URBANTECH®

FUNCTIONAL SERVICING &
STORMWATER MANAGEMENT REPORT

1720 Sherwood Forrest Circle

CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

PREPARED FOR

SHERWOOD FORREST LIMITED PARTNERSHIP

Urbantech File No.: 23-747
City File No.:

Third Submission: May 2024

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TABLE OF CONTENTS

APPENDIX A: Geotechnical and Hydrogeological Reports

APPENDIX B: Storm Drainage Design

APPENDIX C: Stormwater Management Design

APPENDIX D: Sanitary Servicing Design

APPENDIX E: Water Demand Calculations

APPENDIX F: Region of Peel Connection Demand Table

APPENDIX G: Drawings and Figures

- Preliminary Development Concept
- Draft Plan of Subdivision
- Figure 1 – Constraints Mapping
- C101 – Servicing Plan (Part 1)
- C102 – Servicing Plan (Part 2)
- C103 – Watermain Servicing Plan
- C201 – Grading Plan (Part 1)
- C202 – Grading Plan (Part 2)
- C203, C204, C205 – Grading Sections
- C301 – Existing Storm Drainage Plan
- C302 – Storm Drainage Plan
- C303 – Sanitary Drainage Plan
- C401 – Erosion and Sediment Control Plan

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1. INTRODUCTION

Urbantech Consulting has been retained by ARGO Development Corporation to prepare a functional servicing report (FSR) for the proposed 1720 Sherwood Forrest Circle site plan, located in City of Mississauga, Region of Peel (hereafter referred to as the subject lands).

As shown on the proposed *Location Plan*, the subject lands are bounded by Mississauga Road to the east, Dundas Street to the north, rear yards of the existing Sherwood Forrest Circle lots to the west, and the rear yards of existing Prince John Boulevard lots to the south. The subject site is Part of Lot 3, Range 1, south of Dundas Street, in the City of Mississauga and Regional Municipality of Peel.

This study presents the recommended stormwater management and municipal servicing strategy for the development of the subject lands. This study is also applicable for any future revisions to the site plan, assuming the revisions are minor and in general conformance with the concepts outlined herein.

The design information presented in this report considers the following guidelines and studies:

- City of Mississauga T&W Development Requirements
- Region of Peel Watermain Design Criteria (June 2010)
- Region of Peel Linear Wastewater Standards, Version R 1.0 (March 29, 2023)
- Credit Valley Conservation Stormwater Management Guideline (July 2022)
- Credit Valley Conservation Low Impact Development Stormwater Management Planning and Design Guide, Version 1.0 (2010)
- Erosion and Sediment Control Guideline for Urban Construction (2019)
- Draft Ministry of the Environment and Climate Change LID SWM Guidance Manual
- Stormwater Management Planning and Design Manual by the Ministry of Environment and Climate Change
- Environmental Impact Study (Palmer)
- Geotechnical Investigation and Slope Stability Assessment (DS Consultants)
- Scoped Transportation Impact Assessment (CGH Transportation)
- Arborist Tree Preservation and Protection Report (Palmer)

The proposed development will be developed through creation of a site plan block via the subdivision (Draft Plan) process after the Zoning By-Law Amendment Application has been reviewed and approved by the City. The proposed Draft Plan of subdivision dated May 1, 2024, features single detached homes within condominium corporation tenure. Overall, there are 56 units proposed on Block 1 Condominium Detached Residential (2.08 ha). The remainder of the development blocks consist of: Block 2 Open Space (0.12 ha), Block 3 Natural Heritage System (NHS) (1.71 ha) with the associated Block 4 NHS Buffer (0.63 ha), and Block 5 Road Widening (0.09 ha). The total site area is 4.63 ha and Block 3, and Block 4 will be conveyed to the City of Mississauga for the purpose of long-term preservation. The existing site access is owned by the City of Mississauga. Refer to **Appendix G** for the Draft Plan of Subdivision prepared by Glen Schnarr & Associates Inc. and the Development Concept Plan prepared by Gerrard Design.

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2. EXISTING CONDITIONS

2.1. TOPOGRAPHY AND DRAINAGE

The subject lands are predominantly flat, sloping gently to the northeast with an approximate elevation change of 1.0m. The parcel extends past the top of bank, at which point there is a slope toward the Credit Valley River and the Mississauga Road right-of-way. This slope is characterized by a vertical drop greater than 15m.

Upon approval of the rezoning application, the NHS and associated buffer beyond the top of slope to be dedicated to the City of Mississauga.

The site is currently occupied by Carmel Heights Senior Residence, consisting of a complex of three interconnected structures with varying heights of 1, 2, and 3 stories. These existing buildings are scheduled for demolition prior to any new construction activities.

As shown in the existing drainage plan **(Drawing C301)**, the majority of the subject lands drain east towards the NHS / slope. It was confirmed during a site investigation that several catchbasins (CBs) are present on the subject lands. These CBs intercept surface drainage, where it is conveyed through the NHS and over the slope via the storm sewer outfalls into the wooded area. The balance of the site drains overland towards the NHS. Drainage discharged down the slope is captured into a series of ditch inlet catchbasins at the base of the slope along the Mississauga Road ROW. Based on aerial photography and visual inspection, erosion along the slope downstream of the outfalls is evident. After capture into the DICBs at the base of the slope, the drainage is directed east beneath Mississauga Road and ultimately drains into the Credit River, according to the City's available drawings and GIS information.

A small portion of the site drains towards Dundas Street. Each drainage area is characterized by an impervious area (roads, building, walkway) and pervious area. The table below summarizes the drainage areas shown on **Drawing C301** and includes external drainage east of the site / within the NHS and slope area. The areas were separated in this manner to distinguish the subject lands from the external area draining to each outlet, as well as to facilitate modelling. The Visual OTTHYMO hydrologic model recommends that the STANDHYD commands should be applied to areas with impervious ratios larger than 20%. For smaller impervious ratios, the area should be sub-divided into urban (STANDHYD) and rural (NASHYD components).

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Table 2-1 – Existing Drainage Outlets and Contributing Areas

Outfall	Total Area [ha]	Sub-Area [ha]	VO Command	% IMP	Total % IMP
Dundas Street	0.29	0.29	STANDHYD	27%	27%
Existing DICB 2 (Mississauga Road ROW)	1.6	0.11	STANDHYD	100%	25%
		0.26	STANDHYD	62%	
		0.29	STANDHYD	44%	
		0.94	NASHYD	0%	
Existing DICB 3 (Mississauga Road ROW)	0.45	0.062	STANDHYD	100%	14%
		0.388	NASHYD	0	
Existing DICB 4 (Mississauga Road ROW)	0.84	0.108	STANDHYD	100%	13%
		0.7318	NASHYD	0%	
Existing DICB 5 (Mississauga Road ROW)	0.8	0.8	NASHYD	0	0

All outlets from the subject lands ultimately drain to the Credit River.

A Visual OTTHYMO model was created to simulate the existing drainage and identify existing target flows as well as the runoff volumes. The 12-hour Chicago storm distribution was found to generate the highest peak flows for the subject lands.

Table 2-2 – Existing Peak Flows and Runoff Volumes

Outfall / Area	Model Results	25mm	2-year	5-year	10-year	25-year	50-year	100-year
Dundas	Q (m^3/s)	0.011	0.016	0.022	0.028	0.032	0.037	0.054
0.29 ha	RV (m^3)	21	40	58	76	90	105	149
DICB2	Q (m^3/s)	0.056	0.088	0.123	0.156	0.184	0.21	0.289
1.6 ha	RV (m^3)	107	208	303	397	476	553	788
DICB3	Q (m^3/s)	0.009	0.015	0.021	0.027	0.033	0.038	0.051
0.45 ha	RV (m^3)	19	39	60	81	100	118	175
DICB4	Q (m^3/s)	0.016	0.026	0.037	0.049	0.058	0.068	0.09
0.84 ha	RV (m^3)	33	70	108	147	181	215	320
DICB5	Q (m^3/s)	0.002	0.006	0.012	0.019	0.026	0.032	0.046
0.8 ha	RV (m^3)	8	28	51	78	103	128	178
Total	Q (m^3/s)	0.081	0.132	0.188	0.244	0.292	0.337	0.456
3.69 ha	RV (m^3)	167	345	523	704	860	1015	1495

2.2. SOILS AND GROUNDWATER

For detailed geotechnical and hydrogeological information, please refer to the following reports in **Appendix A**:

- Geotechnical Investigation and Slope Stability Assessment (DS Consultants, July 24, 2023) including borehole information previously obtained by Terraprobe (November 2017 Geotechnical Study)

The geotechnical study conducted by DS revealed that the native soil within the subject lands consists mainly of gravelly sand / sand. Groundwater levels were found to vary between 5.8m and 15.0m deep. This composition, and the depth of the groundwater suggests that the site is suitable for infiltration.

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3. GRADING

The site grading design considers the following objectives and constraints:

- Conform to City of Mississauga grading criteria
- Match existing boundary conditions
- Minimize cut and fill operations and work towards a balanced site
- Provide overland flow conveyance for major storm conditions
- Provide minimum cover on proposed servicing

The site grading respects the following boundary grades:

- the existing tie-in to Dundas Street to the north;
- the neighboring residential properties to the west and south grades to the west; and,
- the NHS and buffer grades to the east

The site grading is constrained by the existing boundary grades mentioned above. The emergency overland flow route is graded towards the existing low points located along the boundary of the existing woodlot at the north and east ends of the site adjacent to the proposed parking stalls and a set of double catchbasins along the low point of the roads.

The intent of the grading design is to direct drainage away from existing lots and provide overland flow conveyance towards the existing woodlot to match the existing drainage patterns for major storm conditions. The boundary elevations for the neighbouring residential properties along Sherwood Forrest Circle are lower than the boundary elevations for the existing woodlot. Therefore, the front lot line elevation along the road is approximately 0.7m higher than the rear lot line elevation along the neighbouring residential properties to provide overland conveyance towards the existing woodlot.

Refer to **Drawing C201, C202**, “Grading Plan”, and **Drawing C203, C204, C205,** “Grading Sections” in **Appendix G** for details.

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4. STORMWATER MANAGEMENT PLAN

4.1. STORM DRAINAGE DESIGN CRITERIA AND REQUIREMENTS

The following storm drainage criteria have been adopted for the stormwater conveyance system within the proposed development:

- The minor drainage system shall be designed for the 10-year storm event using the Rational Method and City of Mississauga IDF curves
-
- The minor system capture will be restricted to the 10-year flow; excess flow will remain on the major system. This may require the use of inlet control devices other measures to limit capture.

- The major system shall be designed to accommodate runoff exceeding the capacity of the minor system for flows up to and including the 100-year storm event. The major system should be contained within road allowances and designated easements without over-flowing onto the arterial roads.
- For residential lots, runoff from roof leaders will be directed towards the pervious lawn areas.

- Storm sewers should be installed at adequate depth to enable connection of all basement foundation drains where possible, otherwise it is assumed that sump pumps will be required;

- On-site retention of the first 5 mm of runoff from the entire impervious surface area by way of infiltration, evapotranspiration or re-use is required.

The City confirmed that the following SWM criteria should apply specifically to the site:

- On-site retention of first 5mm of runoff from hard surfaces as noted above.
- Post-development to-pre-development quantity control for the entire site.
- Use of existing storm outfalls through NHS / down slope towards Mississauga Road is acceptable, provided that erosion risk is mitigated and post-to-pre quantity control is achieved. However, CVC had concerns with this approach, so an alternative option has been prepared as described in Section 4.2.
- Quality control to 80% TSS removal using a treatment train approach.

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4.2. PROPOSED STORM DRAINAGE PLAN

The storm drainage concept for the site has been designed to maintain flows and contributing drainage areas to the existing outlets on the site where possible and meet the existing targets established in the preceding section.

Following the first FSR submission, the Urbantech has discussed several outlet options with the City and CVC. These options were evaluated in detail and eventually rejected as summarized below:

Outlet Alternative	Summary of Evaluation
Outlet to existing sewers on Sherwood Forrest	**Not recommended:** Limited capacity – the subdivision sewers were not designed to convey flows from the subject lands
Outlets to existing NHS via conventional sewers / headwalls (with upstream infiltration/SWM tanks	**Rejected by CVC:** Potential impacts to existing vegetation and erosion of the slope due to hardening / point source discharge
Drop structures to existing sewers along Mississauga Road	**Not recommended:** Difficult maintenance, costly structure(s), unavoidable disturbance to slope which creates risk according to geotechnical consultant.
Infiltration/SWM tanks with pumps to level spreaders / NHS surface (to avoid piped outlets within NHS)	**Rejected by City:** City does not want to rely on a non-gravity drainage solution and potentially high HGL
Infiltration / SWM tank with gravity outlet to Dundas Street sewers, with some major system discharge over the NHS via level spreaders	**Recommended & Acceptable to City/CVC:** Although there is limited capacity, this solution addresses agency concerns.

Storm sewers for the subject lands have been sized according to the City of Mississauga sewer design criteria (10-year storm). A conservative value of 70% imperviousness was assigned to the proposed single detached residential and private ROW areas. Refer to the Storm Sewer Design Sheet in **Appendix B.** The proposed development will be serviced by a 250 mm – 600 mm diameter local storm sewer within the private roadway. As shown in The storm drainage collected within the site is directed to an underground storage tank / infiltration facility at the north limits of the site. Flows exceeding the 10-year storm will drain overland towards the valley, at outlets DICB2, DICB4, and DICB5. These flows do not require control and will discharge over a level spreader to promote sheet flow down the valley slope as opposed to concentrated flow. The major/minor flow split was simulated in Visual OTTHYMO using the “DUHYD” command, which was set up to discharge all flows below the 10-year peak flow to the proposed infiltration tank / Dundas Street outfall, and all flows greater towards the NHS. The majority of the flows are directed to the tank.

Existing drainage within the NHS area / buffer will be maintained towards each outlet, similar to existing conditions. The tank at the north outlet to Dundas Street has been designed to retain and infiltrate a substantial runoff volume. To promote infiltration / take advantage of the high infiltration rates while meeting the low target release rates at the Dundas Street outlet, the primary outlet for the tank will be the ground, with the remaining runoff draining from the tank and discharged via a storm sewer to the existing CB structure at the site frontage on Dundas Street. This configuration avoids the necessity for complicated outlet structures / control systems.

Table 4-1 compares the existing and proposed drainage area to each outlet. With the exception of the Dundas Street outlet, which has an increased drainage area and imperviousness compared to existing conditions (and requires SWM controls), all other outlets have a lower area and imperviousness under proposed conditions.

Table 4-1 - Proposed vs. Existing Drainage Area Summary

Outfall	Existing Area [ha]	Existing % IMP	Proposed Area [ha]	Sub-Area [ha]	VO Command	% IMP	Total % IMP
Dundas Street	0.29	27%	2.30	0.29	STANDHYD	27%	67%
				2.01 (To Tank)	STANDHYD	70%	
Existing DICB 2 (Mississauga Road ROW)	1.6	25%	1.024	0.053	STANDHYD	100%	5%
				0.971	NASHYD	0%	
Existing DICB 3 (Mississauga Road ROW)	0.45	14%	0.418	0.418	NASHYD	0%	0%
Existing DICB 4 (Mississauga Road ROW)	0.84	13%	0.378	0.378	NASHYD	0%	13%
Existing DICB 5 (Mississauga Road ROW)	0.8	0%	0.437	0.437	NASHYD	0%	0%

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4.3. LOW IMPACT DEVELOPMENT PRACTICES

As per the City of Mississauga requirements, capture of the first 5mm of runoff from the hard surface (roads, driveway etc.) of the proposed development is proposed. The City has also acknowledged the on-going discussion with the Province regarding the CLI-ECA (Consolidated Linear Infrastructure Environmental Compliance Approval) program that is associated with conditions for pre-approval and stormwater management requirements. In a worst-case scenario, the 27 mm runoff event would need to be addressed through a hierarchical approach (i.e., infiltration, filtration, retention, detention, best efforts, etc.). These requirements will be addressed by infiltration at the two end-of-pipe underground tanks.

The 5mm and 27mm volume requirements over the development area are summarized below. There is sufficient volume within the tanks to ensure no discharge of the 5mm to 27mm storms to the Dundas Street outlets. This approach will significantly reduce the risk of erosion along the sloped area:

Tank	Area	5mm	27mm	Proposed Tank Volume
1	2.01 ha @ 70% IMP	70m^3	380m^3	905m^3

Additional infiltration will be provided by the proposed infiltration trenches in the rear yards. These features have not been modelled at this preliminary stage but will enhance water quality and water quantity control.

4.4. UNDERGROUND STORAGE TANKS

In addition to the retention volumes noted in the preceding section, the minor and major system flows from the subject lands will be conveyed to the underground tank.

Quality Control – In addition to capture and infiltration of the 5mm and 27mm events, which effectively reduces a significant percentage (~90%) of the annual surface water runoff (and corresponding sediment load), the proposed tanks will have an OGS unit upstream to ensure sediments are removed prior to infiltration. Furthermore, the tanks are typically equipped with a separator/isolator row which acts as a type of forebay to settle other debris which may enter the tank. This approach (OGS + separator row + retention of frequent flows) will achieve the target 80% TSS removal. Refer to OGS sizing details in **Appendix C**.

Tank	Area	OGS Recommendation
1	2.01 ha @ 70% IMP	EFO10 Stormceptor (or equivalent) – 60% TSS removal

Provided that the isolator row and infiltration media provide at least 40% TSS removal total, the treatment train will achieve 80% removal:

OGS (60%) + 50% x Isolator row + infiltration (minimum 40% required) → 80% removal

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Quantity Control – To simplify the tank design and promote infiltration, a complex outlet structure is not proposed (i.e. to achieve post- to pre-development flow control for each design event). Instead, the tanks have been provided with sufficient storage such that the "overflow" rate to the Dundas Street outfall for each storm event is reduced and also lagged sufficiently to ensure the total flow from the development area (2.01 ha) and existing area to Dundas Street (0.29 ha) does not exceed the existing release rates based on the 0.29 ha area. This approach uses the "overflow" function in Visual OTTHYMO. Refer to **Table 4-2** for details.

The appropriate volume requirements were based on an iterative approach, which primarily targeted control of the 100-year storm. The tank rating curves are based on a conservative infiltration rate of 30mm/hour applied to the bottom area of the tank (455m^2) assumed to be constant for all depths). This results in a relatively small release rate into the ground (~4 L/s). As shown in the following table, the tank begins to discharge to the Dundas Street sewer during events larger than the 10-year event. There is sufficient volume in the tanks to attenuate / lag the peak flows of the inflow hydrographs and ensure that the overflow rates (plus other drainage directed to the outlets) do not exceed the pre-development rates. This concept will be implemented by matching the obvert of the tank with the obvert of the inlet pipe and outlet pipe – the tank must fill up to the maximum volume before the outlet pipe (i.e. overflow to Dundas Street) is engaged.

It is understood that discharge to the Credit River does not require any quantity control. However, to avoid potential impacts to the existing sewer, only the 10-year pre-development flow is assumed to have been accommodated in the existing storm sewer. At detailed design, if it is determined that the Dundas Street sewers or ROW has excess capacity, there is potential to reduce the size of the storage tank and release more flows from the site.

Refer to underground storage tank information and modelling in **Appendix C**. Note that the post-development areas represented in the following tables is based on the Visual OTTHYMO "effective" area, which reflects adjustments made to account for flow-diversions (i.e. infiltration flows that do not arrive at the outfalls). The actual post-development areas have been accurately accounted for in the model.

Refer to the results in **Table 4-3** for further details.

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Table 4-2 – Proposed Underground Tank Performance

Design Event	Outflow Type	Tank to Dundas		
		Discharge (m^3/s)	Volume released (m^3)	Max. Volume Used (m^3)
25mm	Infiltration	0.004	340	299
	Discharge to Dundas	0	0	
2-year	Infiltration	0.004	443	476
	Discharge to Dundas	0	0	
5-year	Infiltration	0.004	449	694
	Discharge to Dundas	0	0	
10-year	Infiltration	0.004	454	890
	Discharge to Dundas	0	0	
25-year	Infiltration	0.004	456	905
	Discharge to Dundas	0.015	139	
50-year	Infiltration	0.004	456	905
	Discharge to Dundas	0.034	265	
100-year	Infiltration	0.004	460	905
	Discharge to Dundas	0.058	377	

Table 4-3 – *Existing* vs Proposed Drainage Outlets and Contributing Areas

Outfall / Area	Model Results	25mm	2-year	5-year	10-year	25-year	50-year	100-year
Dundas	Q (m^3/s)	*0.011*	*0.016*	*0.022*	*0.028*	*0.032*	*0.037*	*0.054*
0.29 ha		**0.011**	**0.016**	**0.022**	**0.028**	**0.032**	**0.037**	**0.054**
	RV (m^3)	*21*	*40*	*58*	*76*	*90*	*105*	*149*
		Effective Area due to DUYHYD (major/minor flow split) (ha)						
2.30 ha		*0.29*	*0.29*	*0.29*	*0.29*	*0.751*	*1*	*1.132*
		21	**40**	**58**	**76**	**229**	**370**	**498**
DICB2	Q (m^3/s)	*0.056*	*0.088*	*0.123*	*0.156*	*0.184*	*0.21*	*0.289*
1.6 ha		**0.008**	**0.016**	**0.025**	**0.035**	**0.065**	**0.094**	**0.165**
	RV (m^3)	*107*	*208*	*303*	*397*	*476*	*553*	*788*
		Effective Area due to DUYHYD (major/minor flow split) (ha)						
1.024 ha		*1.024*	*1.024*	*1.024*	*1.024*	*1.034*	*1.046*	*1.066*
		22	**56**	**92**	**132**	**174**	**219**	**277**
DICB3	Q (m^3/s)	*0.009*	*0.015*	*0.021*	*0.027*	*0.033*	*0.038*	*0.051*
0.45 ha		**0.001**	**0.003**	**0.006**	**0.010**	**0.013**	**0.017**	**0.021**
	RV (m^3)	*19*	*39*	*60*	*81*	*100*	*118*	*175*
		Effective Area due to DUYHYD (major/minor flow split) (ha)						
0.418 ha		0.418	0.418	0.418	0.418	0.418	0.418	0.418
		4	**14**	**27**	**41**	**54**	**67**	**83**
DICB4	Q (m^3/s)	*0.016*	*0.026*	*0.037*	*0.049*	*0.058*	*0.068*	*0.09*
0.84 ha		**0.001**	**0.003**	**0.006**	**0.009**	**0.024**	**0.040**	**0.081**
	RV (m^3)	*33*	*70*	*108*	*147*	*181*	*215*	*320*
		Effective Area due to DUYHYD (major/minor flow split) (ha)						
0.378 ha		0.378	0.378	0.378	0.378	0.385	0.393	0.406
		4	**13**	**24**	**37**	**53**	**71**	**96**
DICB5	Q (m^3/s)	*0.002*	*0.006*	*0.012*	*0.019*	*0.026*	*0.032*	*0.046*
0.8 ha		**0.001**	**0.003**	**0.007**	**0.011**	**0.049**	**0.086**	**0.188**
	RV (m^3)	*8*	*28*	*51*	*78*	*103*	*128*	*178*
		Effective Area due to DUYHYD (major/minor flow split) (ha)						
0.437 ha		0.437	0.437	0.437	0.437	0.453	0.473	0.507
		4	**15**	**28**	**43**	**66**	**95**	**140**
Total to NHS	Q (m^3/s)	*0.094*	*0.151*	*0.215*	*0.279*	*0.333*	*0.385*	*0.53*
3.98 ha		**0.022**	**0.041**	**0.066**	**0.093**	**0.183**	**0.274**	**0.509**
2.396 ha	RV (m^3)	*188*	*385*	*580*	*779*	*950*	*1119*	*1610*
		55	***138***	***230***	***329***	***576***	***821***	***1094***

The modeling results indicate that the target flows at Dundas Street are not exceeded, and that in general, even the runoff volume is decreased to most outlets due to the diversion towards Dundas Street.

