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	AREA	ACCUM. AREA	POPULATION DENSITY	FLOW RATE	ACCUM. EQUIV. POPULATION	INFILTRATION	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW	ACCUM. AVG. DOMESTIC FLOW	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW	ICI FLOW	TOTAL FLOW	LENGTH	PIPE DIAMETER	SLOPE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
	FROM	TO				PER UNIT	PER HA																				
			(ha)	(ha)	(#)	(p/unit)	(p/ha)			(ha)	(ha)	(p/ha)	(l/s/ha)		(L/s)		(L/s)	(L/s)		(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(L/s)	(m/s)
Catchment EXT12	EXT12-1	ST-208	1.73	1.73	0		175.00	303	303	0.00	0.00	0.00	0.00	0	0.45	303	1.02	1.02	4.00	4.06	0.00	4.51	100.00	200.00	0.50	23.18	UNDER
Bramalea Road	ST-208	ST-012	0.00	88.31	0			0	15806	0.00	197.04	0.00	0.00	28324	74.19	44130	0.00	141.56	2.32	327.78	0.00	401.97	100.00	675.00	0.50	594.08	1.66

Sanitary Design Sheet
Mayfield Golf Club
MESP
Caledon

Minimum Sewer Diameter (mm) =	**200**	**Avg. Domestic Flow (l/cap/day) =**	**290**
Mannings n =	**0.013**	**Infiltration Rate (l/s/ha) =**	**0.26**
Minimum Velocity (m/s) =	**0.75**	**Max. Harmon Peaking Factor =**	**4.0**
Maximum Velocity (m/s) =	**3**	**Min. Harmon Peaking Factor =**	**2.0**
Minimum Pipe Slope (%) =	**0.50**	**NOMINAL PIPE SIZE USED**	

Notes:
1. Population Density based on Mayfield Tullamore Secondary Plan High Level Background Servicing and Stormwater Management Analysis (SCS, 2024)
2. Per capita sanitary flow of 285 L/day per Region of Peel standards

Project: Mayfield Golf Club
Project No. 2539
Date: 19-Sep-24
Designed By: G.M.
Reviewed By: N.D.M.

P:\2539 Mayfield Golf Club\Design\Pipe Design\Sanitary\[Sanitary Sheet Design MESP - 2539.xlsm]Design

LOCATION			RESIDENTIAL							INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE		AREA	ACCUM. AREA	UNITS	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	AREA	ACCUM. AREA	POPULATION DENSITY	FLOW RATE	ACCUM. EQUIV. POPULATION	INFILTRATION	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW	ACCUM. AVG. DOMESTIC FLOW	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW	ICI FLOW	TOTAL FLOW	LENGTH	PIPE DIAMETER	SLOPE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
	FROM	TO	(ha)	(ha)	(#)	PER UNIT (p/unit)	PER HA (p/ha)			(ha)	(ha)	(p/ha)	(l/s/ha)		(L/s)		(L/s)	(L/s)		(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(L/s)	(m/s)
External 1 + 2[1,2]	EXT1	EXT5-1	125.96	125.96	0		70.0	8817	8817	0.00	0.00	0	0	0	32.8	8817	29.1	29.1	3.01	87.5	0.0	120.3	100.0	450	0.50	201.5	1.27
External 3 + 4[1,2]	EXT3	EXT7-1	64.44	64.44	0		70.0	4511	4511	0.00	0.00	0	0	0	16.8	4511	14.9	14.9	3.29	48.9	0.0	65.7	100.0	375	0.50	123.9	1.12
External 5 - Apartments	EXT5-1	EXT5-2	3.27	129.23	491	2.70		1324	10142	0.00	0.00	0	0	0	33.6	10142	4.4	33.5	2.95	98.9	0.0	132.5	100.0	450	0.50	201.5	1.27
External 5 - Stacked Townhouses	EXT5-2	EXT5-3	4.91	134.14	491	3.40		1669	11811	0.00	0.00	0	0	0	34.9	11811	5.6	39.1	2.88	112.8	0.0	147.7	100.0	450	0.50	201.5	1.27
External 5 - Single/Semi-detached	EXT5-3	EXT5-4	29.80	163.94	745	4.20		3129	14940	0.00	0.00	0	0	0	42.6	14940	10.5	49.6	2.78	138.0	0.0	180.6	100.0	525	0.50	303.9	1.40
External 5 - Street Townhouses	EXT5-4	EXT6-1	10.46	174.41	523	3.40		1779	16719	0.00	0.00	0	0	0	45.3	16719	6.0	55.6	2.73	151.9	0.0	197.2	100.0	525	0.50	303.9	1.40
External 6 - Apartments	EXT6-1	EXT6-2	1.96	176.37	294	2.70		794	17513	0.00	0.00	0	0	0	45.9	17513	2.7	58.3	2.71	157.9	0.0	203.8	100.0	525	0.50	303.9	1.40
External 6 - Stacked Townhouses	EXT6-2	EXT6-3	6.00	182.37	600	3.40		2040	19553	0.00	0.00	0	0	0	47.4	19553	6.8	65.1	2.66	173.4	0.0	220.8	100.0	525	0.50	303.9	1.40
External 6 - Single/Semi-detached	EXT6-3	EXT6-4	2.15	184.52	54	4.20		226	19779	0.00	0.00	0	0	0	48.0	19779	0.8	65.9	2.66	175.1	0.0	223.0	100.0	525	0.50	303.9	1.40
External 6 - Street Townhouses	EXT6-4	EXT7-1	0.75	185.27	38	3.40		128	19906	0.00	0.00	0	0	0	48.2	19906	0.4	66.3	2.65	176.0	0.0	224.2	100.0	525	0.50	303.9	1.40
External 7 - Schools	EXT7-1	EXT7-2	0.00	249.71	0			0	24417	5.60	5.60	161	0	900	66.4	25317	3.0	84.2	2.55	214.7	0.0	281.1	100.0	600	0.50	434.0	1.53
External 7 - Stacked Townhouses	EXT7-2	EXT7-3	1.69	251.40	169	3.40		575	24992	0.00	5.60	0	0	900	66.8	25891	1.9	86.1	2.54	218.8	0.0	285.6	100.0	600	0.50	434.0	1.53
External 7 - Single/Semi-detached	EXT7-3	EXT7-4	41.34	292.74	958	4.20		4022	29013	0.00	5.60	0	0	900	77.6	29913	13.5	99.6	2.48	246.9	0.0	324.5	100.0	600	0.50	434.0	1.53
External 7 - Street Townhouses	EXT7-4	4	14.53	307.27	612	3.40		2082	31095	0.00	5.60	0	0	900	81.3	31995	7.0	106.6	2.45	261.2	0.0	342.5	100.0	600	0.50	434.0	1.53
External 8 - Single/Semi-detached	EXT8-1	EXT8-2	8.89	8.89	222	4.20		934	934	0.00	0.00	0	0	0	2.3	934	3.1	3.1	3.82	12.0	0.0	14.3	100.0	250	0.50	42.0	0.86
External 8 - Street Townhouses	EXT8-2	1	3.13	12.02	156	3.40		531	1465	0.00	0.00	0	0	0	3.1	1465	1.8	4.9	3.69	18.1	0.0	21.3	100.0	250	0.50	42.0	0.86
Catchment 301 - Singles	1	2	2.74	14.76	42	4.20		176	1642	0.00	0.00	0	0	0	3.8	1642	0.6	5.5	3.65	20.1	0.0	24.0	100.0	250	0.50	42.0	0.86
Street C Crossing	2	3	0.00	14.76	0			0	1642	0.00	0.00	0	0	0	3.8	1642	0.0	5.5	3.65	20.1	0.0	24.0	100.0	250	0.50	42.0	0.86
Catchment 302 - Singles	3	4	4.41	19.17	76	4.20		319	1961	0.00	0.00	0	0	0	5.0	1961	1.1	6.6	3.59	23.6	0.0	28.6	100.0	250	0.50	42.0	0.86
Catchment 303 - Towns	4	5	4.01	330.45	114	3.40		388	33444	0.00	5.60	0	0	900	87.4	34344	1.3	114.5	2.42	277.1	0.0	364.4	100.0	600	0.50	434.0	1.53
Catchment 304 - Medium Density	5	6	0.38	330.83	0		175.0	67	33510	0.00	5.60	0	0	900	87.5	34410	0.2	114.7	2.42	277.5	0.0	365.0	100.0	600	0.50	434.0	1.53
Steet A Crossing	6	7	0.00	330.83	0			0	33510	0.00	5.60	0	0	900	87.5	34410	0.0	114.7	2.42	277.5	0.0	365.0	100.0	600	0.50	434.0	1.53
Catchment 305 - Singles	7	8	7.55	338.38	115	4.20		483	33993	0.00	5.60	0	0	900	89.4	34893	1.6	116.3	2.41	280.8	0.0	370.2	100.0	600	0.50	434.0	1.53
Catchment 306 - Towns	8	9	0.20	338.58	7	3.40		24	34017	0.00	5.60	0	0	900	89.5	34917	0.1	116.4	2.41	280.9	0.0	370.4	100.0	600	0.50	434.0	1.53
Catchment 307 - Towns	9	10	0.61	339.19	18	3.40		61	34078	0.00	5.60	0	0	900	89.6	34978	0.2	116.6	2.41	281.3	0.0	371.0	100.0	600	0.50	434.0	1.53
Catchment 308 - Elementary School	10	11	0.00	339.19	0			0	34078	2.12	7.72	94	0	1100	90.2	35178	0.7	117.3	2.41	282.7	0.0	372.9	100.0	600	0.50	434.0	1.53
Catchment 309 - Towns	11	12	3.46	342.65	62	3.40		211	34289	0.00	7.72	0	0	1100	91.1	35389	0.7	118.0	2.41	284.1	0.0	375.2	100.0	600	0.50	434.0	1.53
Catchment 310 - Firehall	12	13	0.00	342.65	0			0	34289	0.75	8.47	50	0	1137	91.3	35426	0.1	118.1	2.41	284.3	0.0	375.6	100.0	600	0.50	434.0	1.53
Catchment 311 - Medium Density	13	14	0.81	343.46	0		175.0	142	34431	0.00	8.47	0	0	1137	91.5	35568	0.5	118.6	2.41	285.3	0.0	376.8	100.0	600	0.50	434.0	1.53
Catchment 312 - Medium Density	14	15	0.48	343.94	0		175.0	84	34515	0.00	8.47	0	0	1137	91.6	35652	0.3	118.9	2.40	285.8	0.0	377.5	100.0	600	0.50	434.0	1.53
Catchment 313 - Commercial	15	16	0.00	343.94	0			0	34515	0.47	8.94	50	0	1161	91.7	35676	0.1	119.0	2.40	286.0	0.0	377.7	100.0	600	0.50	434.0	1.53
Street A Outlet	16	17	0.00	343.94	0			0	34515	0.00	8.94	0	0	1161	91.7	35676	0.0	119.0	2.40	286.0	0.0	377.7	100.0	600	0.50	434.0	1.53
Catchment 314 - Residential	18	19	3.88	3.88	70	4.20		294	294	0.00	0.00	0	0	0	1.0	294	1.0	1.0	4.00	3.9	0.0	5.0	100.0	250	0.50	42.0	0.86
Catchment 315 - Residential	19	20	3.59	7.47	78	4.20		328	622	0.00	0.00	0	0	0	1.9	622	1.1	2.1	3.92	8.2	0.0	10.1	100.0	250	0.50	42.0	0.86
Catchment 316 - Singles	20	21	1.02	8.49	12	4.20		50	672	0.00	0.00	0	0	0	2.2	672	0.2	2.3	3.90	8.8	0.0	11.0	100.0	250	0.50	42.0	0.86
Catchment 317 - Medium Density	21	22	2.01	10.50	0		175.0	352	1024	0.00	0.00	0	0	0	2.7	1024	1.2	3.4	3.79	13.0	0.0	15.8	100.0	250	0.50	42.0	0.86
Catchment 318 - Medium Density	22	23	0.54	11.04	0		175.0	95	1118	0.00	0.00	0	0	0	2.9	1118	0.3	3.8	3.77	14.1	0.0	17.0	100.0	250	0.50	42.0	0.86
Street B Outlet	23	24	0.00	11.04	0			0	1118	0.00	0.00	0	0	0	2.9	1118	0.0	3.8	3.77	14.1	0.0	17.0	100.0	250	0.50	42.0	0.86

Appendix C Hydrology Model and Parameters

SCS consulting group ltd

DIGITAL MODELLING FILES

The following secure link is being provided by **SCS Consulting Group** to share Mayfield Golf Club related digital data:

https://filesafecloud.scsconsultinggroup.com/url/wmsjcfg7xjzfgddq

Please click on the link and download all files from this location.

- Visual Otthymo modelling


1
Catchment 106 - Outlet 1
2
Catchment 107 - Outlet 2
3
Catchments 101,102,103,104,105 - Outlet 3

scs consulting group ltd

Existing Conditions
VO Parameter Summary

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: C.M.D.

NASHYD

Number	101+102+103+104+105	106	107
Description			
DT(min)	2	2	2
Area (ha)	97.08	18.41	19.58
CN*	82.0	75.0	84.0
IA(mm)	7.4	4.7	7.3
TP Method	Uplands	Uplands	Uplands
TP (hr)	0.54	0.23	0.47

Existing Conditions
CN Calculations

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: C.M.D.

Site Soils: **As per Draft Phase 1 Local Subwatershed Study prepared by GEI (July 2024),**
Detailed Factual Geotechnical and Hydrogeological Subsurface Investigation Report prepared by GEMTEC (July 2023)

Soil Type	Hydrologic Soil Group
Pontypool Sandy Loam	A
Chinguacousy Clay Loam	C

TABLE OF CURVE NUMBERS (CN's)**

Land Use		Hydrologic Soil Type							Manning's 'n'	Source
		A	AB	B	BC	C	CD	D		
Meadow	"Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot	"Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel		76	80.5	85	87	89	90	91	0.30	USDA
Lawns	"Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range		58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop		66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)		77	82	86	89	91	93	94	0.05	MTO
Low Density Residences		57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved		98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%) - Existing Conditions

Catchment	Hydrologic Soil Type							TOTAL
	A	AB	B	BC	C	CD	D	
101+102+103+104+105	1.3				98.7			100
106					100			100
107					100			100

LAND USE (%) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101+102+103+104+105	2.6	0.2		17.4		78.8			0.9	100.0
106	0.1			88.7		1.1			10.1	100.0
107				16.9		80.5			2.6	100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

CURVE NUMBER (CN) - Existing Conditions

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Weighted CN
101+102+103+104+105	1.8	0.2	0.0	12.8	0.0	64.5	0.0	0.0	0.9	80
106	0.0	0.0	0.0	65.6	0.0	0.9	0.0	0.0	9.9	77
107	0.0	0.0	0.0	12.5	0.0	66.0	0.0	0.0	2.5	81

** AMC II assumed

Existing Conditions
CN Calculations

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: C.M.D.

Input Values

Step					
	Subcatchment:	101+102+103 +104+105		106	107
1	**CN (AMC II):**	**80**		**77**	**81**
2	CN (AMC III) =	91		89	92
3	100 Year Precipitation, P =	88.54	mm	88.54	88.54

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S} \qquad S = \frac{(P - Ia)^2}{Q} - (P - Ia)$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254} \qquad S = \frac{25400}{CN} - 254$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

Output Values

	Subcatchment:	101+102+103 +104+105		106	107
	S_{III} =	25.12	mm	31.39	22.09
	SCS Assumption of 0.2 S = Ia =	5.02	mm	6.28	4.42
4	Q_{III} =	64.20	mm	59.54	66.63
	Preferred Initial Abstraction, Ia =	7.4	mm	4.7	7.3
5	S^*_{III} =	21.36	mm	34.16	17.76
6	CN^*_{III} =	92.24	mm	88.15	93.47
	CN^*_{III}=	**92**	Rounded	**88**	**93**
7	**CN^*_{II}=**	**82**	convert	**75**	**84**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

Existing Conditions
IA Calculations

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: C.M.D.

LAND USE (%) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
101+102+103+104+105	2.6	0.2		17.4		78.8			0.9	100.0
106	0.1			88.7		1.1			10.1	100.0
107				16.9		80.5			2.6	100.0

IA VALUES (mm) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
101+102+103+104+105	0.2	0.0		0.9		6.3			0.0	7.4
106	0.0			4.4		0.1			0.2	4.7
107				0.8		6.4			0.1	7.3

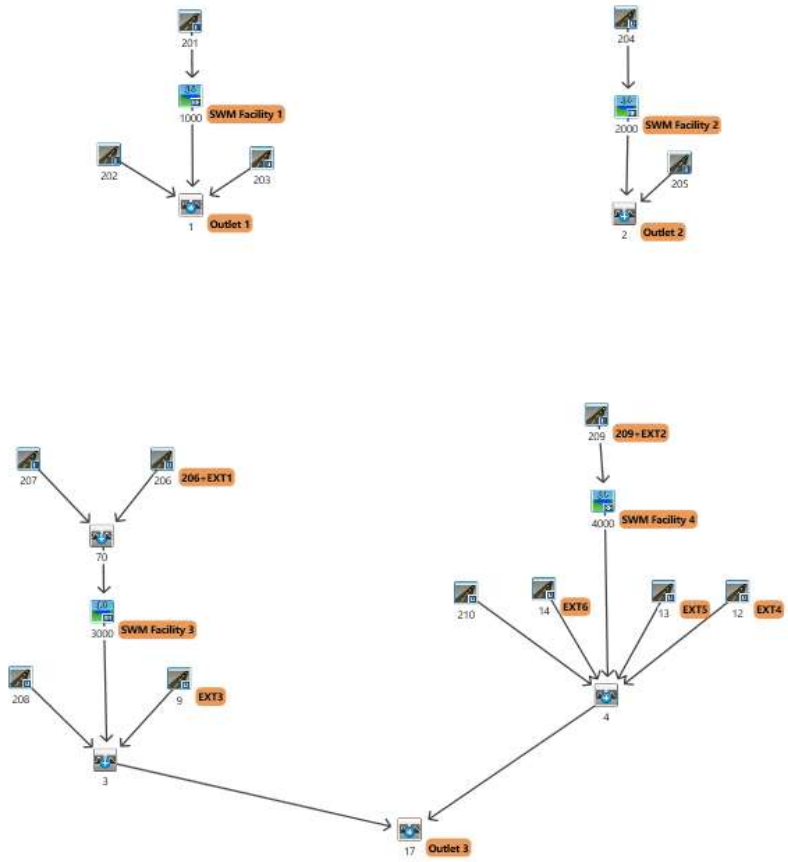
* IA values based on TRCA guidelines

Existing Conditions
Time to Peak Calculations

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: C.M.D.

Uplands Method:

Catchment ID	High Elevation	Low Elevation	Length (m)	Slope (%)	Land Cover Type	Velocity (m/s)	Time of Concentration (s)	Time of Concentration (hr)	Time to Peak (hr)
101+102+103+104+105a	271.50	259.35	775	1.57	Cultivated Straight Row	0.35	2216.5	0.62	0.41
101+102+103+104+105b	259.35	255.26	345	1.19	Waterway	0.51	674.1	0.19	0.13
101+102+103+104+105									**0.54**
106a	253.67	249.22	314	1.42	Pasture	0.26	1211.2	0.34	0.23
106									**0.23**
107a	252.50	249.93	331	0.78	Cultivated Straight Row	0.25	1342.6	0.37	0.25
107b	249.93	245.59	359	1.21	Cultivated Straight Row	0.31	1168.4	0.32	0.22
107									**0.47**


201
1000
SWM Facility 1
202
203
1
Outlet 1
204
2000
SWM Facility 2
205
2
Outlet 2
207
206
206+EXT1
70
3000
SWM Facility 3
208
9
EXT3
3
209
209+EXT2
4000
SWM Facility 4
210
14
EXT6
13
EXT5
12
EXT4
4
17
Outlet 3

Proposed Conditions
VO Parameter Summary

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

STANDHYD

Number	201	202	203	204	205	206+EXT1	207	208	209+EXT2	210	EXT3	EXT4	EXT5	EXT6
Description														
DT(min)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Area (ha)	16.36	4.20	1.66	10.85	5.26	76.22	3.58	0.55	14.30	2.80	5.33	1.67	0.99	0.16
TIMP[2]	0.69	0.19	0.19	0.69	0.19	0.64	0.50	0.52	0.63	0.23	0.15	0.15	0.15	0.15
XIMP[1,2]	0.40	0.01	0.01	0.36	0.01	0.28	0.50	0.01	0.22	0.01	0.01	0.01	0.01	0.01
CN*	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	73.0	61.0	73.0	73.0	73.0
IA(mm)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
SLPP(%)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
LGP(m)	40	40	40	40	40	40	40	40	40	40	40	40	40	40
MNP	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
DPSI (mm)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
SLPI(%)	1	1	1	1		1	1	1	1	1	1	1	1	1
LGI(m)	330.25	167.33	105.20	268.95	187.26	712.83	154.49	60.55	308.76	136.63	188.50	105.51	81.24	32.66
MNI	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013

[1]Note that where there is NO directly connected area (ie: roof runoff to grassed areas), the hydrology program does not accept XIMP=0%, therefore, XIMP = 1% has been used

[2]Note that where there is NO pervious area, the hydrology program does not accept TIMP and XIMP=100%, therefore, TIMP and XIMP = 99% has been used

Proposed Conditions
CN Calculations

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Site Soils: **Just per Draft Phase 1 Local Subwatershed Study prepared by GEI (July 2024),**
Detailed Factual Geotechnical and Hydrogeological Subsurface Investigation Report prepared by GEMTEC (July 2023)

Soil Type	Hydrologic Soil Group
Pontypool Sandy Loam	A
Chinguacousy Clay Loam	C

TABLE OF CURVE NUMBERS (CN's)**

Land Use		Hydrologic Soil Type A	AB	B	BC	C	CD	D	Manning's 'n'	Source
Meadow	"Good"	30	44	58	64.5	71	74.5	78	0.40	MTO
Woodlot	"Fair"	36	48	60	66.5	73	76	79	0.40	MTO
Gravel		76	80.5	85	87	89	90	91	0.30	USDA
Lawns	"Good"	39	50	61	67.5	74	77	80	0.25	USDA
Pasture/Range		58	61.5	65	70.5	76	78.5	81	0.17	MTO
Crop		66	70	74	78	82	84	86	0.13	MTO
Fallow (Bare)		77	82	86	89	91	93	94	0.05	MTO
Low Density Residences		57	64.5	72	76.5	81	83.5	86	0.25	USDA
Streets, paved		98	98	98	98	98	98	98	0.01	USDA

1. MTO Drainage Manual (1997), Design Chart 1.09-Soil/Land Use Curve Numbers
2. USDA (1986), Urban Hydrology for Small Watersheds, Table 2.2-Runoff Curve Numbers for Urban Areas

HYDROLOGIC SOIL TYPE (%)

Catchment	Hydrologic Soil Type A	AB	B	BC	C	CD	D	TOTAL
201					100			100
202					100			100
203					100			100
204					100			100
205					100			100
206+EXT1					100			100
207					100			100
208					100			100
209+EXT2					100			100
210					100			100
EXT3	23.1				76.9			100
EXT4					100			100
EXT5					100			100
EXT6					100			100

LAND USE (%)

Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				100						100.0
202				100						100.0
203				100						100.0
204				100						100.0
205				100						100.0
206+EXT1				100						100.0
207				100						100.0
208				100						100.0
209+EXT2				100						100.0
210				100						100.0
EXT3				100						100.0
EXT4				100						100.0
EXT5				100						100.0
EXT6				100						100.0

Note: Where STANDHYD command used (shaded), impervious fraction is not considered in CN determination, since %Imp directly input in STANDHYD command

Proposed Conditions
CN Calculations

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

CURVE NUMBER (CN) - Existing Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				74						74
202				74						74
203				74						74
204				74						74
205				74						74
206+EXT1				74						74
207				74						74
208				74						74
209+EXT2				74						74
210				74						74
EXT3				66						66
EXT4				74						74
EXT5				74						74
EXT6				74						74

** AMC II assumed

Proposed Conditions
CN Calculations

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Step	Input Values Subcatchment:		201	202	203	204	205	206+EXT1	207	208	209+EXT2	210	EXT3	EXT4	EXT5	EXT6
1	**CN (AMC II):**		**74**	**74**	**74**	**74**	**74**	**74**	**74**	**74**	**74**	**74**	**66**	**74**	**74**	**74**
2	CN (AMC III) =		88	88	88	88	88	88	88	88	88	88	82	88	88	88
3	100 Year Precipitation, P =	mm	100	100	100	100	100	100	100	100	100	100	100	100	100	100

$$Q = \frac{(P - Ia)^2}{(P - Ia) + S}$$

Q = rainfall excess or runoff, mm
S = potential maximum retention or available storage, mm

$$CN = \frac{25400}{S + 254}$$

CN* = modified SCS curve # that better reflects Ia conditions in Ontario

	Output Values Subcatchment:		201	202	203	204	205	206+EXT1	207	208	209+EXT2	210	EXT3	EXT4	EXT5	EXT6
	S_{III} =	mm	34.64	34.64	34.64	34.64	34.64	34.64	34.64	34.64	34.64	34.64	55.76	34.64	34.64	34.64
	SCS Assumption of 0.2 S = Ia =	mm	6.93	6.93	6.93	6.93	6.93	6.93	6.93	6.93	6.93	6.93	11.15	6.93	6.93	6.93
4	Q_{III} =	mm	67.83	67.83	67.83	67.83	67.83	67.83	67.83	67.83	67.83	67.83	54.59	67.83	67.83	67.83
	Preferred Initial Abstraction, Ia =	mm	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
5	S^*_{III} =	mm	38.05	38.05	38.05	38.05	38.05	38.05	38.05	38.05	38.05	38.05	70.32	38.05	38.05	38.05
6	CN^*_{III} =	mm	86.97	86.97	86.97	86.97	86.97	86.97	86.97	86.97	86.97	86.97	78.32	86.97	86.97	86.97
	CN^*_{III}=	Rounded	**87**	**87**	**87**	**87**	**87**	**87**	**87**	**87**	**87**	**87**	**78**	**87**	**87**	**87**
7	**CN^*_{II}=**	convert	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**73**	**61**	**73**	**73**	**73**

Explanation of Procedure

1 Determine CN based on typical AMC II conditions (attached)
2 Convert CN from AMC II to AMC III conditions (standard SCS tables)
3 Get precipitation depth P for 100 year storm
4 Using CN_{III} with Ia = 0.2S, compute Q_{III} for 100 year precipitation
5 For the same Q_{III}, compute S^*_{III} using Ia=1.5mm (or otherwise determined)
6 Compute CN^*_{III} using S^*_{III}
7 Calculate CN^*_{II} using SCS conversion table

Proposed Conditions
IA Calculations

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

LAND USE (%) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
201				100.0						100.0
202				100.0						100.0
203				100.0						100.0
204				100.0						100.0
205				100.0						100.0
206+EXT1				100.0						100.0
207				100.0						100.0
208				100.0						100.0
209+EXT2				100.0						100.0
210				100.0						100.0
EXT3				100.0						100.0
EXT4				100.0						100.0
EXT5				100.0						100.0
EXT6				100.0						100.0

IA VALUES (mm) - Proposed Conditions										
Catchment	Meadow	Woodlot	Gravel	Lawns	Pasture Range	Crop	Fallow (Bare)	Low Density Residences	Impervious	Total
IA (mm)	8	10	2	5	8	8	3	2	2	
201				5.0						5.0
202				5.0						5.0
203				5.0						5.0
204				5.0						5.0
205				5.0						5.0
206+EXT1				5.0						5.0
207				5.0						5.0
208				5.0						5.0
209+EXT2				5.0						5.0
210				5.0						5.0
EXT3				5.0						5.0
EXT4				5.0						5.0
EXT5				5.0						5.0
EXT6				5.0						5.0

* IA values based on TRCA guidelines

Proposed Conditions
Percent Impervious Calculations

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

			StandHyd IDs												
			201	202	203	204	205	206+EXT1	207	208	209+EXT2	210	EXT3	EXT4	EXT5	EXT6
Catchment Area (ha)			16.36	4.20	1.66	10.85	5.26	76.22	3.58	0.55	14.3	2.8	5.33	1.67	0.99	0.16
Land Use Areas	Timp	Ximp	Land Use Areas													
Singles and ROW	63%	20%	9.46			8.39		46.16			11.06					
Uncontrolled Singles	63%	0%		0.38	0.13		0.46	0.26		0.45		0.44				
Townhouses	65%	32%	1.53					15.22			3.05					
Laneway Townhouses	90%	45%	0.49					4.70								
Laneways	100%	100%	0.09					0.35								
School*	77%	77%	2.12					5.66								
Parks/Vista Blocks	15%	0%	0.15	3.82	1.53		4.80	3.38			0.19	2.36	5.33	1.67	0.99	0.16
SWM Pond	50%	50%							3.58							
Firehall*	77%	77%	0.76													
Medium Density	90%	90%	1.29			2.46		0.38								
Open Space	0%	0%						0.09		0.10						
Commercial	90%	90%	0.47													
		Total Land Use =	16.36	4.20	1.66	10.85	5.26	76.20	3.58	0.55	14.30	2.80	5.33	1.67	0.99	0.16
		Timp =	69%	19%	19%	69%	19%	64%	50%	52%	63%	23%	15%	15%	15%	15%
		Ximp =	40%	0%	0%	36%	0%	28%	50%	0%	22%	0%	0%	0%	0%	0%

Appendix D Stormwater Management Calculations

SWM Facility 1
Permanent Pool and
Extended Detention Sizing

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
201	16.36	69	11.29
Total	**16.36**	**69**	**11.29**

SWM Facility 1
Permanent Pool and
Extended Detention Sizing

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 69 %

Drainage Area = 16.36 ha

SWMP Type = 4. Wet Pond

Required Water Quality Control (including 40m^3/ha for extended detention)= 222.7 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 183 m^3/ha

Required Permanent Pool = 2988 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 13.85 mm x 16.36 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 2266 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 16.36 ha

Extended Detention Volume (V) = 654.4 m^3

Governing Volume (V) = 2266 m^3

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

SWM Facility 1
Permanent Pool Stage-Storage Rating Table

Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
243.8	2000				0		0	
		2000	1.5	3000				
245.3	**2000**				3000	**0**	**1.5**	**N.W.L.**

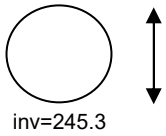
Permanent Pool Volume Required = 2988 m^3
Permanent Pool Volume Provided = 3000 m^3

SWM FACILITY 1
CONTROL STRUCTURE SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

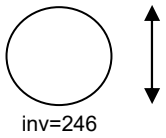
Orifice 1

Invert =	245.30	m
Size =	0.135	m
Orifice Coefficient, C =	0.62	
Obvert =	245.435	m



Orifice 2 (Round Only)

Invert =	246.00	m
Size =	0.365	m
C =	0.62	
Obvert =	246.365	m



SWM FACILITY 1
OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Starting Water Level (m) = 245.30
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES	12 Hour AES
245.30	0.000	0.000	0.00	245.30	0.000	0	0.0	Orifice 1	
245.32	0.000	0.000	0.00	245.32	0.000	76	0.0		
245.34	0.001	0.000	0.00	245.34	0.001	153	0.0		
245.36	0.002	0.000	0.00	245.36	0.002	229	11.6		
245.38	0.004	0.000	0.00	245.38	0.004	306	17.8		
245.40	0.007	0.000	0.00	245.40	0.007	382	21.5		
245.42	0.009	0.000	0.00	245.42	0.009	459	24.1		
245.44	0.011	0.000	0.00	245.44	0.011	535	26.3		
245.46	0.012	0.000	0.00	245.46	0.012	612	28.2		
245.48	0.013	0.000	0.00	245.48	0.013	688	29.9		
245.50	0.014	0.000	0.00	245.50	0.014	765	31.4		
245.52	0.015	0.000	0.00	245.52	0.015	841	32.9		
245.54	0.016	0.000	0.00	245.54	0.016	918	34.2		
245.56	0.017	0.000	0.00	245.56	0.017	994	35.5		
245.58	0.018	0.000	0.00	245.58	0.018	1070	36.7		
245.60	0.019	0.000	0.00	245.60	0.019	1147	37.8		
245.62	0.020	0.000	0.00	245.62	0.020	1223	38.9		
245.64	0.021	0.000	0.00	245.64	0.021	1300	40.0		
245.66	0.021	0.000	0.00	245.66	0.021	1376	41.0		
245.68	0.022	0.000	0.00	245.68	0.022	1453	42.0		
245.70	0.023	0.000	0.00	245.70	0.023	1529	42.9		
245.72	0.023	0.000	0.00	245.72	0.023	1606	43.8		
245.74	0.024	0.000	0.00	245.74	0.024	1682	44.7		
245.76	0.025	0.000	0.00	245.76	0.025	1759	45.6		
245.78	0.025	0.000	0.00	245.78	0.025	1835	46.5		
245.80	0.026	0.000	0.00	245.80	0.026	1912	47.3		
245.82	0.026	0.000	0.00	245.82	0.026	1988	48.1		
245.84	0.027	0.000	0.00	245.84	0.027	2064	48.9		
245.86	0.028	0.000	0.00	245.86	0.028	2141	49.7		
245.88	0.028	0.000	0.00	245.88	0.028	2217	50.4		
245.90	0.029	0.000	0.00	245.90	0.029	2294	51.2	Extended Detention	
245.92	0.029	0.000	0.00	245.92	0.029	2370	51.9		
245.94	0.030	0.000	0.00	245.94	0.030	2447	52.6		
245.96	0.030	0.000	0.00	245.96	0.030	2523	53.3		
245.98	0.031	0.000	0.00	245.98	0.031	2600	54.0		
246.00	0.031	0.000	0.00	246.00	0.031	2676	54.7	Orifice 2	
246.02	0.032	0.001	0.00	246.02	0.032	2753	55.4		
246.04	0.032	0.002	0.00	246.04	0.034	2829	56.0		
246.06	0.033	0.005	0.00	246.06	0.037	2905	56.6		
246.08	0.033	0.008	0.00	246.08	0.041	2982	57.2		
246.10	0.034	0.012	0.00	246.10	0.046	3058	57.7		
246.12	0.034	0.017	0.00	246.12	0.051	3135	58.1	2 Year	
246.14	0.035	0.023	0.00	246.14	0.057	3211	58.5		
246.16	0.035	0.029	0.00	246.16	0.064	3288	58.8		
246.18	0.035	0.036	0.00	246.18	0.071	3364	59.1		2 Year
246.20	0.036	0.038	0.00	246.20	0.074	3441	59.4		
246.22	0.036	0.056	0.00	246.22	0.092	3517	59.7		
246.24	0.037	0.069	0.00	246.24	0.106	3594	59.9		
246.26	0.037	0.080	0.00	246.26	0.117	3670	60.1		
246.28	0.038	0.090	0.00	246.28	0.127	3747	60.3		
246.30	0.038	0.098	0.00	246.30	0.136	3823	60.4		
246.32	0.038	0.107	0.00	246.32	0.145	3899	60.6		
246.34	0.039	0.114	0.00	246.34	0.153	3976	60.7		
246.36	0.039	0.121	0.00	246.36	0.160	4052	60.9	5 Year	
246.38	0.040	0.128	0.00	246.38	0.167	4129	61.0		5 Year
246.40	0.040	0.134	0.00	246.40	0.174	4205	61.1		
246.42	0.040	0.140	0.00	246.42	0.180	4282	61.2		
246.44	0.041	0.146	0.00	246.44	0.187	4358	61.4		
246.46	0.041	0.151	0.00	246.46	0.192	4435	61.5		
246.48	0.041	0.157	0.00	246.48	0.198	4511	61.6		
246.50	0.042	0.162	0.00	246.50	0.204	4588	61.7		
246.52	0.042	0.167	0.00	246.52	0.209	4664	61.8		
246.54	0.043	0.172	0.00	246.54	0.214	4741	61.9	10 Year	
246.56	0.043	0.177	0.00	246.56	0.219	4817	62.0		10 Year

SWM FACILITY 1
OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Starting Water Level (m) = 245.30
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES	12 Hour AES
246.58	0.043	0.181	0.00	246.58	0.224	4893	62.1		
246.60	0.044	0.186	0.00	246.60	0.229	4970	62.2		
246.62	0.044	0.190	0.00	246.62	0.234	5046	62.3		
246.64	0.044	0.194	0.00	246.64	0.239	5123	62.4		
246.66	0.045	0.199	0.00	246.66	0.243	5199	62.4		
246.68	0.045	0.203	0.00	246.68	0.248	5276	62.5		
246.70	0.045	0.207	0.00	246.70	0.252	5352	62.6		
246.72	0.046	0.211	0.00	246.72	0.256	5429	62.7		
246.74	0.046	0.215	0.00	246.74	0.261	5505	62.8		
246.76	0.046	0.218	0.00	246.76	0.265	5582	62.9		
246.78	0.047	0.222	0.00	246.78	0.269	5658	62.9		25 Year
246.80	0.047	0.226	0.00	246.80	0.273	5735	63.0	25 Year	
246.82	0.047	0.229	0.00	246.82	0.277	5811	63.1		
246.84	0.048	0.233	0.00	246.84	0.281	5887	63.2		
246.86	0.048	0.237	0.00	246.86	0.285	5964	63.2		
246.88	0.048	0.240	0.00	246.88	0.288	6040	63.3		
246.90	0.049	0.243	0.00	246.90	0.292	6117	63.4		
246.92	0.049	0.247	0.00	246.92	0.296	6193	63.5		
246.94	0.049	0.250	0.00	246.94	0.299	6270	63.5		
246.96	0.050	0.253	0.00	246.96	0.303	6346	63.6		50 Year
246.98	0.050	0.257	0.00	246.98	0.307	6423	63.7		
247.00	0.050	0.260	0.00	247.00	0.310	6499	63.7	50 Year	
247.02	0.051	0.263	0.00	247.02	0.314	6576	63.8		
247.04	0.051	0.266	0.00	247.04	0.317	6652	63.9		
247.06	0.051	0.269	0.00	247.06	0.320	6728	63.9		
247.08	0.051	0.272	0.00	247.08	0.324	6805	64.0		
247.10	0.052	0.275	0.00	247.10	0.327	6881	64.1		
247.12	0.052	0.278	0.00	247.12	0.330	6958	64.1		
247.14	0.052	0.281	0.00	247.14	0.334	7034	64.2		
247.16	0.053	0.284	0.00	247.16	0.337	7111	64.3		100 Year
247.18	0.053	0.287	0.00	247.18	0.340	7187	64.3		
247.20	0.053	0.290	0.00	247.20	0.343	7264	64.4	100 Year	
247.22	0.054	0.293	0.00	247.22	0.346	7340	64.5		
247.24	0.054	0.295	0.00	247.24	0.349	7417	64.5		
247.26	0.054	0.298	0.00	247.26	0.352	7493	64.6		
247.28	0.054	0.301	0.00	247.28	0.355	7570	64.6		
247.30	0.055	0.304	0.00	247.30	0.358	7646	64.7		

Forebay

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
243.80	600				0	0
		600	1.5	900		
245.30	600				900	1.5
		600	33.7	20,220		
279	600				21,120	35.2
		600	1	600		
280	600				21,720	36.2

Total Permanent Pool

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
243.80	2000				0	0
		2000	1.5	3,000		
245.30	2000				3,000	1.5
		2000	33.7	67,400		
279	2000				70,400	35.2
		2000	1	2,000		
280	2000				72,400	36.2

Minimum Criteria (per MECP guidelines)

Forebay area is **30** % of total Permanent Pool area
Maximum Forebay area is **33** % of total Permanent Pool area
Therefore the minimum criteria per MECP guidelines is satisfied.

SWM FACILITY 1
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

2. Forebay Settling Length

Dist = $(r \times Q_p / V_s)^{0.5}$

Dist = (2 * 0.03 / 0.0003)^0.5

Dist = 13.2

where:
Dist = forebay length (m)
r = length to width ratio
= 2.00
Q_p = peak flow rate from pond during design quality storm (m^3/s)
= 0.026
V_s = settling velocity (m/s)*
= 0.0003

Minimum forebay length is (m)	**13.2**
Actual forebay length is (m)	**40.0**
	CRITERIA SATISFIED

3. Forebay Dispersion Length

Dist = $(8 \times Q) / (d \times V_f)$

Dist = (8 * 3.366) / (1.5 * 0.5)

Dist = 35.9

where:
Dist = forebay length (m)
Q = inlet flow rate (m^3/s) (Please refer to 10-Year Pipe Design Sheet in Appendix D)
= 3.366
d = depth of permanent pool in forebay (m)
= 1.5
V_f = desired velocity in forebay (m/s)*
0.5

Minimum forebay length is (m)	**35.9**
Actual forebay length is (m)	**40.0**
	CRITERIA SATISFIED

4. Minimum Forebay Bottom Width

Width = Dist / 8

Width = 35.9 / 8

Width = 4.5

where:
Width = minimum forebay bottom width (m)
Dist = minimum forebay length (m)
= 35.9

Minimum bottom width is (m)	**4.5**
Actual bottom width is (m)	**15.0**
	CRITERIA SATISFIED

5. Maximum Velocity Check

V = Q/A

V = 3.366 / 22.5

V = 0.15

where:
V = velocity (m/s)
Q = inlet flow rate (m^3/s) (Please refer to 10-Year Pipe Design Sheet in Appendix D)
= 3.366
A = average cross-sectional area of entire forebay (m^2) (see **Page 3**)
= 22.5

Maximum velocity permitted is (m/s)	**0.15**
Actual velocity is (m/s)	**0.15**
	CRITERIA SATISFIED

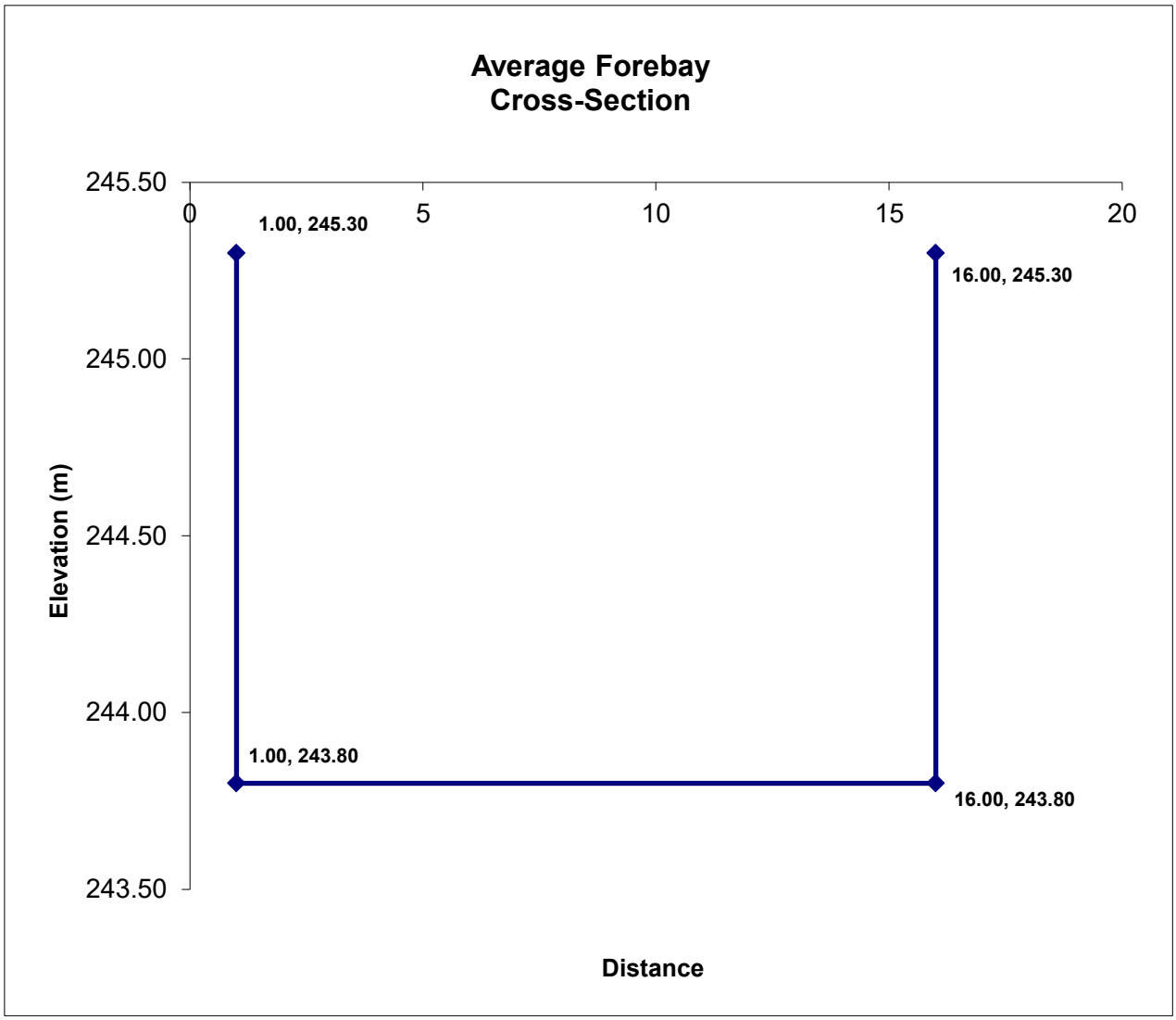
*Value recommended by the MECP Stormwater Management Planning & Design Manual

SWM FACILITY 1
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Distance (m)	Elevation (m)	Depth (m)	Incremental Area (m^2)
1.00	245.30	0.00	--
1.00	243.80	1.50	0.00
16.00	243.80	1.50	22.50
16.00	245.30	0.00	0.00

Area (m^2) = 22.50



SWM Facility 2
Permanent Pool and
Extended Detention Sizing

Mayfield Golf Club
Project Number: 2539
Date: December 2023
Designer Initials: D.V.

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
204	10.85	69	7.49
Total	**10.85**	**69**	**7.49**

SWM Facility 2
Permanent Pool and
Extended Detention Sizing

Mayfield Golf Club
Project Number: 2539
Date: December 2023
Designer Initials: D.V.

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 69 %

Drainage Area = 10.85 ha

SWMP Type = 4. Wet Pond

Required Water Quality Control (including 40m^3/ha for extended detention)= 222.7 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 183 m^3/ha

Required Permanent Pool = 1982 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 13.43 mm x 10.85 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 1457 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 10.85 ha

Extended Detention Volume (V) = 434 m^3

Governing Volume (V) = 1457 m^3

Mayfield Golf Club
Project Number: 2539
Date: November 2023
Designer Initials: D.V.

SWM Facility 2
Permanent Pool Stage-Storage Rating Table

Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
241.65	1400				0		0	
		1400	1.5	2100				
243.15	**1400**				2100	**0**	**1.5**	**N.W.L.**

Permanent Pool Volume Required = 1982 m^3
Permanent Pool Volume Provided = 2100 m^3

SWM FACILITY 2
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Forebay

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
241.65	400	400	1.5	600	0	0
243.15	400				600	1.5

Total Permanent Pool

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
241.65	1400	1400	1.5	2,100	0	0
243.15	1400				2,100	1.5

Minimum Criteria (per MECP guidelines)

Forebay area is **29** % of total Permanent Pool area
Maximum Forebay area is **33** % of total Permanent Pool area
Therefore the minimum criteria per MECP guidelines is satisfied.

SWM FACILITY 2
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

2. Forebay Settling Length

Dist = $(r \times Q_p / V_s)^{0.5}$

Dist = (2 * 0.02 / 0.0003)^0.5

Dist = 10.3

where:
Dist = forebay length (m)
r = length to width ratio
= 2.00
Q_p = peak flow rate from pond during design quality storm (m^3/s)
= 0.016
V_s = settling velocity (m/s)*
= 0.0003

Minimum forebay length is (m)	**10.3**
Actual forebay length is (m)	**40.0**
	CRITERIA SATISFIED

3. Forebay Dispersion Length

Dist = $(8 \times Q) / (d \times V_f)$

Dist = (8 * 2.1) / (1.5 * 0.5)

Dist = 22.4

where:
Dist = forebay length (m)
Q = inlet flow rate (m^3/s) (Please refer to 10-Year Pipe Design Sheet in Appendix D)
= 2.1
d = depth of permanent pool in forebay (m)
= 1.5
V_f = desired velocity in forebay (m/s)*
0.5

Minimum forebay length is (m)	**22.4**
Actual forebay length is (m)	**40.0**
	CRITERIA SATISFIED

4. Minimum Forebay Bottom Width

Width = Dist / 8

Width = 22.4 / 8

Width = 2.8

where:
Width = minimum forebay bottom width (m)
Dist = minimum forebay length (m)
= 22.4

Minimum bottom width is (m)	**2.8**
Actual bottom width is (m)	**10.0**
	CRITERIA SATISFIED

5. Maximum Velocity Check

V = Q/A

V = 2.1 / 19.5

V = 0.11

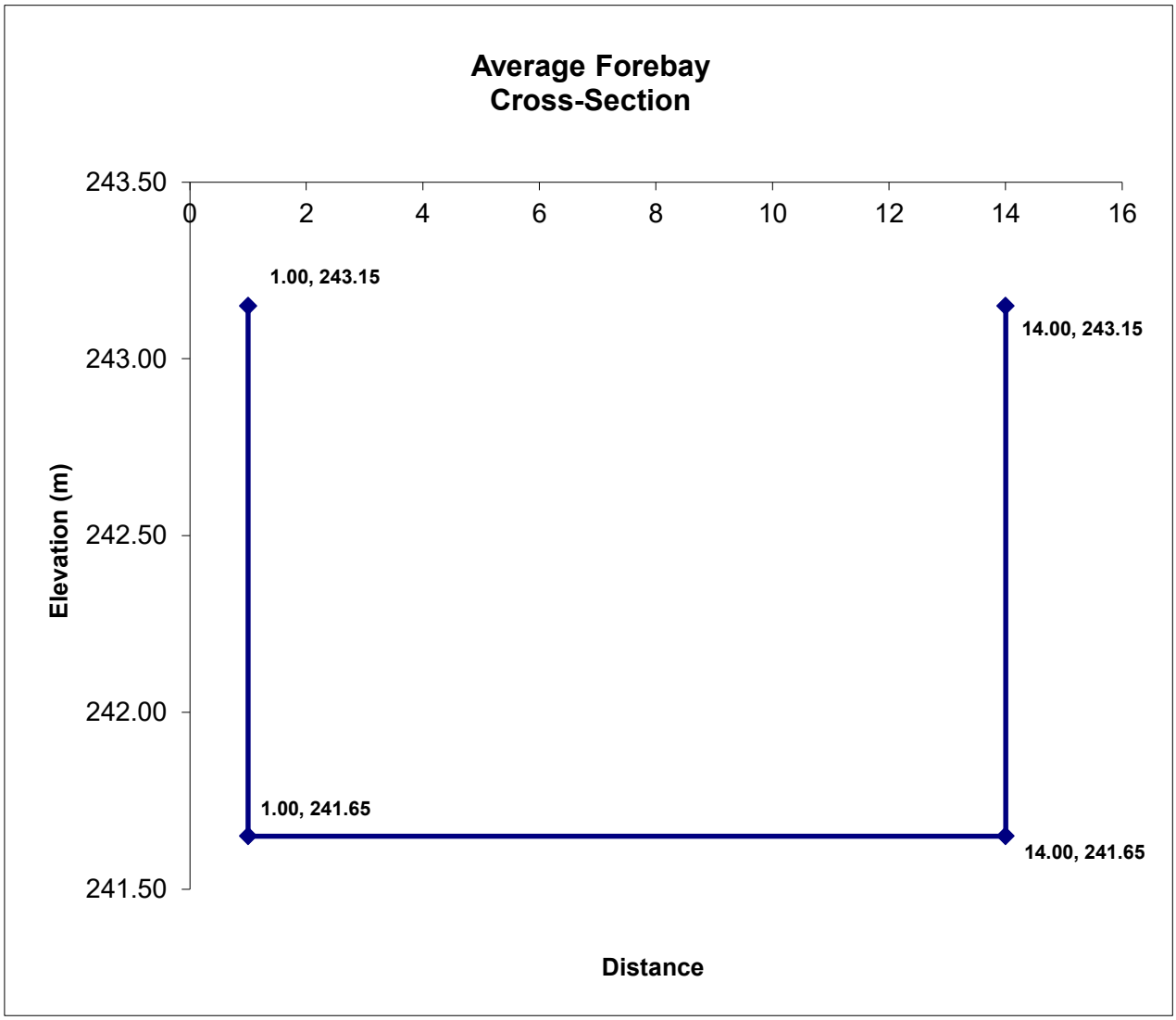
where:
V = velocity (m/s)
Q = inlet flow rate (m^3/s) (Please refer to 10-Year Pipe Design Sheet in Appendix D)
= 2.1
A = average cross-sectional area of entire forebay (m^2) (see **Page 3**)
= 19.5

Maximum velocity permitted is (m/s)	**0.15**
Actual velocity is (m/s)	**0.11**
	CRITERIA SATISFIED

*Value recommended by the MECP Stormwater Management Planning & Design Manual

Distance (m)	Elevation (m)	Depth (m)	Incremental Area (m^2)
1.00	243.15	0.00	--
1.00	241.65	1.50	0.00
14.00	241.65	1.50	19.50
14.00	243.15	0.00	0.00

Area (m^2) = 19.50

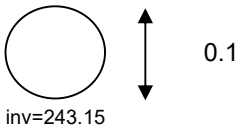


SWM FACILITY 2
CONTROL STRUCTURE SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

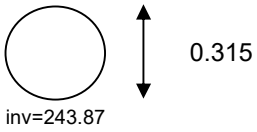
Orifice 1

Invert =	243.15	m
Size =	0.100	m
Orifice Coefficient, C =	0.62	
Obvert =	243.25	m



Orifice 2 (Round Only)

Invert =	243.87	m
Size =	0.315	m
C =	0.62	
Obvert =	244.185	m



SWM FACILITY 2
OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Starting Water Level (m) = 243.15
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES	12 Hour AES
243.15	0.000	0.000	0.00	243.15	0.000	0	0.0	Orifice 1	
243.17	0.000	0.000	0.00	243.17	0.000	50	0.0		
243.19	0.001	0.000	0.00	243.19	0.001	100	0.0		
243.21	0.002	0.000	0.00	243.21	0.002	150	8.9		
243.23	0.004	0.000	0.00	243.23	0.004	199	13.6		
243.25	0.005	0.000	0.00	243.25	0.005	249	16.8		
243.27	0.006	0.000	0.00	243.27	0.006	299	19.4		
243.29	0.006	0.000	0.00	243.29	0.006	349	21.7		
243.31	0.007	0.000	0.00	243.31	0.007	399	23.7		
243.33	0.008	0.000	0.00	243.33	0.008	449	25.6		
243.35	0.008	0.000	0.00	243.35	0.008	498	27.3		
243.37	0.009	0.000	0.00	243.37	0.009	548	28.9		
243.39	0.009	0.000	0.00	243.39	0.009	598	30.4		
243.41	0.010	0.000	0.00	243.41	0.010	648	31.9		
243.43	0.010	0.000	0.00	243.43	0.010	698	33.2		
243.45	0.011	0.000	0.00	243.45	0.011	748	34.5		
243.47	0.011	0.000	0.00	243.47	0.011	797	35.8		
243.49	0.012	0.000	0.00	243.49	0.012	847	37.0		
243.51	0.012	0.000	0.00	243.51	0.012	897	38.2		
243.53	0.012	0.000	0.00	243.53	0.012	947	39.3		
243.55	0.013	0.000	0.00	243.55	0.013	997	40.4		
243.57	0.013	0.000	0.00	243.57	0.013	1047	41.5		
243.59	0.013	0.000	0.00	243.59	0.013	1096	42.5		
243.61	0.014	0.000	0.00	243.61	0.014	1146	43.5		
243.63	0.014	0.000	0.00	243.63	0.014	1196	44.5		
243.65	0.014	0.000	0.00	243.65	0.014	1246	45.5		
243.67	0.015	0.000	0.00	243.67	0.015	1296	46.4		
243.69	0.015	0.000	0.00	243.69	0.015	1346	47.4		
243.71	0.015	0.000	0.00	243.71	0.015	1396	48.3		
243.73	0.016	0.000	0.00	243.73	0.016	1445	49.2	Extended Detention	
243.75	0.016	0.000	0.00	243.75	0.016	1495	50.0		
243.77	0.016	0.000	0.00	243.77	0.016	1545	50.9		
243.79	0.017	0.000	0.00	243.79	0.017	1595	51.7		
243.81	0.017	0.000	0.00	243.81	0.017	1645	52.6		
243.83	0.017	0.000	0.00	243.83	0.017	1695	53.4		
243.85	0.017	0.000	0.00	243.85	0.017	1744	54.2		
243.87	0.018	0.000	0.00	243.87	0.018	1794	55.0	Orifice 2	
243.89	0.018	0.000	0.00	243.89	0.018	1844	55.7		
243.91	0.018	0.002	0.00	243.91	0.020	1894	56.5		
243.93	0.018	0.004	0.00	243.93	0.023	1944	57.1		
243.95	0.019	0.007	0.00	243.95	0.026	1994	57.7		
243.97	0.019	0.011	0.00	243.97	0.030	2043	58.2		
243.99	0.019	0.016	0.00	243.99	0.035	2093	58.6		
244.01	0.019	0.021	0.00	244.01	0.040	2143	59.0		
244.03	0.020	0.021	0.00	244.03	0.040	2193	59.3		
244.05	0.020	0.032	0.00	244.05	0.052	2243	59.6		
244.07	0.020	0.044	0.00	244.07	0.064	2293	59.9		
244.09	0.020	0.054	0.00	244.09	0.074	2342	60.1		
244.11	0.021	0.061	0.00	244.11	0.082	2392	60.2		
244.13	0.021	0.069	0.00	244.13	0.089	2442	60.4		
244.15	0.021	0.075	0.00	244.15	0.096	2492	60.6		
244.17	0.021	0.081	0.00	244.17	0.102	2542	60.7		
244.19	0.021	0.086	0.00	244.19	0.108	2592	60.8		
244.21	0.022	0.091	0.00	244.21	0.113	2642	60.9		
244.23	0.022	0.096	0.00	244.23	0.118	2691	61.1		
244.25	0.022	0.101	0.00	244.25	0.123	2741	61.2		
244.27	0.022	0.105	0.00	244.27	0.128	2791	61.3		
244.29	0.023	0.110	0.00	244.29	0.132	2841	61.4		
244.31	0.023	0.114	0.00	244.31	0.136	2891	61.5		
244.33	0.023	0.118	0.00	244.33	0.141	2941	61.6		
244.35	0.023	0.122	0.00	244.35	0.145	2990	61.7		
244.37	0.023	0.125	0.00	244.37	0.149	3040	61.8		
244.39	0.024	0.129	0.00	244.39	0.152	3090	61.9		
244.41	0.024	0.132	0.00	244.41	0.156	3140	62.0		
244.43	0.024	0.136	0.00	244.43	0.160	3190	62.1		
244.45	0.024	0.139	0.00	244.45	0.163	3240	62.1		
244.47	0.024	0.142	0.00	244.47	0.167	3289	62.2		
244.49	0.024	0.146	0.00	244.49	0.170	3339	62.3		
244.51	0.025	0.149	0.00	244.51	0.173	3389	62.4		
244.53	0.025	0.152	0.00	244.53	0.177	3439	62.5		
244.55	0.025	0.155	0.00	244.55	0.180	3489	62.6		