There is an increase in total runoff volume to the Dundas Street outlet, which is a typical expectation of developed areas and proposed diversion of frequent flows away from the NHS.

In all other cases, the proposed controlled flows and runoff volumes, with the exception of slight flow exceedances at DICB5 during the 50-year and 100-year storms. However, in total, there is a net reduction of peak flow and runoff volume discharged from the proposed site compared to existing conditions. Based on the preceding results, the SWM underground storage tank has provided sufficient quality, erosion and quantity control volume to accommodate the proposed drainage area and land use, and meets the outlet design objectives of CVC and the City.

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Outfall Design

The outlet from the proposed tank will be a 375mm storm sewer that will connect to the existing CB structure / stub at the north limit of the subject lands along the Dundas Street frontage. This outlet pipe is approximately 200m long and will be located within the NHS buffer. It is understood that this is a preferable encroachment, relative to the original outlet pipes / headwalls proposed within the NHS slope itself.

The proposed major system outfalls to the NHS will be controlled with a level spreader as shown on the grading and drainage plan. The level spreaders have been designed according to the TRCA S.T.E.P. wiki guidance, which indicates that the level spreader should be 1.4m long for every 0.1m^3/s of flow.

The total 100-year less 10-year storm flow is approximately 0.349m^3/s based on the Visual OTTHYMO model (10-year flow discharges to tank and remaining flow stays on the major system and drains to the low points along the NHS buffer). The overland flow outlets along the NHS buffer discharge to DICB2, DICB4, and DICB5. These outlets receive approximately 30%, 20%, and 50% of the major system drainage area, respectively. The major system flow has been divided in these ratios to calculate the preliminary level spreader dimensions as follows:

	DICB 2	DICB 4	DICB 5
Approximate Percentage of Major System Drainage Area	30%	20%	50%
100-year less 10-year flow remaining on surface (0.349m^3/s total at NHYD112)	0.1047	0.0698	0.1745
Number of 0.1m^3/s increments for level spreader sizing	1.047	0.698	1.745
Required length at 1.4m per 0.1m^3/s of flow (rounded up)	15	10	24

The width of the level spreaders will be a minimum of 300mm and the depth will be at least 200mm. A constant elevation will be maintained along the edge of the level spreader and NHS setback boundary to promote sheet flow. The level spreader will take the form of a swale or concrete curb structure such as the example provided in the image below (source: S.T.E.P. / Minnesota Pollution Control Agency).

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5. WASTEWATER SERVICING PLAN

5.1. EXISTING WASTEWATER SERVICING

The Region of Peel's mapping data and record drawings indicates that sanitary sewers are in proximity to the subject property as follows:

- Existing 250 mm diameter local asbestos cement sanitary sewer on Sherwood Forrest Circle flowing easterly towards King Richard's Place where it connects to an existing 375 mm diameter sanitary sewer flowing easterly within an existing easement connected to St. Wyntens Court. The existing 250 mm diameter sanitary sewer within an easement between Lot 91 and Lot 92 along Sherwood Forrest Circle will serve as the outlet for the subject lands.

- Existing 1050 mm diameter trunk CPP sanitary sewer on Dundas Street West flowing northerly towards the Credit River where it connects to an existing 2250 mm diameter trunk CPP sanitary sewer flowing easterly along the Credit River.

5.2. PROPOSED WASTEWATER SERVICING

The proposed development will be serviced by a 200 mm diameter local sanitary sewer within the private roadway (CEC). There is a 250 mm diameter sanitary service connection within an existing easement between Lot 91 and Lot 92 along Sherwood Forrest Circle that will convey drainage from the development to the existing 250 mm diameter local sanitary sewer along Sherwood Forrest Circle where it continues to flow easterly towards the existing 375 mm diameter local sanitary sewer within an easement connected to St. Wyntens Court.

An estimate of the post-development sanitary sewage flows from the site to the downstream sanitary system is based on the site plan provided by the Architect, and has been calculated using the following Region Sanitary Sewer Design Criteria as summarized in **Table 5** below:

Table 5-1 – Sanitary Design Criteria

Parameter	Value
Unit Sewage Flow	290 litres/capita/day
Population Equivalent (Single Detached)	4.2 person/unit
Infiltration Rate	0.26 litres/second/hectare

The estimated post-development sanitary sewage flows for the site based on the sanitary design parameters is 3.7 L/s based on a total population of 236 persons and a maximum peaking factor of 4.0 and an infiltration area of 2.08 hectares. Refer to the Sanitary Design Calculations and Sanitary Sewer Design Sheet in **Appendix D** and **Drawing C303**, "Sanitary Drainage Plan," in **Appendix G** for details. The Region has confirmed that they will permit the proposed flow (3.7 L/s). Refer to **Appendix F** for the Region of Peel Connection Demand Table.

6. WATER SUPPLY AND DISTRIBUTION PLAN

6.1. EXISTING WATER SERVICING

The Region of Peel's watermain infrastructure maps and record drawings indicate that the following services are in the vicinity to the subject lands.

- Existing 400 mm diameter CPP watermain on the north and south side of Dundas Street West
- Existing 150 mm diameter PVC watermain on the west side of Mississauga Road
- Existing 150 mm diameter ductile iron watermain on the east side of Sherwood Forrest Circle

6.2. PROPOSED WATER SERVICING

The proposed 200 mm diameter PVC watermain network will be looped wherever possible and each unit will be provided with individual water service laterals per Region standards. The following connection points will service the development:

- Connection to existing 400 mm diameter CPP watermain on the south side of Dundas Street West
- Connection to existing 150 mm diameter ductile iron watermain on the east side of Sherwood Forrest Circle

The estimated fire flow demand for the development has been calculated using the recommendations of the Fire Underwriters Survey (FUS), 2020. The FUS calculations indicate the recommended maximum fire flow given the size of the building based on the site statistics, the type of building confirmed with the Architect, and proximity to other buildings. The estimated calculated fire flow demand for the development is 150.0 L/s (2,378 USGPM).

The estimated domestic water demand for the site has been calculated in accordance with the Region of Peel's Watermain Design Criteria as follows: residential water demand rate of 280 litres/capita/day, max day factor of 2.0, peak hour factor of 3.0. The estimated domestic water (peak hour) for the site based on the design parameters is 2.3 L/s (36 USGPM) based on an estimated population of 236 persons.

The required maximum fire flow rate plus the estimated domestic water demand flow rate for the site is 152.3 L/s (2,414 USGPM). Two (2) fire hydrant flow tests were undertaken along Sherwood Forrest Circle (HYD 2019562) and Mississauga Road (HYD 2020959) and the fire flow test results at 20 PSI were 162 L/s (2,568 USGPM) and 583 L/s (9,248 USGPM), respectively. The available fire flow (162 L/s, 583 L/s) exceeds the required fire flow (152 L/s). Therefore, the existing watermain along Sherwood Forrest Circle and Dundas Street West is suitable to service this development. Refer to the Water Demand Calculations and Hydrant Flow Test Results in **Appendix E** and **Drawing C103**, "Watermain Servicing Plan," in **Appendix G** for details. Refer to **Appendix F** for the Region of Peel Connection Demand Table.

7. EROSION AND SEDIMENT CONTROL

Rigorous erosion and sediment control measures will be designed, implemented and maintained throughout the construction period. At detailed design, an Erosion and Sediment Control Plan will be prepared in conformance with the City and Conservation Authority guidelines. Erosion and sediment control will be implemented for all construction activities including topsoil stripping, earthworks, foundation excavation and stockpiling of materials and will remain in place and functional until bare surfaces are stabilized.

The following erosion and sediment control measures should be considered for use during construction:

- Natural features will be staked and temporary fencing provided to keep machinery out of sensitive areas;
- Sediment control fence and snow fence will be placed prior to earthworks;
- Logistics/construction plan will be implemented to limit the size of disturbed areas, minimizing the non-essential clearing and grading areas;
- Rock check-dams and cut-off swales will be provided, where required, in order to control, slow down and direct runoff to sediment basins;
- Sediment traps will be provided;
- Gravel mud mats will be installed at construction vehicle access points to minimize off-site tracking of sediments;
- All temporary erosion and sediment control measures will be routinely inspected monitored and repaired during construction. Temporary controls will not be removed until the areas they serve are restored and stable;
- Where underground services are located below the water table, the use of trench collars are recommended to provide barriers to flow to prevent groundwater flow along granular bedding material. This is not expected to be required based on the depth of the groundwater table.

Reference will be made to the *Guidelines for Erosion and Sediment Control for Urban Construction Sites* prepared by the Greater Golden Horseshoe Area Conservation Authorities (2019) when preparing Erosion and Sediment Control Plans.

Refer to **Drawing C401**, “Erosion and Sediment Control Plan”, in **Appendix G** for details.

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8. CONCLUSION

The proposed 1720 Sherwood Forrest Circle development can be adequately serviced through existing municipal infrastructure. In summary:

- Stormwater quantity and quality control will be provided by the proposed underground tank, oil-grit separator, and infiltration trenches.
- Water balance will be achieved through various LID practises, including underground tanks and infiltration trenches.
- Wastewater servicing will be provided by proposed 200 mm diameter PVC sanitary sewers within the private roadway and a proposed 250mm diameter PVC sanitary service connection to the existing 250 mm diameter asbestos cement municipal sanitary sewer on Sherwood Forrest Circle.
- Water servicing for domestic supply and fire protection will be provided by proposed 200 mm PVC watermain within the private roadway with two (2) connection points to the to the existing watermain infrastructure within the public roadways. The first connection is to the existing 400 mm diameter CPP watermain on the east side of Dundas Street West and the second connection is to the existing 150 mm diameter ductile iron watermain on the north side of Sherwood Forrest Circle.

Report Prepared by:

Jordan Strauss, P.Eng., PMP
Project Manager

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APPENDIX A

GEOTECHANICAL AND HYDROGEOLOGICAL REPORTS

Report on
Geotechnical Investigation and Slope Stability Assessment Proposed Buildings 1720 Sherwood Forrest Circle Mississauga, Ontario

Prepared For:

Argo Development Corporation

Project No: 23-162-102
Date: July 24, 2023

DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Table of Contents

1. INTRODUCTION

DS Consultants Ltd. (DS) was retained by Argo Development Corporation (the client) to undertake a geotechnical investigation and slope stability assessment for the proposed development, located at 1720 Sherwood Forrest Circle in Mississauga, Ontario.

It is understood that the project will consist of low-rise to mid-rise buildings with one level of basement.

The client has provided us with a report entitled "Geotechnical Investigation and Slope Stability Assessment, Proposed Carmel Heights Seniors Development, 1720 Sherwood Forest Circle, Mississauga, Ontario", prepared by Terraprobe Inc., File No. 1-17-0362-01, dated November 23, 2017. In the report by Terraprobe, a total of 17 boreholes (No. 1 to 17) were drilled in 2017 to depths ranging from 8.1 to 15.7 m. The location plan and logs of the boreholes by Terraprobe are attached in **Appendix A**.

In 2023, DS drilled 4 additional boreholes (BH23-100 to BH23-103) at the site for the geotechnical investigation and slope stability assessment.

The purpose of this investigation was to determine the subsurface conditions at the borehole locations and from the findings in the boreholes make engineering recommendations for the following:

1. Foundations
2. Floor slab and permanent drainage
3. Earth Pressures
4. Earthquake considerations
5. Excavations, backfill and groundwater control
6. Pavements
7. Slope stability assessment

This geotechnical investigation and slope stability assessment report deals with the geotechnical and slope stability aspects of the site only. Environmental and hydrogeological investigations are beyond the scope of work of this investigation.

This report is provided on the basis of the terms of reference presented above and, on the assumption, that the design will be in accordance with the applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning the geotechnical aspects of the codes and standards, this office should be

contacted to review the design. It may then be necessary to carry out additional borings and reporting before the recommendations of this office can be relied upon.

The site investigation and recommendations follow generally accepted practice for geotechnical consultants in Ontario. The format and contents are guided by client specific needs and economics and do not conform to generalized standards for services. Laboratory testing for most part follows ASTM or CSA Standards or modifications of these standards that have become standard practice.

This report has been prepared for Argo Development Corporation and its designers. Third party use of this report without DS Consultants Ltd. (DS) consent is prohibited.

2. FIELD AND LABORATORY WORK

Four (4) boreholes (BH23-100 to BH23-103) were drilled by DS at the site to depths ranging from 6.7 to 15.8 m. The boreholes were drilled with solid stem continuous flight auger equipment by drilling sub-contractors under the direction and supervision of DS personnel. Samples were retrieved at regular intervals with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and returned to the DS laboratory for detailed examination by the project engineer and for laboratory testing.

As well as visual examination in the laboratory, all soil samples for the boreholes drilled by DS were tested for moisture contents. Grain size analyses and Atterberg Limits tests were conducted on selected soil samples and the results are presented in **Drawings 6 to 7.**

Groundwater level observations were made during drilling and in the open boreholes at the completion of the drilling operations. Two (2) boreholes (BH23-101 and BH23-102) were equipped with 50mm dia. monitoring wells for the long-term groundwater level monitoring.

The surface elevations at the borehole locations were surveyed by DS staff using differential GPS system. It should be noted that the elevations at the as-drilled borehole locations were not provided by a professional surveyor and should be considered approximate. Contractors performing any work referenced to the borehole elevations should confirm the borehole elevations for their work.

3. SOIL AND GROUNDWATER CONDITIONS

The locations of the boreholes (BH23-100 to BH23-103) by DS are shown on **Drawing 1**. Notes on sample description are presented on **Drawing 1B**. The subsurface conditions encountered in boreholes are presented in the individual borehole logs (**Drawing 2** to **5**). The results of grain size

analyses are presented in **Drawing 6** and on the borehole logs**.** The results of Atterberg Limits tests are presented in **Drawing 7** and on the borehole logs**.**

The location plan and logs of the previous boreholes (No. 1 to 17) by Terraprobe are attached in **Appendix A**.

3.1 Soil Conditions

In the boreholes, fill materials with asphalt pavement or topsoil at surface were found. The native soils below the fill consisted of cohesionless deposits and clayey silt to silty clay till deposits.

The subsurface conditions encountered in boreholes are summarized in the following paragraphs.

Asphalt Pavement and Topsoil:

A pavement structure consisting of 65 to 140 mm asphalt overlying granular base was encountered in BH23-100 by DS and in Boreholes 2, 6 and 8 by Terraprobe.

A surficial layer of topsoil of 50mm to 390 mm thick was found in all other boreholes, as shown in the borehole logs. It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative for the site and should not be relied on to calculate the amount of topsoil at the site.

Fill Materials:

Below the pavement structure and topsoil, fill materials were found in all boreholes, extending to depths ranging from 1.0 to 2.5 m. The fill materials consisted of very loose to compact sand/silty sand to sandy silt and soft to very stiff clayey silt, with inclusions of topsoil and organics. The SPT 'N' values measured in the fill materials ranged from 3 to 18 blows per 300 mm penetration.

Cohesionless Deposits (Gravelly sand, Sand and Gravel, Sand and Silt to Sandy Silt):

Below the fill materials, cohesionless deposits of gravelly sand to sand and gravel, with some layers of sand and silt to sandy silt, were encountered in all boreholes, extending to depths ranging from 4.6 to 9.7 m. In Boreholes 7, 15 and 17 by Terraprobe, the cohesionless deposits extended to the explored depth of 8.2 m.

These cohesionless deposits were found in compact to very dense state (typically dense to very dense), with measured SPT 'N' values ranging from 14 to more than 50 blows per 300 mm penetration. Some cohesionless deposits were found to be wet to saturated and below groundwater table.

Grain size analyses of two gravelly sand to sand and gravel samples samples (BH23-100/SS3 and BH23-103/SS5) were conducted by DS and the results are presented in **Drawing 6** and on the borehole logs, with the following fractions:

Clay: 3%
Silt: 11%
Sand: 42 to 45%
Gravel: 41 to 44%

Grain size analyses of selected cohesionless soil samples were also conducted by Terraprobe and the results are presented on the borehole logs in **Appendix A**.

Clayey Silt to Silty Clay Till:

Below the cohesionless deposits, clayey silt to silty clay till deposits were encountered in all boreholes, except for Boreholes 7, 15 and 17 by Terraprobe. The clayey silt to silty clay till deposits were found below depths ranging from 4.6 to 9.7 m, extending to the maximum explored borehole depth of 15.8 m.

The clayey silt to silty clay till deposits were found to have a very stiff to hard consistency (typically hard), with measured SPT 'N' values ranging from 17 to more than 50 blows per 300 mm penetration.

Grain size analyses of two clayey silt to silty clay till samples (BH23-100/SS7 and BH23-101/SS7) were conducted by DS and the results are presented in **Drawing 6** and on the borehole logs, with the following fractions:

Clay: 18 to 25%
Silt: 43 to 49%
Sand: 25 to 27%
Gravel: 6 to 7%

Atterberg Limits tests of two clayey silt to silty clay till samples (BH23-100/SS7 and BH23-101/SS7) were conducted by DS and the results are presented in **Drawing 7** and on the borehole logs.

Grain size analyses and Atterberg Limits tests of selected clayey silt samples were also conducted by Terraprobe and the results are presented on the borehole logs in **Appendix A**.

3.2 Groundwater Conditions

The groundwater levels measured in the monitoring wells in the boreholes are shown in the borehole logs and are summarized on **Table 3.2** below. Short-term (not stabilized) groundwater levels observed during the drilling operations in the boreholes without monitoring wells are also listed on **Table 3.2** below.

Table 3.2: Summary of Groundwater Levels

Borehole No.	Ground Surface Elev. (m)	Borehole Depth (m)	Groundwater Depth/Elev. in monitoring Wells (m)	Short-term Groundwater Depth during Drilling (m)	Borehole Location Note
DS Boreholes:					
BH23-100	115.6	6.7	--	Dry	Near slope
BH23-101	116.3	15.8	15.0 /101.3		Near slope
BH23-102	116.0	15.8	Dry		Near slope
BH23-103	116.1	9.7	--	5.5	
Terraprobe Boreholes:					
1	116.2	15.5	13.3 /102.9		Near slope
2	116.2	15.7	--	Dry	Near slope
3	115.8	15.5	14.8 /101.0		Near slope
4	116.1	15.5	--	7.6	Near slope
5	116.1	15.5	12.9 /103.2		Near slope
6	116.2	8.2	--	5.0	
7	115.9	8.2	7.1 /108.8		
8	116.3	15.7	14.2 /102.1		Near slope
9	116.2	8.2	5.8 /110.4		
10	116.3	8.2	--	Dry	Near slope
11	116.1	8.2	5.5 /110.6		
12	116.4	8.2	6.4 /110.0		
13	116.0	8.2	7.0 /109.0		Near slope
14	115.8	8.2	Dry		
15	116.0	8.2	--	7.0	
16	115.9	8.1	--	Dry	
17	115.8	8.2	--	6.4	

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

4. GEOTECHNICAL DISCUSSION AND RECOMMENDATIONS

Based on the borehole information, geotechnical discussion and recommendations for the proposed development are presented as follows. In this report, the soil and groundwater conditions are interpreted as relevant to the design and construction of the proposed buildings. Comments relating to construction are intended for the guidance of the design engineer to establish constructability.

The construction methods described in this report must not be considered as being specifications or direct recommendations to the contractors, or as being the only suitable methods. Prospective contractors should evaluate all of the factual information, obtain additional subsurface information as they might deem necessary and should select their construction methods, sequencing and equipment based on their own experience in similar ground conditions. The readers of this report are also reminded that the conditions are known only at the borehole locations and conditions may vary significantly in-between.

4.1 Foundations

It is understood that the project will consist of low-rise to mid-rise buildings with one level of basement. It is assumed that the basement floor slab will be about 3 m below the existing ground. Footings will be within 1 to 2 m below the basement floor.

Based on the borehole information, the proposed buildings with one level of basement can be supported by spread and strip footings founded on the undisturbed native soils at the anticipated founding levels for a bearing capacity of 350 kPa at SLS (serviceability limit states), and for a factored geotechnical resistance of 525 kPa at ULS (ultimate limit states).

Footings designed to the specified bearing capacity at the serviceability limit states (SLS) are expected to settle less than 25 mm total and 19 mm differential.

In the vicinity of the existing buried utilities, all footings must be lowered to undisturbed native soils, or alternatively the services must be structurally bridged.

New footings close to any existing structures must match the existing footing base level. If adjacent existing footings are higher than the proposed new footings, underpinning of the existing footings may be required.

All footing bases must be inspected by this office prior to pouring concrete to confirm the beating capacity of the founding soils.

The excavated footing bases must be covered with 50 mm thick mud slab immediately after inspection and cleaning, in order to avoid disturbance of the founding soil due to water and construction activity.

All footings exposed to seasonal freezing conditions must have at least 1.2 m of soil cover for frost protection.

Where it is necessary to place footings at different levels, the upper footing must be founded below an imaginary 10 horizontal to 7 vertical line drawn up from the base of the lower footing. The lower footing must be installed first to help minimize the risk of undermining the upper footing.

It should be noted that the recommended bearing capacities have been calculated by DS from the borehole information for the design stage only. The investigation and comments are necessarily on-going as new information of the underground conditions becomes available. For example, more specific information is available with respect to conditions between boreholes when foundation construction is underway. The interpretation between boreholes and the recommendations of this report must therefore be checked through field inspections provided by DS to validate the information for use during the construction stage.

4.2 Floor Slab and Permanent Drainage

With one level of basement, the floor slab can be supported on grade provided all fill and disturbed native soils are removed and the base thoroughly proof rolled. The backfill required to raise the grade can consist of inorganic soil, placed in shallow lifts and compacted to 98 percent of Standard Proctor Maximum Dry Density (SPMDD).

A moisture break consisting of at least 200 mm of 19 mm clear crushed stone should be installed under the floor slab.

Underfloor drainage system and perimeter drainage system around the exterior basement walls will be required. The perimeter drainage system shown on **Drawing 8** is recommended for the basement walls where open cut procedures are used.

4.3 Earth Pressures

The lateral earth pressures acting on basement walls and retaining structures may be calculated from the following expression:

$$p = K(\gamma h + q)$$

where p	=	Lateral earth pressure in kPa acting at depth h
K	=	Earth pressure coefficient equal to 0.40 for vertical walls and horizontal backfill used for permanent construction
γ	=	Unit weight of backfill, a value of 21.0 kN/m^3 may be assumed
H	=	Depth to point of interest in metres
Q	=	Equivalent value of surcharge on the ground surface in kPa

The above expression assumes that the perimeter drainage system prevents the buildup of any hydrostatic pressure behind the wall.