SWM FACILITY 2
OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Starting Water Level (m) = 243.15
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Backwater Elevation (m)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES	12 Hour AES
244.57	0.025	0.158	0.00	244.57	0.183	3539	62.6		
244.59	0.025	0.161	0.00	244.59	0.186	3588	62.7		
244.61	0.026	0.163	0.00	244.61	0.189	3638	62.8		
244.63	0.026	0.166	0.00	244.63	0.192	3688	62.9		
244.65	0.026	0.169	0.00	244.65	0.195	3738	62.9		
244.67	0.026	0.172	0.00	244.67	0.198	3788	63.0		
244.69	0.026	0.174	0.00	244.69	0.201	3838	63.1		
244.71	0.027	0.177	0.00	244.71	0.203	3888	63.1		
244.73	0.027	0.179	0.00	244.73	0.206	3937	63.2		
244.75	0.027	0.182	0.00	244.75	0.209	3987	63.3		
244.77	0.027	0.184	0.00	244.77	0.211	4037	63.3		
244.79	0.027	0.187	0.00	244.79	0.214	4087	63.4		
244.81	0.027	0.189	0.00	244.81	0.217	4137	63.5		
244.83	0.028	0.192	0.00	244.83	0.219	4187	63.5		
244.85	0.028	0.194	0.00	244.85	0.222	4236	63.6		
244.87	0.028	0.196	0.00	244.87	0.224	4286	63.6		
244.89	0.028	0.199	0.00	244.89	0.227	4336	63.7		
244.91	0.028	0.201	0.00	244.91	0.229	4386	63.8		
244.93	0.028	0.203	0.00	244.93	0.232	4436	63.8		
244.95	0.029	0.206	0.00	244.95	0.234	4486	63.9		
244.97	0.029	0.208	0.00	244.97	0.236	4535	63.9		
244.99	0.029	0.210	0.00	244.99	0.239	4585	64.0		
245.01	0.029	0.212	0.00	245.01	0.241	4635	64.1		
245.03	0.029	0.214	0.00	245.03	0.243	4685	64.1		
245.05	0.029	0.216	0.00	245.05	0.246	4735	64.2		
245.07	0.029	0.219	0.00	245.07	0.248	4785	64.2		
245.09	0.030	0.221	0.00	245.09	0.250	4834	64.3		
245.11	0.030	0.223	0.00	245.11	0.252	4884	64.3		
245.13	0.030	0.225	0.00	245.13	0.255	4934	64.4		
245.15	0.030	0.227	0.00	245.15	0.257	4984	64.5		

SWM Facility 3
Permanent Pool and
Extended Detention Sizing

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
207	3.58	50	1.79
206+EXT1	76.22	64	48.78
Total	**79.80**	**63**	**50.57**

SWM Facility 3
Permanent Pool and
Extended Detention Sizing

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 63 %

Drainage Area = 79.80 ha

SWMP Type = 4. Wet Pond

Required Water Quality Control (including 40m^3/ha for extended detention)= 209.5 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 170 m^3/ha

Required Permanent Pool = 13529 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 12.04 mm x 79.80 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 9608 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 79.80 ha

Extended Detention Volume (V) = 3192 m^3

Governing Volume (V) = 9608 m^3

SWM Facility 3
Permanent Pool Stage-Storage Rating Table

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
245.25	5190				0		0	
		7373	1.5	11059.5				
246.75	9556				11060	0	1.5	
		11228	1	11228				
247.75	12900				22288		2.5	
		14294	0.5	7146.75				
248.25	**15687**				29434		**3**	**N.W.L.**

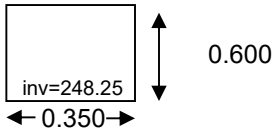
Permanent Pool Volume Required = 13529 m^3
Permanent Pool Volume Provided = 29434 m^3

CONTROL STRUCTURE SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: C.M.D.

Orifice 1 (Square)

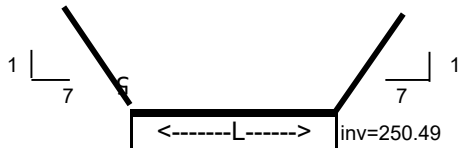
Invert =	248.25	m
Width=	0.350	m
C =	0.62	
Obvert =	248.85	m
Height =	0.600	m
Channel Width, b =	1.0	m



Broad Crested Weir (Weir 1 - Regional)

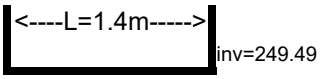
Length =	2.00	m
Elevation =	250.49	m
Crest Breadth =	5.0	m
Side Slope =	7.0	

(0 = vertical, 1 = 1H to 1V, 3 = 3H to 1 v)



Broad Crested Weir (Weir 2)

Length =	1.40	m
Elevation =	249.49	m
Crest Breadth =	0.20	m



OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: C.M.D.

Starting Water Level (m) =
Elevation Increment (m) =

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Weir 1 (Regional) Outflow (cms)	Weir 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES Storm	12 Hour AES Storm
248.25	0.000	0.000	0.000	248.25	0.000	0	0.0	Orifice 1	
248.27	0.002	0.000	0.000	248.27	0.002	315	0.0		
248.29	0.005	0.000	0.000	248.29	0.005	632	0.0		
248.31	0.009	0.000	0.000	248.31	0.009	952	12.2		
248.33	0.014	0.000	0.000	248.33	0.014	1274	19.8		
248.35	0.020	0.000	0.000	248.35	0.020	1599	25.1		
248.37	0.026	0.000	0.000	248.37	0.026	1926	29.1		
248.39	0.032	0.000	0.000	248.39	0.032	2255	32.2		
248.41	0.039	0.000	0.000	248.41	0.039	2586	34.8		
248.43	0.047	0.000	0.000	248.43	0.047	2921	37.0		
248.45	0.054	0.000	0.000	248.45	0.054	3257	38.8		
248.47	0.062	0.000	0.000	248.47	0.062	3596	40.4		
248.49	0.071	0.000	0.000	248.49	0.071	3937	41.9		
248.51	0.079	0.000	0.000	248.51	0.079	4281	43.1		
248.53	0.088	0.000	0.000	248.53	0.088	4627	44.3		
248.55	0.097	0.000	0.000	248.55	0.097	4975	45.3		
248.57	0.106	0.000	0.000	248.57	0.106	5326	46.3		
248.59	0.115	0.000	0.000	248.59	0.115	5679	47.2		
248.61	0.125	0.000	0.000	248.61	0.125	6035	48.0		
248.63	0.134	0.000	0.000	248.63	0.134	6393	48.8		
248.65	0.144	0.000	0.000	248.65	0.144	6753	49.5		
248.67	0.154	0.000	0.000	248.67	0.154	7116	50.2		
248.69	0.164	0.000	0.000	248.69	0.164	7481	50.8		
248.71	0.173	0.000	0.000	248.71	0.173	7849	51.4		
248.73	0.183	0.000	0.000	248.73	0.183	8219	52.0		
248.75	0.193	0.000	0.000	248.75	0.193	8591	52.5		
248.77	0.203	0.000	0.000	248.77	0.203	8966	53.1		
248.79	0.213	0.000	0.000	248.79	0.213	9343	53.6		
248.81	0.223	0.000	0.000	248.81	0.223	9723	54.0	Extended Detention	
248.83	0.232	0.000	0.000	248.83	0.232	10105	54.5		
248.85	0.242	0.000	0.000	248.85	0.242	10489	55.0		
248.87	0.326	0.000	0.000	248.87	0.326	10876	55.3		
248.89	0.336	0.000	0.000	248.89	0.336	11265	55.7		
248.91	0.346	0.000	0.000	248.91	0.346	11656	56.0		
248.93	0.356	0.000	0.000	248.93	0.356	12050	56.3		
248.95	0.365	0.000	0.000	248.95	0.365	12446	56.6		
248.97	0.374	0.000	0.000	248.97	0.374	12845	56.9	2 Year	
248.99	0.383	0.000	0.000	248.99	0.383	13246	57.2		
249.01	0.391	0.000	0.000	249.01	0.391	13650	57.5		
249.03	0.400	0.000	0.000	249.03	0.400	14056	57.8		2 Year
249.05	0.408	0.000	0.000	249.05	0.408	14464	58.1		
249.07	0.416	0.000	0.000	249.07	0.416	14874	58.3		
249.09	0.424	0.000	0.000	249.09	0.424	15288	58.6		
249.11	0.432	0.000	0.000	249.11	0.432	15703	58.9		
249.13	0.439	0.000	0.000	249.13	0.439	16121	59.1		
249.15	0.447	0.000	0.000	249.15	0.447	16541	59.4		
249.17	0.454	0.000	0.000	249.17	0.454	16964	59.7		
249.19	0.461	0.000	0.000	249.19	0.461	17389	59.9		
249.21	0.469	0.000	0.000	249.21	0.469	17816	60.2		
249.23	0.476	0.000	0.000	249.23	0.476	18246	60.4		
249.25	0.483	0.000	0.000	249.25	0.483	18678	60.7	5 Year	
249.27	0.489	0.000	0.000	249.27	0.489	19112	60.9		
249.29	0.496	0.000	0.000	249.29	0.496	19547	61.2		5 Year
249.31	0.503	0.000	0.000	249.31	0.503	19982	61.4		
249.33	0.509	0.000	0.000	249.33	0.509	20419	61.7		
249.35	0.516	0.000	0.000	249.35	0.516	20857	61.9		
249.37	0.522	0.000	0.000	249.37	0.522	21296	62.1		
249.39	0.529	0.000	0.000	249.39	0.529	21735	62.4		
249.41	0.535	0.000	0.000	249.41	0.535	22176	62.6		
249.43	0.541	0.000	0.000	249.43	0.541	22617	62.8		
249.45	0.547	0.000	0.000	249.45	0.547	23060	63.0	10 Year	
249.47	0.553	0.000	0.000	249.47	0.553	23504	63.3		
249.49	0.559	0.000	0.000	249.49	0.559	23948	63.5	Weir 2	10 Year
249.51	0.565	0.000	0.006	249.51	0.571	24393	63.7		
249.53	0.571	0.000	0.017	249.53	0.588	24840	63.9		
249.55	0.577	0.000	0.032	249.55	0.609	25287	64.1		
249.57	0.582	0.000	0.049	249.57	0.632	25736	64.3		
249.59	0.588	0.000	0.069	249.59	0.657	26185	64.5		
249.61	0.594	0.000	0.090	249.61	0.684	26635	64.7		
249.63	0.599	0.000	0.114	249.63	0.713	27086	64.9		
249.65	0.605	0.000	0.139	249.65	0.744	27539	65.1		
249.67	0.610	0.000	0.166	249.67	0.776	27992	65.2	25 Year	
249.69	0.616	0.000	0.194	249.69	0.810	28446	65.4		25 Year

OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: C.M.D.

Starting Water Level (m) =
Elevation Increment (m) =

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Weir 1 (Regional) Outflow (cms)	Weir 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES Storm	12 Hour AES Storm
249.71	0.621	0.000	0.231	249.71	0.852	28901	65.5		
249.73	0.626	0.000	0.263	249.73	0.890	29357	65.7		
249.75	0.632	0.000	0.297	249.75	0.929	29814	65.8		
249.77	0.637	0.000	0.332	249.77	0.969	30272	66.0		
249.79	0.642	0.000	0.368	249.79	1.010	30731	66.1		
249.81	0.647	0.000	0.438	249.81	1.086	31191	66.2		
249.83	0.652	0.000	0.480	249.83	1.133	31652	66.3	50 Year	50 Year
249.85	0.658	0.000	0.523	249.85	1.181	32114	66.4		
249.87	0.663	0.000	0.567	249.87	1.230	32577	66.5		
249.89	0.668	0.000	0.613	249.89	1.280	33040	66.6		
249.91	0.673	0.000	0.686	249.91	1.358	33505	66.7		
249.93	0.677	0.000	0.735	249.93	1.413	33971	66.8		
249.95	0.682	0.000	0.786	249.95	1.469	34437	66.9		100 Year
249.97	0.687	0.000	0.838	249.97	1.525	34905	67.0	100 Year	
249.99	0.692	0.000	0.901	249.99	1.593	35374	67.1		
250.01	0.697	0.000	0.955	250.01	1.652	35843	67.2		
250.03	0.702	0.000	1.011	250.03	1.713	36314	67.3		
250.05	0.706	0.000	1.068	250.05	1.774	36785	67.3		
250.07	0.711	0.000	1.125	250.07	1.837	37258	67.4		
250.09	0.716	0.000	1.184	250.09	1.900	37731	67.5		
250.11	0.720	0.000	1.251	250.11	1.971	38206	67.5		
250.13	0.725	0.000	1.312	250.13	2.037	38681	67.6		
250.15	0.729	0.000	1.374	250.15	2.103	39157	67.7		
250.17	0.734	0.000	1.437	250.17	2.171	39635	67.7		
250.19	0.739	0.000	1.500	250.19	2.239	40113	67.8		
250.21	0.743	0.000	1.565	250.21	2.308	40592	67.9		
250.23	0.748	0.000	1.631	250.23	2.378	41072	67.9		
250.25	0.752	0.000	1.697	250.25	2.449	41553	68.0		
250.27	0.756	0.000	1.765	250.27	2.521	42036	68.0		
250.29	0.761	0.000	1.833	250.29	2.594	42519	68.1		
250.31	0.765	0.000	1.902	250.31	2.667	43003	68.1		
250.33	0.769	0.000	1.972	250.33	2.742	43488	68.2		
250.35	0.774	0.000	2.043	250.35	2.817	43974	68.2		
250.37	0.778	0.000	2.115	250.37	2.893	44461	68.3		
250.39	0.782	0.000	2.187	250.39	2.970	44949	68.3		
250.41	0.787	0.000	2.261	250.41	3.047	45437	68.4		
250.43	0.791	0.000	2.335	250.43	3.126	45927	68.4		
250.45	0.795	0.000	2.410	250.45	3.205	46418	68.4		
250.47	0.799	0.000	2.486	250.47	3.285	46910	68.5		
250.49	0.803	0.000	2.562	250.49	3.365	47403	68.5	Weir 1 (Regional)	
250.51	0.807	0.009	2.639	250.51	3.456	47896	68.6		
250.53	0.812	0.027	2.717	250.53	3.556	48391	68.6		
250.55	0.816	0.053	2.796	250.55	3.665	48887	68.6		
250.57	0.820	0.086	2.876	250.57	3.781	49383	68.7		
250.59	0.824	0.127	2.956	250.59	3.907	49881	68.7		
250.61	0.828	0.176	3.037	250.61	4.040	50379	68.8		
250.63	0.832	0.233	3.118	250.63	4.183	50879	68.8		
250.65	0.836	0.298	3.201	250.65	4.334	51379	68.8		
250.67	0.840	0.371	3.284	250.67	4.495	51881	68.9		
250.69	0.844	0.453	3.368	250.69	4.665	52383	68.9		
250.71	0.848	0.544	3.452	250.71	4.844	52886	68.9		
250.73	0.852	0.645	3.538	250.73	5.034	53391	68.9		
250.75	0.855	0.755	3.624	250.75	5.234	53896	69.0		
250.77	0.859	0.874	3.710	250.77	5.444	54402	69.0		
250.79	0.863	1.004	3.797	250.79	5.664	54910	69.0		
250.81	0.867	1.113	3.885	250.81	5.865	55418	69.0		
250.83	0.871	1.259	3.974	250.83	6.104	55927	69.1		
250.85	0.875	1.416	4.063	250.85	6.354	56437	69.1		
250.87	0.878	1.583	4.153	250.87	6.615	56948	69.1		
250.89	0.882	1.761	4.244	250.89	6.887	57460	69.1		
250.91	0.886	1.963	4.335	250.91	7.184	57973	69.2		
250.93	0.890	2.165	4.427	250.93	7.482	58487	69.2		
250.95	0.893	2.378	4.520	250.95	7.791	59002	69.2		
250.97	0.897	2.602	4.613	250.97	8.112	59518	69.2		
250.99	0.901	2.820	4.707	250.99	8.427	60035	69.2		
251.01	0.905	3.067	4.801	251.01	8.772	60553	69.2		
251.03	0.908	3.326	4.896	251.03	9.130	61071	69.3	Regional	
251.05	0.912	3.597	4.992	251.05	9.501	61591	69.3		
251.07	0.916	3.881	5.088	251.07	9.885	62112	69.3		
251.09	0.919	4.178	5.185	251.09	10.282	62634	69.3		
251.11	0.923	4.488	5.283	251.11	10.693	63156	69.3		
251.13	0.926	4.811	5.381	251.13	11.118	63680	69.3		
251.15	0.930	5.147	5.480	251.15	11.556	64205	69.3		

OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: C.M.D.

Starting Water Level (m) =
Elevation Increment (m) =

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Weir 1 (Regional) Outflow (cms)	Weir 2 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES Storm	12 Hour AES Storm
251.17	0.933	5.496	5.579	251.17	12.009	64730	69.4		
251.19	0.937	5.860	5.679	251.19	12.475	65257	69.4		
251.21	0.941	6.236	5.779	251.21	12.956	65784	69.4		
251.23	0.944	6.627	5.880	251.23	13.452	66313	69.4		
251.25	0.948	7.032	5.982	251.25	13.962	66842	69.4		

Forebay

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
246.75	1895				0	0
		2625	1	2,625		
247.75	3355				2,625	1
		3936	0.5	1,968		
248.25	4516				4,593	1.5

Total Permanent Pool

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
245.25	5190				0	0
		7373	1.5	11,060		
246.75	9556				11,060	1.5
		11228	1	11,228		
247.75	12900				22,288	2.5
		14294	0.5	7,147		
248.25	15687				29,434	3

Minimum Criteria (per MECP guidelines)

Forebay area is **29** % of total Permanent Pool area
Maximum Forebay area is **33** % of total Permanent Pool area
Therefore the minimum criteria per MECP guidelines is satisfied.

SWM FACILITY 3
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: C.M.D.

2. Forebay Settling Length

Dist = $(r \times Q_p / V_s)^{0.5}$

Dist = (5.1 * 0.18 / 0.0003)^0.5

Dist = 54.9

where:
Dist = forebay length (m)
r = length to width ratio
= 5.10
Q_p = peak flow rate from pond during design quality storm (m^3/s)
= 0.177
V_s = settling velocity (m/s)*
= 0.0003

Minimum forebay length is (m)	**54.9**
Actual forebay length is (m)	**150**

CRITERIA SATISFIED

3. Forebay Dispersion Length

Dist = $(8 \times Q) / (d \times V_f)$

Dist = (8 * 2.094) / (1.5 * 0.5)

Dist = 22.3

where:
Dist = forebay length (m)
Q = inlet flow rate (m^3/s) (25mm 4 Hour Chicago Peak Flow into Pond)
= 2.094
d = depth of permanent pool in forebay (m)
= 1.5
V_f = desired velocity in forebay (m/s)*
0.5

Minimum forebay length is (m)	**22.3**
Actual forebay length is (m)	**150.0**

CRITERIA SATISFIED

4. Minimum Forebay Bottom Width

Width = Dist / 8

Width = 54.9 / 8

Width = 6.9

where:
Width = minimum forebay bottom width (m)
Dist = minimum forebay length (m)
= 54.9

Minimum bottom width is (m)	**6.9**
Actual bottom width is (m)	**10.0**

CRITERIA SATISFIED

5. Maximum Velocity Check

V = Q/A

V = 2.094 / 72.3749999999996

V = 0.03

where:
V = velocity (m/s)
Q = inlet flow rate (m^3/s) (Please refer to 10-Year Pipe Design Sheet in Appendix D)
= 2.094
A = average cross-sectional area of entire forebay (m^2) (see **Page 3**)
= 72.4

Maximum velocity permitted is (m/s)	**0.15**
Actual velocity is (m/s)	**0.03**

CRITERIA SATISFIED

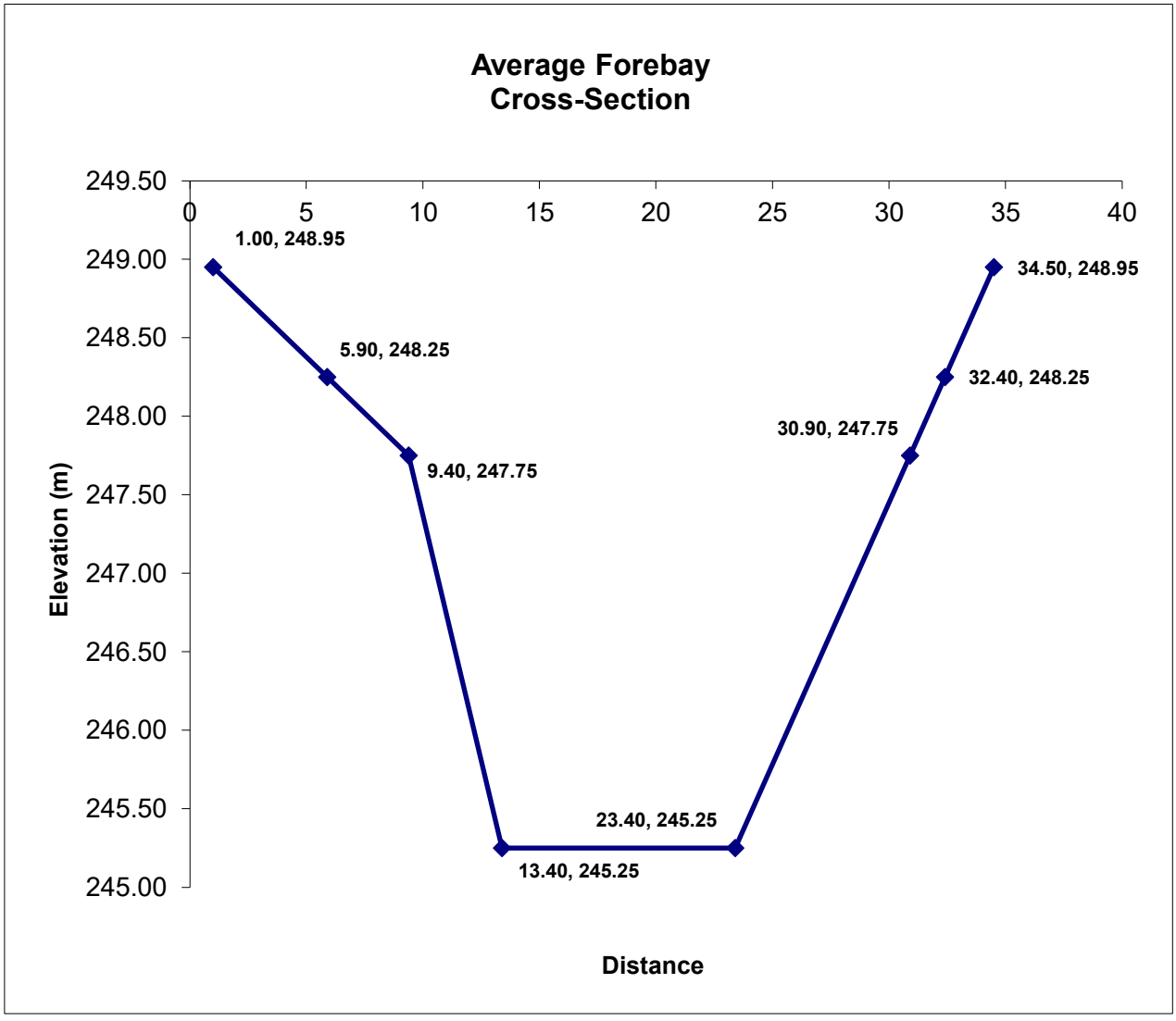
*Value recommended by the MECP Stormwater Management Planning & Design Manual

SWM FACILITY 3
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: C.M.D.

Distance (m)	Elevation (m)	Depth (m)	Incremental Area (m^2)
1.00	248.95	0.00	--
5.90	248.25	0.70	1.71
9.40	247.75	1.20	3.32
13.40	245.25	3.70	9.80
23.40	245.25	3.70	37.00
30.90	247.75	1.20	18.37
32.40	248.25	0.70	1.42
34.50	248.95	0.00	0.73

Area (m^2) = 72.37



SWM Facility 4
Permanent Pool and
Extended Detention Sizing

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Weighted Impervious Calculation

Catchment ID	Total Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
209+EXT2	14.30	63	9.01
Total	**14.30**	**63**	**9.01**

SWM Facility 4
Permanent Pool and
Extended Detention Sizing

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

PERMANENT POOL

Level of Protection = Enhanced (Level 1)

Weighted Impervious = 63 %

Drainage Area = 14.30 ha

SWMP Type = 4. Wet Pond

Required Water Quality Control (including 40m^3/ha for extended detention)= 208.7 m^3/ha
Required Permanent Pool (minus 40m^3/ha for extended detention)= 169 m^3/ha

Required Permanent Pool = 2412 m^3

TABLE 3.2 - WATER QUALITY STORAGE REQUIREMENTS
(FROM MOE SWM PLANNING AND DESIGN MANUAL - 2003)

Protection Level	SWMP Type	Storage Volume (m^3/ha) for Impervious Level			
		35%	55%	70%	85%
Enhanced (Level 1)	1. Infiltration	25	30	35	40
	2. Wetlands	80	105	120	140
	3. Hybrid Wet Pond/Wetland	110	150	175	195
	4. Wet Pond	140	190	225	250
Normal (Level 2)	1. Infiltration	20	20	25	30
	2. Wetlands	60	70	80	90
	3. Hybrid Wet Pond/Wetland	75	90	105	120
	4. Wet Pond	90	110	130	150
Basic (Level 3)	1. Infiltration	20	20	20	20
	2. Wetlands	60	60	60	60
	3. Hybrid Wet Pond/Wetland	60	70	75	80
	4. Wet Pond	60	75	85	95
	5. Dry Pond (Continuous Flow)	90	150	200	240

EXTENDED DETENTION

Using the 25mm - 4 hour Chicago Storm

Erosion Control Volume (V) = Runoff Depth (mm) x Drainage Area (ha) x 10 (m^3) / (mm)(ha)

Erosion Control Volume (V) = 11.22 mm x 14.30 ha x 10 m^3 / mm·ha

Erosion Control Volume (V) = 1604 m^3

Using 40m^3/ha

Extended Detention Volume (V) = 40m^3/ha x Drainage Area (ha)

Extended Detention Volume (V) = 40 m^3/ha 14.30 ha

Extended Detention Volume (V) = 572 m^3

Governing Volume (V) = 1604 m^3

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

SWM Facility 4
Permanent Pool Stage-Storage Rating Table

Elevation (m)	Area (m^2)	Area (m^2)	H (m)	Vol (m^3)	Volume (m^3)	Storage (m^3)	Depth (m)	
251.10	1700				0		0	
		1700	1.5	2550				
252.60	**1700**				2550	**0**	**1.5**	**N.W.L.**

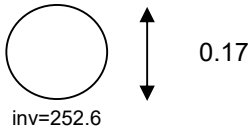
Permanent Pool Volume Required = 2412 m^3
Permanent Pool Volume Provided = 2550 m^3

SWM FACILITY 4
CONTROL STRUCTURE SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

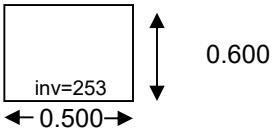
Orifice 1

Invert =	252.60	m
Size =	0.170	m
Orifice Coefficient, C =	0.62	
Obvert =	252.77	m



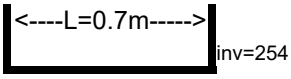
Orifice 2 (Square)

Invert =	253.00	m
Width=	0.500	m
C =	0.62	
Obvert =	253.60	m
Height =	0.600	m
Channel Width, b =	1.0	m



Broad Crested Weir (Weir 1 - Regional)

Length =	0.70	m
Elevation =	254.00	m
Crest Breadth =	0.20	m



SWM FACILITY 4
OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Starting Water Level (m) = 252.60
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Weir 1 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES	12 Hour AES
252.60	0.000	0.000	0.000	252.60	0.000	0	0.0	Orifice 1	
252.62	0.000	0.000	0.000	252.62	0.000	133	0.0		
252.64	0.001	0.000	0.000	252.64	0.001	266	0.0		
252.66	0.003	0.000	0.000	252.66	0.003	399	17.4		
252.68	0.005	0.000	0.000	252.68	0.005	532	26.9		
252.70	0.008	0.000	0.000	252.70	0.008	665	32.8		
252.72	0.012	0.000	0.000	252.72	0.012	798	36.6		
252.74	0.015	0.000	0.000	252.74	0.015	931	39.4		
252.76	0.017	0.000	0.000	252.76	0.017	1064	41.8		
252.78	0.019	0.000	0.000	252.78	0.019	1197	43.8		
252.80	0.021	0.000	0.000	252.80	0.021	1330	45.6		
252.82	0.023	0.000	0.000	252.82	0.023	1463	47.3		
252.84	0.025	0.000	0.000	252.84	0.025	1596	48.9	Extended Detention	
252.86	0.026	0.000	0.000	252.86	0.026	1729	50.3		
252.88	0.028	0.000	0.000	252.88	0.028	1862	51.7		
252.90	0.029	0.000	0.000	252.90	0.029	1995	53.0		
252.92	0.030	0.000	0.000	252.92	0.030	2128	54.3		
252.94	0.031	0.000	0.000	252.94	0.031	2261	55.5		
252.96	0.033	0.000	0.000	252.96	0.033	2394	56.6	2 Year	
252.98	0.034	0.000	0.000	252.98	0.034	2527	57.7		
253.00	0.035	0.000	0.000	253.00	0.035	2660	58.8	Orifice 2	
253.02	0.036	0.003	0.000	253.02	0.039	2793	59.8		
253.04	0.037	0.007	0.000	253.04	0.045	2926	60.7		
253.06	0.038	0.013	0.000	253.06	0.052	3059	61.5		
253.08	0.039	0.020	0.000	253.08	0.060	3192	62.1		
253.10	0.040	0.028	0.000	253.10	0.069	3325	62.7	5 Year	
253.12	0.041	0.037	0.000	253.12	0.078	3458	63.2		
253.14	0.042	0.047	0.000	253.14	0.089	3591	63.7		5 Year
253.16	0.043	0.057	0.000	253.16	0.100	3724	64.0		
253.18	0.044	0.068	0.000	253.18	0.112	3857	64.4		
253.20	0.045	0.079	0.000	253.20	0.124	3990	64.7	10 Year	
253.22	0.046	0.091	0.000	253.22	0.136	4123	65.0		10 Year
253.24	0.046	0.103	0.000	253.24	0.150	4256	65.3		
253.26	0.047	0.116	0.000	253.26	0.163	4389	65.5		
253.28	0.048	0.129	0.000	253.28	0.177	4522	65.7		
253.30	0.049	0.143	0.000	253.30	0.192	4655	65.9		
253.32	0.050	0.157	0.000	253.32	0.206	4788	66.1	25 Year	25 Year
253.34	0.050	0.171	0.000	253.34	0.221	4921	66.3		
253.36	0.051	0.186	0.000	253.36	0.237	5054	66.4		
253.38	0.052	0.200	0.000	253.38	0.252	5187	66.6		50 Year
253.40	0.053	0.216	0.000	253.40	0.268	5320	66.7	50 Year	
253.42	0.053	0.231	0.000	253.42	0.285	5453	66.9		
253.44	0.054	0.247	0.000	253.44	0.301	5586	67.0		
253.46	0.055	0.263	0.000	253.46	0.318	5719	67.1		100 Year
253.48	0.056	0.279	0.000	253.48	0.335	5852	67.2	100 Year	
253.50	0.056	0.295	0.000	253.50	0.352	5985	67.3		
253.52	0.057	0.312	0.000	253.52	0.369	6118	67.4		
253.54	0.058	0.328	0.000	253.54	0.386	6251	67.5		
253.56	0.058	0.345	0.000	253.56	0.403	6384	67.6		
253.58	0.059	0.362	0.000	253.58	0.421	6517	67.7		
253.60	0.060	0.379	0.000	253.60	0.439	6650	67.8		
253.62	0.060	0.466	0.000	253.62	0.526	6783	67.9		
253.64	0.061	0.480	0.000	253.64	0.541	6916	67.9		
253.66	0.062	0.494	0.000	253.66	0.556	7049	68.0		
253.68	0.062	0.508	0.000	253.68	0.570	7182	68.1		
253.70	0.063	0.521	0.000	253.70	0.584	7315	68.1		
253.72	0.063	0.534	0.000	253.72	0.597	7448	68.2		
253.74	0.064	0.546	0.000	253.74	0.611	7581	68.3		
253.76	0.065	0.559	0.000	253.76	0.623	7714	68.3		
253.78	0.065	0.571	0.000	253.78	0.636	7847	68.4		
253.80	0.066	0.583	0.000	253.80	0.648	7980	68.4		
253.82	0.066	0.594	0.000	253.82	0.661	8113	68.5		
253.84	0.067	0.605	0.000	253.84	0.672	8246	68.5		
253.86	0.068	0.617	0.000	253.86	0.684	8379	68.6		
253.88	0.068	0.627	0.000	253.88	0.696	8512	68.7		
253.90	0.069	0.638	0.000	253.90	0.707	8645	68.7		
253.92	0.069	0.649	0.000	253.92	0.718	8778	68.8		
253.94	0.070	0.659	0.000	253.94	0.729	8911	68.8		
253.96	0.070	0.669	0.000	253.96	0.740	9044	68.9		
253.98	0.071	0.679	0.000	253.98	0.750	9177	68.9		

SWM FACILITY 4
OUTFLOW SUMMARY

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Starting Water Level (m) = 252.60
Elevation Increment (m) = 0.02

Shading represents Storage-Discharge pairings used in VO modelling

Upstream Elevation (m)	Orifice 1 Outflow (cms)	Orifice 2 Outflow (cms)	Weir 1 Outflow (cms)	Stage (m)	Total Flow (cms)	Storage (m^3)	Detention Time (hrs)	6 Hour AES	12 Hour AES
254.00	0.071	0.689	0.000	254.00	0.761	9310	69.0	Weir 1	
254.02	0.072	0.699	0.003	254.02	0.774	9443	69.0		
254.04	0.073	0.709	0.009	254.04	0.790	9576	69.1		
254.06	0.073	0.718	0.016	254.06	0.807	9709	69.1		
254.08	0.074	0.728	0.025	254.08	0.826	9842	69.1		
254.10	0.074	0.737	0.034	254.10	0.845	9975	69.2		
254.12	0.075	0.746	0.045	254.12	0.866	10108	69.2		
254.14	0.075	0.755	0.057	254.14	0.887	10241	69.3		
254.16	0.076	0.764	0.069	254.16	0.909	10374	69.3		
254.18	0.076	0.773	0.083	254.18	0.932	10507	69.4		
254.20	0.077	0.782	0.097	254.20	0.955	10640	69.4		
254.22	0.077	0.790	0.116	254.22	0.983	10773	69.4		
254.24	0.078	0.799	0.132	254.24	1.008	10906	69.5		
254.26	0.078	0.807	0.148	254.26	1.034	11039	69.5		
254.28	0.079	0.816	0.166	254.28	1.060	11172	69.5		
254.30	0.079	0.824	0.199	254.30	1.102	11305	69.6		
254.32	0.080	0.832	0.219	254.32	1.131	11438	69.6		
254.34	0.080	0.840	0.240	254.34	1.160	11571	69.6		
254.36	0.081	0.848	0.262	254.36	1.190	11704	69.7		
254.38	0.081	0.856	0.284	254.38	1.221	11837	69.7		
254.40	0.082	0.864	0.319	254.40	1.264	11970	69.7		
254.42	0.082	0.872	0.343	254.42	1.297	12103	69.8		
254.44	0.083	0.880	0.368	254.44	1.330	12236	69.8	Regional	
254.46	0.083	0.887	0.393	254.46	1.363	12369	69.8		
254.48	0.084	0.895	0.419	254.48	1.397	12502	69.8		
254.50	0.084	0.903	0.450	254.50	1.437	12635	69.9		
254.52	0.084	0.910	0.478	254.52	1.472	12768	69.9		
254.54	0.085	0.917	0.506	254.54	1.508	12901	69.9		
254.56	0.085	0.925	0.534	254.56	1.544	13034	69.9		
254.58	0.086	0.932	0.563	254.58	1.581	13167	70.0		
254.60	0.086	0.939	0.592	254.60	1.618	13300	70.0		

SWM FACILITY 4
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Forebay

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
251.10	486	486	1.5	729	0	0
252.60	486				729	1.5

Total Permanent Pool

Elevation (m)	Area (m^2)	Average Area (m^2)	Height (m)	Volume (m^3)	Cumulative Volume (m^3)	Depth (m)
251.10	1700	1700	1.5	2,550	0	0
252.60	1700				2,550	1.5

Minimum Criteria (per MECP guidelines)

Forebay area is **29** % of total Permanent Pool area
Maximum Forebay area is **33** % of total Permanent Pool area
Therefore the minimum criteria per MECP guidelines is satisfied.

SWM FACILITY 4
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

2. Forebay Settling Length

Dist = $(r \times Q_p / V_s)^{0.5}$

Dist = (2 * 0.03 / 0.0003)^0.5

Dist = 12.9

where:
Dist = forebay length (m)
r = length to width ratio
= 2.00
Q_p = peak flow rate from pond during design quality storm (m^3/s)
= 0.025
V_s = settling velocity (m/s)*
= 0.0003

Minimum forebay length is (m)	**12.9**
Actual forebay length is (m)	**32.5**
	CRITERIA SATISFIED

3. Forebay Dispersion Length

Dist = $(8 \times Q) / (d \times V_f)$

Dist = (8 * 3.029) / (1.5 * 0.5)

Dist = 32.3

where:
Dist = forebay length (m)
Q = inlet flow rate (m^3/s) (Please refer to 10-Year Pipe Design Sheet in Appendix D)
= 3.029
d = depth of permanent pool in forebay (m)
= 1.5
V_f = desired velocity in forebay (m/s)*
0.5

Minimum forebay length is (m)	**32.3**
Actual forebay length is (m)	**32.5**
	CRITERIA SATISFIED

4. Minimum Forebay Bottom Width

Width = Dist / 8

Width = 32.3 / 8

Width = 4.0

where:
Width = minimum forebay bottom width (m)
Dist = minimum forebay length (m)
= 32.3

Minimum bottom width is (m)	**4.0**
Actual bottom width is (m)	**14.0**
	CRITERIA SATISFIED

5. Maximum Velocity Check

V = Q/A

V = 3.029 / 21

V = 0.14

where:
V = velocity (m/s)
Q = inlet flow rate (m^3/s) (Please refer to 10-Year Pipe Design Sheet in Appendix D)
= 3.029
A = average cross-sectional area of entire forebay (m^2) (see **Page 3**)
= 21.0

Maximum velocity permitted is (m/s)	**0.15**
Actual velocity is (m/s)	**0.14**
	CRITERIA SATISFIED

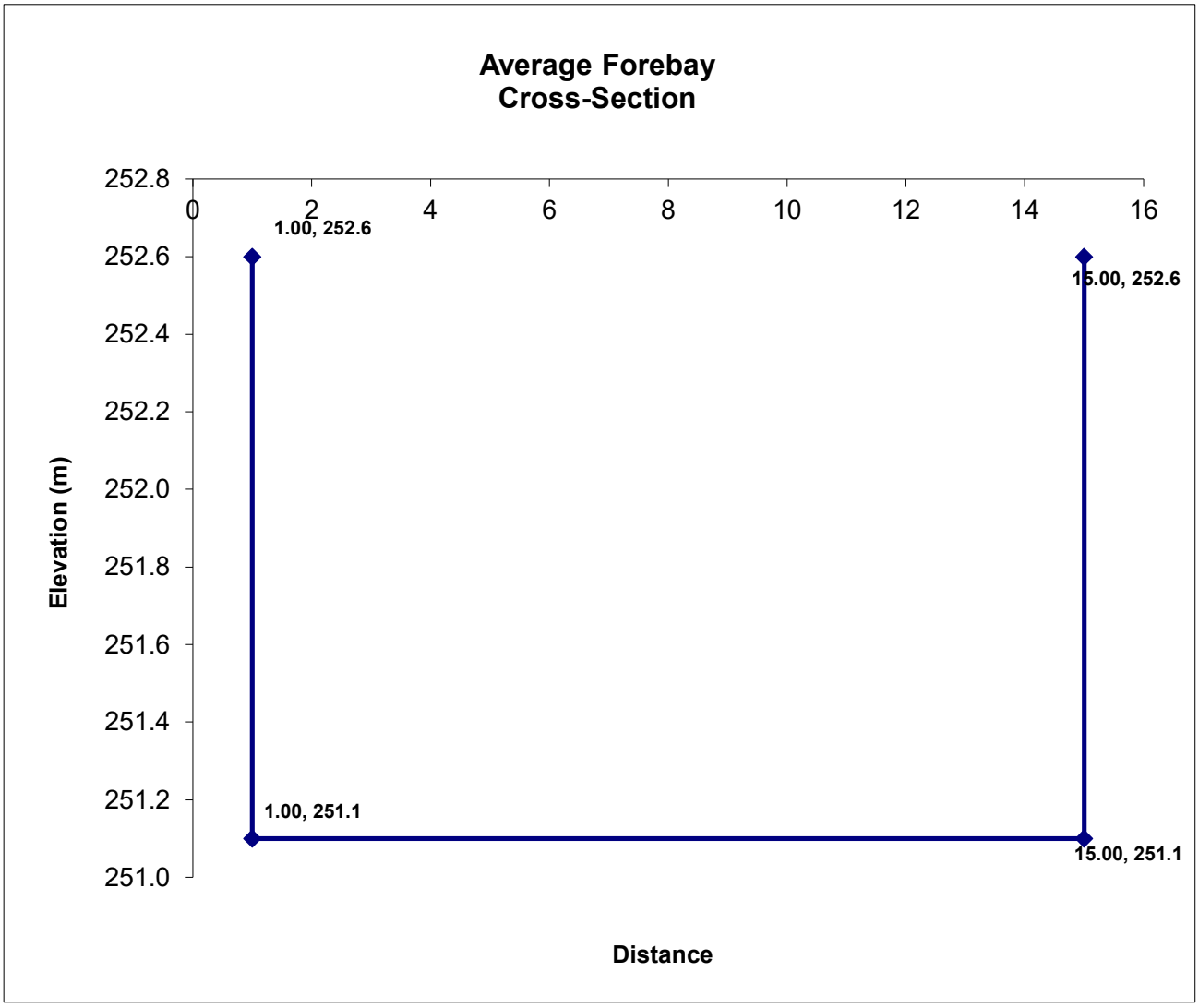
*Value recommended by the MECP Stormwater Management Planning & Design Manual

SWM FACILITY 4
FOREBAY SIZING CALCULATIONS

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Distance (m)	Elevation (m)	Depth (m)	Incremental Area (m^2)
1.00	252.6	0.00	--
1.00	251.1	1.50	0.00
15.00	251.1	1.50	21.00
15.00	252.6	0.00	0.00

Area (m^2) = 21.00



Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: G.M.

LID Sizing
Imperviousness Calculations

Weighted Impervious Calculation

Land Use	Area	Imperviousness	Impervious Area
	(ha)	(%)	(ha)
Singles and ROW	31.56	63	19.88
Townhouses	1.80	65	1.17
Laneway Townhouses	2.50	90	2.25
Laneways	0.44	100	0.44
School	2.05	77	1.58
Parks/Vista/SWM Blocks	13.31	15	2.00
SWM Pond	1.20	50	0.60
Firehall	0.75	77	0.58
Medium Density	4.11	90	3.70
Commercial	0.45	90	0.41
Total	**58.17**	**56**	**32.60**

Required Infiltration Volume Calculation		
Area	58.17	ha
Imperviousness	56	%
Approximate Impervious Area	32.60	ha
Rainfall Depth	5	mm
Required Infiltration Volume	**1630.0**	m^3

Rear Yard Infiltration Trench LID Sizing Calculations

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: G.M.

LID Infiltration Volume Calculation - Participating Properties						
LID Type	Number of Lots/Units	Percentage of Lot as Roof to Infiltration Trench (%)	Approximate Lot Area (m^2)	Total Approximate Impervious Area to Infiltration Trench (ha)	Rainfall Depth (mm)	Total Required Infiltration Volume (m^3)
				(1)	(2)	(3) =(2)x(1)x10 m3/ha-mm
9.15m Frontage Rear Yard Infiltration Trench	20	20	261.5	0.10	25	26.2
9.75m Frontage Rear Yard Infiltration Trench	27	20	282.8	0.15	25	38.2
11.00m Frontage Rear Yard Infiltration Trench	89	20	329.3	0.59	25	146.5
11.60m Frontage Rear Yard Infiltration Trench	12	20	348.0	0.08	25	20.9
13.40m Frontage Rear Yard Infiltration Trench	38	20	400.0	0.30	25	76.0
Total	**186**			**1.13**		**307.8**

LID Infiltration Volume Calculation - Non-Participating Properties						
LID Type	Number of Lots/Units*	Percentage of Lot as Roof to Infiltration Trench (%)	Approximate Lot Area (m^2)	Total Approximate Impervious Area to Infiltration Trench (ha)	Rainfall Depth (mm)	Total Required Infiltration Volume (m^3)
				(1)	(2)	(3) =(2)x(1)x10 m3/ha-mm
11.60m Frontage Rear Yard Infiltration Trench	94	20	348.0	0.65	25	163.6
Total	**94**			**0.65**		**163.6**

*Assumed lot types, to be revised in subsequent submissions with detailed lotting information

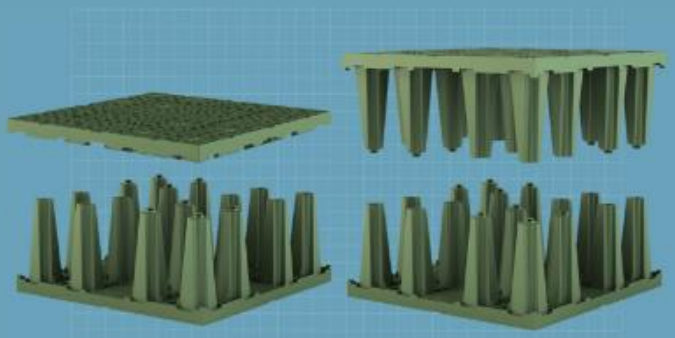
Drawdown Calculation		
I - Infiltration Rate (Per Gemtec Infiltration Testing, dated July 2023)	14.0	mm/h
n - Porosity	0.4	
t - Design Detention Time	48	h
SF - Safety Factor	2.5	
D - Maximum Depth of Infiltration Trench for 48 Hour Drawdown	0.7	m

$$D = \frac{I * t}{SF * n * 1000}$$

LID Sizing Calculations					
LID Type	Depth (m)	Length (m)	Width (m)	Provided Infiltration Volume/Trench (m^3)	Total Provided Infiltration Volume (m^3)
9.15m Frontage Rear Yard Infiltration Trench	0.5	8.15	1.00	1.6	32.6
9.75m Frontage Rear Yard Infiltration Trench	0.5	8.75	1.00	1.8	47.3
11.00m Frontage Rear Yard Infiltration Trench	0.5	10.00	1.00	2.0	178.0
11.60m Frontage Rear Yard Infiltration Trench	0.5	10.60	1.00	2.1	224.7
13.40m Frontage Rear Yard Infiltration Trench	0.5	12.40	1.00	2.5	94.2
Total					**576.8**

Therefore, the proposed LIDs have been adequately sized to capture the required 25mm infiltration volume (471.3 cu.m), with a total provided infiltration volume of 576.8 cu.m.

STORMCON



THE VAULT

OPERATION & MAINTENANCE MANUAL

FEATURING GREENSTORM & STORMCRETE

www.stormcon.ca

Table of Contents

1. Introduction

The following Operation & Maintenance Manual has been generated for ownership use, in an effort to promote diligent operating practices of The Vault. The implementation of routine inspection and maintenance programs are recommended to ensure an effective and well-maintained system. The owner bears responsibility for ensuring compliance with this manual and is expected to maintain a detailed log of all preventative and corrective maintenance completed on The Vault. The owner is to evaluate the effectiveness of the maintenance and inspection program at least once per year and adjust the plan if necessary.

During active construction, it is imperative to ensure that all reasonable preventative measures are exercised to ensure little to no sediment and/or foreign particles enter the system. During and immediately after construction processes, increased sediment from the connected infrastructure is expected. To prevent this, additional measures, including increased inspection and cleaning frequency are required. Upstream sewers and quality control units must be inspected and maintained according to their manufacture's guidelines.

1.1 Definitions

Qualified Person(s) .. *In respect to a specified duty, a person who, because of his knowledge, training, and experience, is qualified to perform that duty.*

GreenStorm .. *A polypropylene geocellular stormwater retention & detention system.*

Access Shaft .. *A 450 mm diameter access, that can be integrated into the GreenStorm modules.*

StormCrete .. *A concrete stormwater detention system.*

StormCrete Low Flow Channel .. *A lower component of StormCrete, designed to capture sediment.*

StormCrete Distribution Channel .. *A StormCrete component consisting of 600 mm cored holes.*

Monobox Manhole .. *A rectangular concrete manhole.*

Centre Access Manhole .. *A monobox manhole designed with a sump and flow controller.*

Sluice Gate .. *A sliding gate/device utilized for controlling the flow of water.*

Manhole Tee .. *Access to StormCrete.*

Access Points .. *Monobox manholes, center access manholes, manhole tees, and access shafts.*

2. Inspection

2.1 Inspection Interval

The Vault must be inspected by a qualified person(s). During active subdivision construction, The Vault must be inspected post-installation and every 2-3 months to ensure excess sediment and debris are not entering the system. Following significant storm events, additional inspections are required. During longer construction periods, the inspection log may be used to determine the required frequency of inspection. Inspection checklists and logs may be provided by Stormcon at the owner's request.

Following construction, The Vault must be inspected twice during the first year of operation. The inspection results should be recorded in a log and used to determine the interval at which future inspections are required for the lifecycle of the system. The Vault must be inspected at a minimum of once every 5 years, following the first year post-construction. All inspection tasks may be completed using CCTV inspection methodology.

Image 1 *– Manned StormCrete access*

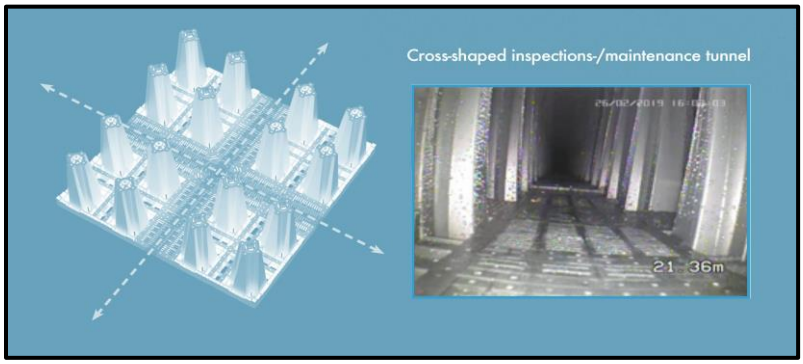


Image 2 *- Full-range GreenStorm inspectability*

2.2 Inspection Procedure

Access points are placed at suitable locations to allow for inspection.

GreenStorm is designed with cross shaped inspection channels that allow for two axes of CCTV inspection. The Distribution Channel and Access Shafts allow for ease of access to the GreenStorm sections. The perimeter of the GreenStorm sections are inspected to confirm all connections are operational.

All structural components must be inspected for cracking, wearing, and deterioration. All inlets and outlets must be inspected for clogging or blockages.

StormCrete is designed with Center Access Manholes, monobox manholes, and manhole tees. StormCrete is human accessible and may be inspected through CCTV or visual inspection.

Sluice gates are incorporated in the Center Access Manhole to isolate sections of The Vault when inspection is required during wet conditions.

Steps to Inspect The Vault During Dry Conditions:

1. Visually inspect the Center Access Manhole to verify water is not flowing; if water is flowing, refer to “Steps to Inspect The Vault During Wet Conditions” below.
2. Vacuum out the permanent pool through the Center Access Manhole and dispose of the contents in accordance with local laws and regulations.
3. Enter the Center Access Manhole and walk down the Distribution Channel to visually inspect the StormCrete joints, end wall, and cores.
4. Place a CCTV camera through the 600mm concrete core into the Greenstorm channels.
5. Lower a CCTV camera through Access Shafts to each layer in areas inaccessible though the StormCrete Distribution Channel.
6. Access the perimeter StormCrete through the monobox manholes or manhole tees.
7. Use a CCTV camera to inspect the StormCrete perimeter.

Steps to Inspect The Vault During Wet Conditions:

1. Visually inspect the Center Access Manhole to determine the water level within the system to accurately size a required pump.
2. Isolate the section to be inspected by closing the corresponding sluice gate.
3. Pump to remove any remaining water within the isolated section to the Center Access Manhole through the Access Shaft.
4. Lower a CCTV camera through Access Shafts to each layer.
5. Inspect the perimeter and all connections of the system to identify clogging or blockages.

3. Cleaning

3.1 Cleaning Interval

The cleaning interval is determined at the inspection stage. During the building program it is expected that the Low Flow Channel and Center Access Manhole will require cleaning every 6 months. If the system is subject to oil spills, runoff from non-landscaped areas, such as stockpiles or unseeded slopes, cleaning frequency will increase. The GreenStorm sections should be kept offline until after the building program is completed and the site has achieved 100% softscape completion, or as per municipal guidelines.

After subdivision construction, The Vault must be cleaned. All conveyance systems, including catch basins, manholes, pipes, water quality units, and inlets to the system, must be cleaned before final connection. Once 100% of the site has been soft scaped, the filter fabric covering the concrete cores can be removed. The bi-annual inspection results from the first year of operation will determine the cleaning frequency that must be carried out for the lifespan of the system.

3.2 Cleaning Procedure

The Vault is designed with access points at critical locations for cleaning. All cleanings may be completed using a high-pressure nozzle on a flushing and vacuum truck. The Center Access Manhole is the primary collection point for sediment within The Vault.

Steps to Clean The Vault:

1. Visually inspect the Center Access Manhole to verify water is not flowing; cleanings must only be conducted during dry conditions.
2. Vacuum out the permanent pool within the Low Flow Channel and the Center Access Manhole.
3. Use a high-pressure vacuum truck nozzle to clean the StormCrete Distribution Channel, while vacuuming out sediment and debris.
4. Lower high-pressure vacuum truck nozzle through Access Shafts to each GreenStorm layer in areas inaccessible though the StormCrete Distribution Channel, while vacuuming out sediment and debris.
5. Enter the Center Access Manhole and walk down the Distribution Channel to place a high-pressure vacuum truck nozzle through the 600mm concrete core into GreenStorm channels, while vacuuming out sediment and debris.
6. Access the StormCrete perimeter through the designated access points.
7. Use a high-pressure vacuum truck nozzle to clean the StormCrete perimeter, while vacuuming out sediment and debris.
8. Use a high-pressure vacuum truck nozzle to clean the StormCrete Low Flow Channel, while vacuuming out sediment and debris.
9. Use a high-pressure vacuum truck nozzle to clean the Center Access Manhole, while vacuuming out sediment and debris.
10. Dispose of contents in accordance with local laws and regulations.