4.4 Earthquake Considerations

Based on the borehole information and according to Table 4.1.8.4.A of OBC 2012, the subject site for the proposed buildings can be classified as 'Class C' for seismic site response.

4.5 Excavation, Backfill and Groundwater Control

It is understood that the proposed buildings will include one level of basement or parking levels below ground. It is assumed that excavations to underside of footings will continue to a depth of 4 to 5 m below the existing ground. Sumps and elevator pits may require localized excavations to continue approximately one metre deeper.

Excavations can be carried out with heavy hydraulic backhoe. No major problems with groundwater are anticipated for excavations above groundwater and to a depth of 4 to 5 m. It is expected that any seepage, which occurs during wet periods, can be removed by pumping from sumps for excavations above groundwater.

Groundwater was found in some boreholes at depths of 5 to 7 m or deeper. Positive dewatering will be required for any excavation (if any) below groundwater. Otherwise, it will result in an unstable base and flowing sides. The groundwater table must be lowered to at least 1.0 m below the excavation base.

It should be noted that the till is a non-sorted sediment and therefore may contain boulders. Possible large obstructions such as buried concrete pieces are also anticipated in the fill material. Provisions must be made in the excavation contract for the removal of possible boulders in the till or obstructions in the fill material.

All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the fill and cohesionless deposits (gravelly sand, sand and gravel, sand and silt to sandy silt) can be classified as Type 3 Soil above groundwater table and Type 4 Soil below groundwater table. Very stiff to hard clayey silt to silty clay deposits can be classified as Type 3 Soil above groundwater table and Type 4 Soil below groundwater table.

The select inorganic fill and native soils free from topsoil and organics can be used as general construction backfill where it can be compacted with sheep's foot type compactors. Loose lifts of soil, which are to be compacted, should not exceed 200 mm.

Depending on the time of construction and weather, some excavated material may be too wet to compact and will require aeration prior to its use.

Imported granular fill, which can be compacted with hand-held equipment, should be used in confined areas.

Underfloor fill should be compacted to at least 98 percent of Standard Proctor Maximum Dry Density (SPMDD).

The excavated soils are not considered to be free draining. Where free draining backfill is required, imported granular fill such as OPSS Granular B should be used.

It should be noted that the excavated soils are subject to moisture content increase during wet weather which would make these materials too wet for adequate compaction. Stockpiles should be compacted at the surface or be covered with tarpaulins to minimize moisture uptake.

4.6 Pavements

The recommended pavement structures provided in **Table 4.6** are based upon an estimate of the subgrade soil properties determined from visual examination and textural classification of the soil samples. The values may need to be adjusted based on the city /regional standards. Consequently, the recommended pavement structures should be considered for preliminary design purposes only. A functional design life of eight to ten years has been used to establish the pavement recommendations. This represents the number of years to the first rehabilitation, assuming regular maintenance is carried out. If required, a more refined pavement structure design can be performed based on specific traffic data and design life requirements and will involve specific laboratory tests to determine frost susceptibility and strength characteristics of the subgrade soils, as well as specific data input from the client.

Table 4.6: Recommended Pavement Structure Thickness

Pavement Layer	Compaction Requirements	Light Duty Parking (Cars)	Heavy Duty Parking (Delivery Trucks)
Asphaltic Concrete	Min. 92% of Maximum Relative Density (MRD)	40 mm HL 3 or SP 12.5 40 mm HL 8 or SP 19.0	40 mm HL 3 or SP 12.5 80 mm HL 8 or SP 19.0
OPSS Granular A Base (or 20mm Crusher Run Limestone)	100% SPMDD*	150 mm	150 mm
OPSS Granular B (or 50mm Crusher Run Limestone)	100% SPMDD	250 mm	350 mm

* Denotes Standard Proctor Maximum Dry Density, ASTM-D698
The subgrade must be compacted to 98% SPMDD for at least the upper 500 mm unless accepted by DS Consultants Ltd.

The long-term performance of the pavement structure is highly dependent upon the subgrade support conditions. Stringent construction control procedures should be maintained to ensure

uniform subgrade moisture and density conditions are achieved. In addition, the need for adequate drainage cannot be over-emphasized. The finished pavement surface and underlying subgrade should be free of depressions and should be sloped (preferably at a minimum grade of two percent) to provide effective surface drainage toward catch basins. Surface water should not be allowed to pond adjacent to the outside edges of pavement areas. Subdrains should be installed to intercept excess subsurface moisture and prevent subgrade softening. This is particularly important in heavy-duty pavement areas.

Additional comments on the construction of parking areas and access roadways are as follows:

1) As part of the subgrade preparation, proposed parking areas and access roadways should be stripped of topsoil and other obvious objectionable material. Fill required to raise the grades to design elevations should conform to backfill requirements outlined in previous sections of this report. The subgrade should be properly shaped, crowned then proof-rolled in the full time presence of a representative of this office. Soft or spongy subgrade areas should be sub-excavated and properly replaced with suitable approved backfill compacted to 98% SPMDD.

2) The locations and extent of sub-drainage required within the paved areas should be reviewed by this office in conjunction with the proposed lot grading. Assuming that satisfactory crossfalls in the order of two percent have been provided, subdrains extending from and between catch basins may be satisfactory. In the event that shallower crossfalls are considered, a more extensive system of sub-drainage may be necessary and should be reviewed by DS Consultants Ltd.

3) The most severe loading conditions on light-duty pavement areas and the subgrade may occur during construction. Consequently, special provisions such as restricted access lanes, half-loads during paving, etc., may be required, especially if construction is carried out during unfavourable weather.

4) It is recommended that DS Consultants Ltd. be retained to review the final pavement structure designs and drainage plans prior to construction to ensure that they are consistent with the recommendations of this report.

5. SLOPE STABILITY ASSESSMENTS

This section presents stability assessments of the slopes at the site to determine the locations of the long-term stable top of slope (LTSTOS) line, as required by Credit Valley Conservation (CVC). The top of bank had been staked out by CVC on August 3, 2018, as shown **on Drawing 1**.

5.1 Site and Slope Conditions

A site visit was made on July 11, 2023 by a senior geotechnical engineer from DS Consultants Ltd. (DS). Selected photographs (Photos B1 to B20) taken during our site visit are presented in **Appendix B**. A Google Image showing the slope site and surrounding areas is also presented in **Appendix B**.

A total of 11 slope profiles (X1-X1 to X11-X11) were derived from the topographic map (**Drawing 1**) provided by the client. The locations of the slope profiles are shown on **Drawing 1**. The slope profiles are presented on **Drawings 9 to 19**.

For the convenience of discussion, it is assumed that Mississauga Road near the site is in the south-north alignment, and Dundas Street is in the east-west alignment.

Based on our site observations, the site and slope conditions are described as follows:

- The subject slopes are located at the southwest corner of Mississauga Road and Dundas Street.
- The major slope of approximately 10 to 17 m in height is along the west side of Mississauga Road. There is also a slope along the south side of Dundas Street, which is up to 10 m in height.
- The steepness of the slopes ranged from 1.4H:1V (at Cross-Section X7-X7) to flatter than 2.0H:1V.
- The slopes were covered with trees, grasses and other vegetation (see Photos in **Appendix B**), and were generally well protected from surface erosion. No seepage from the slope surface was found during the site visit. No evidence of slope failures was observed during our site visit.
- The toes of the slopes were along Mississauga Road and Dundas Street. The slope toe areas were well covered with grass and other vegetation and were well protected from erosions.
- There are no creek/watercourses within 15 m from the toe of the slopes. Credit River is located far away to the northeast side of Mississauga Road and is more than 80 m away from the toe of the subject slopes.

5.2 Soil Parameters for Slope Stability Analyses

Based on the borehole information and site observations, soil parameters used in the slope stability analyses are given on **Table 5.2**.

Table 5.2: Soil Parameters for Long-term Slope Stability Analyses

Soil Type	Unit Weight (kN/m^3)	Cohesion c' (kPa)	Friction Angle ϕ' (degree)
Slope surface layer	19.5	10	29
Fill material	19.5	1	29
Gravelly sand to sand & gravel	21	0	36
Clayey silt to silty clay till	21.5	9	32

To take into consideration the vegetation and tree roots on the slopes and to prevent shallow surficial failures in the analyses, a soil layer of up to 0.5 m thick along the slope surface is assumed to have a cohesion value of 10 kPa.

5.3 Erosion Considerations

As indicated in Section 5.2 above, the toes of the slopes were along Mississauga Road and Dundas Street. The slope toe areas were well covered with grass and other vegetation and were well protected from erosions. There are no creek/watercourses within 15 m from the toes of the slopes. Credit River is located far away to the northeast side of Mississauga Road and is more than 80 m away from the toe of the subject slopes.

In accordance with the Provincial Guidelines entitled "Understanding Natural Hazards" and according to the soil and creek conditions, no erosion allowance at the toes of the slopes should be required for the setback of the long-term stable slopes.

5.4 Stability Analyses of Existing Slopes

Eleven (11) slope profiles of the existing slopes at Cross-Sections X1-X1 through X11-X11 (see **Drawing 1** for locations) were derived from the topographic map (**Drawing 1**), as shown on **Drawings 9** to **19.**

The slope at Cross-Section X7-X7 is steep (1.4H:1V) and the slope at Cross-Section X10-X10 is relatively flatter (2H:1V). Long-term stability analyses of the existing slopes at the critical/typical Cross-Sections X7-X7 and X10-X10 have been carried out with the computer program SLIDE (Version 2018) using the Morgenstern-Price, Spencer, Bishop and Janbu methods. The analysis results are presented in **Drawings 20 and 21**.

The calculated factor of safety (FS) of the existing slope (1.4H:1V) at Cross-Section X7-X7 is FS=1.18 (see **Drawing 20**), which is less than the minimum acceptable value of 1.5. Therefore, the existing

slope (1.4H:1V) at Cross-Section X7-X7 is considered not stable in terms of long-term stability based on CVC's requirements.

The calculated factor of safety (FS) of the existing slope (2.0H:1V) at Cross-Section X10-X10 is FS=1.662 (see **Drawing 21**), which is greater than the minimum acceptable value of 1.5. Therefore, the existing slope (2.0H:1V) at Cross-Section X10-X10 is considered stable in terms of long-term stability based on CVC's requirements.

5.5 Stability Analyses of Long-term Stable Slope

Based on the slope stability analysis results presented above, the existing slope (1.4H:1V) at Cross-Section X7-X7 is considered not stable in terms of long-term stability based on CVC's requirements.

In order to determine the long-term stable slope at the site, stability analysis of the modified 1.8H:1V slope at Cross-Section X7-X7, has been carried out. The results are presented on **Drawing 22**. The calculated factor of safety of the 1.8H:1V slope on **Drawing 22** is FS=1.563, which is greater than the minimum acceptable value of 1.5. The 1.8H:1V slope shown on **Drawing 22** is considered stable in terms of long-term stability.

Based on the slope stability analysis results, it can be concluded that a slope of 1.8H:1V is stable in terms of long-term stability.

Accordingly, the long-term stable slopes at Cross-Section X1-X1 through Cross-Section X11-X11 are presented on **Drawing 9** through **Drawing 19**, respectively.

5.6 Long-term Stable Top of Slope (LTSTOS)

Credit Valley Conservation (CVC) had staked out the top of slope on August 3, 2018, as shown on **Drawing 1**.

Based on the slope stability analysis results presented above, the long-term stable slopes at Cross-Section X1-X1 through Cross-Section X11-X11 are presented on **Drawing 9** through **Drawing 19**. The points representing the long-term stable top of slope (LTSTOS) at the Cross-Sections are determined using the following criteria:

- If the stable top of slope determined in the slope stability analysis in this study is further away from the toe of the slope than the staked top of slope by CVC, then the stable top of slope determined in the slope stability analysis in this study is considered as the long-term stable top of slope (LTSTOS), such as at Cross-Sections X3-X3 to X5-X5, X7-X7 and X11.
- If the stable top of slope determined in the slope stability analysis in this study is the same as or closer to the toe of the slope than the staked top of slope by CVC, then the staked top of slope by CVC is considered as the long-term stable top of slope (LTSTOS), such as at Cross-Sections X1-X1, X2-X2, X6-X6, and X8-X8 to X10-X10.

Accordingly, the points representing the long-term stable top of slope (LTSTOS) at the Cross-Sections are as follows.

- Point 'S1' on **Drawing 9** represents the long-term stable top of slope at Cross-Section X1-X1
- Point 'S2' on **Drawing 10** represents the long-term stable top of slope at Cross-Section X2-X2
- Point 'S3' on **Drawing 11** represents the long-term stable top of slope at Cross-Section X3-X3
- Point 'S4' on **Drawing 12** represents the long-term stable top of slope at Cross-Section X4-X4
- Point 'S5' on **Drawing 13** represents the long-term stable top of slope at Cross-Section X5-X5
- Point 'S6' on **Drawing 14** represents the long-term stable top of slope at Cross-Section X6-X6
- Point 'S7' on **Drawing 15** represents the long-term stable top of slope at Cross-Section X7-X7
- Point 'S8' on **Drawing 16** represents the long-term stable top of slope at Cross-Section X8-X8
- Point 'S9' on **Drawing 17** represents the long-term stable top of slope at Cross-Section X9-X9
- Point 'S10' on **Drawing 18** represents the long-term stable top of slope at Cross-Section X10-X10
- Point 'S11' on **Drawing 19** represents the long-term stable top of slope at Cross-Section X11-X11

Based on the long-term stable top of slope at Cross-Sections X1-X1 to X11-X11, and our field observations, the recommended long-term stable top of slope line (Line S0-S1-S2-S3-S4-S5-S6-S7-S8-S9-S10-S11-S12) is shown on **Drawing 1**.

This long-term stable top of slope (LTSTOS) line must be reviewed by Credit Valley Conservation (CVC) for their approval.

6. GENERAL COMMENTS AND LIMITATIONS OF REPORT

DS Consultants Ltd. (DS) should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, DS will assume no responsibility for interpretation of the recommendations in the report.

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to DS at the time of preparation. Unless otherwise agreed in writing by DS, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The sub-surface conditions are interpreted as relevant to the design and construction of the proposed sanitary sewer. Comments relating to construction are intended for the guidance of the design engineer to establish constructability and must not be considered as being specifications or recommendations to the prospective contractors, or as being the only suitable methods. Prospective contractors should evaluate all of the factual information, obtain additional subsurface information as they might deem necessary and should select their construction methods, sequencing and equipment based on their own experience in similar ground conditions. The readers of this report are also reminded that the conditions are known only at the borehole locations and in view of the generally wide spacing of the boreholes, conditions may vary significantly between boreholes.

The conclusions and recommendations given in this report are based on information determined at the test hole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the test holes may differ from those encountered at the test hole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the test hole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. DS accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

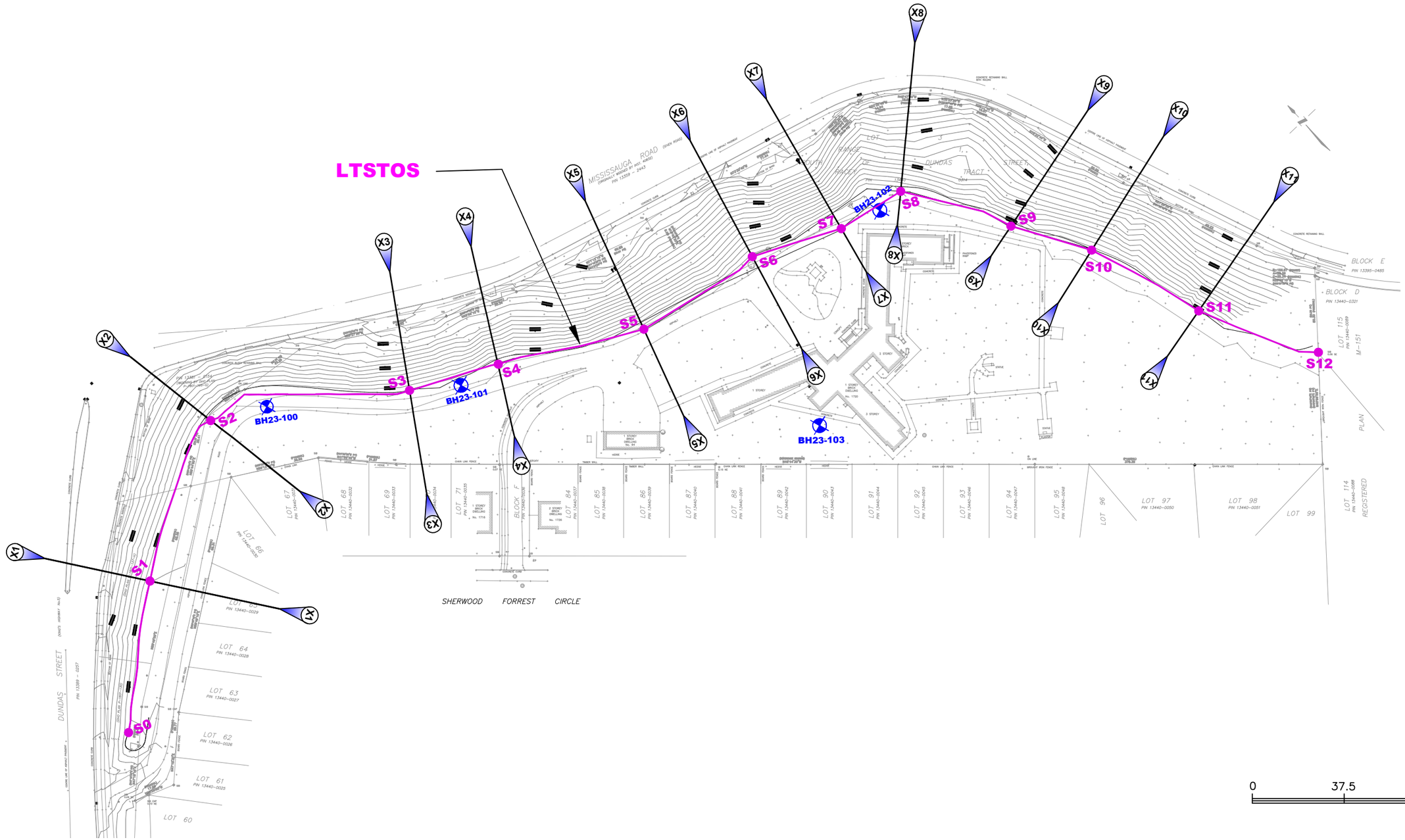
We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

DS CONSULTANTS LTD

Alka Sangar, M.Eng., P.Eng.

Fanyu Zhu, Ph.D., P.Eng.

Drawings



S0 - S1 - S2 - S3 - S4 - S5 - S6 - S7 - S8 - S9 - S10 - S11 - S12 Long-Term Stable Top of Slope Line (LTSTOS Line)

Borehole Location

Path:----

DS CONSULTANTS LTD.
6221 Highway 7, UNIT 16
Vaughan, Ontario L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project: SLOPE STABILITY ASSESSMENT
1720 Sherwood Forest Circle, Mississauga, ON

Title: **SLOPE AND BOREHOLE LOCATION PLAN**

Client: ARGO DEVELOPMENT CORP.

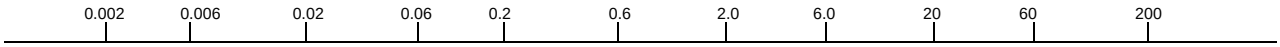
Size:	Approved By:	Drawn By:	Date:
11 X 17	A.S	S.Y	July 2023
Rev.	Scale: As Shown	Project No: 23-162-102	Drawing No. 1

Drawing 1A: Notes on Soil Sample Descriptions

1. All sample descriptions included in this report generally follow the Unified Soil Classification. Laboratory grain size analyses provided by DS also follow the same system. Different classification systems may be used by others, such as the system by the International Society for Soil Mechanics and Foundation Engineering (ISSMFE). Please note that, with the exception of those samples where a grain size analysis and/or Atterberg Limits testing have been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.

ISSMFE SOIL CLASSIFICATION

CLAY	SILT			SAND			GRAVEL			COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE		



EQUIVALENT GRAIN DIAMETER IN MILLIMETRES

CLAY (PLASTIC) TO	FINE	MEDIUM	CRS.	FINE	COARSE
SILT (NONPLASTIC)	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

2. Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional preliminary geotechnical site investigation.

3. Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

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LOG OF BOREHOLE BH23-100

PROJECT: Geotechnical Investigation
CLIENT: Argo Development Corporation
PROJECT LOCATION: 1720 Sherwood Forest Circle, Mississauga
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4821882.62 E 608347.11

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jun-20-2023

REF. NO.: 23-162-102
ENCL NO.: 2

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
115.6												
115.4 / 0.2	**ASPHALT:** 100mm **GRANULAR BASE:** sand and gravel, 100mm **FILL:** sandy silt, trace rootlets, trace organics, brown, moist, compact		1	SS	10		115					
114.6 / 1.0	**GRAVELLY SAND TO SAND AND GRAVEL:** some silt, trace clay, brown, moist, dense		2	SS	31		114					
			3	SS	37							41 45 11 3
			4	SS	39		113					
			6	SS	35		112					
			6	SS	31		111					
109.5 / 6.1	**SILTY CLAY TILL:** sandy, trace gravel, trace cobbles, grey, moist, hard		7	SS	46		110					7 25 43 25
108.9 / 6.7	**END OF BOREHOLE:** Notes: 1) Borehole was dry upon completion.						109					

DS SOIL LOG-2021-FINAL 23-162-102GEO.GPJ DS.GDT 23-7-11

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

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LOG OF BOREHOLE BH23-101

PROJECT: Geotechnical Investigation
CLIENT: Argo Development Corporation
PROJECT LOCATION: 1720 Sherwood Forest Circle, Mississauga
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4821830.09 E 608414.17

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jun-20-2023

REF. NO.: 23-162-102
ENCL NO.: 3

ELEV / DEPTH (m)	DESCRIPTION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION
116.3 / 0.0	**TOPSOIL:** 150mm				
116.1 / 0.2	**FILL:** sandy silt, trace organics, trace rootlets, some clay, reddish brown, moist, loose	1	SS	4	116
		2	SS	4	
114.8 / 1.5	**SAND AND GRAVEL:** some silt, trace clay, brown, moist, dense	3	SS	34	115
		4	SS	30	114
		5	SS	44	113
		6	SS	34	112
110.2 / 6.1	**CLAYEY SILT TO SILTY CLAY TILL:** sandy, trace gravel, trace cobbles/boulders, grey, moist, very stiff to hard	7	SS	27	111
		8	SS	50	110
		9	SS	83	109
		10	SS	50/ 25 mm	108
		11	SS	50/ 130 mm	107
		12	SS	50	106
		13	SS	89	105
100.5 / 15.8	**END OF BOREHOLE:**				104
	Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water Level(mbgl): June 29, 2023 dry July 10, 2023 15.01				103
					102

W. L. 101.3 m
Jul 10, 2023

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)

GR	SA	SI	CL
6	27	49	18

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 23-162-102GEO.GPJ DS.GDT 23-7-11

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LOG OF BOREHOLE BH23-102

PROJECT: Geotechnical Investigation
CLIENT: Argo Development Corporation
PROJECT LOCATION: 1720 Sherwood Forest Circle, Mississauga
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4821777.34 E 608581.35

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jun-21-2023

REF. NO.: 23-162-102
ENCL NO.: 4

(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
116.0												
116.0	**TOPSOIL:** 300mm											
115.7 0.3	**FILL:** sandy silt, trace organics, trace rootlets, reddish brown, moist, loose to compact		1	SS	17							
1			2	SS	4		115					
114.5 1.5	**SAND AND GRAVEL:** some silt, trace clay, brown, moist, compact to very dense		3	SS	18							
2			4	SS	50/ 100mm		114					
3			5	SS	35		113					
4							112					
5			6	SS	45		111					
6			7	SS	50/ 50mm		110					
7							109					
108.4 7.6	**CLAYEY SILT TO SILTY CLAY TILL:** sandy, trace gravel, cobbles/boulders, grey, moist, hard		8	SS	39		108					
8												
9			9	SS	63		107					
10							106					
11			10	SS	87		105					
12			11	SS	72		104					
13							103					
14			12	SS	68		102					
15							101					
100.2	silty sand at 15.3m		13	SS	84							
15.8	**END OF BOREHOLE:** Notes: 1) 50mm dia. monitoring well installed upon completion. 2) Water Level Readings: Date: Water level(mbgl): June 29, 2023 dry July 10, 2023 dry											

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 23-162-102GEO.GPJ DS.GDT 23-7-11

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LOG OF BOREHOLE BH23-103

PROJECT: Geotechnical Investigation
CLIENT: Argo Development Corporation
PROJECT LOCATION: 1720 Sherwood Forest Circle, Mississauga
DATUM: Geodetic
BH LOCATION: See Drawing 1 N 4821726.2 E 608503.5

DRILLING DATA
Method: Solid Stem Augers
Diameter: 150 mm
Date: Jun-20-2023

REF. NO.: 23-162-102
ENCL NO.: 5

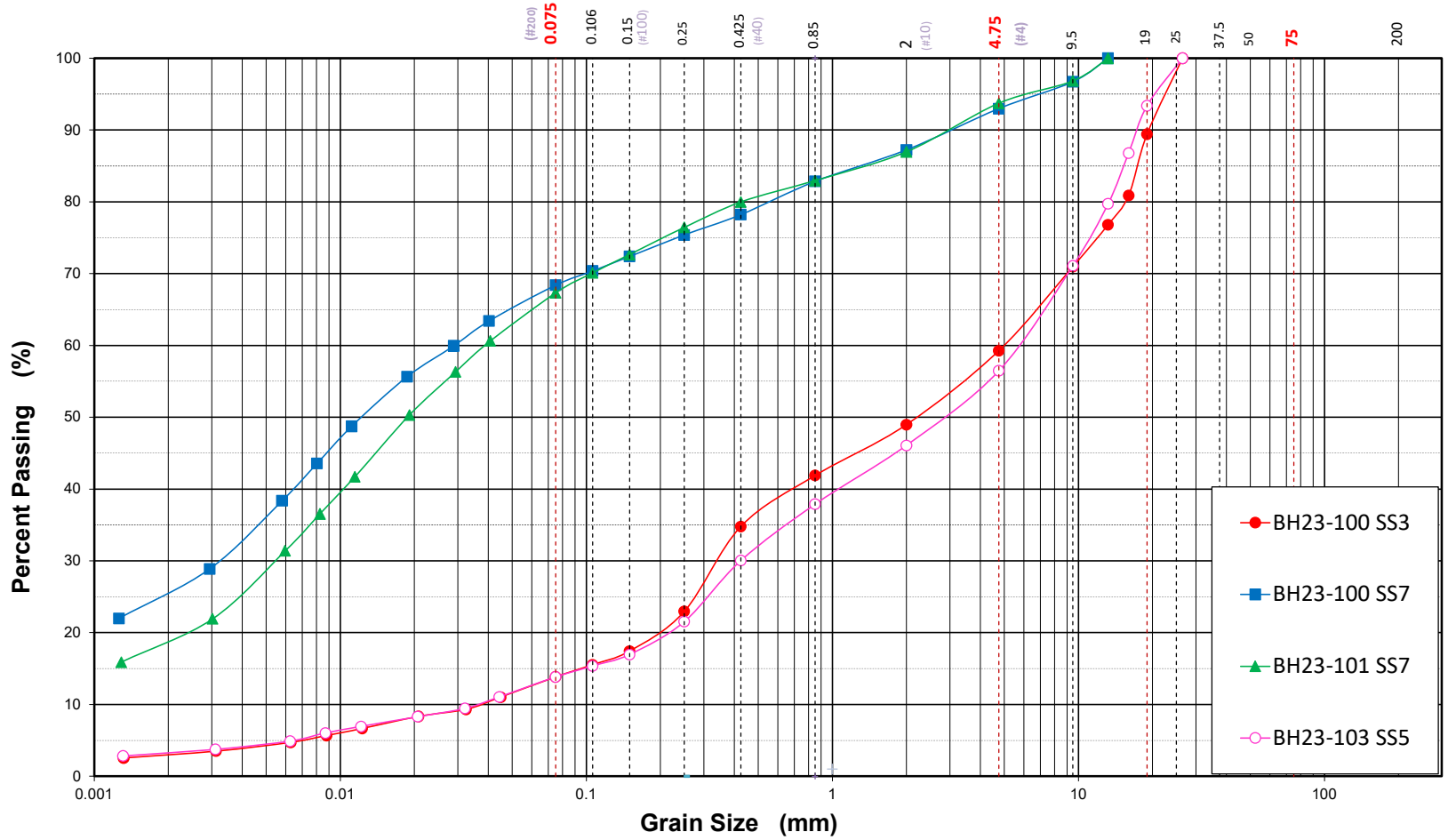
(m) ELEV / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
116.1							116					
116.0	**TOPSOIL:** 180mm											
0.2	**FILL:** sandy silt, trace rootlets, reddish brown, moist, compact		1	SS	10							
115.3							115					
0.8	**FILL:** clayey silt with sand layers, reddish brown, moist, firm		2	SS	4							
114.6							114					
1.5	**FILL:** sand, trace clay, trace gravel, brown, moist, loose		3	SS	9							
113.8												
2.3	**SAND AND GRAVEL:** some silt, trace clay, trace cobbles, brown, moist, compact to very dense		4	SS	50/ 100 mm		113					44 42 11 3
			5	SS	50/ 130 mm							
			6	SS	24		112					
	water at 5.5m		7	SS	29		111					
108.5							110					
7.6	**SILTY CLAY TILL:** sandy, trace gravel, grey, moist, hard		8	SS	34		109					
			9	SS	65		108					
106.4							107					
9.7	**END OF BOREHOLE:** Notes: 1) Water encountered at 5.5m during drilling.											

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

DS SOIL LOG-2021-FINAL 23-162-102GEO.GPJ DS.GDT 23-7-11

Particle Size Distribution (ASTM-D421/D422)

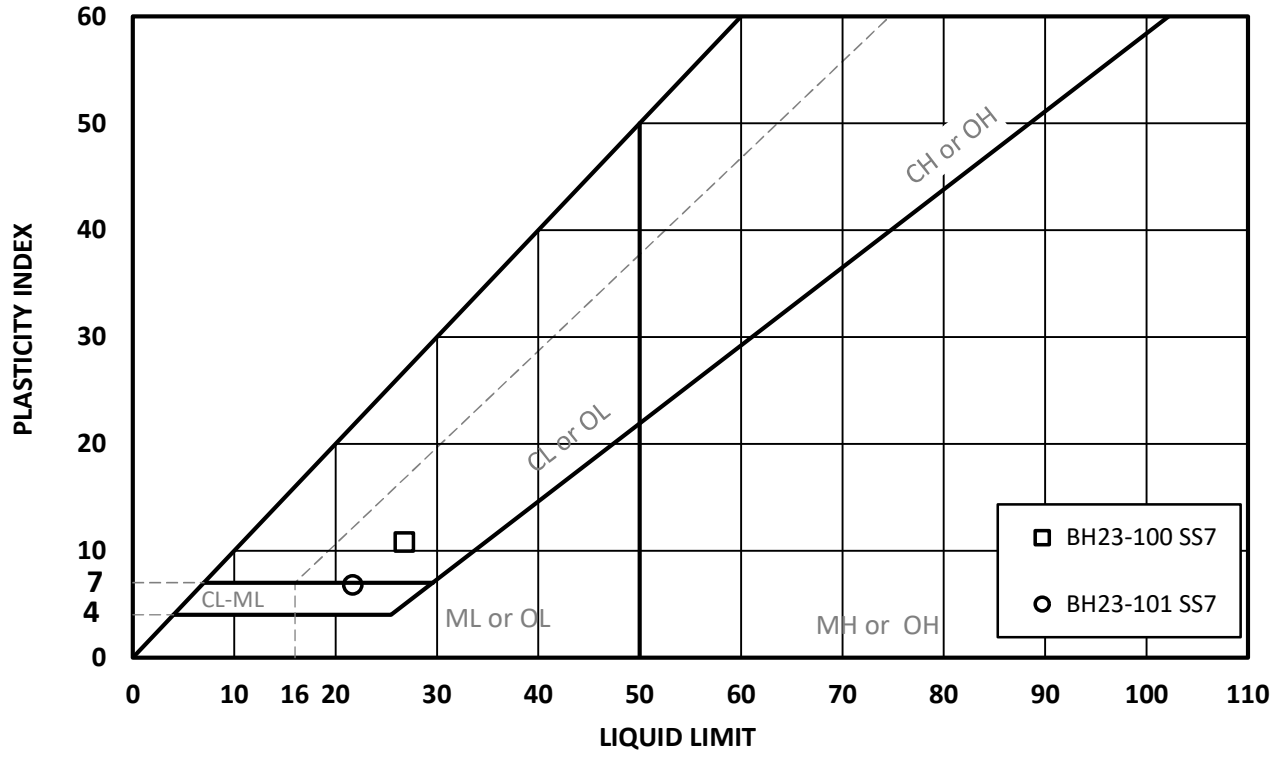


Silt and Clay		Sand			Gravel		Cobble +
Clay	Silt	Fine	Medium	Coarse	Fine	Coarse	

DS CONSULTANTS LTD.
6221 Highway 7, Unit 16
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project	**Geotechincal Investigation**	Project No	**23-162-102**
Location	**1720 Sherwood Forest Circle, Mississauga**	Date	**Jun/28/2023**
Client	**Argo Development Corporation**	Drawing No	6

Atterberg Test (ASTM D-4318)



Code	Sample ID	Sample No.		Moisture Contant (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	**USCS Symbol**
1	□	BH23-100	SS7	9	26.8	16	10.8	CL
2	○	BH23-101	SS7	9	21.7	14.9	6.8	CL-ML

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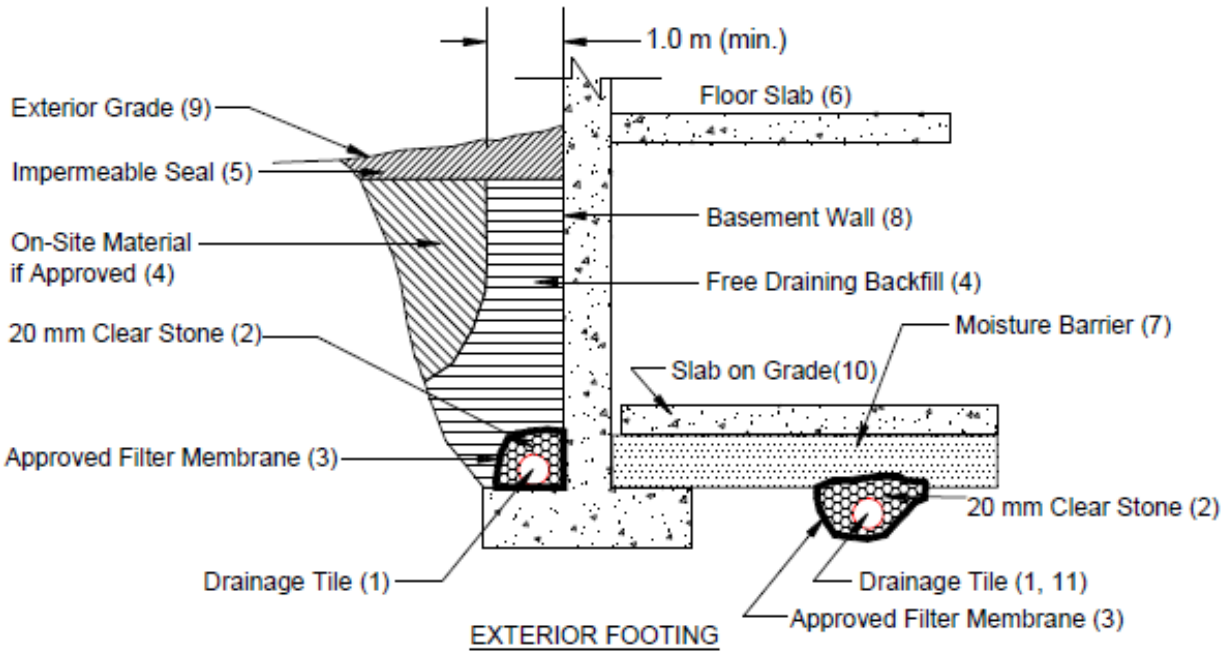
Vaughan, Ontario, L4H 0K8
Telephone: (905) 264-9393
www.dsconsultants.ca

Project	**Geotechincal Investigation**	Project No	**23-162-102**
Location	**1720 Sherwood Forest Circle, Mississauga**	Date	**Jun/28/2023**
Client	**Argo Development Corporation**	Drawing No	7

Project: 23-162-102 **Drawing No. 8**



EXTERIOR FOOTING

Notes

1. Drainage tile to consist of 100 mm (4") diameter weeping tile or equivalent perforated pipe leading to a positive sump or outlet.
2. 20 mm (3/4") clear stone - 150 mm (6") top and side of drain. If drain is not on footing, place100 mm (4 inches) of stone below drain .
3. Wrap the clear stone with an approved filter membrane (Terrafix 270R or equivalent).
4. Free Draining backfill - OPSS Granular B or equivalent compacted to the specified density. Do not use heavy compaction equipment within 450 mm (18") of the wall. Use hand controlled light compaction equipment within 1.8 m (6') of wall. The minimum width of the Granular 'B' backfill must be 1.0 m.
5. Impermeable backfill seal - compacted clay, clayey silt or equivalent. If original soil is free-draining, seal may be omitted. Maximum thickness of seal to be 0.5 m.
6. Do not backfill until wall is supported by basement and floor slabs or adequate bracing.
7. Moisture barrier to be at least 200 mm (8") of compacted clear 20 mm (3/4") stone or equivalent free draining material. A vapour barrier may be required for specialty floors.
8. Basement wall to be damp proofed /water proofed.
9. Exterior grade to slope away from building.
10. Slab on grade should not be structurally connected to the wall or footing.
11. Underfloor drain invert to be at least 300 mm (12") below underside of floor slab.
12. Drainage tile placed in parallel rows 6 to 8 m (20 to 25') centers one way. Place drain on 100 mm (4") clear stone with 150 mm (6") of clear stone on top and sides. Enclose stone with filter fabric as noted in (3).
13. The entire subgrade to be sealed with approved filter fabric (Terrafix 270R or equivalent) if non-cohesive (sandy) soils below ground water table encountered.
14. Do not connect the underfloor drains to perimeter drains.
15. Review the geotechnical report for specific details.

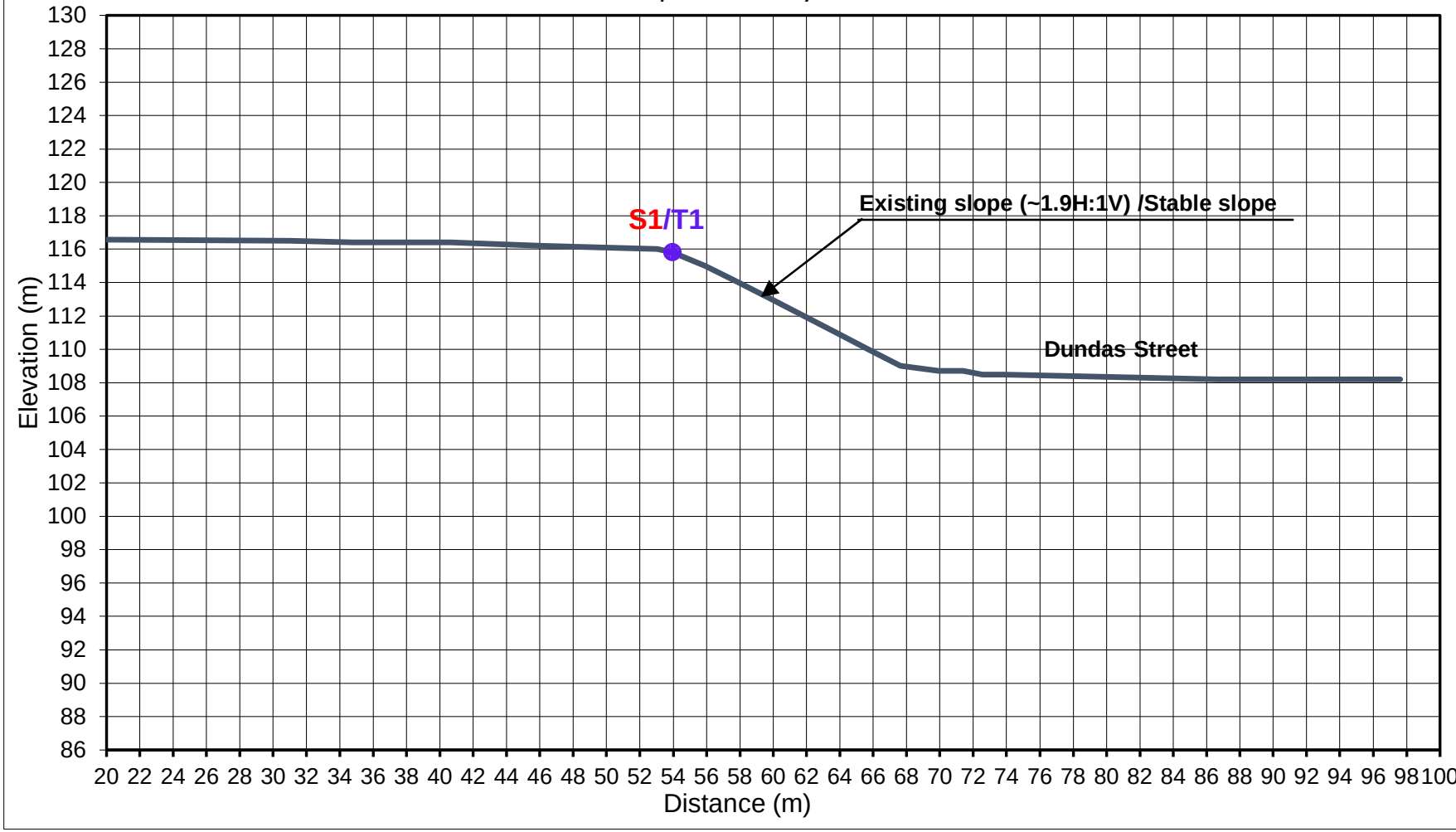
DRAINAGE AND BACKFILL RECOMMENDATIONS
Basement with Underfloor Drainage
(not to scale)

Project: 23-162-102 - Drawing 9

Slope Profile at **Section X1-X1** (See Drawing 1 for Location Plan)

Point '**S1**': Long-term stable top of slope (LTSTOS), same as **T1**

Point '**T1**': Staked Top of Bank by CVC

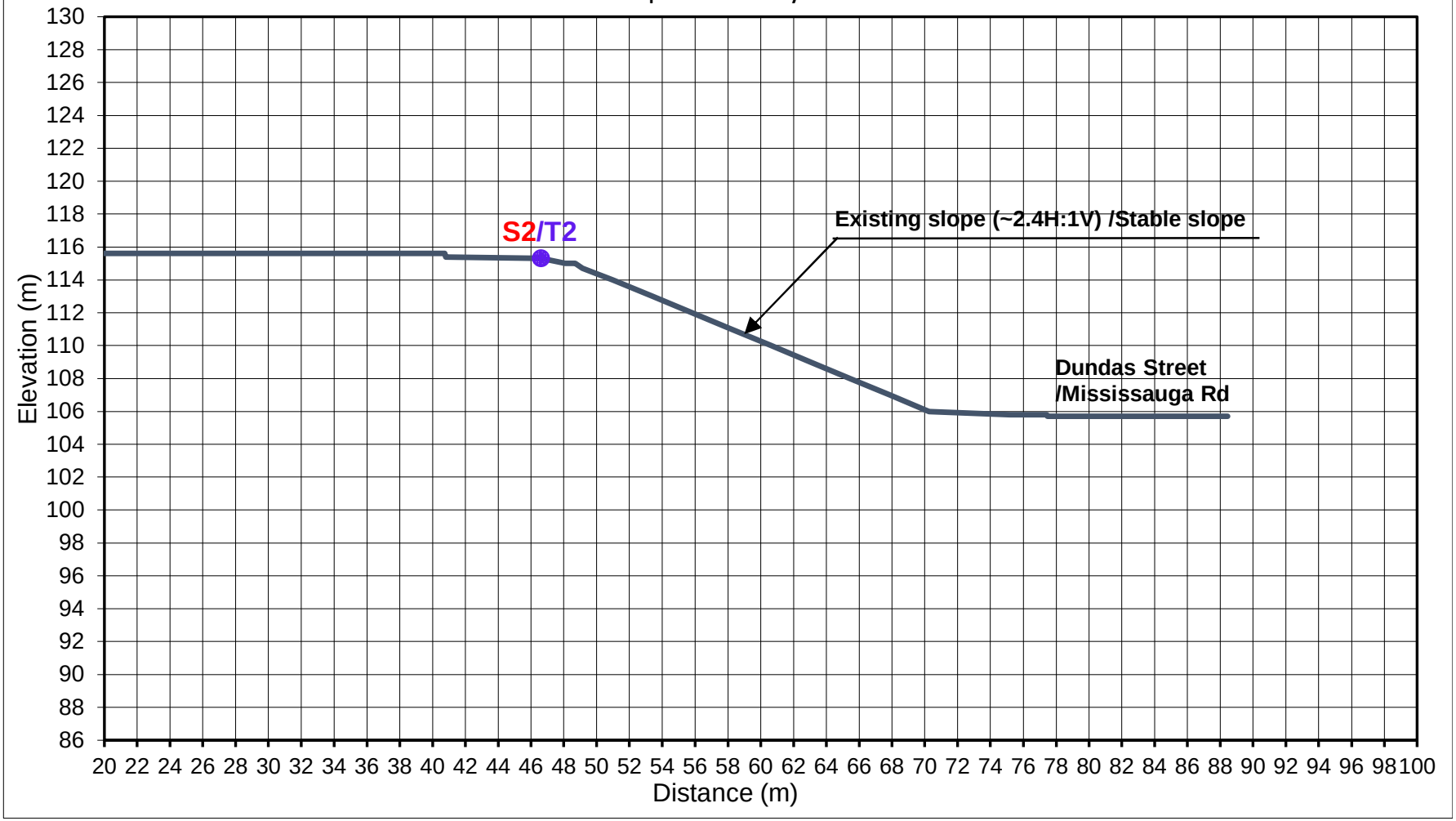


Project: 23-162-102 - Drawing 10

Slope Profile at **Section X2-X2** (See Drawing 1 for Location Plan)