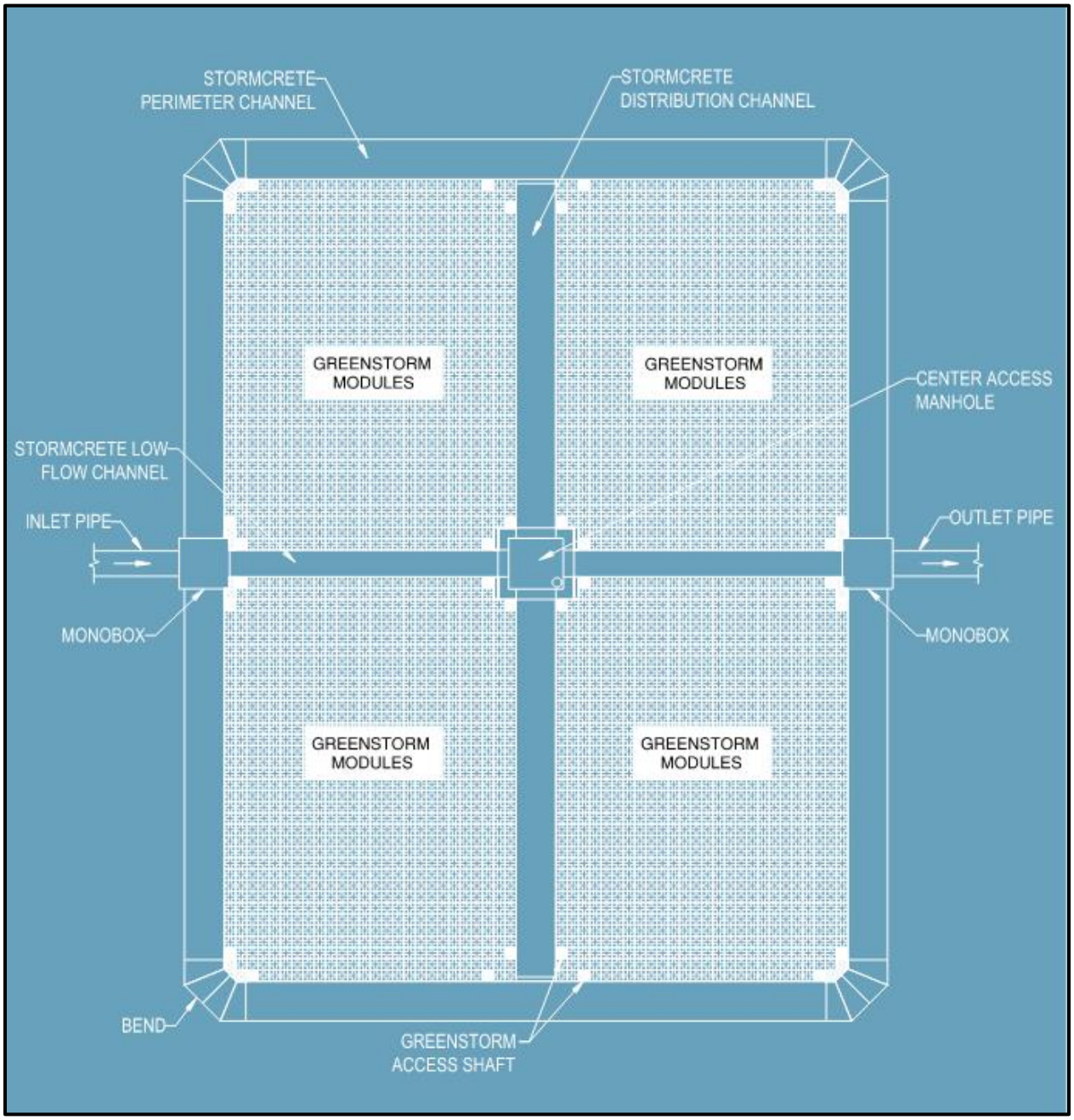


Image 3 *– Callout of Centre Access Manhole*

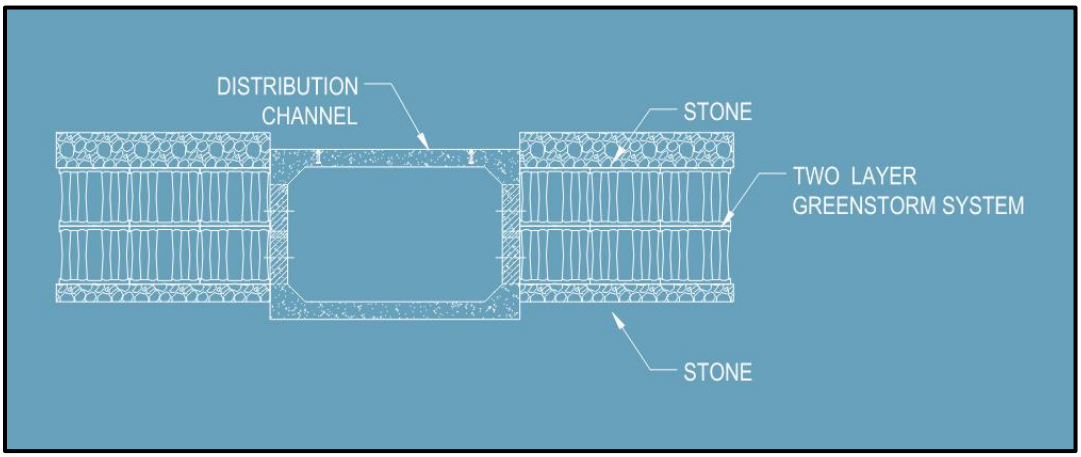


Image 4 *– Distribution Channel*

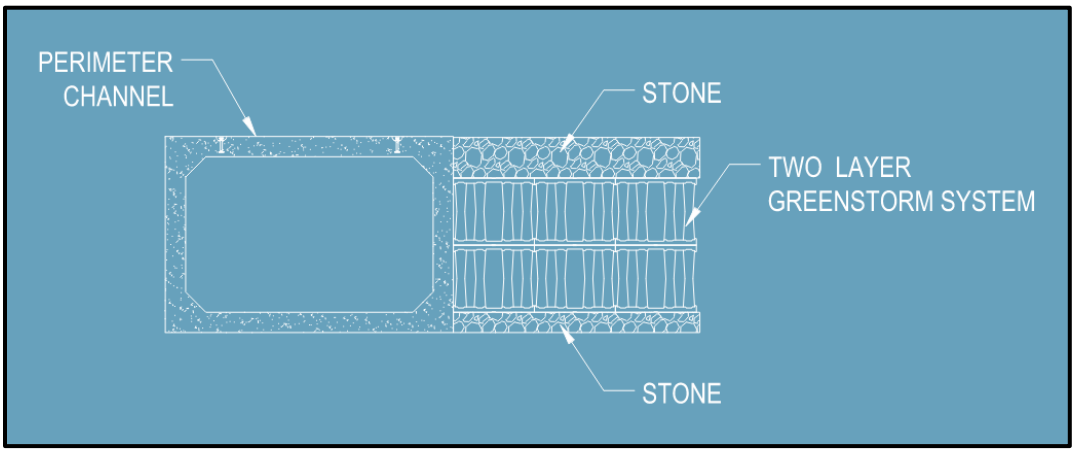


Image 5 *– Perimeter Channel*

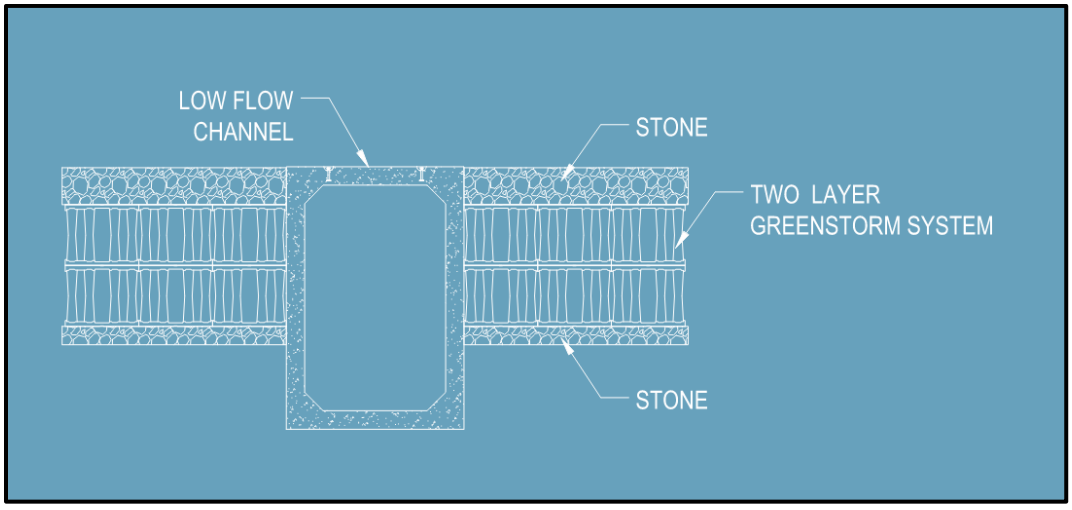


Image 6 *– Low Flow Channel*

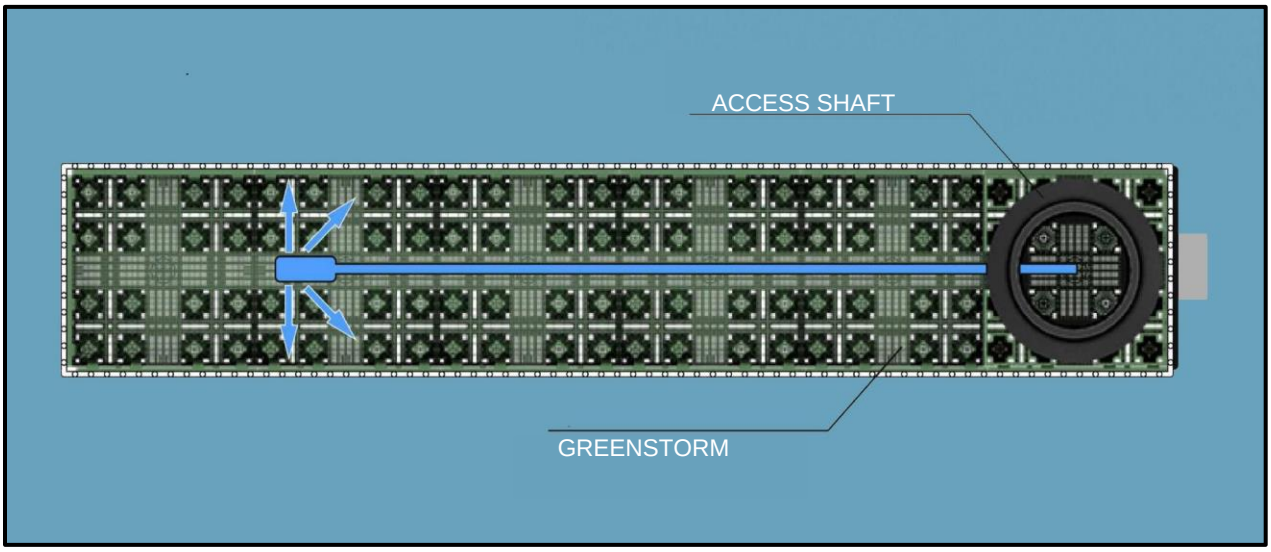
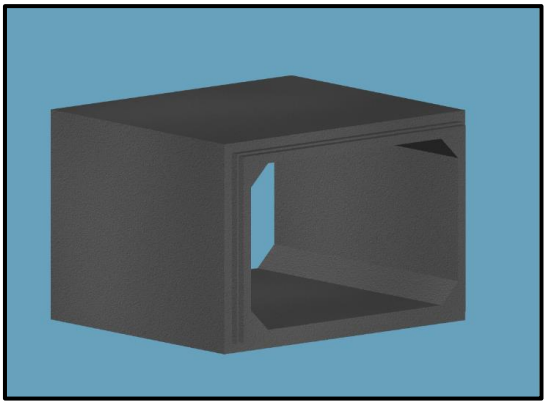
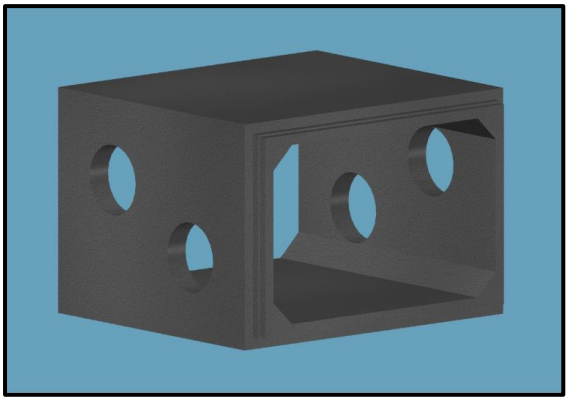


Image 7 *– Access Shaft and GreenStorm*





Images 8 & 9 *– StormCrete (Left); StormCrete Distribution Channel (Right)*

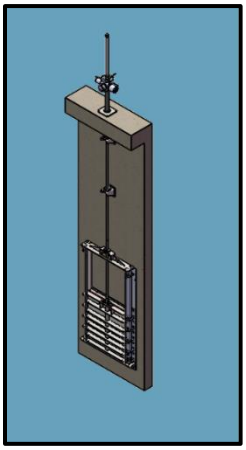
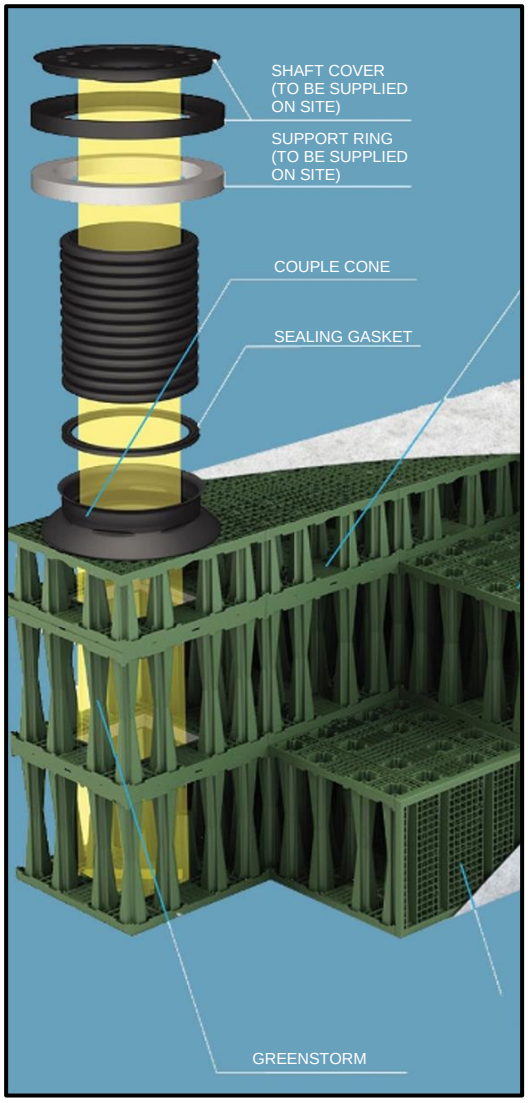


Image 10 *– Sluice Gate*



Images 11, 12, & 13 *– Access Shaft (Left); StormCrete Inspection (Top Right); GreenStorm Inspection Channel (Bottom Right)*

67.23ha | EXT1 | 0.67

6.96ha | EXT2 | 0.67

4.95ha | EXT3 | 0.68

STREET C

LENGTH = 647m

STREET I

LENGTH = 272m

STREET E

8.03ha | F | 0.65

1.43ha | J | 0.56

STREET D

LENGTH = 278m

0.96ha | I | 0.57

0.41ha | G | 0.74

STREET F

ST. G

GREENBELT

CAMPBELL TRIBUTARY - REACH 2

TORBRAM ROAD

STREET A

0.55ha | H | 0.66

STREET A

CAMPBELL TRIBUTARY - REACH 1

STREET K

STREET J

7.22ha | A | 0.67

LANEWAY B

LENGTH = 790m

STREET A

STREET B

STREET J

8.01ha | B | 0.67

STREET M

ST. N

STREET O

STREET P

LENGTH = 657m

STREET Q

1.14ha | C | 0.60

STREET M

STREET Q

LENGTH = 634m

9.18ha | D | 0.59

TORBRAM ROAD

CAMPBELL TRIBUTARY A - REACH 3

GREENBELT

CAMPBELL TRIBUTARY A - REACH 3

STREET P

1.66ha | E | 0.73

GREENBELT

CAMPBELL TRIBUTARY A - REACH 3

*NOTE: LAYOUT IS SCHEMATIC ONLY. DETAILS TO BE PROVIDED AT DETAILED DESIGN STAGE.

LEGEND:

- LIMIT OF PROPERTY
- LIMIT OF DEVELOPMENT
- LIMIT OF DEVELOPMENT TO BE CONFIRMED
- GREENBELT
- 100 YEAR CAPTURE LOCATION
- STORM DRAINAGE BOUNDARY
- MAJOR SYSTEM - OVERLAND FLOW
- EXISTING CONTOUR AND ELEVATION (252.00)
- 7.67ha | A | 0.66 — DRAINAGE AREA (HECTARES); RUNOFF COEFFICIENT (-); CATCHMENT ID
- HEADWATER DRAINAGE FEATURE
- TIME TO PEAK FLOW PATH

SCS consulting group ltd
30 CENTURIAN DRIVE, SUITE 100
MARKHAM, ONTARIO L3R 8B8
TEL: (905) 475-1900
FAX: (905) 475-8335

MAYFIELD GOLF CLUB

OVERLAND FLOW AND ROW CONVEYANCE

DESIGNED BY:	N.D.M.	CHECKED BY:	S.E.K.
SCALE:	1:3500	DATE:	OCTOBER 2024

PROJECT No: 2539

FIGURE No: D.1

File: P:\2539 Mayfield Golf Club\Drawings\FSP\Fig\Report Figures\2539P-STRM-OVL-D.1.dwg – Revised by <SOZDEMIR> : Mon, Oct 07 2024 – 9:36am

Runoff Coefficient Calculations

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Catchment A

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Singles	1.16	0.50	0.63	0.08	0.10
Townhouses	1.15	0.70	0.88	0.11	0.14
Laneway Townhouses	0.49	0.75	0.94	0.05	0.06
Laneways	0.09	0.90	1.00	0.01	0.01
Parks/Open Space	0.15	0.25	0.31	0.01	0.01
Firehall	0.76	0.75	0.94	0.08	0.10
Medium Density	0.81	0.75	0.94	0.08	0.11
Local ROW	2.04	0.68	0.85	0.19	0.24
Collector ROW	0.57	0.66	0.83	0.05	0.07
Total	**7.22**			**0.67**	**0.83**

Catchment B

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Singles	2.13	0.50	0.63	0.13	0.17
Townhouses	0.38	0.70	0.88	0.03	0.04
School	2.12	0.75	0.94	0.20	0.25
Medium Density	0.49	0.75	0.94	0.05	0.06
Commercial	0.47	0.90	1.00	0.05	0.06
Local ROW	1.64	0.68	0.85	0.14	0.17
Collector ROW	0.78	0.66	0.83	0.06	0.08
Total	**8.01**			**0.67**	**0.83**

Catchment C

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Singles	0.53	0.50	0.63	0.23	0.29
Local ROW	0.61	0.68	0.85	0.36	0.45
Total	**1.14**			**0.60**	**0.75**

Catchment D

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Singles	5.16	0.50	0.63	0.28	0.35
Medium Density	1.19	0.75	0.94	0.10	0.12
Local ROW	1.84	0.68	0.85	0.14	0.17
Collector ROW	0.99	0.66	0.83	0.07	0.09
Total	**9.18**			**0.59**	**0.74**

Catchment E

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Medium Density	1.27	0.75	0.94	0.57	0.72
Collector ROW	0.39	0.66	0.83	0.16	0.20
Total	**1.66**			**0.73**	**0.91**

Catchment F

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Singles	2.46	0.50	0.63	0.15	0.19
Townhouses	0.79	0.70	0.88	0.07	0.09
Laneway Townhouses	1.10	0.75	0.94	0.10	0.13
Laneways	0.25	0.90	1.00	0.03	0.03
Medium Density	0.38	0.75	0.94	0.04	0.04
Local ROW	2.48	0.68	0.85	0.21	0.26
Collector ROW	0.57	0.66	0.83	0.05	0.06
Total	**8.03**			**0.65**	**0.81**

Catchment G

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Laneway Townhouses	0.38	0.75	0.94	0.70	0.87
Local ROW	0.03	0.68	0.85	0.05	0.06
Total	**0.41**			**0.74**	**0.93**

Catchment H

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Collector ROW	0.55	0.66	0.83	0.66	0.83
Total	**0.55**			**0.66**	**0.83**

Runoff Coefficient Calculations

Mayfield Golf Club
Project Number: 2539
Date: October 2024
Designer Initials: A.Y.

Catchment I

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Singles	0.57	0.50	0.63	0.30	0.37
Local ROW	0.39	0.68	0.85	0.28	0.35
Total	**0.96**			**0.57**	**0.72**

Catchment J

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Singles	0.90	0.50	0.63	0.32	0.41
Local ROW	0.50	0.68	0.85	0.24	0.30
Total	**1.40**			**0.56**	**0.71**

Catchment EXT 1

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Laneway Townhouses	2.68	0.75	0.94	0.03	0.04
School	5.66	0.75	0.94	0.06	0.08
Parks/Open Space	3.38	0.25	0.31	0.01	0.02
Local ROW	55.51	0.68	0.85	0.56	0.70
Total	**67.23**			**0.67**	**0.83**

Catchment EXT 2

Land Use	Total Area	10 Year Runoff Coefficient	100 Year Runoff Coefficient	Weighted 10 Year Runoff Coefficient	Weighted 100 Year Runoff Coefficient
	(ha)	(-)	(-)	(-)	(-)
Parks/Open Space	0.19	0.25	0.31	0.01	0.01
Local ROW	6.77	0.68	0.85	0.66	0.83
Total	**6.96**			**0.67**	**0.84**

OVERLAND FLOW CALCULATIONS
CATCHMENT A

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Town of Caledon 10 Year (Rational Method)	
Area (ha) =	7.22
Runoff Coeff.[1] =	0.67
T_c (min) =	16.58
a=	2221.0
b=	12.0
c=	0.9080
Intensity (mm/hr) =	105.78
Runoff (m^3/s)=	**1.421**

(Assumes initial Tc of 10 minutes and 790m flowing at 2 m/s)

Town of Caledon 100 Year (Rational Method)	
Area (ha) =	7.22
Runoff Coeff.[1] =	0.83
T_c (min) =	16.58
a=	4688.0
b=	17.0
c=	0.9624
Intensity (mm/hr) =	159.31
Runoff (m^3/s)=	**2.652**

Required 18 m ROW Capacity:

$Q_{100yr} - Q_{10yr}$ = 1.231 m^3/s

Therefore, there is sufficient capacity in the 18 m R.O.W. at 0.5% with boulevards sloped at 2% (capacity of 1.792 cu.m/s per calculations in this Appendix) to convey the peak flow of 1.231 cu.m/s.

[1]Weighted runoff coefficient calculations are provided on a separate sheet in this Appendix.

OVERLAND FLOW CALCULATIONS
CATCHMENT B

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Town of Caledon 10 Year (Rational Method)	
Area (ha) =	8.01
Runoff Coeff.[1] =	0.67
T_c (min) =	15.48
a=	2221.0
b=	12.0
c=	0.9080
Intensity (mm/hr) =	109.65
Runoff (m^3/s)=	**1.635**

(Assumes initial Tc of 10 minutes and 657m flowing at 2 m/s)

Town of Caledon 100 Year (Rational Method)	
Area (ha) =	8.01
Runoff Coeff.[1] =	0.83
T_c (min) =	15.48
a=	4688.0
b=	17.0
c=	0.9624
Intensity (mm/hr) =	164.54
Runoff (m^3/s)=	**3.039**

Required 18 m ROW Capacity:

$Q_{100yr} - Q_{10yr}$ = 1.404 m^3/s

Therefore, there is sufficient capacity in the 18 m R.O.W. at 0.5% with boulevards sloped at 2% (capacity of 1.792 cu.m/s per calculations in this Appendix) to convey the peak flow of 1.404 cu.m/s.

[1]Weighted runoff coefficient calculations are provided on a separate sheet in this Appendix.

OVERLAND FLOW CALCULATIONS
CATCHMENT D

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Town of Caledon 10 Year (Rational Method)	
Area (ha) =	9.18
Runoff Coeff.[1] =	0.59
T_c (min) =	15.24
a=	2221.0
b=	12.0
c=	0.9080
Intensity (mm/hr) =	110.50
Runoff (m^3/s)=	**1.662**

(Assumes initial Tc of 10 minutes and 629m flowing at 2 m/s)

Town of Caledon 100 Year (Rational Method)	
Area (ha) =	9.18
Runoff Coeff.[1] =	0.74
T_c (min) =	15.24
a=	4688.0
b=	17.0
c=	0.9624
Intensity (mm/hr) =	165.69
Runoff (m^3/s)=	**3.127**

Required 22 m ROW Capacity:

$Q_{100yr} - Q_{10yr}$ = 1.464 m^3/s

Therefore, there is sufficient capacity in the 22 m R.O.W. at 0.5% with boulevards sloped at 2% (capacity of 2.506 cu.m/s per calculations in this Appendix) to convey the peak flow of 1.464 cu.m/s.

[1]Weighted runoff coefficient calculations are provided on a separate sheet in this Appendix.

OVERLAND FLOW CALCULATIONS
CATCHMENT F

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Town of Caledon 10 Year (Rational Method)	
Area (ha) =	8.03
Runoff Coeff.[1] =	0.65
T_c (min) =	15.39
a=	2221.0
b=	12.0
c=	0.9080
Intensity (mm/hr) =	109.95
Runoff (m^3/s)=	**1.594**

(Assumes initial Tc of 10 minutes and 647m flowing at 2 m/s)

Town of Caledon 100 Year (Rational Method)	
Area (ha) =	8.03
Runoff Coeff.[1] =	0.81
T_c (min) =	15.39
a=	4688.0
b=	17.0
c=	0.9624
Intensity (mm/hr) =	164.95
Runoff (m^3/s)=	**2.980**

Required 22 m ROW Capacity:

$Q_{100yr} - Q_{10yr}$ = 1.386 m^3/s

Therefore, there is sufficient capacity in the 22 m R.O.W. at 0.5% with boulevards sloped at 2% (capacity of 2.506 cu.m/s per calculations in this Appendix) to convey the peak flow of 1.386 cu.m/s.

[1]Weighted runoff coefficient calculations are provided on a separate sheet in this Appendix.

OVERLAND FLOW CALCULATIONS
CATCHMENTS J + EXT 3

Mayfield Golf Club
Project Number: 2539
Date: September 2024
Designer Initials: A.Y.

Town of Caledon 10 Year (Rational Method)	
Area (ha) =	6.38
Runoff Coeff.[1] =	0.65
T_c (min) =	13.96
a=	2221.0
b=	12.0
c=	0.9080
Intensity (mm/hr) =	115.45
Runoff (m^3/s)=	**1.330**

(Assumes initial Tc of 10 minutes and 475m flowing at 2 m/s)

Town of Caledon 100 Year (Rational Method)	
Area (ha) =	6.38
Runoff Coeff.[1] =	0.82
T_c (min) =	13.96
a=	4688.0
b=	17.0
c=	0.9624
Intensity (mm/hr) =	172.29
Runoff (m^3/s)=	**2.504**

Required 16 m ROW Capacity:

$Q_{100yr} - Q_{10yr}$ = 1.174 m^3/s

Therefore, there is sufficient capacity in the 16 m R.O.W. at 0.7% with boulevards sloped at 2% (capacity of 1.288 cu.m/s per calculations in this Appendix) to convey the peak flow of 1.174 cu.m/s.

[1]Weighted runoff coefficient calculations are provided on a separate sheet in this Appendix.