Point '**S2**': Long-term stable top of slope (LTSTOS), same as **T2**

Point '**T2**': Staked Top of Bank by CVC

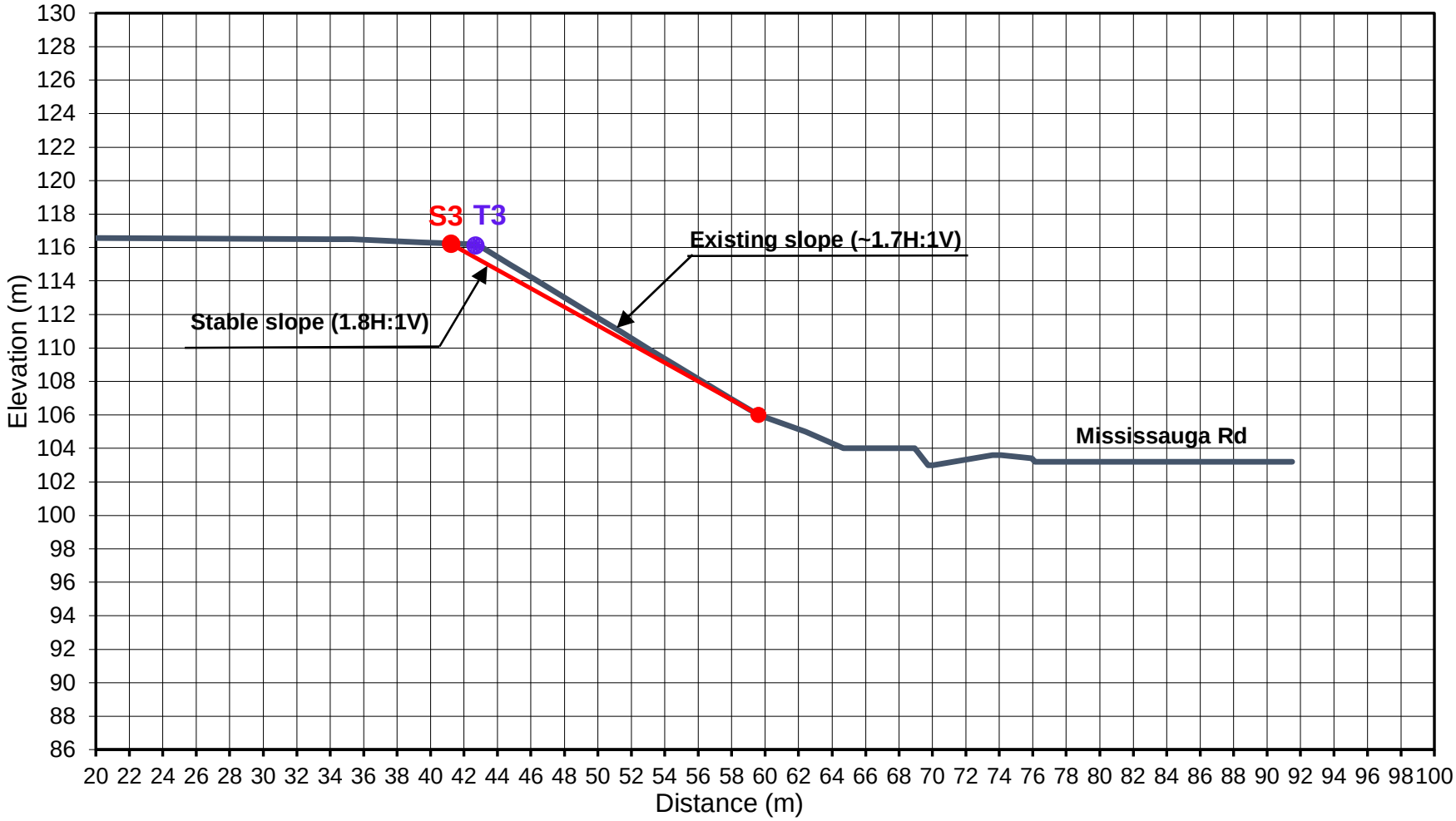


Project: 23-162-102 - Drawing 11

Slope Profile at **Section X3-X3** (See Drawing 1 for Location Plan)

Point '**S3**': Long-term stable top of slope (LTSTOS)

Point '**T3**': Staked Top of Bank by CVC

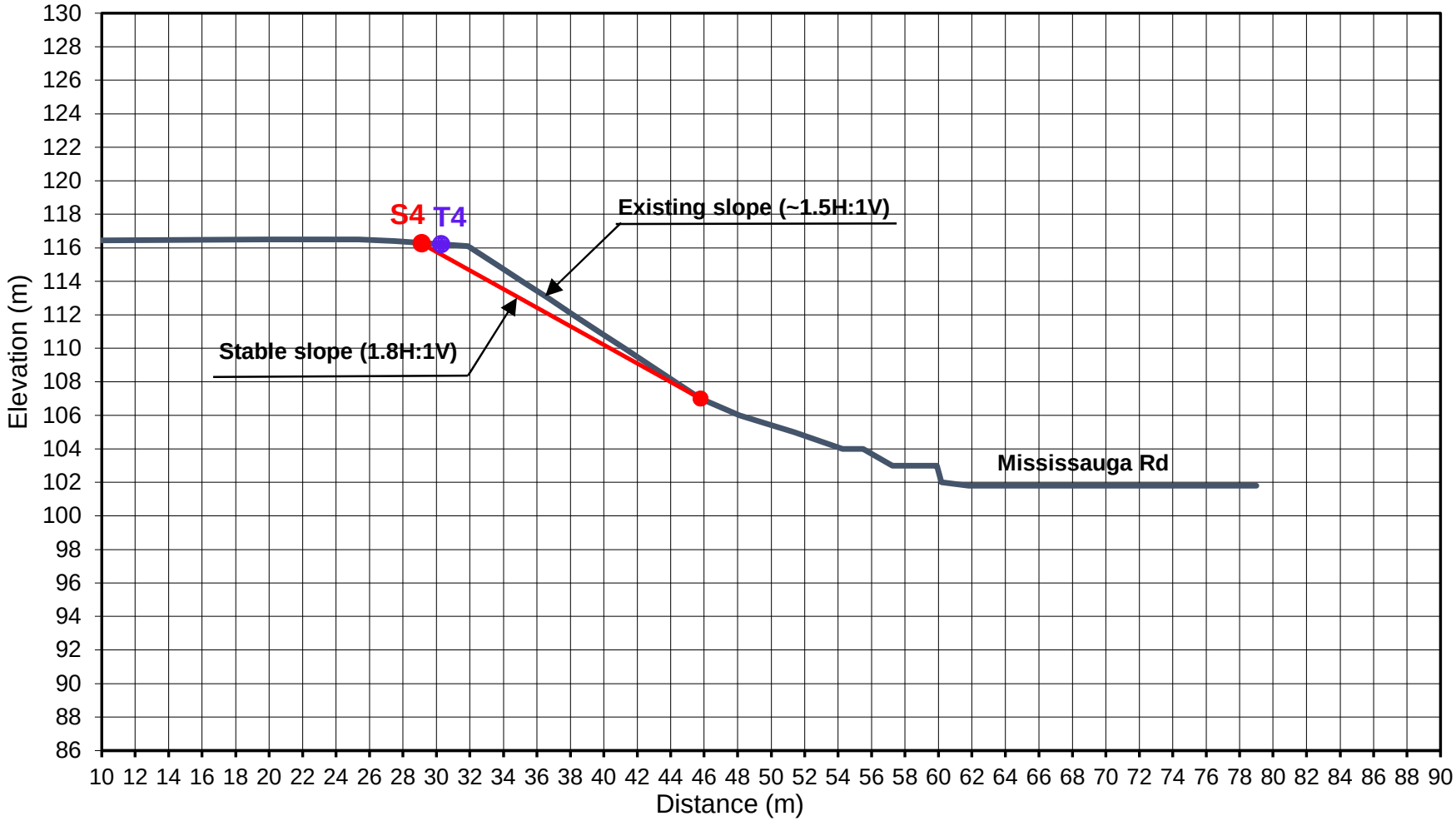


Project: 23-162-102 - Drawing 12

Slope Profile at **Section X4-X4** (See Drawing 1 for Location Plan)

Point '**S4**': Long-term stable top of slope (LTSTOS)

Point '**T4**': Staked Top of Bank by CVC

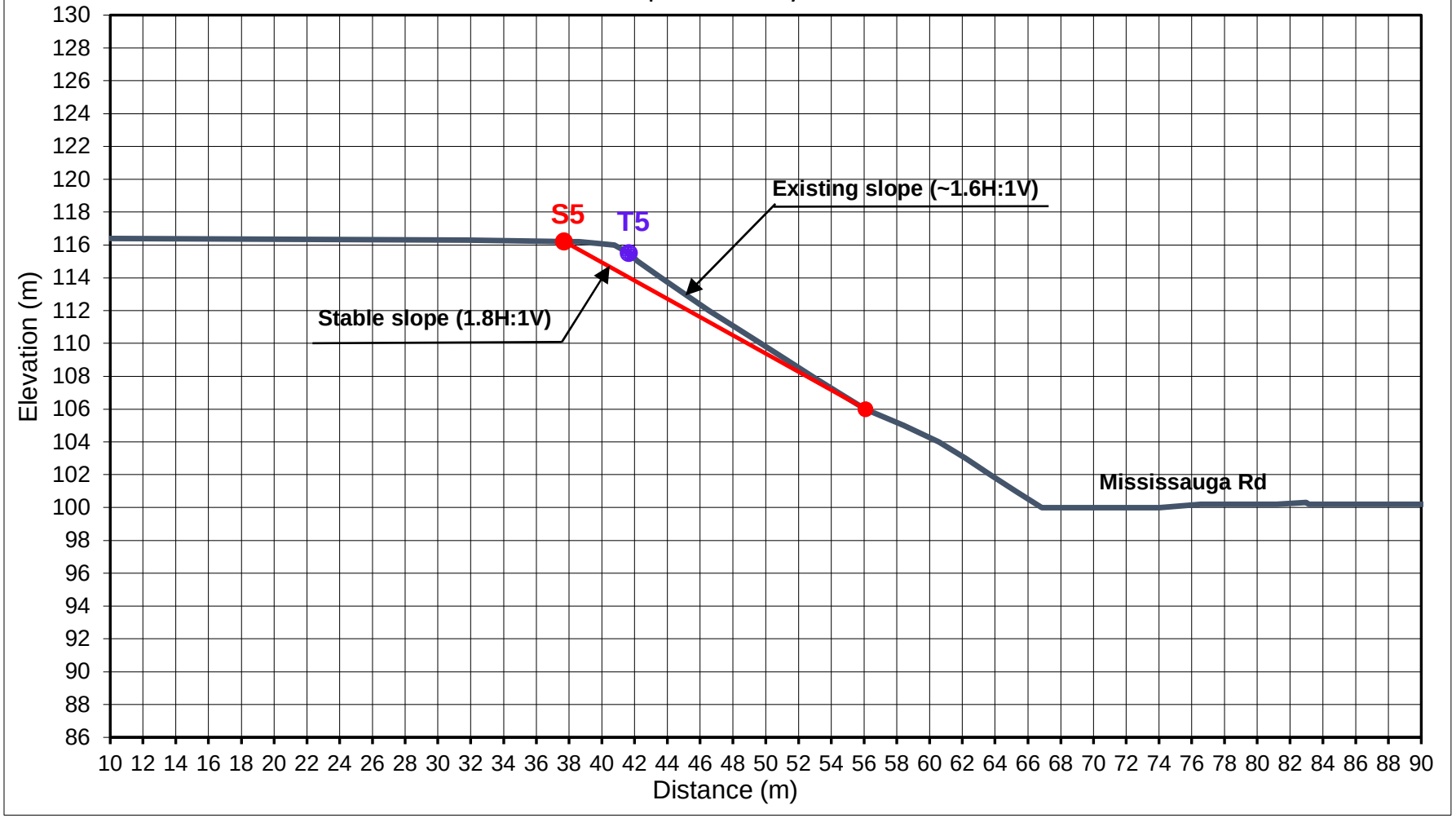


Project: 23-162-102 - Drawing 13

Slope Profile at **Section X5-X5** (See Drawing 1 for Location Plan)

Point '**S5**': Long-term stable top of slope (LTSTOS)

Point '**T5**': Staked Top of Bank by CVC

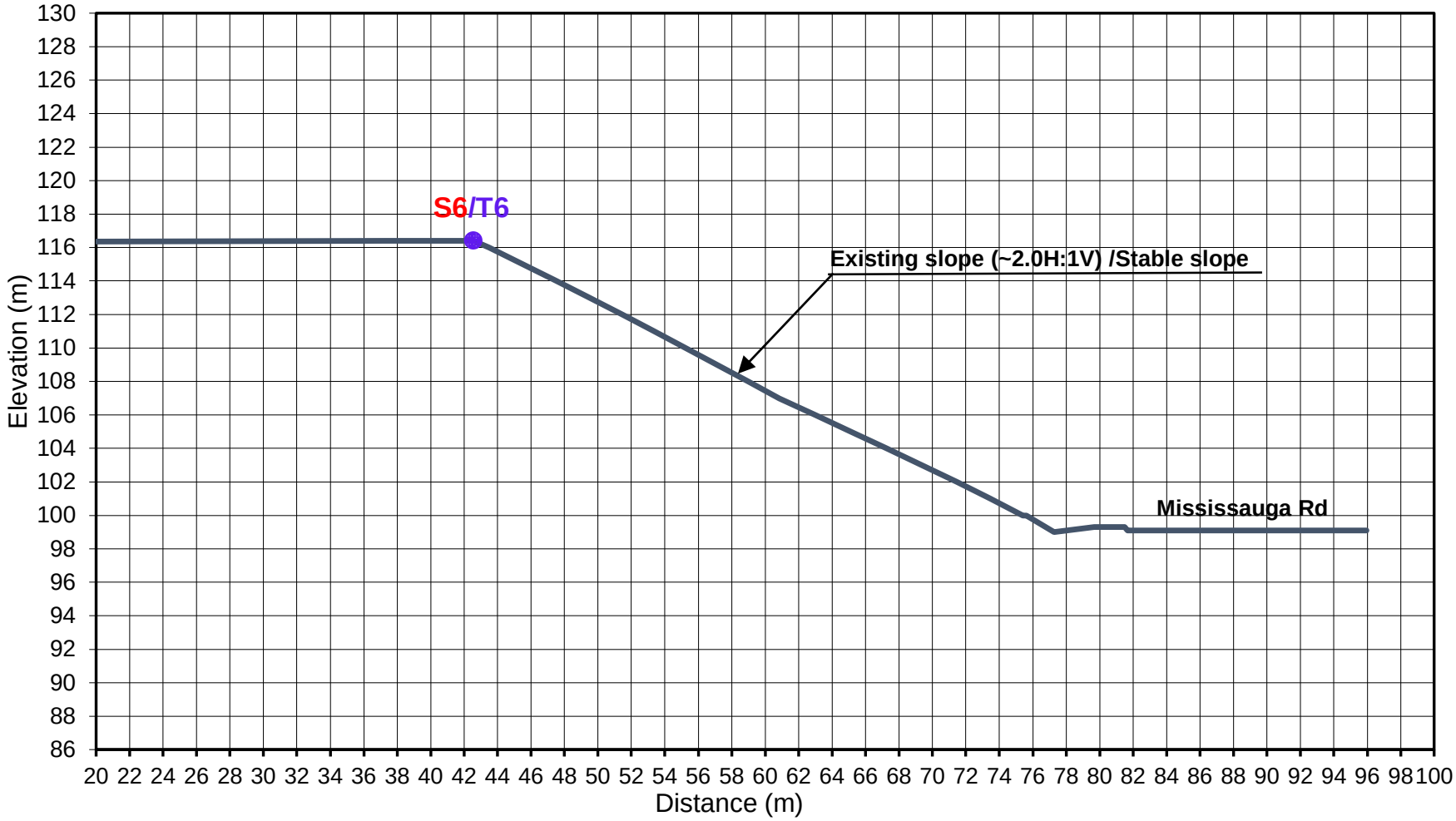


Project: 23-162-102 - Drawing 14

Slope Profile at **Section X6-X6** (See Drawing 1 for Location Plan)

Point 'S6': Long-term stable top of slope (LTSTOS), same as T6

Point 'T6': Staked Top of Bank by CVC

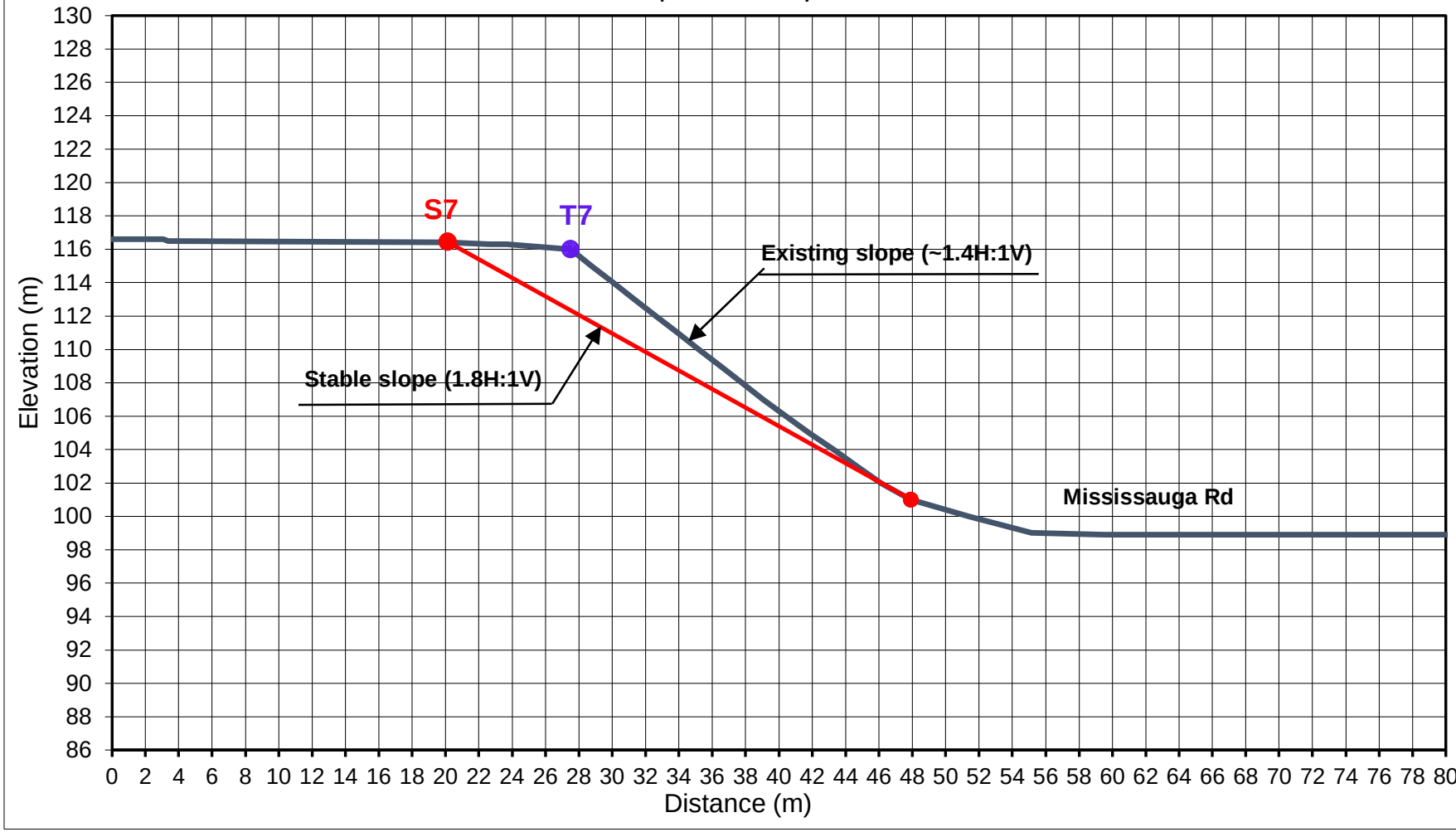


Project: 23-162-102 - Drawing 15

Slope Profile at **Section X7-X7** (See Drawing 1 for Location Plan)

Point '**S7**': Long-term stable top of slope (LTSTOS)

Point '**T7**': Staked Top of Bank by CVC

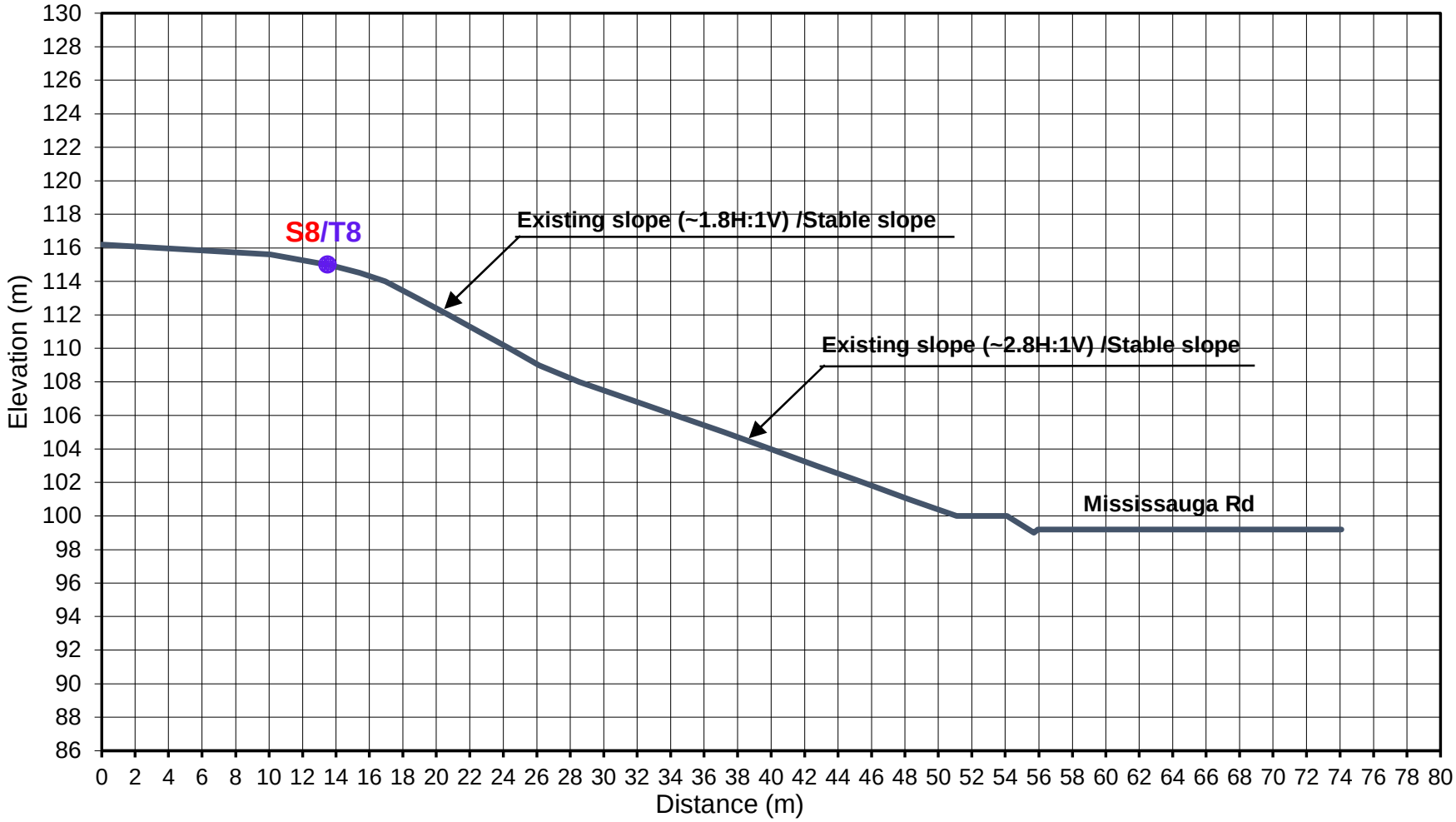


Project: 23-162-102 - Drawing 16

Slope Profile at **Section X8-X8** (See Drawing 1 for Location Plan)