16.0m ROW @0.5%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.5 %
Normal Depth	0.20 m

Section Definitions

Station (m)	Elevation (m)
0+00.000	-0.040
0+02.550	-0.091
0+02.700	-0.091
0+02.750	-0.241
0+03.050	-0.216
0+07.000	-0.137
0+10.950	-0.216
0+11.250	-0.241
0+11.300	-0.091
0+11.450	-0.091
0+14.000	-0.040
0+15.500	-0.010
0+16.000	0.000

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, -0.040)	(0+02.550, -0.091)	0.025
(0+02.550, -0.091)	(0+11.450, -0.091)	0.013
(0+11.450, -0.091)	(0+14.000, -0.040)	0.025
(0+14.000, -0.040)	(0+15.500, -0.010)	0.013
(0+15.500, -0.010)	(0+16.000, 0.000)	0.025

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

Results	
Discharge	1.089 m³/s
Roughness Coefficient	0.018
Elevation Range	-0.241 to 0.000 m
Flow Area	1.3 m²

16.0m ROW @0.5%

Results	
Wetted Perimeter	14.221 m
Hydraulic Radius	0.09 m
Top Width	14.00 m
Normal Depth	0.20 m
Critical Depth	0.19 m
Critical Slope	0.7 %
Velocity	0.81 m/s
Velocity Head	0.033 m
Specific Energy	0.23 m
Froude Number	0.830
Flow Type	Subcritical

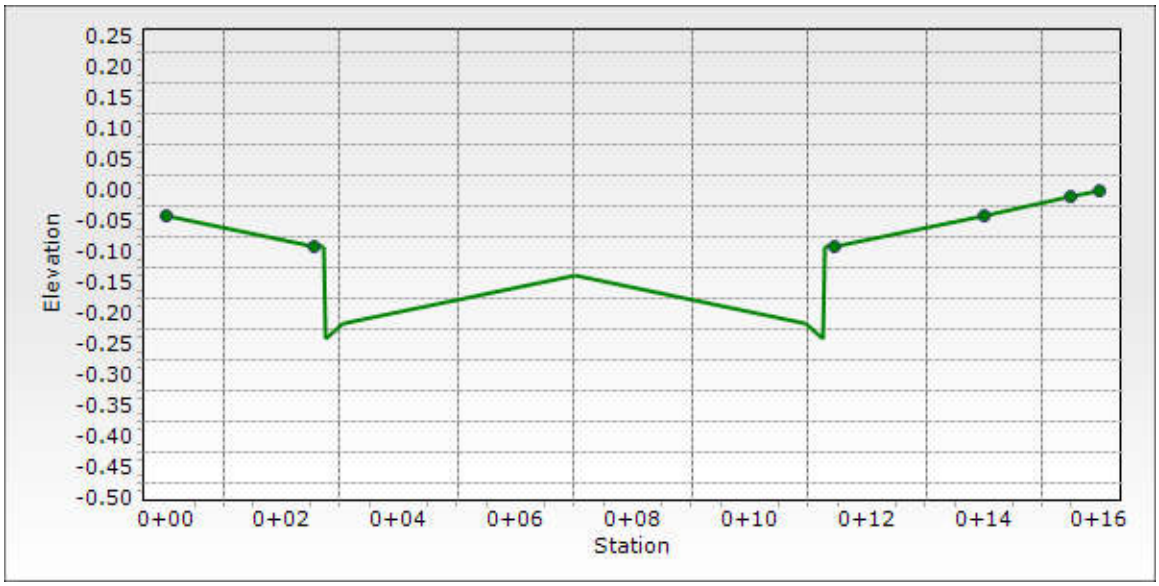
GVF Input Data	
Downstream Depth	0.00 m
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	0.20 m
Critical Depth	0.19 m
Channel Slope	0.5 %
Critical Slope	0.7 %

16.0m ROW @0.5%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.5 %
Normal Depth	0.20 m
Discharge	1.089 m³/s



18.0m ROW @0.5%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.5 %
Normal Depth	0.24 m

Section Definitions

Station (m)	Elevation (m)
0+00.000	0.000
0+00.500	-0.010
0+02.000	-0.040
0+04.550	-0.091
0+04.700	-0.091
0+04.750	-0.241
0+05.050	-0.216
0+09.000	-0.137
0+12.950	-0.216
0+13.250	-0.241
0+13.300	-0.091
0+13.450	-0.091
0+16.000	-0.040
0+17.500	-0.010
0+18.000	0.000

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.000)	(0+00.500, -0.010)	0.025
(0+00.500, -0.010)	(0+02.000, -0.040)	0.013
(0+02.000, -0.040)	(0+04.550, -0.091)	0.025
(0+04.550, -0.091)	(0+13.450, -0.091)	0.013
(0+13.450, -0.091)	(0+16.000, -0.040)	0.025
(0+16.000, -0.040)	(0+17.500, -0.010)	0.013
(0+17.500, -0.010)	(0+18.000, 0.000)	0.025

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

Results	
Discharge	1.792 m³/s

18.0m ROW @0.5%

Results	
Roughness Coefficient	0.018
Elevation Range	-0.241 to 0.000 m
Flow Area	2.0 m²
Wetted Perimeter	18.222 m
Hydraulic Radius	0.11 m
Top Width	18.00 m
Normal Depth	0.24 m
Critical Depth	0.23 m
Critical Slope	0.7 %
Velocity	0.90 m/s
Velocity Head	0.041 m
Specific Energy	0.28 m
Froude Number	0.865
Flow Type	Subcritical

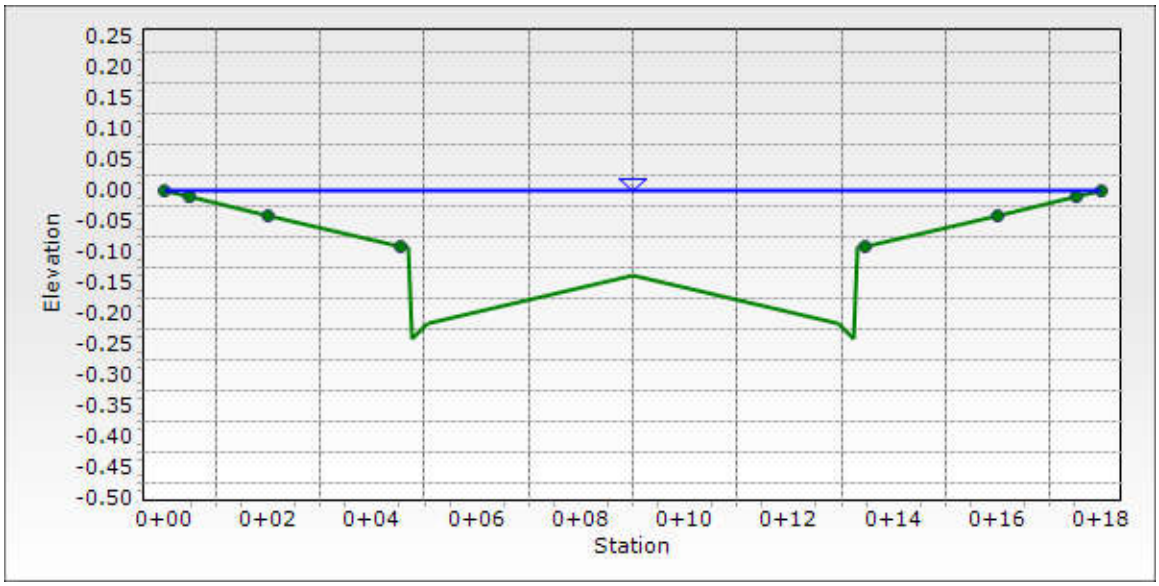
GVF Input Data	
Downstream Depth	0.00 m
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	0.24 m
Critical Depth	0.23 m
Channel Slope	0.5 %
Critical Slope	0.7 %

18.0m ROW @0.5%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.5 %
Normal Depth	0.24 m
Discharge	1.792 m³/s



22.0m ROW @0.5%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.5 %
Normal Depth	0.26 m

Section Definitions

Station (m)	Elevation (m)
0+00.000	0.000
0+00.500	-0.010
0+02.000	-0.040
0+05.600	-0.112
0+05.750	-0.112
0+05.800	-0.262
0+06.100	-0.237
0+11.000	-0.139
0+15.900	-0.237
0+16.200	-0.262
0+16.250	-0.112
0+16.400	-0.112
0+20.000	-0.040
0+21.500	-0.010
0+22.000	0.000

Roughness Segment Definitions

Start Station	Ending Station	Roughness Coefficient
(0+00.000, 0.000)	(0+00.500, -0.010)	0.025
(0+00.500, -0.010)	(0+02.000, -0.040)	0.013
(0+02.000, -0.040)	(0+05.600, -0.112)	0.025
(0+05.600, -0.112)	(0+16.400, -0.112)	0.013
(0+16.400, -0.112)	(0+20.000, -0.040)	0.025
(0+20.000, -0.040)	(0+21.500, -0.010)	0.013
(0+21.500, -0.010)	(0+22.000, 0.000)	0.025

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

Results	
Discharge	2.506 m³/s

22.0m ROW @0.5%

Results	
Roughness Coefficient	0.018
Elevation Range	-0.262 to 0.000 m
Flow Area	2.7 m²
Wetted Perimeter	22.223 m
Hydraulic Radius	0.12 m
Top Width	22.00 m
Normal Depth	0.26 m
Critical Depth	0.25 m
Critical Slope	0.7 %
Velocity	0.94 m/s
Velocity Head	0.045 m
Specific Energy	0.31 m
Froude Number	0.859
Flow Type	Subcritical

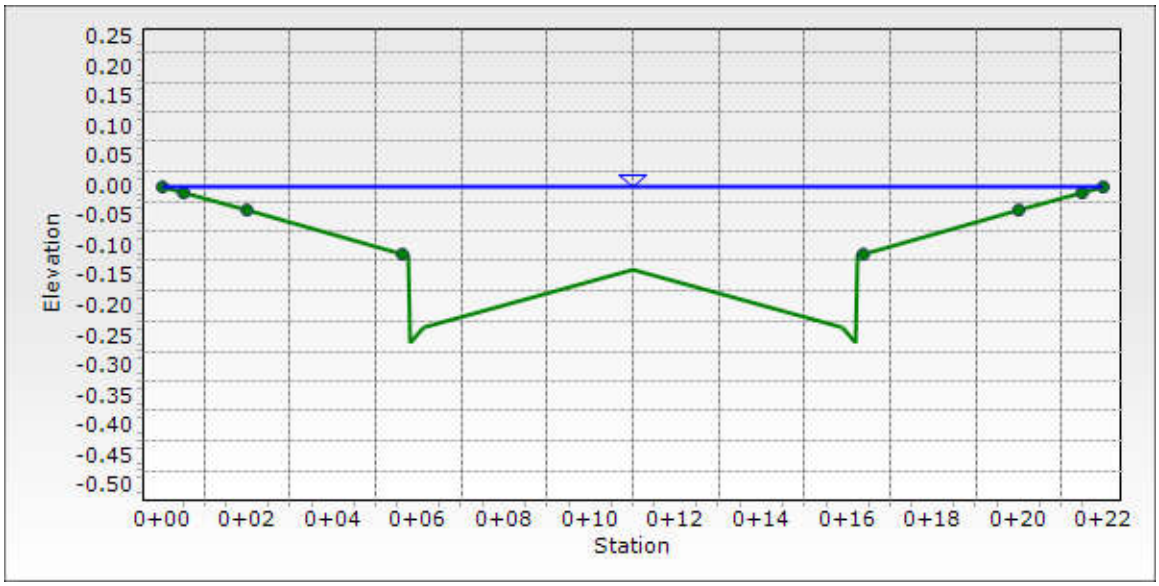
GVF Input Data	
Downstream Depth	0.00 m
Length	0.000 m
Number Of Steps	0

GVF Output Data	
Upstream Depth	0.00 m
Profile Description	N/A
Profile Headloss	0.00 m
Downstream Velocity	0.00 m/s
Upstream Velocity	0.00 m/s
Normal Depth	0.26 m
Critical Depth	0.25 m
Channel Slope	0.5 %
Critical Slope	0.7 %

22.0m ROW @0.5%

Project Description	
Friction Method	Manning Formula
Solve For	Discharge

Input Data	
Channel Slope	0.5 %
Normal Depth	0.26 m
Discharge	2.506 m³/s



10-Year Storm Design
Mayfield Golf Club
MESP
Caledon

Rainfall Intensity (i) = $\frac{A}{(T_c+B)^c}$

A= 2221
B= 12
c= 0.908

Starting T_c (min)= 10

1. Pipe size based on equivalent circular pipe diameter of box pipe (1436mm = 1800*900mm; 1658mm = 1800*1200mm: 3028mm = 3000*2400mm).
2. Time to peak length is an estimated value.

Project: Mayfield Golf Club
Project No. 2539
Date: 8-Oct-24
Designed By: G.M.
Reviewed By: C.M.D.

P:\2539 Mayfield Golf Club\Design\Pipe Design\Storm\[Copy of 10 and 100 year Storm Design Sheet MESP - 2539-03.xlsm]Design

LOCATION			10 YEAR						TOTAL FLOW	PIPE DATA						
STREET	MAINTENANCE HOLE		10-YEAR AREA	RUNOFF COEFF.	"AR"	ACCUM. "AR"	RAINFALL INTENSITY	ACCUM. FLOW	TOTAL (Qdes)	LENGTH	SLOPE	PIPE DIAMETER	FULL FLOW CAPACITY	FULL FLOW VELOCITY	TIME OF CONC.	ACCUM. TIME OF CONC.
	FROM	TO	(ha)	(R)			(mm/hr)	(m3/s)	(m3/s)	(m)	(%)	(mm)	(m3/s)	(m/s)	(min)	(min)
Catchment A	A	Capture 1	7.22	0.67	4.84	4.84	134.16	1.803	1.803	790.0	0.50	1200	2.755	2.438	5.40	15.40
Catchment B	B	Capture 1	8.01	0.67	5.37	5.37	134.16	2.000	2.000	657.0	0.50	1200	2.755	2.438	4.49	14.49
Catchment C[2]	C	Capture 1	1.14	0.60	0.68	0.68	134.16	0.255	0.255	227.0	0.50	525	0.304	1.405	2.69	12.69
SWM Facility 1 Inlet	Capture 1	SWM 1	0.00	0.00	0.00	10.89	109.91	3.324	3.324	24.0	0.50	1658	6.525	3.024	0.13	15.53
Catchment D	D	Capture 2	9.18	0.59	5.42	5.42	134.16	2.018	2.018	629.0	0.50	1200	2.755	2.438	4.30	14.30
Catchment E[2]	E	Capture 2	1.66	0.73	1.21	1.21	134.16	0.452	0.452	128.0	0.50	825	1.014	1.899	1.12	11.12
SWM Facility 2 Inlet[1]	Capture 2	SWM 2	0.00	0.00	0.00	6.63	114.08	2.100	2.100	43.0	0.50	1436	4.448	2.748	0.26	14.56
Catchment EXT 1[1,2]	EXT1	F	67.23	0.67	45.04	45.04	134.16	16.787	16.787	1388.0	0.50	3028	32.518	4.518	5.12	15.12
Catchment F[1]	F	Capture 3	8.03	0.65	5.22	50.26	110.95	15.491	15.491	647.0	0.50	3028	32.518	4.518	2.39	17.51
Catchment H	H	Capture 3	0.55	0.66	0.36	0.36	134.16	0.135	0.135	246.0	0.50	450	0.201	1.268	3.23	13.23
SWM Facility 3 Inlet[1]	Capture 3	SWM 3	0.00	0.00	0.00	50.63	102.77	14.452	14.452	20.0	0.50	3028	32.518	4.518	0.07	17.58
Catchment EXT 2[1,2]	EXT2	J	6.96	0.67	4.66	4.66	134.16	1.738	1.738	317.0	0.50	1200	2.755	2.438	2.17	12.17
Ctachment EXT 3[1,2]	EXT3	J	4.95	0.68	3.37	3.37	134.16	1.254	1.254	309.0	0.50	1200	2.755	2.438	2.11	12.11
Catchment I	I	Capture 4	0.96	0.57	0.55	0.55	134.16	0.204	0.204	272.0	0.50	600	0.434	1.536	2.95	12.95
Catchment J[1]	J	Capture 4	1.40	0.56	0.78	8.81	123.19	3.016	3.016	278.0	0.50	1658	6.525	3.024	1.53	13.70
SWM Facility 4 Inlet[1]	Capture 4	SWM 4	0.00	0.00	0.00	9.36	116.50	3.029	3.029	14.0	0.50	1658	6.525	3.024	0.08	13.78

100-Year Storm Design
Mayfield Golf Club
MESP
Caledon

Rainfall Intensity (i) = $\frac{A}{(T_c+B)^c}$

A= 4688
B= 17
c= 0.9624

Starting T_c (min)= 10

1. Pipe size based on equivalent circular pipe diameter of box pipe (1436mm = 1800*900mm; 1658mm = 1800*1200mm; 3028mm = 3000*2400mm).
2. Time to peak length is an estimated value.

Project: Mayfield Golf Club
Project No. 2539
Date: 08-Oct-24
Designed By: G.M.
Reviewed By: C.M.D.

P:\2539 Mayfield Golf Club\Design\Pipe Design\Storm\[Copy of 10 and 100 year Storm Design Sheet MESP - 2539-03.xlsm]Design

LOCATION			100 YEAR						TOTAL FLOW	PIPE DATA						
STREET	MANHOLE		100-YEAR AREA	RUNOFF COEFF.	"AR"	ACCUM. "AR"	RAINFALL INTENSITY	ACCUM. FLOW	TOTAL (Qdes)	LENGTH	SLOPE	PIPE DIAMETER	FULL FLOW CAPACITY	FULL FLOW VELOCITY	TIME OF CONC.	ACCUM. TIME OF CONC.
	FROM	TO	(ha)	"R"			(mm/hr)	(m3/s)	(m3/s)	(m)	(%)	(mm)	(m3/s)	(m/s)	(min)	(min)
Catchment A	A	Capture 1	7.22	0.83	5.99	5.99	196.54	3.272	3.27	790.0	0.50	1200	2.755	2.438	5.40	15.40
Catchment B	B	Capture 1	8.01	0.83	6.65	6.65	196.54	3.630	3.63	657.0	0.50	1200	2.755	2.438	4.49	14.49
Catchment C[2]	C	Capture 1	1.14	0.75	0.86	0.86	196.54	0.467	0.47	227.0	0.50	525	0.304	1.405	2.69	12.69
SWM Facility 1 Inlet	Capture 1	SWM 1	0.00	0.00	0.00	13.50	164.90	6.182	6.18	24.0	0.50	1658	6.525	3.024	0.13	15.53
Catchment D	D	Capture 2	9.18	0.74	6.77	6.77	196.54	3.696	3.70	629.0	0.50	1200	2.755	2.438	4.30	14.30
Catchment E[2]	E	Capture 2	1.66	0.91	1.51	1.51	196.54	0.827	0.83	128.0	0.50	825	1.014	1.899	1.12	11.12
SWM Facility 2 Inlet[1]	Capture 2	SWM 2	0.00	0.00	0.00	8.29	170.48	3.923	3.92	43.0	0.50	1436	4.448	2.748	0.26	14.56
Catchment EXT 1[1,2]	EXT1	F	67.23	0.83	55.80	55.80	196.54	30.464	30.46	1388.0	0.50	3028	32.518	4.518	5.12	15.12
Catchment F[1]	F	Capture 3	8.03	0.81	6.50	62.31	166.29	28.780	28.78	647.0	0.50	3028	32.518	4.518	2.39	17.51
Catchment H	H	Capture 3	0.55	0.83	0.45	0.45	196.54	0.248	0.25	246.0	0.50	450	0.201	1.268	3.23	13.23
SWM Facility 3 Inlet[1]	Capture 3	SWM 3	0.00	0.00	0.00	62.76	155.20	27.057	27.06	20.0	0.50	3028	32.518	4.518	0.07	17.58
Catchment EXT 2[1,2]	EXT2	J	6.96	0.84	5.83	5.83	196.54	3.182	3.18	317.0	0.50	1200	2.755	2.438	2.17	12.17
Ctachment EXT 3[1,2]	EXT3	J	4.95	0.85	4.21	4.21	196.54	2.297	2.30	309.0	0.50	1200	2.755	2.438	2.11	12.11
Catchment I	I	Capture 4	0.96	0.72	0.69	0.69	196.54	0.377	0.38	272.0	0.50	600	0.434	1.536	2.95	12.95
Catchment J[1]	J	Capture 4	1.40	0.71	0.99	11.03	182.46	5.591	5.59	278.0	0.50	1658	6.525	3.024	1.53	13.70
SWM Facility 4 Inlet[1]	Capture 4	SWM 4	0.00	0.00	0.00	11.72	173.69	5.655	5.66	14.0	0.50	1658	6.525	3.024	0.08	13.78

Appendix E Sanitary Flow Calculations

SCS consulting group ltd

Sanitary Design Sheet
Mayfield Golf Club
MESP
Caledon

Minimum Sewer Diameter (mm) =	**200**	**Avg. Domestic Flow (l/cap/day) =**	**290**
Mannings n =	**0.013**	**Infiltration Rate (l/s/ha) =**	**0.26**
Minimum Velocity (m/s) =	**0.75**	**Max. Harmon Peaking Factor =**	**4.0**
Maximum Velocity (m/s) =	**3**	**Min. Harmon Peaking Factor =**	**2.0**
Minimum Pipe Slope (%) =	**0.50**	**NOMINAL PIPE SIZE USED**	

Notes:
1. Population Density based on Mayfield Tullamore Secondary Plan High Level Background Servicing and Stormwater Management Analysis (SCS, 2024)
2. Per capita sanitary flow of 285 L/day per Region of Peel standards

Project: Mayfield Golf Club
Project No. 2539
Date: 19-Sep-24
Designed By: G.M.
Reviewed By: N.D.M.

P:\2539 Mayfield Golf Club\Design\Pipe Design\Sanitary\[Sanitary Sheet Design MESP - 2539.xlsm]Design

LOCATION			RESIDENTIAL							INDUSTRIAL/COMMERCIAL/INSTITUTIONAL					FLOW CALCULATIONS								PIPE DATA				
STREET	MANHOLE		AREA	ACCUM. AREA	UNITS	DENSITY		RESIDENTIAL POPULATION	ACCUM. RESIDENTIAL POPULATION	AREA	ACCUM. AREA	POPULATION DENSITY	FLOW RATE	ACCUM. EQUIV. POPULATION	INFILTRATION	TOTAL ACCUM. POPULATION	AVG. DOMESTIC FLOW	ACCUM. AVG. DOMESTIC FLOW	PEAKING FACTOR	PEAKED RESIDENTIAL FLOW	ICI FLOW	TOTAL FLOW	LENGTH	PIPE DIAMETER	SLOPE	FULL FLOW CAPACITY	FULL FLOW VELOCITY
	FROM	TO	(ha)	(ha)	(#)	PER UNIT (p/unit)	PER HA (p/ha)			(ha)	(ha)	(p/ha)	(l/s/ha)		(L/s)		(L/s)	(L/s)		(L/s)	(L/s)	(L/s)	(m)	(mm)	(%)	(L/s)	(m/s)
External 1 + 2[1,2]	EXT1	EXT5-1	125.96	125.96	0		70.0	8817	8817	0.00	0.00	0	0	0	32.8	8817	29.1	29.1	3.01	87.5	0.0	120.3	100.0	450	0.50	201.5	1.27
External 3 + 4[1,2]	EXT3	EXT7-1	64.44	64.44	0		70.0	4511	4511	0.00	0.00	0	0	0	16.8	4511	14.9	14.9	3.29	48.9	0.0	65.7	100.0	375	0.50	123.9	1.12
External 5 - Apartments	EXT5-1	EXT5-2	3.27	129.23	491	2.70		1324	10142	0.00	0.00	0	0	0	33.6	10142	4.4	33.5	2.95	98.9	0.0	132.5	100.0	450	0.50	201.5	1.27
External 5 - Stacked Townhouses	EXT5-2	EXT5-3	4.91	134.14	491	3.40		1669	11811	0.00	0.00	0	0	0	34.9	11811	5.6	39.1	2.88	112.8	0.0	147.7	100.0	450	0.50	201.5	1.27
External 5 - Single/Semi-detached	EXT5-3	EXT5-4	29.80	163.94	745	4.20		3129	14940	0.00	0.00	0	0	0	42.6	14940	10.5	49.6	2.78	138.0	0.0	180.6	100.0	525	0.50	303.9	1.40
External 5 - Street Townhouses	EXT5-4	EXT6-1	10.46	174.41	523	3.40		1779	16719	0.00	0.00	0	0	0	45.3	16719	6.0	55.6	2.73	151.9	0.0	197.2	100.0	525	0.50	303.9	1.40
External 6 - Apartments	EXT6-1	EXT6-2	1.96	176.37	294	2.70		794	17513	0.00	0.00	0	0	0	45.9	17513	2.7	58.3	2.71	157.9	0.0	203.8	100.0	525	0.50	303.9	1.40
External 6 - Stacked Townhouses	EXT6-2	EXT6-3	6.00	182.37	600	3.40		2040	19553	0.00	0.00	0	0	0	47.4	19553	6.8	65.1	2.66	173.4	0.0	220.8	100.0	525	0.50	303.9	1.40
External 6 - Single/Semi-detached	EXT6-3	EXT6-4	2.15	184.52	54	4.20		226	19779	0.00	0.00	0	0	0	48.0	19779	0.8	65.9	2.66	175.1	0.0	223.0	100.0	525	0.50	303.9	1.40
External 6 - Street Townhouses	EXT6-4	EXT7-1	0.75	185.27	38	3.40		128	19906	0.00	0.00	0	0	0	48.2	19906	0.4	66.3	2.65	176.0	0.0	224.2	100.0	525	0.50	303.9	1.40
External 7 - Schools	EXT7-1	EXT7-2	0.00	249.71	0			0	24417	5.60	5.60	161	0	900	66.4	25317	3.0	84.2	2.55	214.7	0.0	281.1	100.0	600	0.50	434.0	1.53
External 7 - Stacked Townhouses	EXT7-2	EXT7-3	1.69	251.40	169	3.40		575	24992	0.00	5.60	0	0	900	66.8	25891	1.9	86.1	2.54	218.8	0.0	285.6	100.0	600	0.50	434.0	1.53
External 7 - Single/Semi-detached	EXT7-3	EXT7-4	41.34	292.74	958	4.20		4022	29013	0.00	5.60	0	0	900	77.6	29913	13.5	99.6	2.48	246.9	0.0	324.5	100.0	600	0.50	434.0	1.53
External 7 - Street Townhouses	EXT7-4	4	14.53	307.27	612	3.40		2082	31095	0.00	5.60	0	0	900	81.3	31995	7.0	106.6	2.45	261.2	0.0	342.5	100.0	600	0.50	434.0	1.53
External 8 - Single/Semi-detached	EXT8-1	EXT8-2	8.89	8.89	222	4.20		934	934	0.00	0.00	0	0	0	2.3	934	3.1	3.1	3.82	12.0	0.0	14.3	100.0	250	0.50	42.0	0.86
External 8 - Street Townhouses	EXT8-2	1	3.13	12.02	156	3.40		531	1465	0.00	0.00	0	0	0	3.1	1465	1.8	4.9	3.69	18.1	0.0	21.3	100.0	250	0.50	42.0	0.86
Catchment 301 - Singles	1	2	2.74	14.76	42	4.20		176	1642	0.00	0.00	0	0	0	3.8	1642	0.6	5.5	3.65	20.1	0.0	24.0	100.0	250	0.50	42.0	0.86
Street C Crossing	2	3	0.00	14.76	0			0	1642	0.00	0.00	0	0	0	3.8	1642	0.0	5.5	3.65	20.1	0.0	24.0	100.0	250	0.50	42.0	0.86
Catchment 302 - Singles	3	4	4.41	19.17	76	4.20		319	1961	0.00	0.00	0	0	0	5.0	1961	1.1	6.6	3.59	23.6	0.0	28.6	100.0	250	0.50	42.0	0.86
Catchment 303 - Towns	4	5	4.01	330.45	114	3.40		388	33444	0.00	5.60	0	0	900	87.4	34344	1.3	114.5	2.42	277.1	0.0	364.4	100.0	600	0.50	434.0	1.53
Catchment 304 - Medium Density	5	6	0.38	330.83	0		175.0	67	33510	0.00	5.60	0	0	900	87.5	34410	0.2	114.7	2.42	277.5	0.0	365.0	100.0	600	0.50	434.0	1.53
Steet A Crossing	6	7	0.00	330.83	0			0	33510	0.00	5.60	0	0	900	87.5	34410	0.0	114.7	2.42	277.5	0.0	365.0	100.0	600	0.50	434.0	1.53
Catchment 305 - Singles	7	8	7.55	338.38	115	4.20		483	33993	0.00	5.60	0	0	900	89.4	34893	1.6	116.3	2.41	280.8	0.0	370.2	100.0	600	0.50	434.0	1.53
Catchment 306 - Towns	8	9	0.20	338.58	7	3.40		24	34017	0.00	5.60	0	0	900	89.5	34917	0.1	116.4	2.41	280.9	0.0	370.4	100.0	600	0.50	434.0	1.53
Catchment 307 - Towns	9	10	0.61	339.19	18	3.40		61	34078	0.00	5.60	0	0	900	89.6	34978	0.2	116.6	2.41	281.3	0.0	371.0	100.0	600	0.50	434.0	1.53
Catchment 308 - Elementary School	10	11	0.00	339.19	0			0	34078	2.12	7.72	94	0	1100	90.2	35178	0.7	117.3	2.41	282.7	0.0	372.9	100.0	600	0.50	434.0	1.53
Catchment 309 - Towns	11	12	3.46	342.65	62	3.40		211	34289	0.00	7.72	0	0	1100	91.1	35389	0.7	118.0	2.41	284.1	0.0	375.2	100.0	600	0.50	434.0	1.53
Catchment 310 - Firehall	12	13	0.00	342.65	0			0	34289	0.75	8.47	50	0	1137	91.3	35426	0.1	118.1	2.41	284.3	0.0	375.6	100.0	600	0.50	434.0	1.53
Catchment 311 - Medium Density	13	14	0.81	343.46	0		175.0	142	34431	0.00	8.47	0	0	1137	91.5	35568	0.5	118.6	2.41	285.3	0.0	376.8	100.0	600	0.50	434.0	1.53
Catchment 312 - Medium Density	14	15	0.48	343.94	0		175.0	84	34515	0.00	8.47	0	0	1137	91.6	35652	0.3	118.9	2.40	285.8	0.0	377.5	100.0	600	0.50	434.0	1.53
Catchment 313 - Commercial	15	16	0.00	343.94	0			0	34515	0.47	8.94	50	0	1161	91.7	35676	0.1	119.0	2.40	286.0	0.0	377.7	100.0	600	0.50	434.0	1.53
Street A Outlet	16	17	0.00	343.94	0			0	34515	0.00	8.94	0	0	1161	91.7	35676	0.0	119.0	2.40	286.0	0.0	377.7	100.0	600	0.50	434.0	1.53
Catchment 314 - Residential	18	19	3.88	3.88	70	4.20		294	294	0.00	0.00	0	0	0	1.0	294	1.0	1.0	4.00	3.9	0.0	5.0	100.0	250	0.50	42.0	0.86
Catchment 315 - Residential	19	20	3.59	7.47	78	4.20		328	622	0.00	0.00	0	0	0	1.9	622	1.1	2.1	3.92	8.2	0.0	10.1	100.0	250	0.50	42.0	0.86
Catchment 316 - Singles	20	21	1.02	8.49	12	4.20		50	672	0.00	0.00	0	0	0	2.2	672	0.2	2.3	3.90	8.8	0.0	11.0	100.0	250	0.50	42.0	0.86
Catchment 317 - Medium Density	21	22	2.01	10.50	0		175.0	352	1024	0.00	0.00	0	0	0	2.7	1024	1.2	3.4	3.79	13.0	0.0	15.8	100.0	250	0.50	42.0	0.86
Catchment 318 - Medium Density	22	23	0.54	11.04	0		175.0	95	1118	0.00	0.00	0	0	0	2.9	1118	0.3	3.8	3.77	14.1	0.0	17.0	100.0	250	0.50	42.0	0.86
Street B Outlet	23	24	0.00	11.04	0			0	1118	0.00	0.00	0	0	0	2.9	1118	0.0	3.8	3.77	14.1	0.0	17.0	100.0	250	0.50	42.0	0.86

Appendix F Water Distribution Analysis

SCS consulting group ltd

Municipal Engineering Solutions

September 13, 2024 Project No. 17002-179

Sent via email
Mr. Colby Maier-Downing
SCS Consulting Group Ltd.
30 Centurian Drive, Suite 100
Markham, ON L3R 8B8

Subject: 12580 and 12552 Torbram Road Development
Preliminary Water and Wastewater Calculations (Revision 1)
Town of Caledon, Region of Peel

Dear Mr. Maier-Downing,

Municipal Engineering Solutions ("MES") was retained by Mayfield Golf Course Inc. to calculate the preliminary water demands for the proposed development of 12580 Torbram Road (currently the Mayfield Golf Club) and 12552 Torbram Road in the Town of Caledon (Region of Peel). As part of this assignment MES was requested to estimate the flow requirements for the proposed development using Region of Peel, Fire Underwriters Survey, provincial and industry design standards. The following report has been updated to reflect the most recent development plan (MGP, July 2024).

Development Background

The development site is located on the west side of Torbram Road, between Old School Road and Mayfield Road in the Town of Caledon. The development is primarily residential, with an elementary school, a Firehall and 0.45 Ha of commercial land along Torbram Road. The development will have a total of 442 houses and townhouses, 4.07 Ha of medium density residential land, and 5 future development lots. An additional 174 residential units were added to the calculations for the future residential area (by others) in the middle of the development area, south of Street M and north of Street B.

The development is located within water Zone 6. The Region is proposing to upgrade the existing 200 mm watermain on Torbram Road to a 400 mm watermain (Master Plan Project D-180). The water connection to the development will be from the proposed 400 mm watermain on Torbram Road.

In accordance with the Region of Peel Water and Wastewater Master Plan, the Subject Lands are anticipated to be serviced by Regional trunk sanitary sewer ST-178 which will be constructed as part of the proposed development immediately to the east (Tullamore). Two connections will be provided to service the Subject Lands. The connections will be located on the East side of Torbram at the proposed intersections. The proposed sanitary sewers will be extended underneath Torbram Road as part of the development of the Subject Lands.

55 Gilbank Drive, Aurora, Ontario L4G 6H9
Tel: 905.726.1016 Cell: 416.434.0186 Fax: 905.726.1225

Equivalent Population Serviced

To calculate the equivalent population for the proposed development MES used population densities outlined in the Region of Peel "*Water and Wastewater Modelling Demand Table, August 2024*" and "*Linear Wastewater Standards, March 2023*". **Table 1** summarizes the residential and institutional population densities.

Table 1 – Equivalent Population Density

Type of Development	Equivalent Population Density
Single/Semi-detached	4.20 People/unit
Townhouse	3.40 People/unit
Apartments	3.10 People/unit
Medium Density Residential	475 Persons/Ha
Commercial	50 Persons/Ha
School	½ x number of students, 900 students minimum

Source: Region of Peel Water and Wastewater Modelling Demand Table (August 2024) and Region of Peel Linear Wastewater Standards (March 2023)

The equivalent population for the site, including the residential area (by others) in the middle of the development area, was calculated to be 4826 people total; 4316 residential population and 510 Commercial/Institutional (ICI) population. Detailed calculations are attached.

Domestic Water Usage

The domestic water demands for the development were calculated using the design criteria outlined in the Region of Peel "*Water and Wastewater Modelling Demand Table, August 2024*". **Table 2** summarizes the average daily demand and peaking factors used for this analysis.

Table 2 - Water Design Factors

Type of Development	Average Daily Demand	Maximum Daily Demand Peaking Factor	Peak Hourly Demand Peaking Factor
Residential	270 L/capita/day	1.8	3.0
Institutional	250 L/capita/day	1.4	3.0

Source: Region of Peel Water and Wastewater Modelling Demand Table (August 2024)

Utilizing the equivalent population data from Table 1 and the corresponding Maximum Day and Peak Hour data from Table 2 the water demands for this development were calculated. The calculated demands for the development are summarized in **Table 3**. Detailed water demand calculations are attached.

Table 3 – Water Demand for the 12580 and 12552 Torbram Road Development

	Average Day Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Water Demands (Residential and ICI)	14.97	26.34	44.89

Fire Flow Demands

Typical fire demands for the development were estimated using the Fire Underwriters Survey ("FUS") formula outlined in the *'Water Supply For Public Fire Protection Guideline'*, dated 2020. The estimated minimum required fire flow for each area of the development is shown in **Table 4**. The required fire flows for this development must be calculated and confirmed once the buildings have been designed. Detailed calculations for typical buildings are attached.

Table 4 - Fire Flow Requirements

Type of Development	Fire Flow (L/s)
Row Townhouses	350
Medium Density Residential	317
School	183

Source: Fire Underwriters Survey, 2020

As noted, the fire flow in Table 4 above was calculated using the FUS formula. **Table 5** below summarizes the criteria utilized to calculate the fire flow requirements as well as the assumptions made. These minimum fire flow requirements are estimates only as the buildings have not yet been designed.

The townhouse blocks are assumed to be of wood-frame construction with no sprinklers. Fire walls will be required for every 600 m^2 footprint of the building. Should additional fire walls be included in the units then only firewalls with a fire resistive rating of 2 or more hours as per the current edition of the National Building Code of Canada would be considered to reduce the required fire flow for the buildings.

The apartment buildings are assumed to be of fire-resistive construction and fully sprinklered. The school is assumed to be of non-combustible construction with a fully supervised sprinkler system. The building areas for these buildings are not yet know and are estimated.

Once the detailed design data (specifics) for these building(s) are finalized the assumptions noted in Table 5 and in the FUS calculation must be reviewed and confirmed by the appropriate designer and any design/criteria changes required are to be reported to MES.

Table 5 – FUS Criteria/Assumptions

	Type of Development		
	Townhouses	**Apartments**	**School**
Type of Construction	Wood Frame Construction	Fire-Resistive Construction	Non Combustible Construction
Occupancy Type	Limited Combustible	Limited Combustible	Combustible
Fire Protection (Sprinkler/Firewalls)	2-hour rated firewall every 600m^2 of footprint	Fully Sprinklered (Unsupervised)	Fully Sprinklered (Supervised)
Area Considered	Townhouses Total Effective Area for each building is the area between firewalls. Assume a 3 storey townhouses, 1800 m^2 between firewalls: Total Building Area 1,800 m^2 Effective Area (FUS) 1,800 m^2	Apartments Total Effective Area for each building is calculated as the largest two adjoining floors plus 50% of any floors immediately above them up to a maximum of eight. Assume a 10 storey apartment building with 40% lot coverage: Total Building Area 76,400 m^2 Effective Area (FUS) 45,840 m^2	School Total Effective Area for the building is calculated as the largest two adjoining floors plus 50% of any floors immediately above them up to a maximum of eight. Assume a 3 storey school with 40% lot coverage: Total Building Area 24,600 m^2 Effective Area (FUS) 20,500 m^2

Note: For Additional Information on FUS Criteria Refer to Water Supply for Public Protection Guide, Fire Underwriters Survey, 2020

Hydrant Test

Hydrant tests have not yet been performed for the area. The Region is proposing to upgrade the existing 200 mm watermain on Torbram Road to a 400mm watermain. It is assumed that this will be completed prior to the construction of the proposed development.

Watermain Hydraulic Modelling

This development is in early design stages and a hydrant test has not yet been completed on Torbram Road. The Region's Water and Wastewater Modelling Demand Table will be completed in the future once more information is available.

It should be noted that detailed water hydraulic modeling will be required within the development to ensure that the required fire flows, once finalized, are met at the proposed hydrants within the development.

Conclusions/Recommendations

Once the building designs have been finalized the required fire flow for each building will need to be calculated to determine the minimum required fire flow for the development as per the Fire Underwriters Survey. The required fire flows for this site must be discussed and confirmed by the Region. Regardless, buildings will need to be designed to suit the fire flow available to the site.

Watermain hydraulic modelling will be required for the internal watermains to ensure that the minimum required fire flows can be met at each of the hydrants within the development.

We trust you find this report satisfactory. Should you have any questions or require further clarification, please call.

Yours truly,

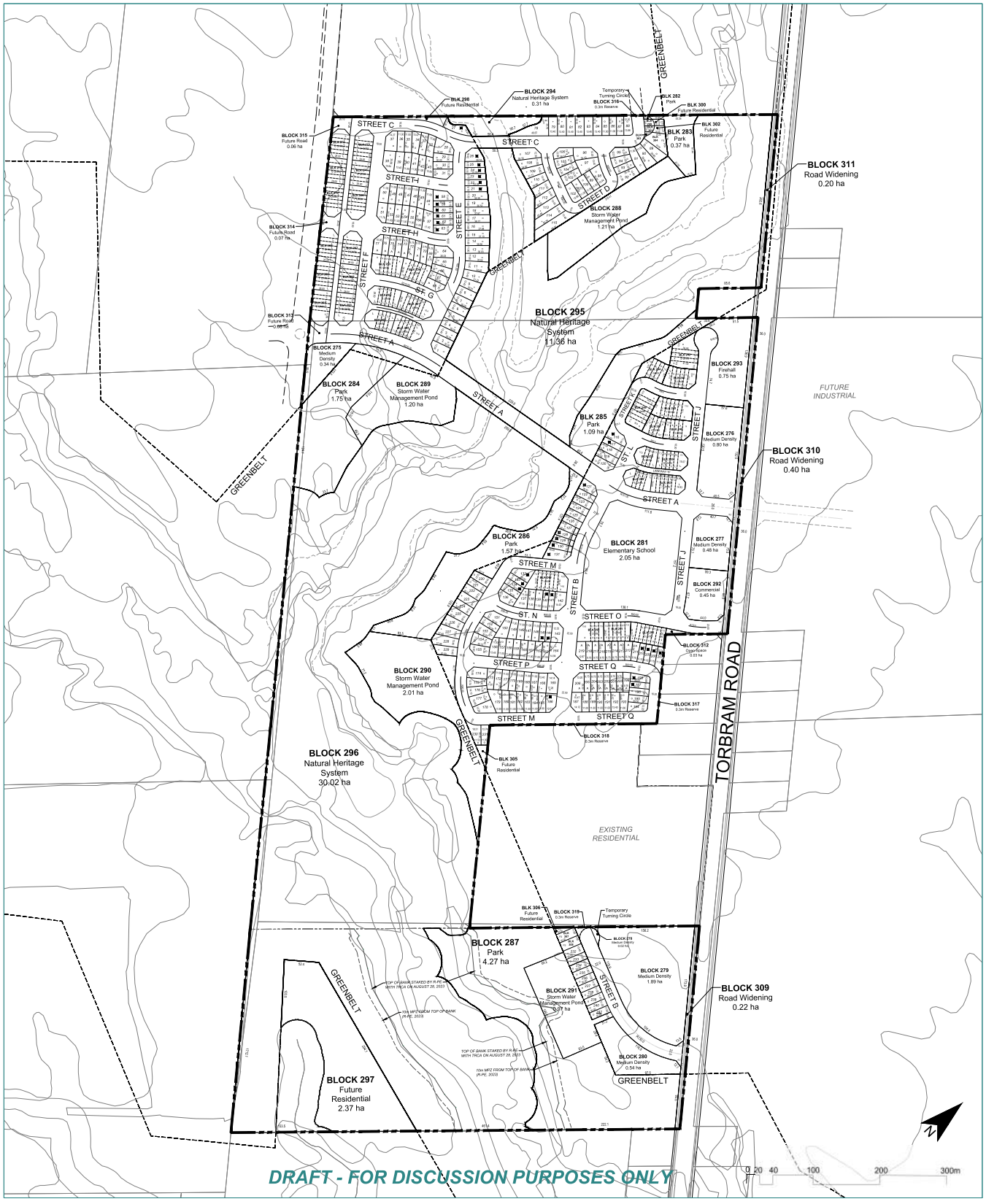
Municipal Engineering Solutions

Kristin St-Jean, P.Eng.

/KS

Attachments:

Development Plan (MGP, July 2024)
Region of Peel Design Criteria
Domestic Water Usage Calculations
Fire Underwriters Survey (FUS) Calculations

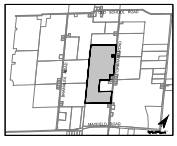


DRAFT - FOR DISCUSSION PURPOSES ONLY

DRAFT PLAN OF SUBDIVISION

Part of Lots 19, 20 and 21
Concession 5,
East of Hurontario Street
Town of Caledon
Regional Municipality of Peel

KEY PLAN



Prepared For:

Mayfield Golf Course Inc. &
Tullamore Industrial GP Inc.

SCHEDULE OF LAND USE

LOT/BLOCK	LAND USE		UNITS	AREA (ha)
1-241	Single Detached Min. 13.40m	+	45	
	Single Detached Min. 11.60m	=	14	
	Single Detached Min. 11.00m	O	121	9.23
	Single Detached Min. 9.45m	^	27	
	Single Detached Min. 9.15m	⊠	34	
Blks 242-254	Street Townhouse Min. 6.10m	X	77	1.80
Blks 255-274	Lane Townhouse Min. 5.80m	L	124	2.50
Blks 275-280	Medium Density			4.07
Blks 281	Elementary School			2.05
Blks 282-287	Park			9.05
Blks 288-291	Storm Water Management Pond			5.39
Blk 292	Commercial			0.45
Blk 293	Firehall			0.75
Blks 294-296	Natural Heritage System			41.69
Blks 297-308	Future Residential			2.67
Blks 309-311	Road Widening			0.82
Blk 312	Open Space			0.02
Blks 313-315	Future Road			0.21
Blks 316-319	0.3m Reserve			0.01
Street A	26.0m Right of Way - 713m			1.83
Street B	22.0m Right of Way -614m			2.22
Streets C-Q	18.0m Right of Way - 3,690m			6.10
Laneway A-B	8.0m Right of Way - 440m			0.32
TOTAL			442	91.18

OWNER'S AUTHORIZATION

I hereby authorize Malone Given Parsons Ltd. to prepare and submit this Draft Plan of Subdivision to the Town of Caledon.

Mayfield Golf Course Inc. & Tullamore Industrial GP Inc. — Date

SURVEYOR'S CERTIFICATE

I hereby certify that the boundaries of the lands to be subdivided as shown on this Plan and their relationship to the adjacent lands are accurately and correctly shown.

RPE — Date

ADDITIONAL INFORMATION

AS REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT, CHAPTER P.13(R.S.O. 1990).

(a),(e),(f),(g),(j),(l) - As shown of the Draft Plan.
(b),(c) - As shown on the Draft and Key Plan.
(d) - Land to be used in accordance with the Schedule of Land Use.
(i) - Soil is silt and clay loam.
(h),(k) - Full municipal services to be provided.

No.	Date	Revision

MGP File No.: 22-3154
Date: May 31, 2024
Revised: July 31, 2024

Malone Given Parsons
140 Renfrew Drive, Suite 201 | Markham, ON | L3R 6B3
905 513-0170 | mgp.ca

Region of Peel Design Criteria

Equivalent Population by Unit

Type of Development	Equivalent Population Density *(Person/Unit)*
Single/Semi-detached	4.20
Townhouses	3.40
Apartments	3.10

Source: Region of Peel Water and Wastewater Modelling Demand Table, August 2024

Equivalent Population by Area

Type of Development	Equivalent Population Density *(Persons/Ha)*
Apartment Buildings	475
Commercial	50
Senior Public School	1/2 x number of students (900 students minimum)

Source: Region of Peel Linear Wastewater Standards, March 2023

Water Design Factors

Residential	
Average Daily Demand (L/person/day)	270
Maximum Day Factor	1.8
Peak Hour Factor	3.0
Industrial, Commercial and Institutional (ICI)	
Average Daily Demand (L/person/day)	250
Maximum Day Factor	1.4
Peak Hour Factor	3.0

Source: Region of Peel Water and Wastewater Modelling Demand Table, August 2024

Domestic Water Usage
12580 and 12552 Torbram Road Development
September 2024

Municipal Engineering Solutions

RESIDENTIAL

Population (Residential - Houses and Townhouses)

Unit Type	No. of Units	People/Unit	Population (Res)
Single Detached	241	4.20	1012.2
Townhouses	201	3.40	683.4
Single Detatched (Future)	5	4.20	21.0
Single Detached (Future) *	93	4.20	390.6
Townhouses (Future)*	81	3.40	275.4
Residential Population			**2383**

* Non-participant property

Population (Residential - Apartments)

Unit Type	Ha	People/Ha	Population (Res)
Apartments (Med Density)	4.07	475.00	1933.3
Residential Population			**1933**

Water Demands

Demand Type	Population	Demand Rate
Average Day (Residential)	4316	270 L/capita/day
Average Day Water Demand Residential		1165320 L/day
		13.49 L/s

Water Demands

Demand Type	Peaking Factor (Res)	Water Demands (Res)
Average Day		13.49 L/s
Maximum Day	1.8	24.28 L/s
Peak Hour	3.0	40.46 L/s

INSTITUTIONAL AND COMMERCIAL

Population (ICI)

Unit Type	Site Area (Ha)	People/Ha	Population (ICI)
Institutional	2.05	-	450 *
Commercial	1.20 **	50.00	60.0
ICI Population			**510**

* Student population assumed to be 1/2 x 900 students (Junior/Senior Public School) from Linear Wastewater Standards (rev March 2023)

** Firehall property was considered 'commercial' for demand calculation purposes

Water Demands

Demand Type	Population	Demand Rate
Average Day (ICI)	510	250 L/capita/day
Average Day Water Demand ICI		127500 L/day
		1.48 L/s

Water Demands

Demand Type	Peaking Factor (ICI)	Water Demands (ICI)
Average Day		1.48 L/s
Maximum Day	1.4	2.07 L/s
Peak Hour	3.0	4.43 L/s

TOTAL

Population

Total Population	4826

Total Demands

Demand Type	**Demand (L/s)**
Average Day	14.97
Maximum Day	26.34
Peak Hour	44.89

Calculations are based on "Water Supply for Public Fire Protection Guide" by Fire Underwriters Survey Dated 2020

Municipal Engineering Solutions

FUS CALCULATION

Project:	12580 & 12552 Torbram Road	**Building Type/Block #**	Townhouses (row)
Project Number:	17002-179	**Firewalls/Sprinkler:**	Firewall every 600 sq.m footprint
Project Location:	Region of Peel (Caledon)	**Number of Units/Unit #'s**	
Date:	September 2024		

This calculation is preliminary based on typical building information. Required Fire Flow must be confirmed with final building designs.

1.0 FUS Formula

$$RFF = 220C\sqrt{A}$$

where: RFF = required fire flow in litres per minute;
C = the Coefficient related to the type of construction; and
A = the Total Effective Floor Area (m^2) excluding basements at least 50% below grade) [a]

NBC Occupancy	Group C		
Type of Construction [b]	Wood Frame Construction	Type V	
Protection (for C below 1.0)	na		
Footprint area	600.0	sq. metres	
Storeys	3		
C =	1.5		
A =	1800.0	Total Effective Area [a]	
F =	**14000**	**L/min** (rounded)	

2.0 Occupancy Adjustment

Type of Occupancy [c]	Limited Combustible	
Hazard Allowance	-0.15	
	-2100	L/min
Adjusted Fire Flow	**11900**	**L/min**

3.0 Sprinkler Adjustment

		Credit	Total
NFPA 13 sprinkler standard	NO	0%	0%
Standard Water Supply	NO	0%	
Fully Supervised system	NO	0%	

Sprinkler Credit **0 L/min**

4.0 Exposure Adjustment

Construction Type of the Exposed Building Face: Type V

		Percent	Total*
North Side			
Distance to Building (m)	0 to 3	25%	75%
Length (ft) by height in storeys	na		
South Side			
Distance to Building (m)	0 to 3	25%	
Length (ft) by height in storeys	na		
East Side			
Distance to Building (m)	10.1 to 20	15%	
Length (ft) by height in storeys	na		
West Side			
Distance to Building (m)	10.1 to 20	15%	
Length (ft) by height in storeys	na		

*max 75%

Exposures Surcharge **8930 L/min**

Total Required Fire Flow (rounded)	**21000 L/min**
	350 L/sec

a) For buildings with a construction coefficient from 1.0 to 1.5, consider 100% of all floor areas. For buildings with a construction coefficient below 1.0 (vertical openings are inadequately protected), consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to a maximum of eight. If the vertical openings and exterior vertical communications are properly protected, consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.
b) Wood Frame=1.5, Mass Timber= 0.8 to 1.5, Ordinary=1.0, Noncombustible=0.8, Fire-Resistive=0.6
c) Noncombustible=-25%, Limited Combustible=-15%, Combustible=0%, Free Burning=+15%, Rapid Burning=+25%

55 Gilbank Drive, Aurora, Ontario L4G 6H9
Tel: 905.726.1016 Cell: 416.434.0186 Fax: 905.726.1225

Calculations are based on "Water Supply for Public Fire Protection Guide" by Fire Underwriters Survey Dated 2020

Municipal Engineering Solutions

FUS CALCULATION

Project:	12580 & 12552 Torbram Road	**Building Type/Block #**	Medium Density/Commercial
Project Number:	17002-179	**Firewalls/Sprinkler:**	Sprinklered
Project Location:	Region of Peel (Caledon)	**Number of Units/Unit #'s**	
Date:	September 2024		

This calculation is preliminary based on typical building information. Required Fire Flow must be confirmed with final building designs.

1.0 FUS Formula

$$RFF = 220C\sqrt{A}$$

where: RFF = required fire flow in litres per minute;
C = the Coefficient related to the type of construction; and
A = the Total Effective Floor Area (m^2) excluding basements at least 50% below grade) [a]

NBC Occupancy	Group C	
Type of Construction [b]	Fire-Resistive Construction	Type I
Protection (for C below 1.0)	na	
Footprint area	7640.0	sq. metres (assumes 40% lot coverage)
Storeys	10	(number of storeys unkown)
C =	0.6	
A =	45840.0	Total Effective Area [a]
F =	**28000**	**L/min** (rounded)

2.0 Occupancy Adjustment

Type of Occupancy [c]	Limited Combustible	
Hazard Allowance	-0.15	
	-4200	L/min
Adjusted Fire Flow	**23800**	**L/min**

3.0 Sprinkler Adjustment

		Credit	Total
NFPA 13 sprinkler standard	YES	30%	40%
Standard Water Supply	YES	10%	
Fully Supervised system	NO	0%	

Sprinkler Credit **9520 L/min**

4.0 Exposure Adjustment

Construction Type of the Exposed Building Face: Type I-II (unprotected)

		Percent	Total*
North Side			
Distance to Building (m)	10.1 to 20	8%	20%
Length (ft) by height in storeys	over 100		
South Side			
Distance to Building (m)	10.1 to 20	8%	
Length (ft) by height in storeys	over 100		
East Side			
Distance to Building (m)	20.1 to 30	4%	
Length (ft) by height in storeys	over 100		
West Side			
Distance to Building (m)	over 30	0%	
Length (ft) by height in storeys	over 100		

*max 75%

Exposures Surcharge **4760 L/min**

Total Required Fire Flow (rounded)	**19000**	**L/min**
	317	**L/sec**

a) For buildings with a construction coefficient from 1.0 to 1.5, consider 100% of all floor areas. For buildings with a construction coefficient below 1.0 (vertical openings are inadequately protected), consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to a maximum of eight. If the vertical openings and exterior vertical communications are properly protected, consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.
b) Wood Frame=1.5, Mass Timber= 0.8 to 1.5, Ordinary=1.0, Noncombustible=0.8, Fire-Resistive=0.6
c) Noncombustible=-25%, Limited Combustible=-15%, Combustible=0%, Free Burning=+15%, Rapid Burning=+25%

55 Gilbank Drive, Aurora, Ontario L4G 6H9
Tel: 905.726.1016 Cell: 416.434.0186 Fax: 905.726.1225

Calculations are based on "Water Supply for Public Fire Protection Guide" by Fire Underwriters Survey Dated 2020

Municipal Engineering Solutions

FUS CALCULATION

Project:	12580 & 12552 Torbram Road	**Building Type/Block #**	Elementary School
Project Number:	17002-179	**Firewalls/Sprinkler:**	Sprinklered
Project Location:	Region of Peel (Caledon)	**Number of Units/Unit #'s**	
Date:	September 2024		

This calculation is preliminary based on typical building information. Required Fire Flow must be confirmed with final building designs.

1.0 FUS Formula

$$RFF = 220C\sqrt{A}$$

where: RFF = required fire flow in litres per minute;
C = the Coefficient related to the type of construction; and
A = the Total Effective Floor Area (m^2) excluding basements at least 50% below grade) [a]

NBC Occupancy	Group C	
Type of Construction [b]	Non-combustible Construction	Type II
Protection (for C below 1.0)	na	
Footprint area	8200.0	sq. metres (assumes 40% lot coverage)
Storeys	3	
C =	0.8	
A =	20500.0	Total Effective Area [a]
F =	**25000**	**L/min** (rounded)

2.0 Occupancy Adjustment

Type of Occupancy [c]	Combustible	
Hazard Allowance	0	
	0	L/min
Adjusted Fire Flow	**25000**	**L/min**

3.0 Sprinkler Adjustment

		Credit	Total
NFPA 13 sprinkler standard	YES	30%	50%
Standard Water Supply	YES	10%	
Fully Supervised system	YES	10%	

Sprinkler Credit **12500 L/min**

4.0 Exposure Adjustment

Construction Type of the Exposed Building Face: Type I-II (unprotected)

		Percent	Total*
North Side			
Distance to Building (m)	over 30	0%	
Length (ft) by height in storeys	na		
South Side			
Distance to Building (m)	over 30	0%	
Length (ft) by height in storeys	na		
East Side			0%
Distance to Building (m)	over 30	0%	
Length (ft) by height in storeys	na		
West Side			
Distance to Building (m)	over 30	0%	
Length (ft) by height in storeys	na		

*max 75%

Exposures Surcharge **0 L/min**

Total Required Fire Flow (rounded)	**13000**	**L/min**
	217	**L/sec**

a) For buildings with a construction coefficient from 1.0 to 1.5, consider 100% of all floor areas. For buildings with a construction coefficient below 1.0 (vertical openings are inadequately protected), consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to a maximum of eight. If the vertical openings and exterior vertical communications are properly protected, consider only the area of the largest floor plus 25% of each of the two immediately adjoining floors.
b) Wood Frame=1.5, Mass Timber= 0.8 to 1.5, Ordinary=1.0, Noncombustible=0.8, Fire-Resistive=0.6
c) Noncombustible=-25%, Limited Combustible=-15%, Combustible=0%, Free Burning=+15%, Rapid Burning=+25%

55 Gilbank Drive, Aurora, Ontario L4G 6H9
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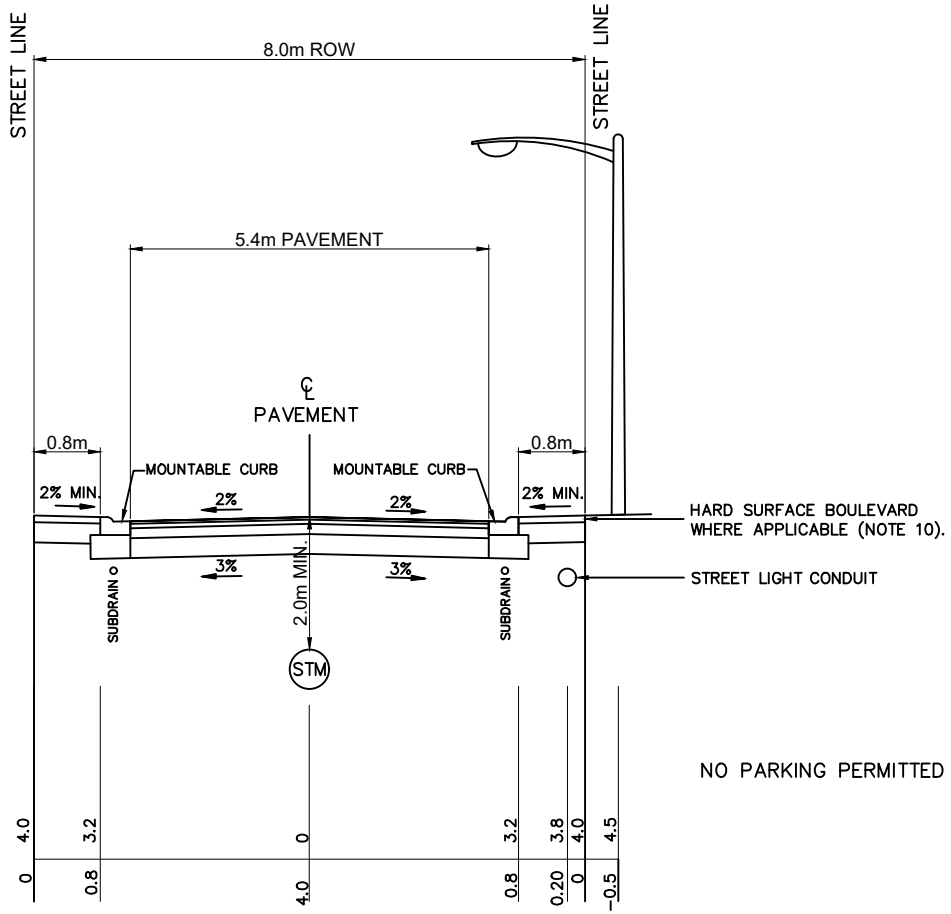
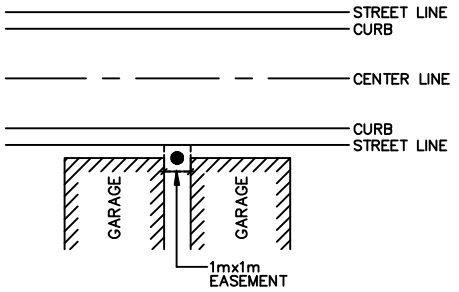
Appendix G Right-of-Way Concepts



PLAN:



NOTES

1. THE FOLLOWING IS A MINIMUM ROAD BASE AND WILL REQUIRE A SOILS REPORT VERIFICATION
   - 40 mm HL3
   - 65 mm HL8
   - 150 mm GRANULAR "A"
   - 300 mm GRANULAR "B"
2. STREETLIGHT FIXTURE PER APPROVED TOWN STANDARD.
3. FULL LENGTH MINIMUM 100 MM DIA.SUB-DRAINS C/W FILTERCLOTH SHALL BE INSTALLED, AS PER APPROVED TOWN OF CALEDON STANDARD NO. 218.
4. SUB-GRADE SHALL BE COMPACTED TO A MINIMUM 95% OF S.P.D. AT OPTIMUM MOISTURE CONTENT.
5. WHERE POSSIBLE MANHOLE LIDS TO BE LOCATED OUT OF TIRE LANE OF TRAFFIC.
6. TRANSFORMERS TO BE LOCATED ON SIDE STREETS WHERE POSSIBLE OR ALTERNATIVELY ON EASEMENT ADJACENT TOLANEWAY.
7. STREET LIGHT POLE IN 1mx1m EASEMENT.
8. 50m MAXIMUM POLE SPACING AND THEREFORE MAXIMUM LANEWAY LENGTH IS 50m WITHOUT LANEWAY ILLUMINATION.
9. ONLY STORM SEWERS ARE PERMITTED WITHIN LANEWAYS.
10. WHERE LANEWAYS ARE PROPOSED ADJACENT RESIDENTIAL REAR YARDS, HARD SURFACING IS TO BE INSTALLED FROM THE BACK OF CURB TO THE STREET LINE. HARD SURFACE TYPE IS AT THE DISCRETION OF THE TOWN.