Point '**S8**': Long-term stable top of slope (LTSTOS), same **as T8**

Point '**T8**': Staked Top of Bank by CVC

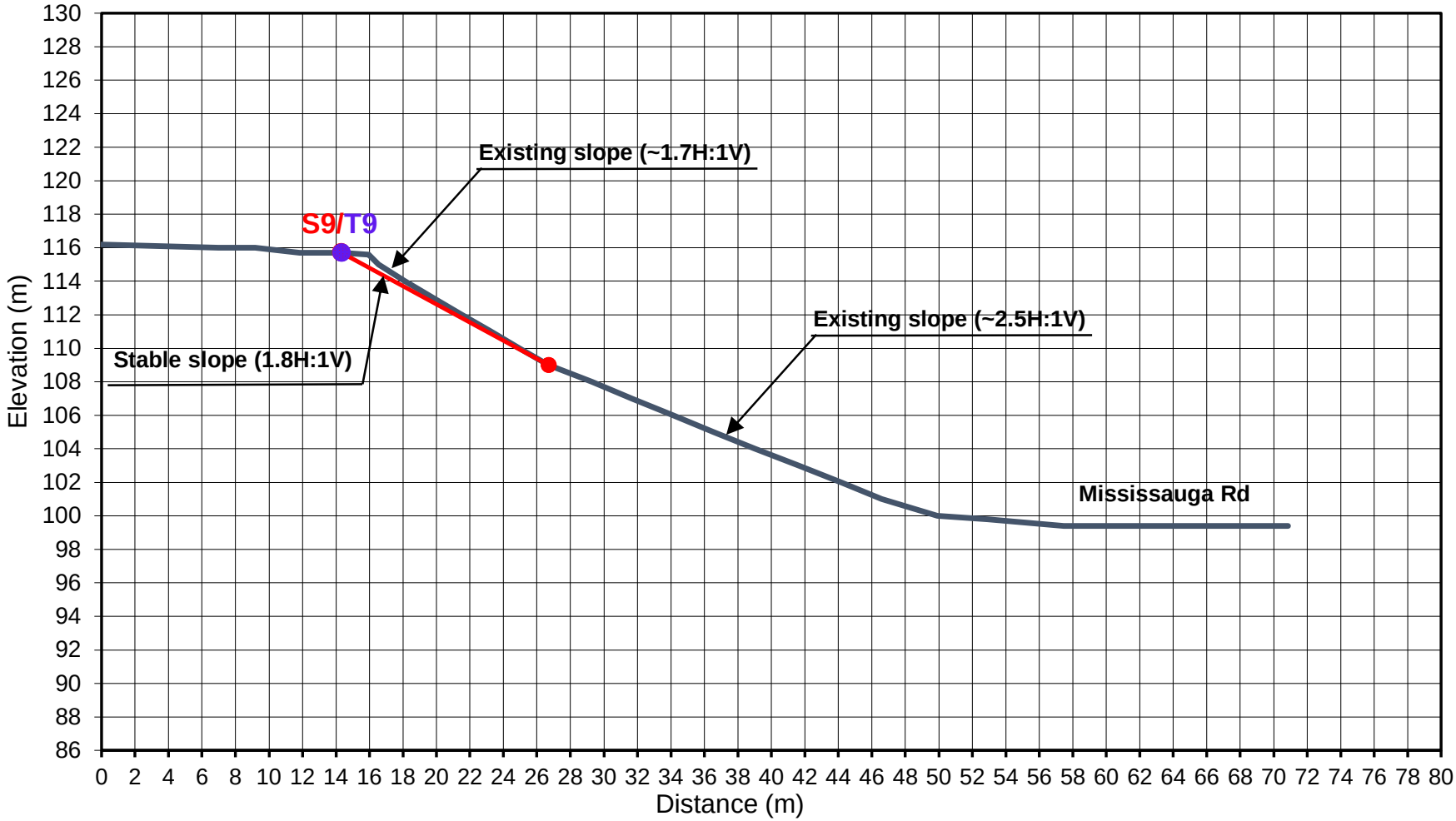


Project: 23-162-102 - Drawing 17

Slope Profile at **Section X9-X9** (See Drawing 1 for Location Plan)

Point 'S9': Long-term stable top of slope (LTSTOS), same as T9

Point 'T9': Staked Top of Bank by CVC

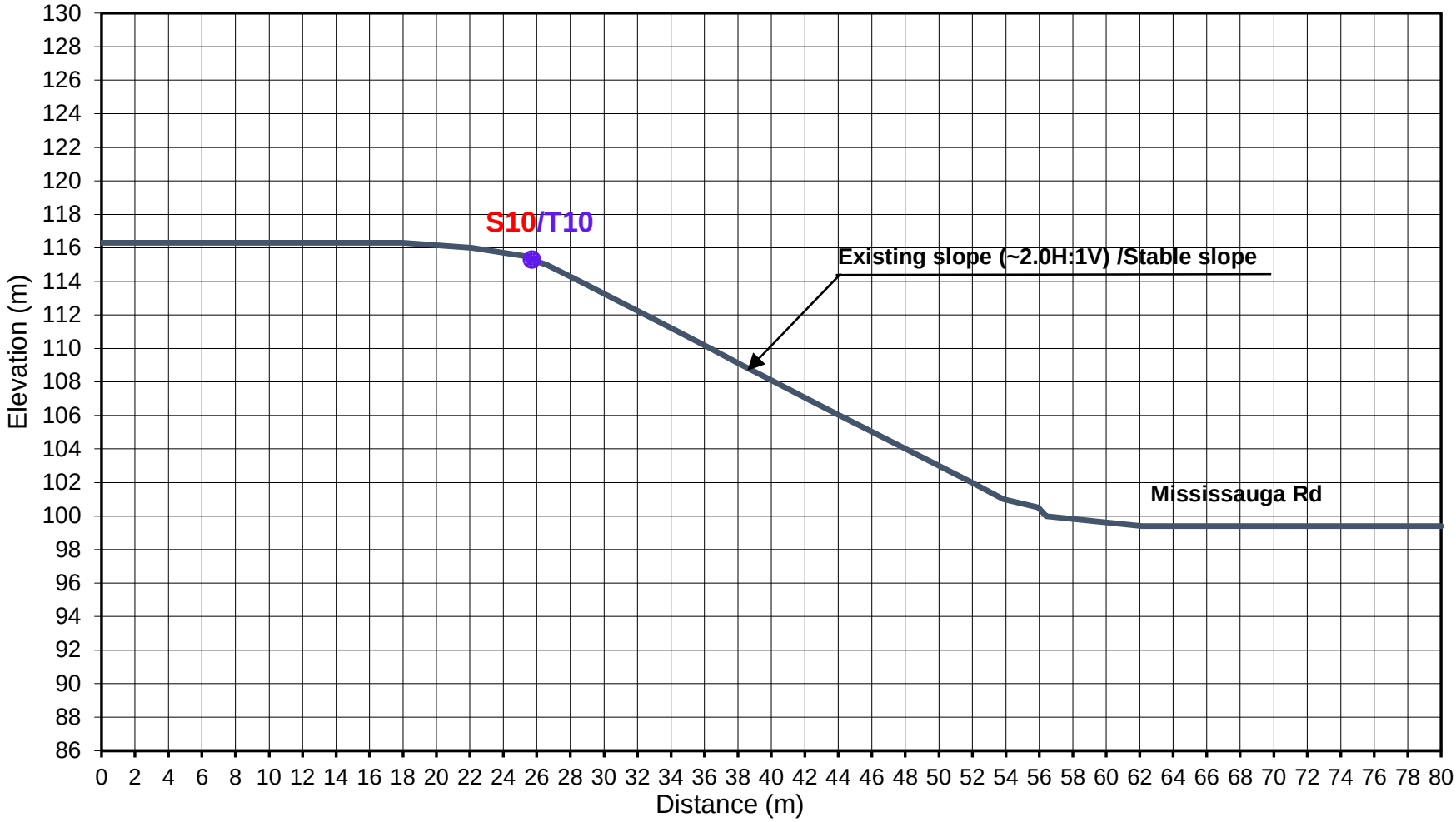


Project: 23-162-102 - Drawing 18

Slope Profile at **Section X10-X10** (See Drawing 1 for Location Plan)

Point '**S10**': Long-term stable top of slope (LTSTOS), same as **T10**

Point '**T10**': Staked Top of Bank by CVC

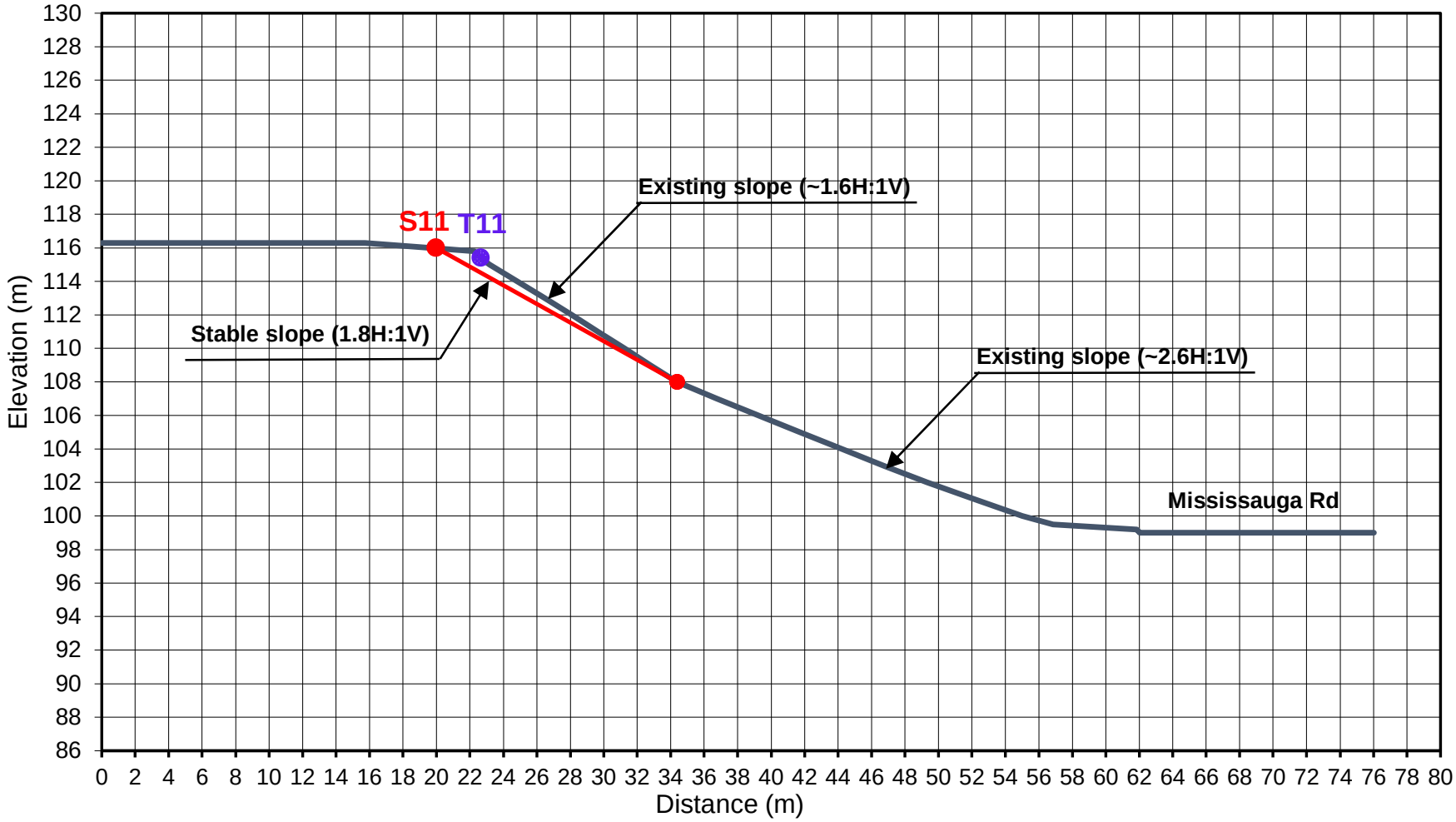


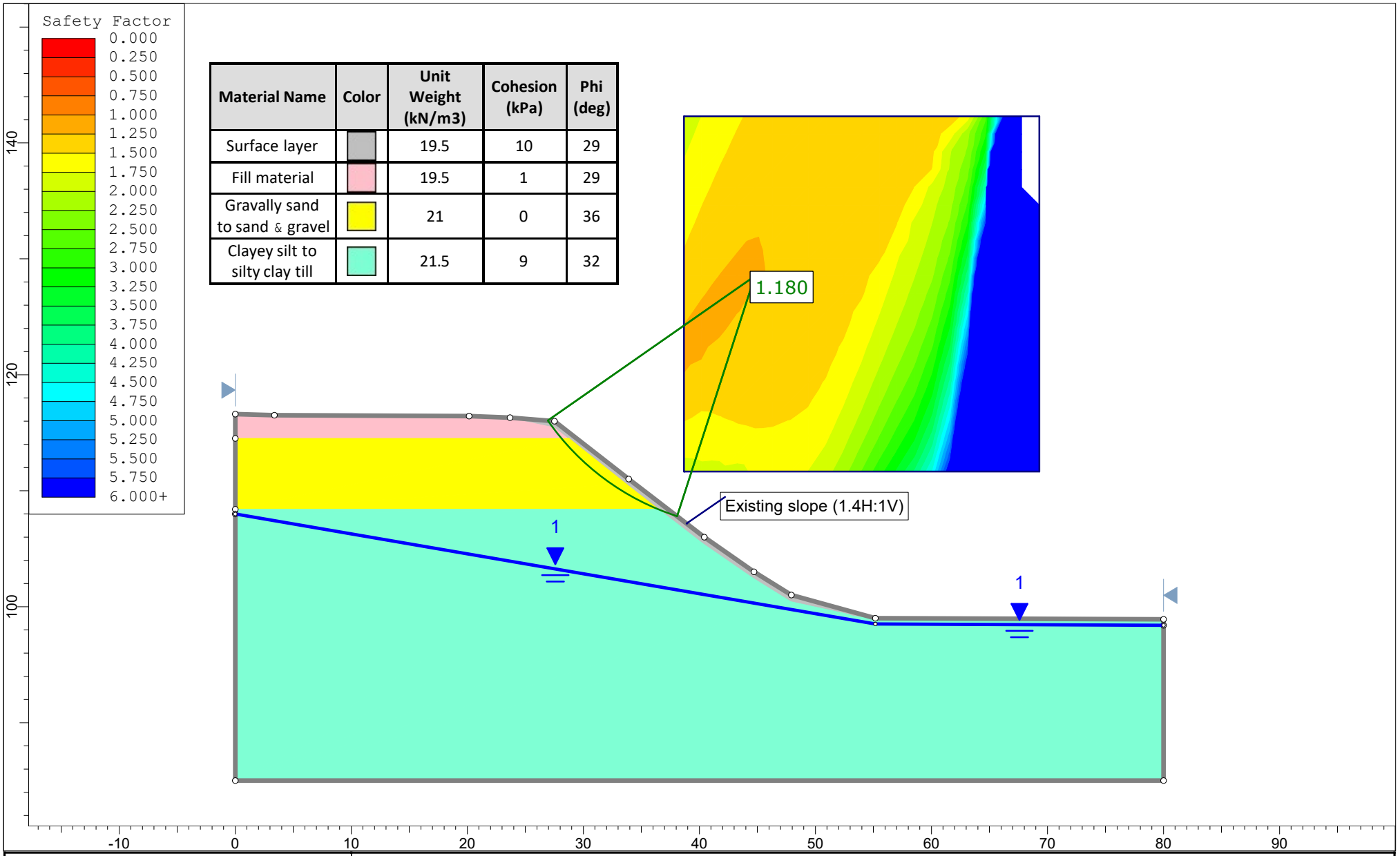
Project: 23-162-102 - Drawing 19

Slope Profile at **Section X11-X11** (See Drawing 1 for Location Plan)

Point '**S11**': Long-term stable top of slope (LTSTOS)

Point '**T11**': Staked Top of Bank by CVC



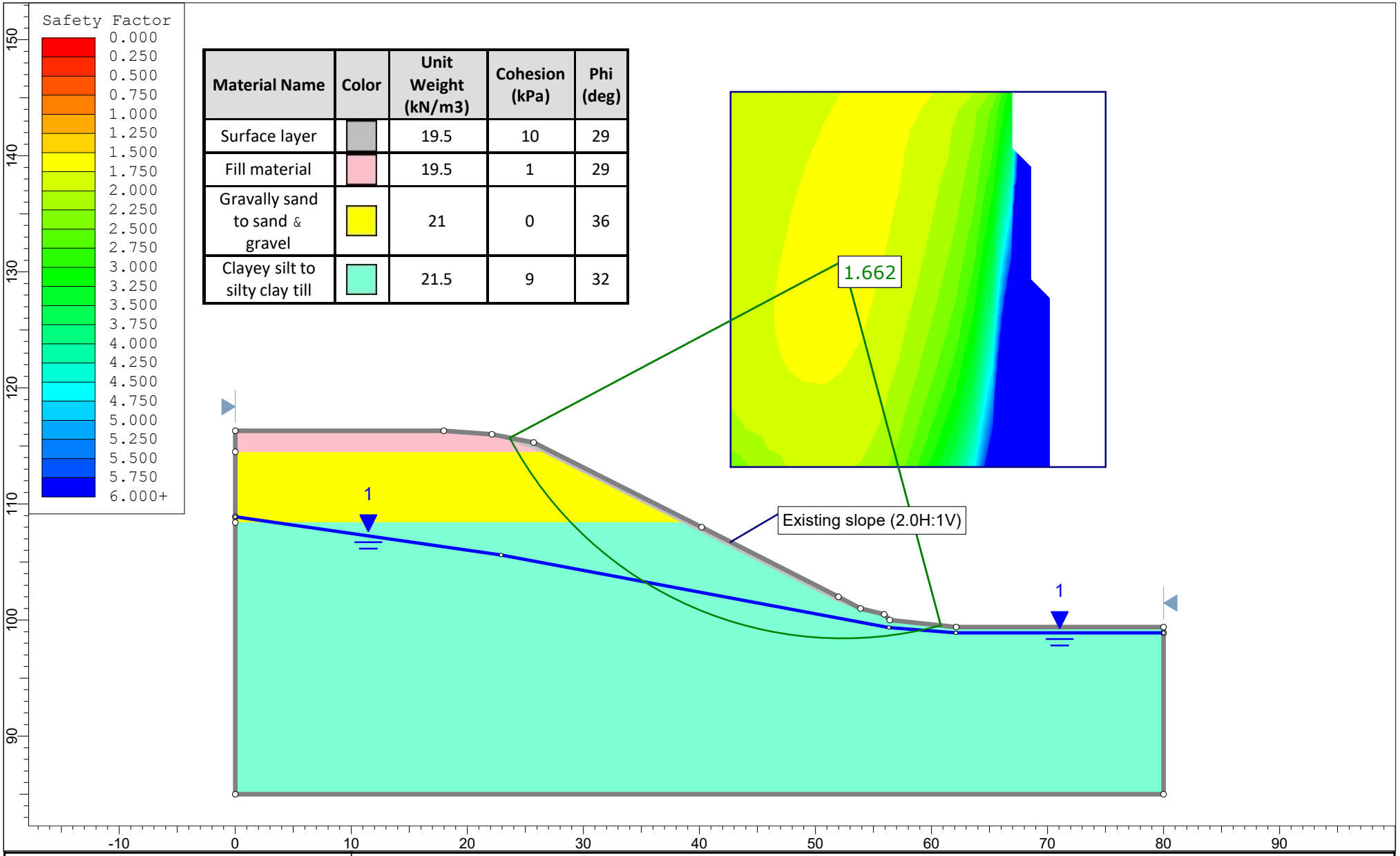


Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)
Surface layer		19.5	10	29
Fill material		19.5	1	29
Gravally sand to sand & gravel		21	0	36
Clayey silt to silty clay till		21.5	9	32

rocscience

SLIDEINTERPRET 9.002

Project	23-162-102 - Long-term Slope Stability Analyses, 1720 Sherwood Forest Circle, Mississauga, ON		
Group	Group 1	*Scenario*	Master Scenario
Drawn By	DS	*Company*	DS Consultants Ltd.
Date	July 2023	*File Name*	Drawing 20 - Existing Slope at X7-X7.slmd