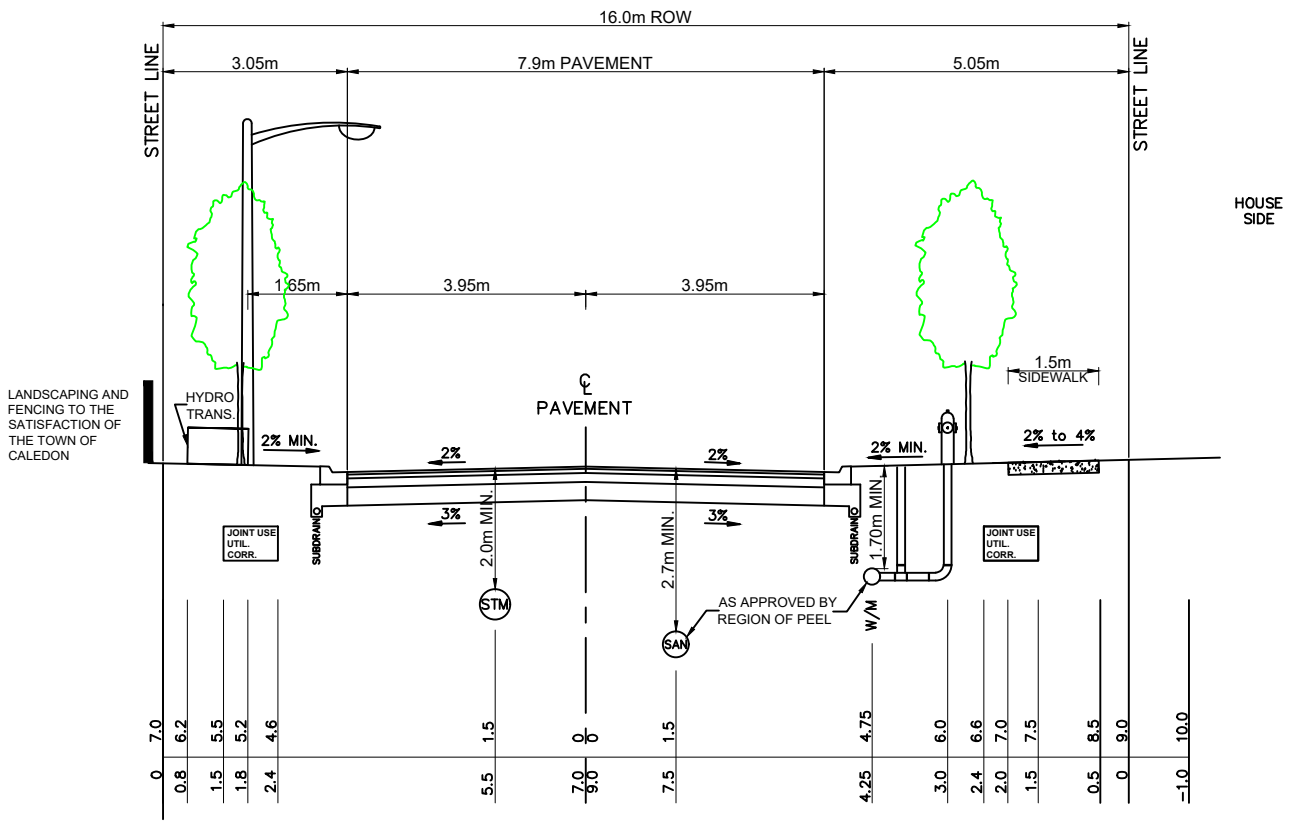
TOWN OF CALEDON

8.0m LANEWAY
6.0m ROADWAY (5.4m PAVEMENT)

NO.	REVISION	APR'D	DATE
4	TEXT AND SLOPE REVISIONS		JULY 19
3	DIMENSION AND TEXT REVISION		JAN. 09
2	DIMENSION AND LAYOUT REVISION		JULY 08
1	NOTES EDIT, STANDARD No. 225 NOW 200		JUNE 08

APR'D: C.C. DATE: JUNE 08
DRAWN: SCALE: N.T.S.

STANDARD No. 200



NOTES

1. WATERMAIN TO HAVE MINIMUM COVER OF 1.7m.
2. UTILITY CORRIDOR TO HAVE A MINIMUM COVER OF 0.9m.
3. TREES TO BE PLACED IN LOCATIONS PER APPROVED LANDSCAPE PLAN.
4. STREETLIGHT FIXTURE PER APPROVED TOWN STANDARD.
5. THE FOLLOWING IS A MINIMUM ROAD BASE AND WILL REQUIRE A SOILS REPORT VERIFICATION
   - 40 mm HL3
   - 65 mm HL8
   - 150 mm GRANULAR "A"
   - 300 mm GRANULAR "B"
6. THE BOULEVARDS REQUIRE A MINIMUM OF 300mm OF TOPSOIL AND NURSERY SOD.
7. ON A CRESCENT THE WATERMAIN SHALL BE PLACED ON THE OUTSIDE.
8. FULL LENGTH MINIMUM 100 MM DIA.SUB-DRAINS C/W FILTERCLOTH SHALL BE INSTALLED, AS PER APPROVED TOWN OF CALEDON STANDARD NO .218.
9. SUB-GRADE SHALL BE COMPACTED TO A MINIMUM 95% OF S.P.D. AT OPTIMUM MOISTURE CONTENT.
10. WHERE POSSIBLE MANHOLE LIDS TO BE LOCATED OUT OF TIRE LANE OF TRAFFIC.
11. LONG DIMENSION OF TRANSFORMER TO BE PARALLEL TO STREETLINE.

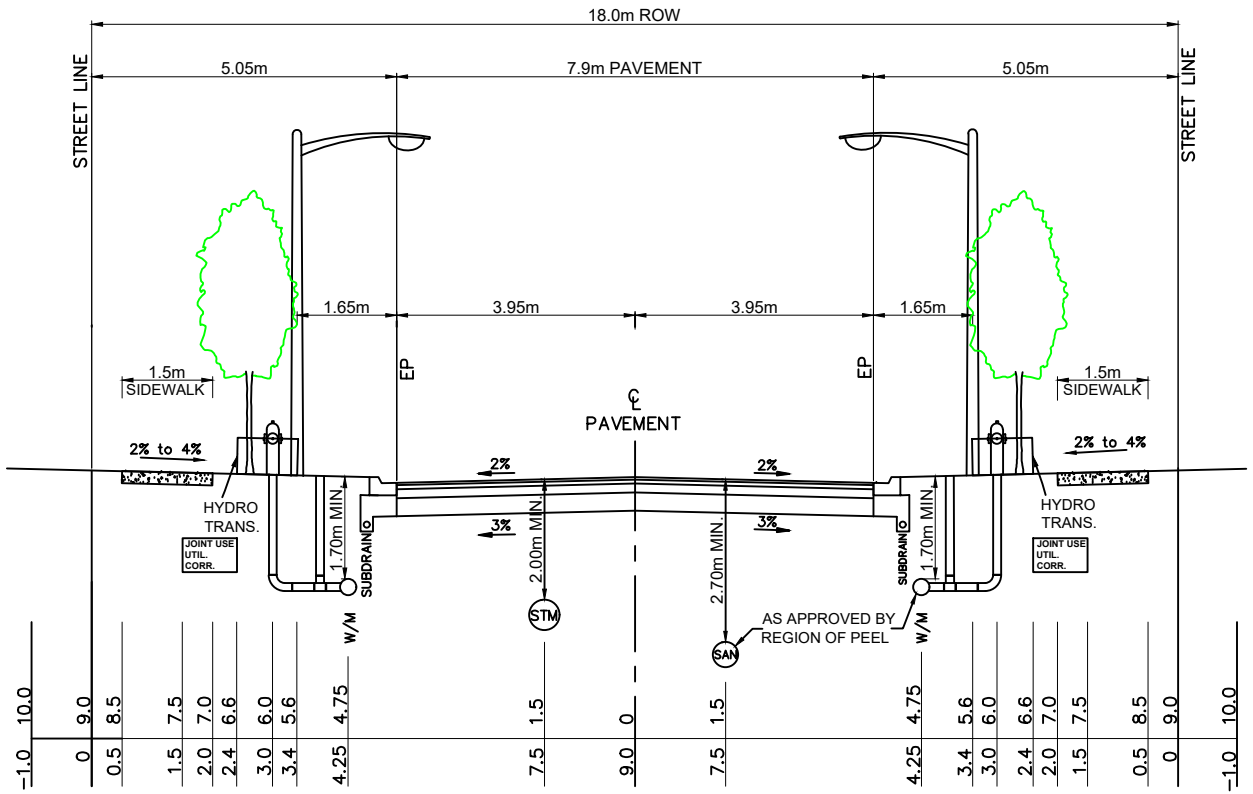
TOWN OF CALEDON

16.0m LOCAL WINDOW STREET
8.5m ROADWAY (7.9m PAVEMENT)

NO.	REVISION	APR'D	DATE
4	TEXT AND SLOPE REVISIONS		MAY 19
3	DIMENSION AND TEXT REVISION		JAN. 09
2	DIMENSION AND LAYOUT REVISION		JULY 08
1	DIMENSION EDIT, STD No. 212 NOW 201		JUNE 08

APR'D: C.C. DATE: JUNE 08
DRAWN: SCALE: N.T.S.

STANDARD No. 201



NOTES

1. WATERMAIN TO HAVE MINIMUM COVER OF 1.7m.
2. UTILITY CORRIDOR TO HAVE A MINIMUM COVER OF 0.9m.
3. TREES TO BE PLACED IN LOCATIONS PER APPROVED LANDSCAPE PLAN.
4. STREETLIGHT FIXTURE PER APPROVED TOWN STANDARD.
5. THE FOLLOWING IS A MINIMUM ROAD BASE AND WILL REQUIRE A SOILS REPORT VERIFICATION
   - 40 mm HL3
   - 65 mm HL8
   - 150 mm GRANULAR "A"
   - 300 mm GRANULAR "B"
6. THE BOULEVARDS REQUIRE A MINIMUM OF 300mm OF TOPSOIL AND NURSERY SOD.
7. ON A CRESCENT THE WATERMAIN SHALL BE PLACED ON THE OUTSIDE.
8. FULL LENGTH MINIMUM 100 MM DIA.SUB-DRAINS C/W FILTERCLOTH SHALL BE INSTALLED, AS PER APPROVED TOWN OF CALEDON STANDARD NO. 219.
9. SUB-GRADE SHALL BE COMPACTED TO A MINIMUM 95% OF S.P.D. AT OPTIMUM MOISTURE CONTENT.
10. WHERE POSSIBLE MANHOLE LIDS TO BE LOCATED OUT OF TIRE LANE OF TRAFFIC.
11. LONG DIMENSION OF TRANSFORMER TO BE PARALLEL TO STREETLINE.

TOWN OF CALEDON

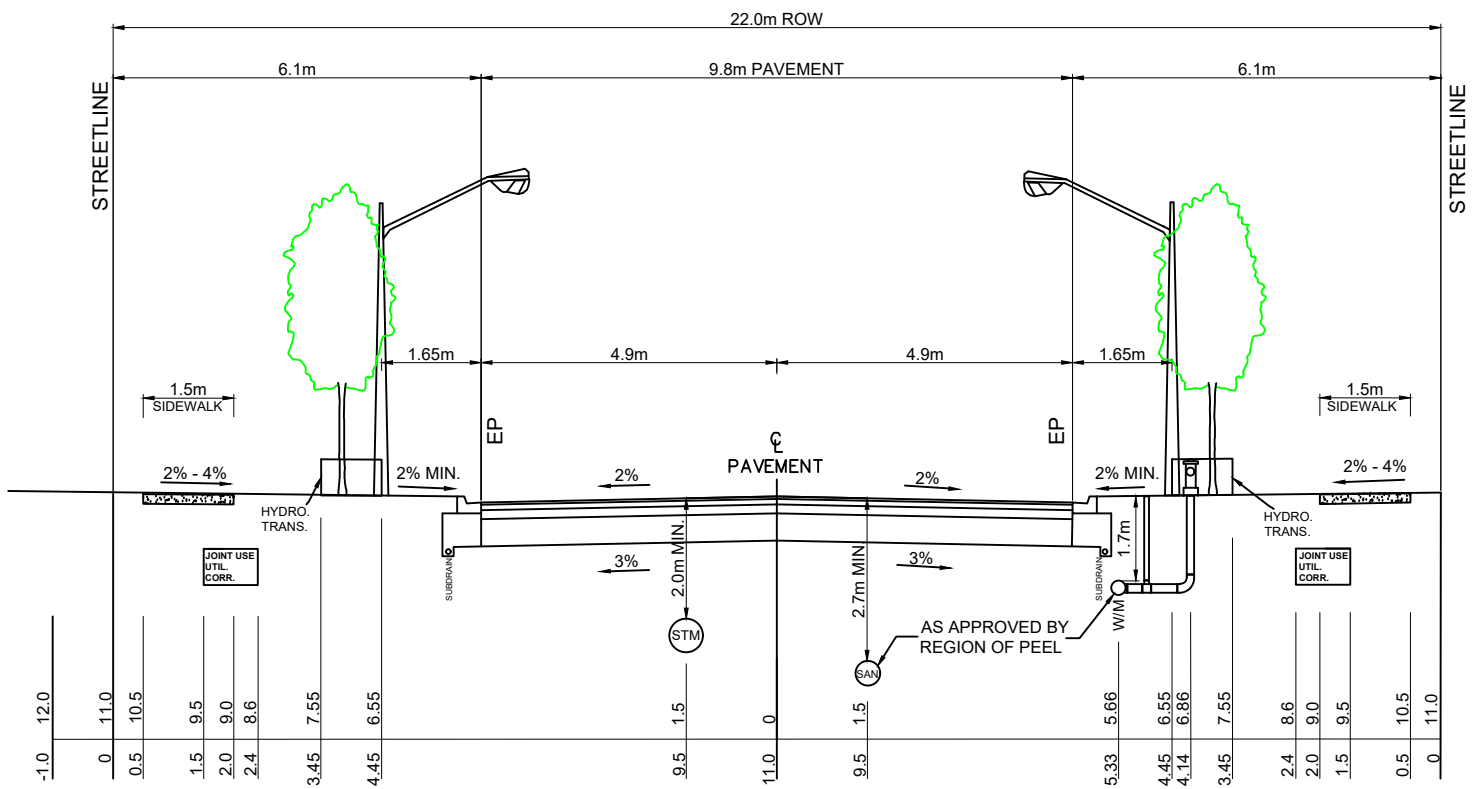
18.0m LOCAL ROAD
8.5m ROADWAY (7.9m PAVEMENT)

NO.	REVISION	APR'D	DATE
4	TEXT AND SLOPE REVISIONS		MAY 19
3	DIMENSION AND TEXT REVISION		JAN. 09
2	DIMENSION AND LAYOUT REVISION		JULY 08
1	DIMENSION EDIT		JUNE 08

APR'D: C.C. | DATE: JUNE 08

DRAWN: | SCALE: N.T.S.

STANDARD No. 202



NOTES:

1. UTILITY CORRIDOR TO HAVE A MINIMUM COVER OF 0.9m.
2. WATERMAIN TO HAVE MINIMUM COVER OF 1.7m.
3. THE FOLLOWING IS A MINIMUM ROAD BASE AND WILL REQUIRE A SOILS REPORT VERIFICATION
   40mm HL3
   90mm HL8
   150mm GRANULAR "A"
   450mm GRANULAR 'B'
4. THE BOULEVARDS REQUIRE A MINIMUM OF 300mm OF TOPSOIL AND NURSERY SOD.
5. TREES TO BE PLACED IN LOCATIONS PER APPROVED LANDSCAPE PLAN
6. STREETLIGHT FIXTURE PER APPROVED TOWN STANDARD.
7. ON A CRESCENT THE WATERMAIN SHALL BE PLACED ON THE OUTSIDE.
8. FULL LENGTH MINIMUM 100MM DIA.SUB-DRAINS C/W FILTERCLOTH SHALL BE INSTALLED AS PER TOWN OF CALEDON APPROVED STANDARDS NO. 218.
9. SUB-GRADE SHALL BE COMPACTED TO A MINIMUM 95% OF S.P.D. AT OPTIMUM MOISTURE CONTENT.
10. WHERE POSSIBLE MANHOLE LIDS TO BE LOCATED OUT OF TIRE LANE OF TRAFFIC.

TOWN OF CALEDON

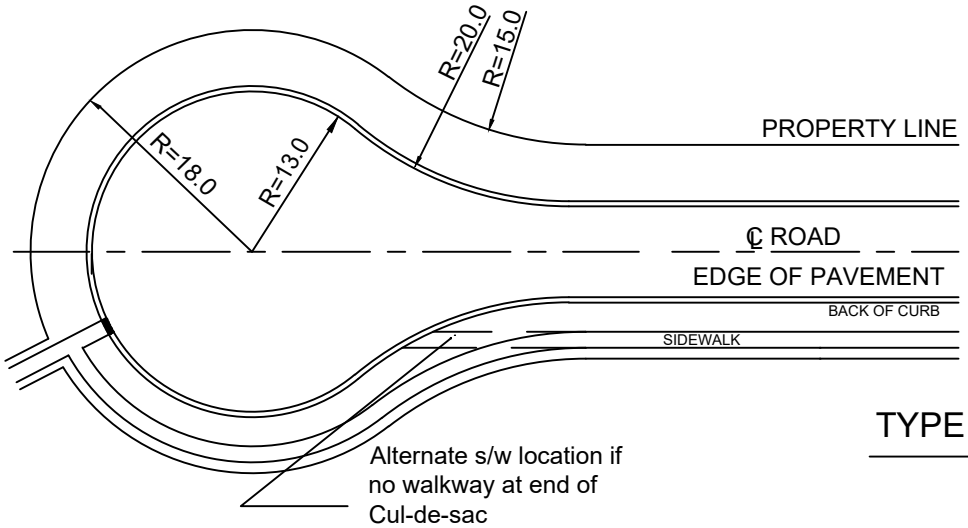
22m LOCAL THROUGH/URBAN
10.4m ROADWAY (9.8m PAVEMENT)

NO.	REVISION	APR'D	DATE
5	TEXT AND SLOPE REVISIONS		MAY 19
4	DIMENSION AND TEXT REVISION		JAN. 09
3	DIMENSION AND LAYOUT REVISION		JULY 08
2	DIMENSION EDIT		JUNE 08
1	OFFSETS		APRIL 08

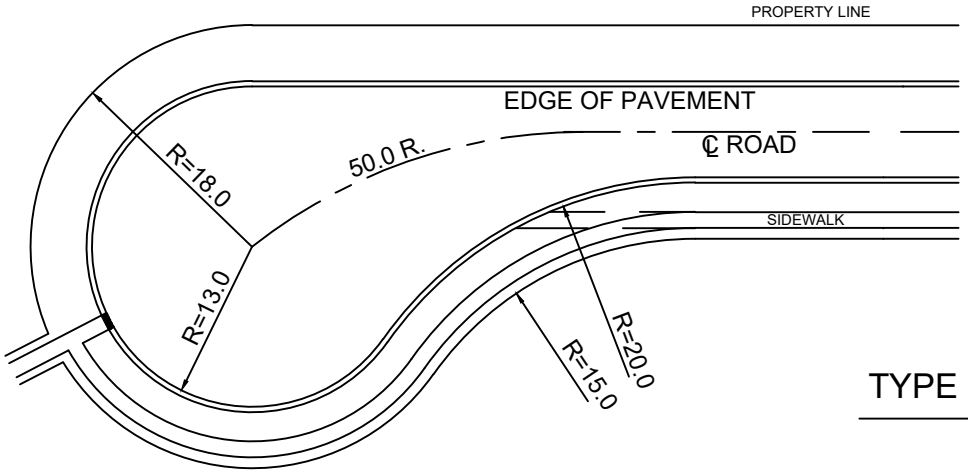
APR'D: C.C. DATE: JUNE 08

DRAWN: SCALE: N.T.S.

STANDARD No. 205



TYPE 'A'



TYPE 'B'

NOTES:

1. MAXIMUM 40 UNITS ON CUL-DE-SAC OR MAXIMUM 150m IN LENGTH.
2. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN.
3. MINIMUM GUTTER GRADE 0.75%
4. TREE PLANTING AS PER APPROVED LANDSCAPE PLANS.

NO.	REVISION	APR'D	DATE
4			
3	STANDARD No. 251 NOW 216		JUNE 08
2	REMOVAL OF ISLAND AND ROADWAY DIMENSIONING, RADII DIMENSIONING CORRECTED, NOTES EDIT		MARCH 08
1	ISLAND CURB STANDARD 600.060 ADDED	C.C.	01/03

TOWN OF CALEDON

APR'D: C.C.

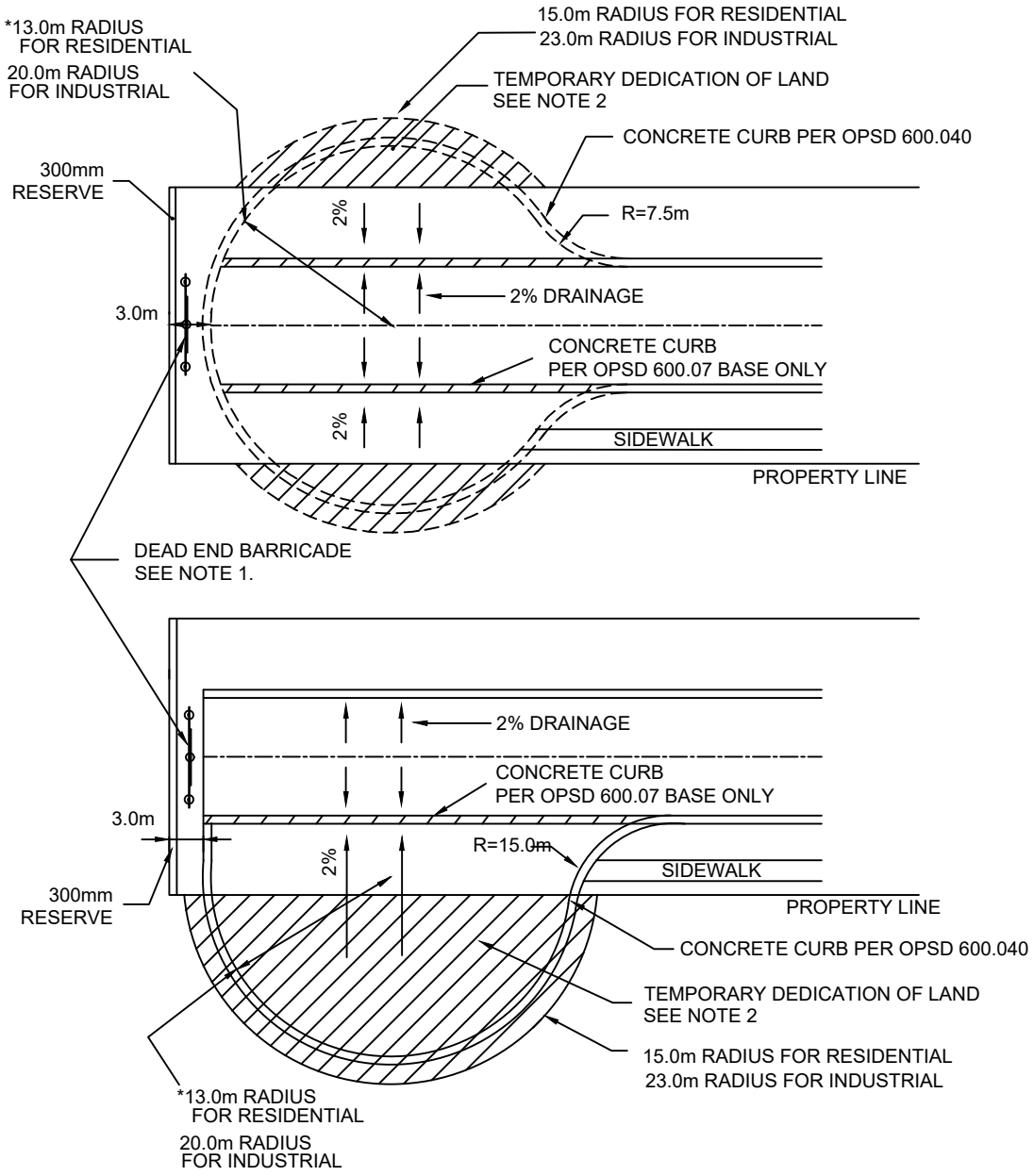
DATE: 26/06/19

DRAWN:

SCALE: N.T.S.

RESIDENTIAL CUL-DE-SAC

STANDARD No.216



NOTES:

1. DEAD END BARRICADE PER OPSD 906.01 COMPLETE WITH ADDITIONAL 500mm X 500mm BLACK ON WHITE SIGN NOTING '-TEMPORARY ONLY- LOCATION OF FUTURE ROAD'.
2. TEMPORARY LAND DEDICATION VIA. BLOCK ON PLAN.
3. *IF SCHOOL BUS SERVICE IS REQUIRED THE MINIMUM RADIUS SHALL BE 14.5m.

NO.	REVISION	APR'D	DATE
4			
3	STANDARD No. 252 NOW 217		JUNE 08
2	CURB MATERIAL AND OPSD NUMBER CORRECTION		MARCH 08
1	INDUSTRIAL RADII ADDED		JUNE 04

TOWN OF CALEDON	APR'D:	DATE: 29/11/99
	DRAWN: BJM	SCALE: N.T.S.
TEMPORARY CUL-DE-SAC	STANDARD No. 217	

Appendix H Hydraulic Model and Crossing Analysis

SCS consulting group ltd

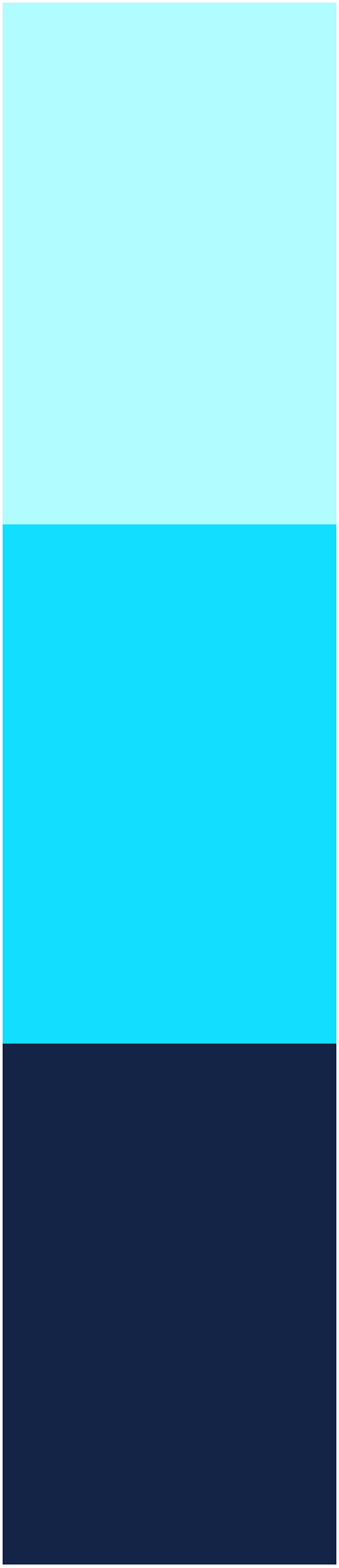
DIGITAL MODELLING FILES

The following secure link is being provided by **SCS Consulting Group** to share Mayfield Golf Club related digital data:

https://filesafecloud.scsconsultinggroup.com/url/pekah6hmemnrabad

Please click on the link and download all files from this location.

- HEC-RAS Modelling



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