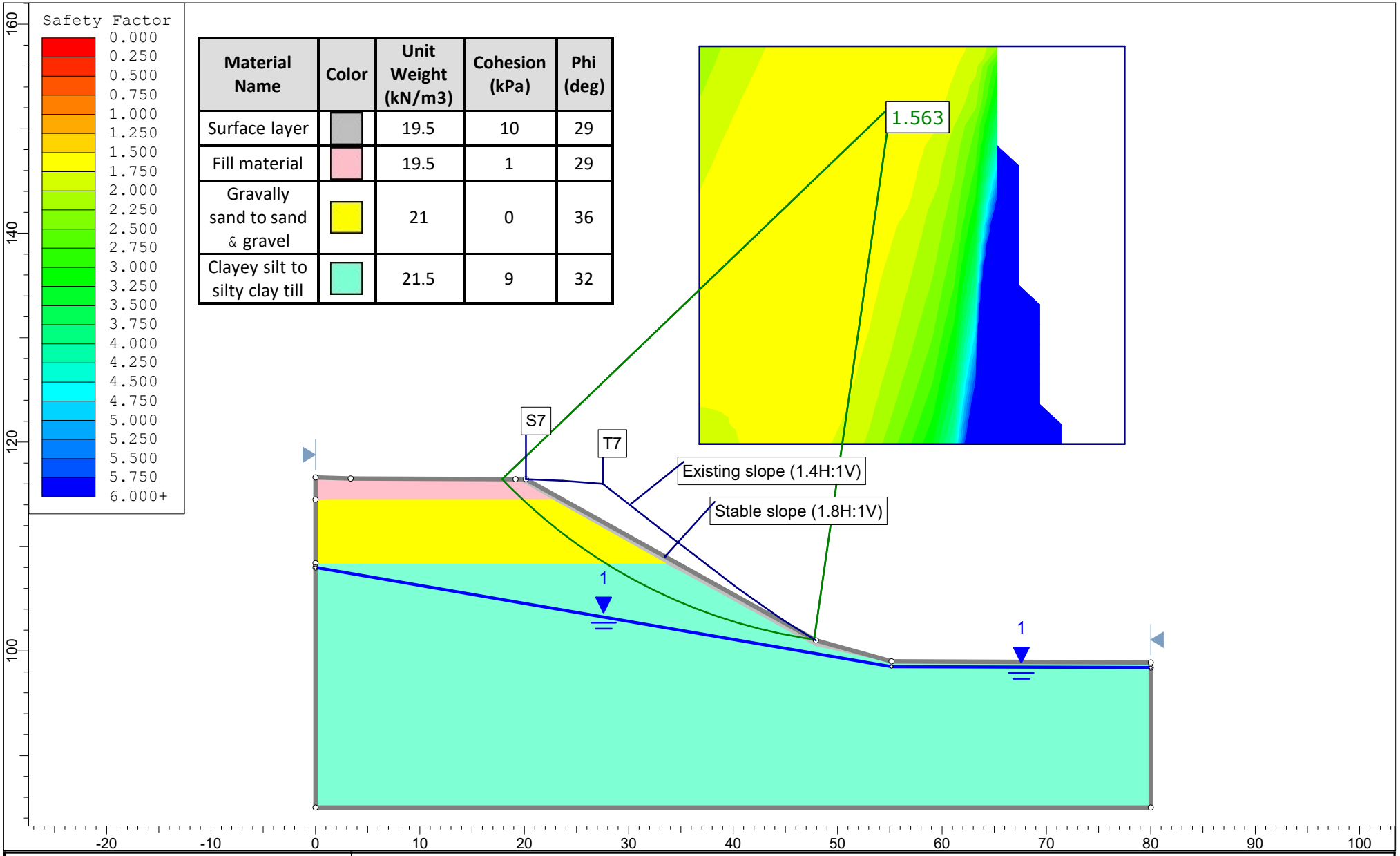


Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)
Surface layer		19.5	10	29
Fill material		19.5	1	29
Gravally sand to sand & gravel		21	0	36
Clayey silt to silty clay till		21.5	9	32

rocscience

SLIDEINTERPRET 9.002

Project	23-162-102 - Long-term Slope Stability Analyses, 1720 Sherwood Forest Circle, Mississauga, ON		
Group	Group 1	*Scenario*	Master Scenario
Drawn By	DS	*Company*	DS Consultants Ltd.
Date	July 2023	*File Name*	Drawing 21 - Existing Slope at X10-X10.slmd



Material Name	Color	Unit Weight (kN/m3)	Cohesion (kPa)	Phi (deg)
Surface layer		19.5	10	29
Fill material		19.5	1	29
Gravally sand to sand & gravel		21	0	36
Clayey silt to silty clay till		21.5	9	32

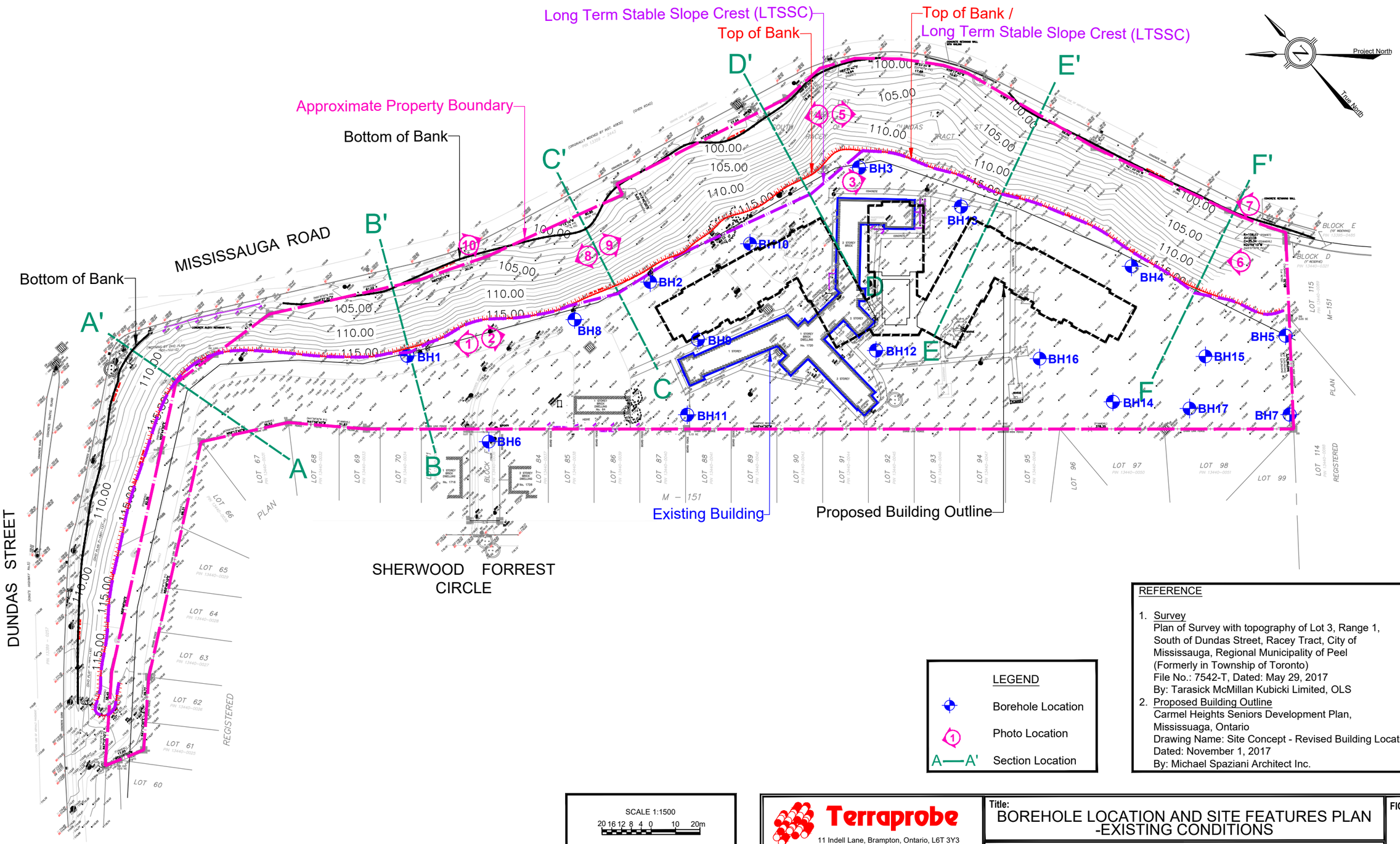
rocscience

SLIDEINTERPRET 9.002

Project	23-162-102 - Long-term Slope Stability Analyses, 1720 Sherwood Forest Circle, Mississauga, ON		
Group	Group 1	Scenario	Master Scenario
Drawn By	DS	Company	DS Consultants Ltd.
Date	July 2023	File Name	Drawing 22 - Stable Slope at X7-X7.slmd

Appendix A

Location Plan and Logs of Previous Boreholes (BH1 to BH17) Drilled By Terraprobe in 2017



REFERENCE

1. Survey
   Plan of Survey with topography of Lot 3, Range 1, South of Dundas Street, Racey Tract, City of Mississauga, Regional Municipality of Peel (Formerly in Township of Toronto)
   File No.: 7542-T, Dated: May 29, 2017
   By: Tarasick McMillan Kubicki Limited, OLS
2. Proposed Building Outline
   Carmel Heights Seniors Development Plan, Mississauga, Ontario
   Drawing Name: Site Concept - Revised Building Location
   Dated: November 1, 2017
   By: Michael Spaziani Architect Inc.

LEGEND

- Borehole Location
- Photo Location
- A—A' Section Location

SCALE 1:1500

20 16 12 8 4 0 10 20m

Terraprobe
11 Indell Lane, Brampton, Ontario, L6T 3Y3
Tel: (905) 796-2650 Fax: (905) 796-2250

Title: BOREHOLE LOCATION AND SITE FEATURES PLAN -EXISTING CONDITIONS

File No. 1-17-0362-01

FIGURE : 2

LOG OF BOREHOLE 1

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 18, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608399, N: 4821838 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
116.2	**GROUND SURFACE**				
116.0 / 0.2	150mm **TOPSOIL**				
	FILL, sandy silt, trace to some gravel, trace to some clay, trace organics, roots, loose, brown, damp to moist		1	SS	5
			2	SS	8
114.7 / 1.5	**SAND AND GRAVEL**, trace to some silt, trace clay, compact to very dense, brown, damp to moist		3	SS	28
	...sandy gravel		4	SS	52
			5	SS	48
111.6 / 4.6	**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, damp to moist (GLACIAL TILL)		6	SS	34
			7	SS	37
			8	SS	75
			9	SS	85

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

55 34 9 2

...at 3.7m, Auger grinding

...at 5.8m, Auger grinding

...at 6.1m, Spoon wet

(continued next page)

LOG OF BOREHOLE 1

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 18, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 2 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608399, N: 4821838 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
		(continued)					
11		**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, damp to moist (GLACIAL TILL) *(continued)*		10	SS	95 / 225mm	106
							105
12				11	SS	50 / 125mm	104
13							103
14				12	SS	53	102
15	100.7 / 15.5	...shale fragments		13	SS	50 / 150mm	101

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

...at 10.7m, Auger grinding

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.
10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	13.3	102.9

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 2

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 17, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608492, N: 4821795 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	116.2	**GROUND SURFACE**				
		65mm **ASPHALTIC CONCRETE**				
		430mm **AGGREGATE**		1	SS	10
	115.7 / 0.5					
	115.4 / 0.8	**FILL**, sandy silt, trace gravel, trace clay, loose, brown, damp to moist				
1		**FILL**, sand, some silt, trace gravel, trace clay, loose, brown, moist		2	SS	8
	114.7 / 1.5					
2		**GRAVELLY SAND to SAND AND GRAVEL**, trace to some silt, trace clay, dense to very dense, brown, damp		3	SS	66
				4	SS	41
3				5	SS	83 / 275mm
4						
	111.4 / 4.8			6A	SS	21
5		**CLAYEY SILT**, some sand to sandy, trace gravel, very stiff, grey, damp to moist (GLACIAL TILL)		6B		
6				7	SS	29
7						
		...hard below		8	SS	34
8						
9				9	SS	53
10						

Elevation Scale (m): 116, 115, 114, 113, 112, 111, 110, 109, 108, 107

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit — PL MC LL — 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

9 10 28 40 22

(continued next page)

LOG OF BOREHOLE 2

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 17, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 2 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608492, N: 4821795 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description (continued)	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
		CLAYEY SILT, some sand to sandy, trace gravel, very stiff, grey, damp to moist (GLACIAL TILL) *(continued)* ...shale fragments					106
11				10	SS	62	105
12				11	SS	92 / 275mm	104
13							103
14				12	SS	50 / 125mm	102
15	100.5 / 15.7			13	SS	35	101

Penetration Test Values (Blows / 0.3m) — Dynamic Cone: 10, 20, 30, 40

Undrained Shear Strength (kPa) — Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40, 80, 120, 160

Moisture / Plasticity — Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL): 10, 20, 30

Headspace Vapour (ppm) | Instrument Details | Unstabilized Water Level | Lab Data and Comments | GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 3

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 18, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608586, N: 4821772 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
0	115.8	**GROUND SURFACE**					
	115.4 / 0.4	390mm **TOPSOIL**		1	SS	12	
	115.0 / 0.8	**FILL**, clayey silt, some sand, trace gravel, stiff, brown, moist					
1	114.3 / 1.5	**FILL**, sandy silt, trace gravel, trace to some clay, loose, brown, damp		2	SS	8	115
2		**SAND AND GRAVEL**, trace to some silt, trace clay, very dense, brown, damp to moist		3	SS	81 / 250mm	114
				4	SS	50 / 115mm	
3				5	SS	81 / 275mm	113
4							112
5		...sandy gravel, dense		6	SS	49	111
6				7	SS	50 / 125mm	110
7	108.2 / 7.6						109
8		**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, damp to moist (GLACIAL TILL)		8	SS	44	108
9				9	SS	52	107
10							106

Penetration Test Values (Blows / 0.3m)
× Dynamic Cone
10 20 30 40
Undrained Shear Strength (kPa)
○ Unconfined + Field Vane
● Pocket Penetrometer ■ Lab Vane
40 80 120 160

Moisture / Plasticity
Plastic Limit | Natural Water Content | Liquid Limit
PL MC LL
10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

...at 2.4m, Auger grinding

...at 3.4m, Auger grinding

(continued next page)

LOG OF BOREHOLE 3

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 18, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 2 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608586, N: 4821772 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
		(continued)					
11		**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, damp to moist (GLACIAL TILL) *(continued)*		10	SS	77	105
12				11	SS	93 / 275mm	104
13							103
14		...shale fragments below		12	SS	92	102
15	100.3 / 15.5			13	SS	50 / 125mm	101

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) — Natural Water Content (MC) — Liquid Limit (LL) — 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.
10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	14.8	101.0

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 4

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 19, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608640, N: 4821668 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	116.1	**GROUND SURFACE**					116					
		50mm **TOPSOIL**		1	SS	7						
		FILL, sandy silt, trace to some clay, trace gravel, trace organics, roots, loose, brown, damp to moist										
1				2	SS	9	115					
	114.6 / 1.5											
		SAND AND GRAVEL, trace to some silt, trace clay, very dense, brown, damp to moist		3	SS	52						
2							114					
				4	SS	87 / 275mm						
3				5	SS	50 / 75mm	113					
4							112					
				6	SS	90 / 225mm						
5							111					
6							110					
				7	SS	85						
7							109					
		...wet, dense										...at 7.6m, Spoon wet
8				8	SS	50	108					
9	107.0 / 9.1						107					
		CLAYEY SILT, trace to some gravel, some sand to sandy, hard, grey, damp to moist (GLACIAL TILL)		9	SS	79						...at 9.8m, Auger grinding
10												

(continued next page)

LOG OF BOREHOLE 4

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 19, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 2 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608640, N: 4821668 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL
		(continued)											
11		**CLAYEY SILT**, trace to some gravel, some sand to sandy, hard, grey, damp to moist (GLACIAL TILL) *(continued)*		10	SS	88 / 275mm	105						
12				11	SS	95 / 225mm	104						
13							103						
14				12	SS	50 / 75mm	102						
15		...at 15.0 m, sandy silt, some clay		13	SS	50 / 150mm	101						11 31 40 18
	100.6 / 15.5	**END OF BOREHOLE**											

Penetration Test Values (Blows / 0.3m): Dynamic Cone; scale 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; scale 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL); scale 10 20 30

Unstabilized water level measured at 7.6 m below ground surface; borehole caved to 9.8 m below ground surface upon completion of drilling.

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 5

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 19, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608667, N: 4821606 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments
0	116.1	**GROUND SURFACE**					116						
		50mm **TOPSOIL**											
		FILL, sandy silt, trace gravel, trace clay, loose, brown, damp		1	SS	9							
	115.3 / 0.8												
1		**FILL**, sand, some silt, trace gravel, trace clay, compact, brown, moist		2	SS	11	115						
	114.6 / 1.5												
2		**SAND AND GRAVEL**, trace to some silt, trace clay, compact, brown, moist		3	SS	16	114						
		...dense to very dense below		4	SS	73							
3				5	SS	50 / 125mm	113						
4							112						
				6	SS	50 / 125mm							
5							111						
6				7	SS	50 / 150mm	110						
7							109						
		...wet below											...at 7.6m, Spoon wet
8				8	SS	28	108						
9				9A	SS	39	107						
	106.4 / 9.7			9B									
10		*(continued on next page)*											

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LOG OF BOREHOLE 5

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 19, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 2 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608667, N: 4821606 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
		(continued)					
11		**CLAYEY SILT**, trace to some sand, trace to some gravel, hard, grey, damp to moist (GLACIAL TILL) *(continued)*		10	SS	50 / 150mm	105
12				11	SS	50 / 150mm	104
13							103
14				12	SS	50 / 100mm	102
15	100.6 / 15.5			13	SS	50 / 75mm	101

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Unstabilized water level measured at 11.3 m below ground surface; borehole caved to 14.0 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	12.9	103.2

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 6

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 24, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608401, N: 4821789 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments
	116.2	**GROUND SURFACE**											
		140mm **ASPHALTIC CONCRETE**											
	115.8	230mm **AGGREGATE**		1	SS	10							
1	0.4	**FILL**, clayey silt, trace to some sand, trace gravel, firm to stiff, brown, moist		2	SS	4							
	114.7												
2	1.5	**GRAVELLY SAND to SAND AND GRAVEL**, trace to some silt, trace clay, compact to very dense, brown, moist		3	SS	50 / 150mm							26 48 19 7
				4	SS	50 / 125mm							
3				5	SS	50 / 75mm							
4													
5				6	SS	14						▽	
6	110.1												
	6.1	**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, damp to moist (GLACIAL TILL)		7	SS	50 / 150mm							...at 6.1m, Spoon wet
7													
8	108.0			8	SS	72							
	8.2	**END OF BOREHOLE**											

Penetration Test Values (Blows / 0.3m): ✕ Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): ○ Unconfined ● Pocket Penetrometer + Field Vane ■ Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL); 10 20 30

Elevation Scale (m): 116 115 114 113 112 111 110 109 108

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Unstabilized water level measured at 5.0 m below ground surface; borehole caved to 5.9 m below ground surface upon completion of drilling.

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 7

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 20, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608646, N: 4821582 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	115.9	**GROUND SURFACE**				
		80mm **TOPSOIL**		1	SS	7
		FILL, clayey silt, some sand, trace gravel, soft to firm, brown, moist		2	SS	3
1	114.4 / 1.5	**FILL**, sand, some silt, loose, brown, moist		3	SS	9
2	113.6 / 2.3	**GRAVELLY SAND to SAND AND GRAVEL**, trace clay, some silt, dense to very dense, brown, damp to moist		4	SS	75 / 275mm
				5	SS	50 / 100mm
3						
4				6	SS	51
5						
6		...compact		7	SS	25
7						
		...wet		8	SS	33
8	107.7 / 8.2					

Elevation Scale (m): 115, 114, 113, 112, 111, 110, 109, 108

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Unstabilized water level measured at 7.0 m below ground surface; borehole caved to 7.5 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed. 10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	7.1	108.9

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 8

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 17, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 2	Location : Mississauga, ON	Checked by : MT
Position : E: 608459, N: 4821804 (UTM 17T)	Elevation Datum : Geodetic	
Rig type : Truck-mounted	Drilling Method : Solid stem augers	

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Lab Data and Comments
0	116.3	**GROUND SURFACE**					116					
		100mm **ASPHALTIC CONCRETE**										
		340mm **AGGREGATE**										
	115.9 / 0.4			1	SS	18						
	115.5 / 0.8	**FILL**, clayey silt, some sand, trace gravel, very stiff, brown, moist										
1		**FILL**, silty sand to sandy silt, trace to some clay, loose, brown, moist		2	SS	6	115					
	114.6 / 1.7			3A / 3B	SS	50						
2		**SAND AND GRAVEL**, trace to some silt, trace clay, dense to very dense, brown, damp to moist		4	SS	48	114					...at 2.3m, Auger grinding to 2.6m
3				5	SS	71	113					
4	111.7 / 4.6			6A / 6B	SS	17	112					
5		**CLAYEY SILT**, trace gravel, trace to some sand, very stiff to hard, grey, damp to moist (GLACIAL TILL)					111					
6				7	SS	18	110					
7							109					
8				8	SS	40	108					
9				9	SS	56	107					
10												

Penetration Test Values (Blows / 0.3m): Dynamic Cone (10, 20, 30, 40)

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane (40, 80, 120, 160)

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL) (10, 20, 30)

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

(continued next page)

LOG OF BOREHOLE 8

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 17, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 2 of 2	Location : Mississauga, ON	Checked by : MT

Position : E: 608459, N: 4821804 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description (continued)	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)
		CLAYEY SILT, trace gravel, trace to some sand, very stiff to hard, grey, damp to moist (GLACIAL TILL) *(continued)*					106
11				10	SS	85 / 275mm	105
12				11	SS	50 / 150mm	104
13							103
14				12	SS	97	102
15							101
	100.6 / 15.7			13	SS	61	

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.
10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	14.2	102.1

file: 1-17-0362-01 bh logs.gpj

Terraprobe

LOG OF BOREHOLE 9

Project No. : 1-17-0362-01 | Client : Mississauga Seniors Land Corp | Originated by : FA

Date started : July 24, 2017 | Project : 1720 Sherwood Forrest Circle | Compiled by : NNA

Sheet No. : 1 of 1 | Location : Mississauga, ON | Checked by : MT

Position : E: 608490, N: 4821764 (UTM 17T) | Elevation Datum : Geodetic

Rig type : Truck-mounted | Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	116.2	**GROUND SURFACE**				
		80mm **TOPSOIL**				
		FILL, sandy silt, trace to some clay, trace to some gravel, very loose to loose, brown, moist		1	SS	7
1				2	SS	3
	114.7					
	1.5	**GRAVELLY SAND to SAND AND GRAVEL**, trace to some silt, trace clay, compact, brown, moist		3	SS	21
2				4	SS	28
3		...very dense		5	SS	50 / 125mm
4						
		...dense		6	SS	34
5						
6	110.1					
	6.1	**SILT**, trace sand, trace clay, trace gravel, dilatant, dense, brown, wet		7	SS	35
7						
	108.6					
	7.6	**CLAYEY SILT**, trace gravel, trace to some sand, shale fragments, hard, grey, damp to moist (GLACIAL TILL)		8	SS	36
8	108.0					
	8.2	**END OF BOREHOLE**				

Elevation Scale (m): 116, 115, 114, 113, 112, 111, 110, 109, 108

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL) 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

36 42 14 8

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	5.8	110.4

Unstabilized water level measured at 6.4 m below ground surface; borehole caved to 7.3 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed. 10' screen installed.

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 10

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 21, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608533, N: 4821777 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Sample Number	Sample Type	SPT 'N' Value
0	116.3	**GROUND SURFACE**				
		100mm **TOPSOIL**				
		FILL, sandy silt, trace clay, trace gravel, trace organics, roots, loose, brown, moist		1	SS	8
1				2	SS	4
	114.8					
	1.5	**GRAVELLY SAND to SAND AND GRAVEL**, trace silt, very dense, brown, moist		3	SS	51
2				4	SS	50 / 100mm
3				5	SS	50 / 75mm
4	111.7					
	4.6	**CLAYEY SILT**, trace to some sand, trace to some gravel, hard, brown / grey, moist (GLACIAL TILL)		6	SS	31
5						
6				7	SS	39
7						
8	108.1			8	SS	32
	8.2	**END OF BOREHOLE**				

Elevation Scale (m): 116, 115, 114, 113, 112, 111, 110, 109

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) Natural Water Content (MC) Liquid Limit (LL) — 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

Borehole was dry and open upon completion of drilling.

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 11

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 24, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608467, N: 4821745 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	116.1	**GROUND SURFACE**				
0		100mm **TOPSOIL**				
		FILL, sandy silt, trace to some clay, trace gravel, loose, brown, moist		1	SS	7
1				2	SS	4
	114.6					
	1.5	**SANDY SILT**, trace clay		3A	SS	29
	114.2					
	1.9	**GRAVELLY SAND to SAND AND GRAVEL**, trace to some silt, trace clay, compact to very dense, brown, damp to moist		3B		
2				4	SS	50 / 125mm
3				5	SS	50 / 125mm
4						
				6	SS	19
5						
6		...wet		7	SS	24
7	108.5					
	7.6	**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, moist (GLACIAL TILL)		8	SS	65
8	107.9					
	8.2	**END OF BOREHOLE**				

Elevation Scale (m): 116, 115, 114, 113, 112, 111, 110, 109, 108

Penetration Test Values (Blows / 0.3m)
Dynamic Cone: 10 20 30 40
Undrained Shear Strength (kPa)
Unconfined, Pocket Penetrometer, Field Vane, Lab Vane: 40 80 120 160

Moisture / Plasticity
Plastic Limit, Natural Water Content, Liquid Limit
PL MC LL: 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments
GRAIN SIZE DISTRIBUTION (%) (MIT)
GR SA SI CL

Unstabilized water level measured at 6.4 m below ground surface; borehole caved to 7.3 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed.
10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	5.5	110.6

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 12

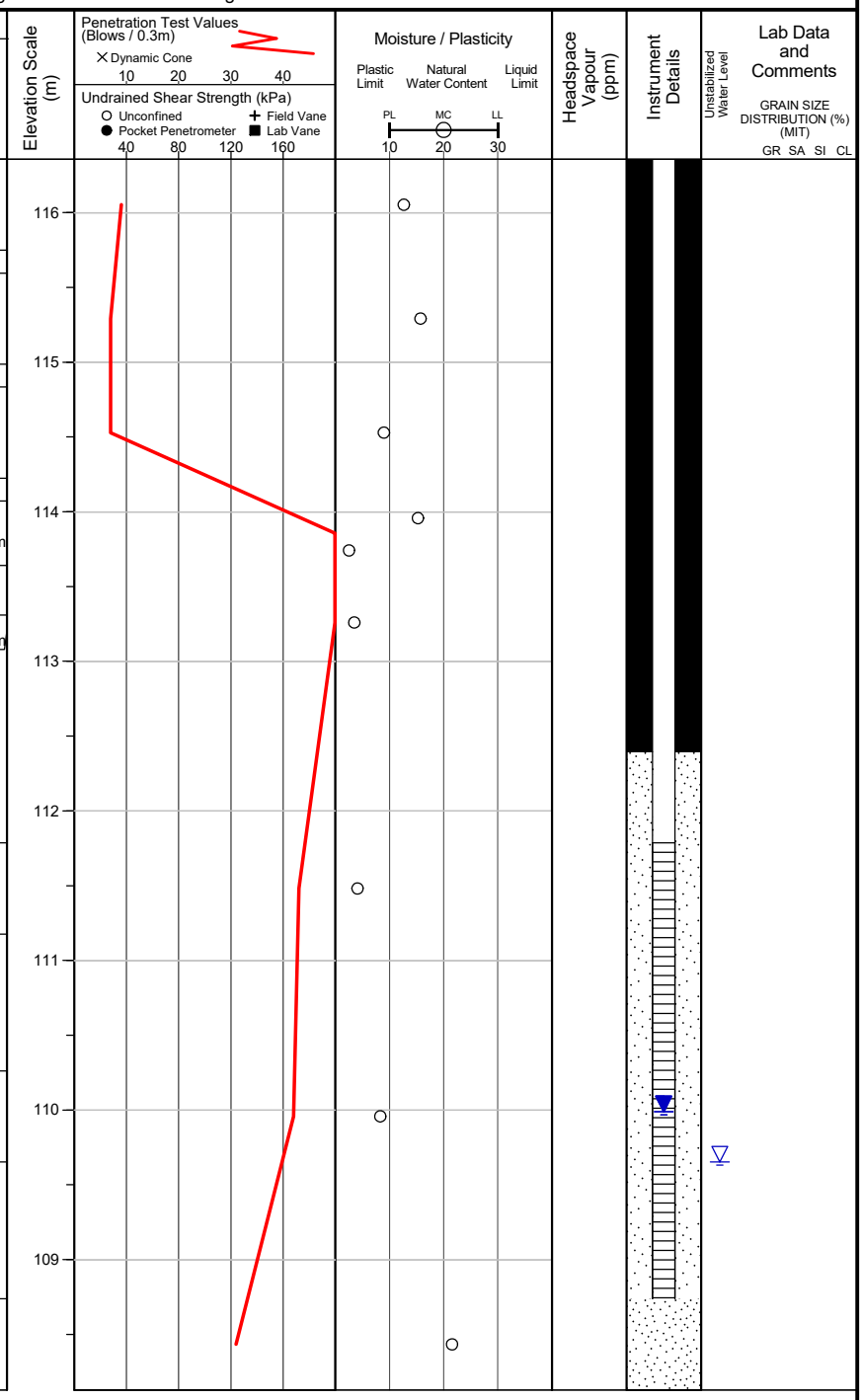
Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 21, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608540, N: 4821713 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	116.4	**GROUND SURFACE**				
		80mm **TOPSOIL**		1	SS	9
		FILL, clayey silt, trace to some sand, trace to some gravel, firm to stiff, brown, moist		2	SS	7
1	114.9					
	1.5	**FILL**, silty sand, trace clay, trace to some gravel, loose, brown, moist		3	SS	7
2	113.9			4A	SS	74 / 275mm
	2.5	**SAND AND GRAVEL**, trace to some silt, trace clay, dense to very dense, brown, damp to moist		4B		
3				5	SS	50 / 100mm
4						
5				6	SS	43
6				7	SS	42
7	108.8					
	7.6	**CLAYEY SILT**, some sand, trace gravel, hard, brown, moist (GLACIAL TILL)		8	SS	31
8	108.2					
	8.2	**END OF BOREHOLE**				



Unstabilized water level measured at 6.7 m below ground surface; borehole caved to 7.3 m below ground surface upon completion of drilling.

50 mm dia. monitoring well installed. 10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	6.4	110.0

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 13

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 21, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608606, N: 4821733 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
116.0	**GROUND SURFACE**				
	100mm **TOPSOIL**				
	FILL, clayey silt, trace sand, trace gravel, trace organics, roots, stiff, brown, moist		1	SS	12
115.2 / 0.8					
	FILL, sandy silt, trace gravel, some clay, loose, brown, moist		2	SS	9
114.5 / 1.5					
	SAND AND GRAVEL, trace silt, trace clay, dense, brown, moist		3	SS	35
	...at 2.5 m, gravel and sand		4	SS	41
			5	SS	38
	...very dense below		6	SS	50 / 125mm
			7	SS	50 / 25mm
108.4 / 7.6					
	CLAYEY SILT, some sand, some gravel, hard, grey, moist (GLACIAL TILL)		8	SS	40
107.8 / 8.2					

Penetration Test Values (Blows / 0.3m): Dynamic Cone (10, 20, 30, 40)

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane (40, 80, 120, 160)

Moisture / Plasticity: Plastic Limit (PL), Natural Water Content (MC), Liquid Limit (LL) (10, 20, 30)

Lab Data and Comments: GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL — 46 44 7 3

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.
10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	7.0	108.9

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 14

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 20, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608596, N: 4821634 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	115.8	**GROUND SURFACE**				
		80mm **TOPSOIL**		1	SS	4
		FILL, clayey silt, trace sand, trace gravel, trace organics, roots, soft, brown, moist				
	115.0 / 0.8	**FILL**, silty sand, some clay, trace gravel, loose, brown, moist		2	SS	4
1	114.3 / 1.5	**SAND AND GRAVEL**, trace silt, trace clay, dense to very dense, brown, moist		3	SS	25
2				4	SS	67
3				5	SS	27
4				6	SS	94 / 275mm
5						
6		...wet below		7	SS	19
7						
8	107.9 / 7.9			8	SS	43
	107.6 / 8.2	**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, moist (GLACIAL TILL)				

Elevation Scale (m): 115, 114, 113, 112, 111, 110, 109, 108

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit (PL) 10, Natural Water Content (MC) 20, Liquid Limit (LL) 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

END OF BOREHOLE

Borehole was dry and open upon completion of drilling.

50 mm dia. monitoring well installed.
10' screen installed.

WATER LEVEL READINGS

Date	Water Depth (m)	Elevation (m)
Aug 1, 2017	dry	n/a

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 15

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 19, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608637, N: 4821622 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value	Elevation Scale (m)	Penetration Test Values (Blows / 0.3m) / Undrained Shear Strength (kPa)	Moisture / Plasticity (PL, MC, LL)	Headspace Vapour (ppm)	Instrument Details	Unstabilized Water Level	Lab Data and Comments (GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL)
0	116.0	**GROUND SURFACE**											
		50mm **TOPSOIL**											
		FILL, clayey silt, some sand, trace to some gravel, trace organics, roots, firm to stiff, brown, moist		1	SS	9							
1				2	SS	4	115						
	114.5 / 1.5												
		GRAVELLY SAND to SAND AND GRAVEL, trace silt, trace clay, compact to very dense, brown, moist		3	SS	16							
2							114						
		...gravel and sand		4	SS	82 / 225mm							51 39 8 2
3				5	SS	50 / 125mm	113						
4							112						
				6	SS	50 / 125mm							
5							111						
6							110						
				7	SS	56							
7							109					▽	
		...wet											...at 7.6m, Spoon wet
8	107.8 / 8.2			8	SS	33	108						

END OF BOREHOLE

Unstabilized water level measured at 7.0 m below ground surface; borehole caved to 7.5 m below ground surface upon completion of drilling.

LOG OF BOREHOLE 16

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 20, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608588, N: 4821666 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev / Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
0	115.9 GROUND SURFACE					
		100mm **TOPSOIL**				
		FILL, sandy silt to silty sand, trace to some clay, trace to some gravel, loose, brown, moist		1	SS	9
1				2	SS	5
	114.4 / 1.5	**SAND AND GRAVEL**, trace silt, compact, brown, damp to moist		3	SS	28
2				4	SS	65 / 275mm
3				5	SS	62
4				6	SS	50 / 125mm
5						
6		...wet		7	SS	24
7	108.3 / 7.6					
	107.8 / 8.1	**CLAYEY SILT**, trace gravel, trace to some sand, hard, grey, moist (GLACIAL TILL)		8	SS	94 / 275mm
8		**END OF BOREHOLE**				

Borehole was dry and open upon completion of drilling.

Elevation Scale (m): 115, 114, 113, 112, 111, 110, 109, 108

Penetration Test Values (Blows / 0.3m): Dynamic Cone 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane — 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit — PL MC LL — 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT) GR SA SI CL

file: 1-17-0362-01 bh logs.gpj

LOG OF BOREHOLE 17

Terraprobe

Project No. : 1-17-0362-01	Client : Mississauga Seniors Land Corp	Originated by : FA
Date started : July 20, 2017	Project : 1720 Sherwood Forrest Circle	Compiled by : NNA
Sheet No. : 1 of 1	Location : Mississauga, ON	Checked by : MT

Position : E: 608617, N: 4821611 (UTM 17T) Elevation Datum : Geodetic

Rig type : Truck-mounted Drilling Method : Solid stem augers

Depth Scale (m)	Elev Depth (m)	Description	Graphic Log	Number	Type	SPT 'N' Value
	115.8	**GROUND SURFACE**				
		80mm **TOPSOIL**		1	SS	7
		FILL, sandy silt to silty sand, trace to some clay, trace to some gravel, loose, brown, moist		2	SS	6
	114.3 1.5	**SAND**, trace silt, trace gravel, trace clay, compact, brown, moist		3	SS	25
	113.7 2.1	**SAND AND GRAVEL**, trace to some silt, trace clay, very dense, brown, moist		4	SS	50 / 125mm
				5	SS	99 / 275mm
				6	SS	50 / 150mm
		...wet, dense		7	SS	35
	108.2 7.6	**SAND**, some gravel, trace to some silt, very dense, brown, wet		8	SS	53
	107.6 8.2	**END OF BOREHOLE**				

Elevation Scale (m): 115, 114, 113, 112, 111, 110, 109, 108

Penetration Test Values (Blows / 0.3m): Dynamic Cone; 10 20 30 40

Undrained Shear Strength (kPa): Unconfined, Pocket Penetrometer, Field Vane, Lab Vane; 40 80 120 160

Moisture / Plasticity: Plastic Limit, Natural Water Content, Liquid Limit; PL MC LL; 10 20 30

Headspace Vapour (ppm)

Instrument Details

Unstabilized Water Level

Lab Data and Comments

GRAIN SIZE DISTRIBUTION (%) (MIT)

GR SA SI CL

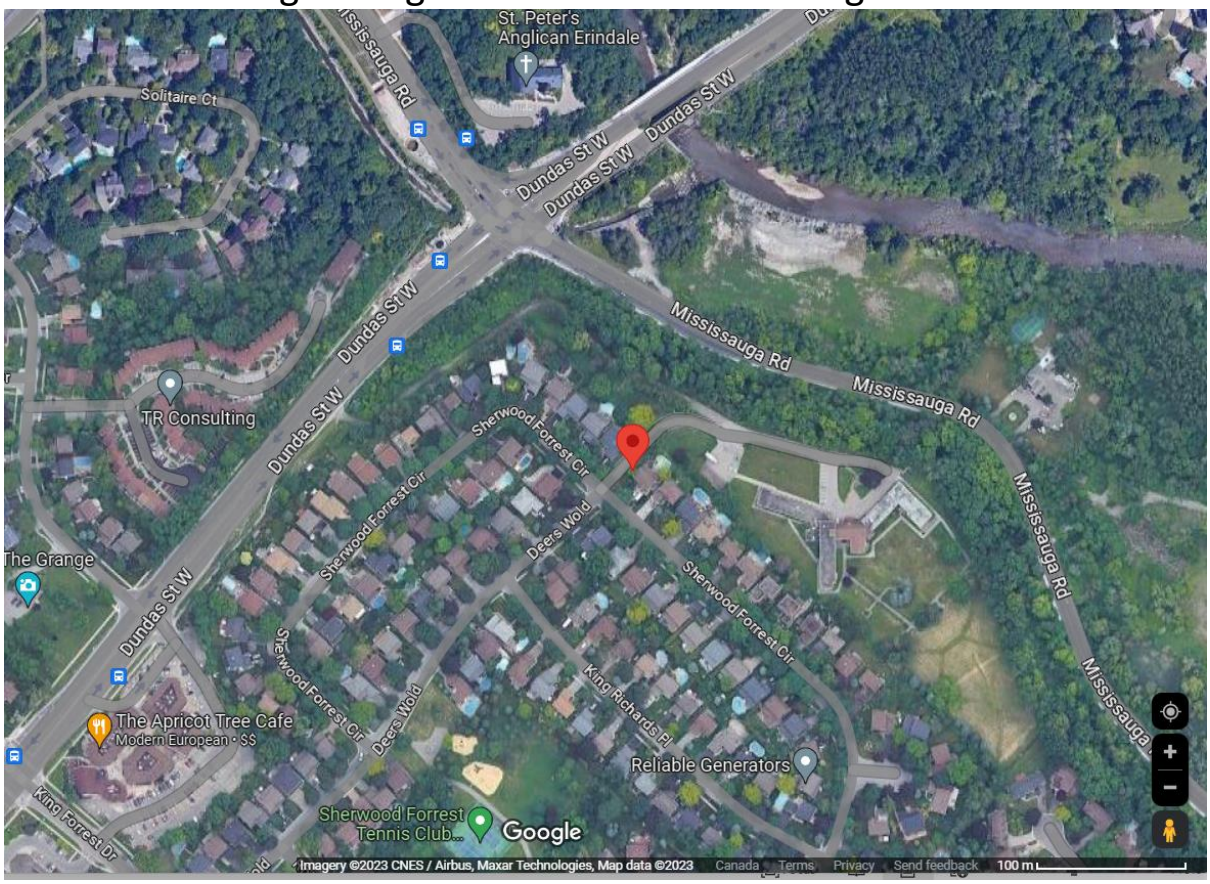
9 78 8 5

Unstabilized water level measured at 6.4 m below ground surface; borehole caved to 7.3 m below ground surface upon completion of drilling.

file: 1-17-0362-01 bh logs.gpj

Appendix B

Google Image of Site and Surrounding Areas



Slope Site Photographs
(Photos B1 to B20, taken by DS on July 11, 2023)

Photo B1: Top of slope area near Dundas St. (looking west from near Cross-Section X2-X2)

Photo B2: Toe of slope area near Dundas St. (looking west from near Cross-Section X2-X2)

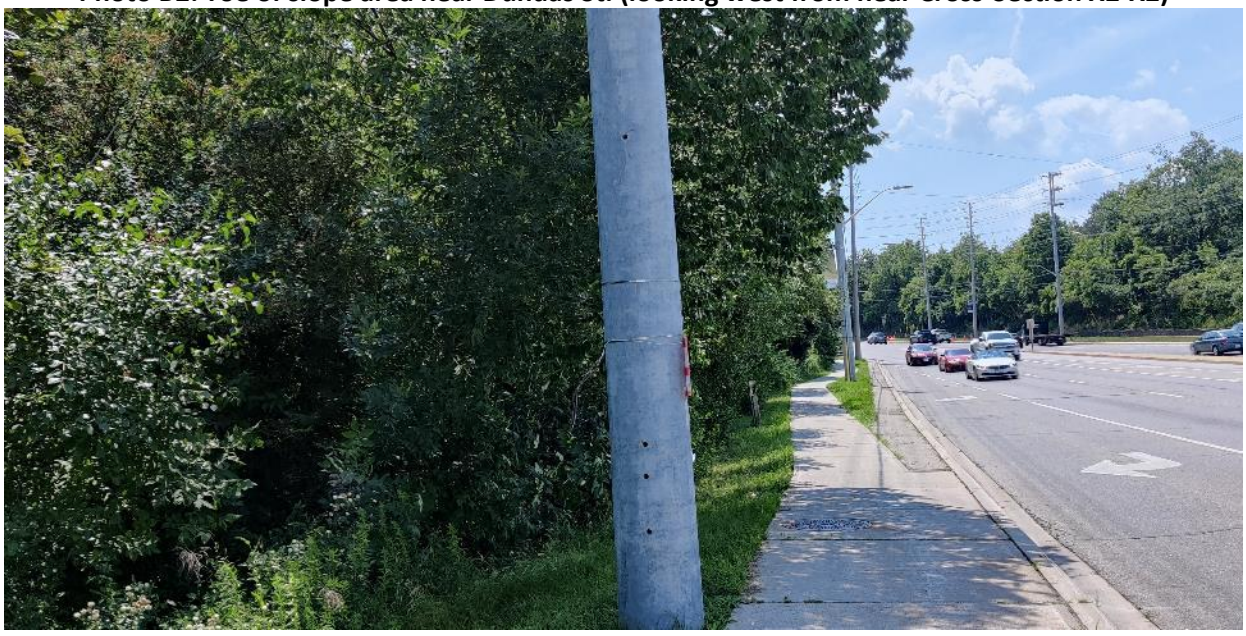


Photo B3: Top of slope area near Mississauga Rd (looking south from near Cross-Section X2-X2)

Photo B4: Toe of slope area near Mississauga Rd (looking south from near Cross-Section X2-X2)

Photo B5: Top of slope area (looking north from north of Cross-Section X5-X5)

Photo B6: Toe of slope area near Mississauga Rd
(looking north from north of Cross-Section X5-X5)

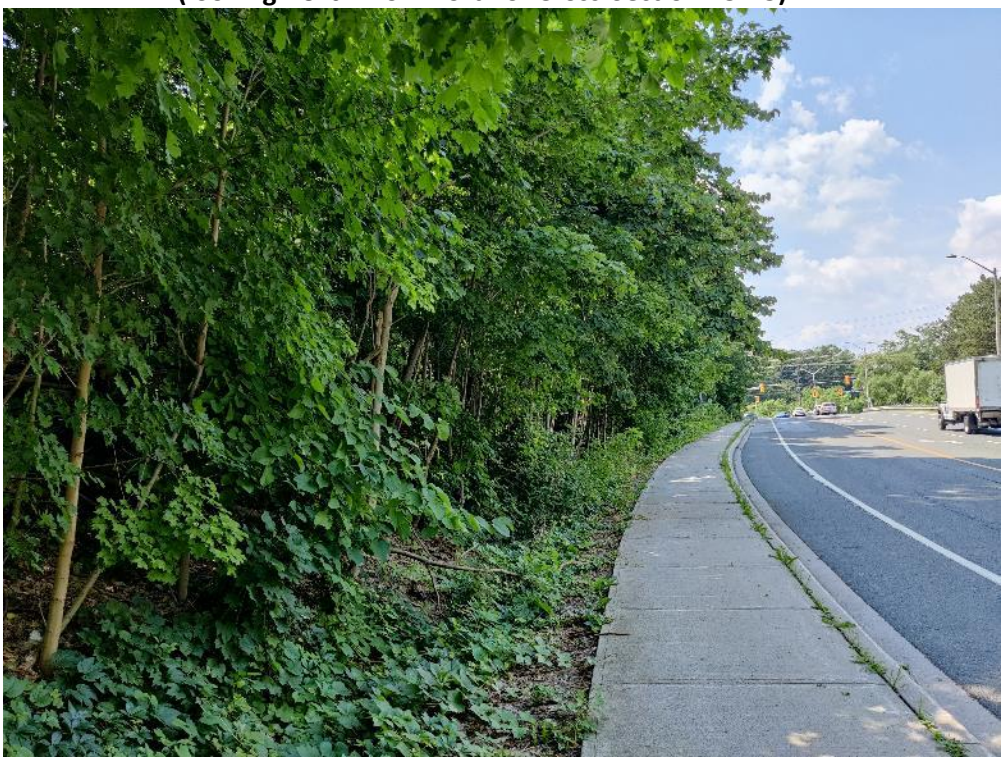


Photo B7: Top of slope area (looking south from north of Cross-Section X5-X5)

Photo B8: Toe of slope area (looking south from north of Cross-Section X5-X5)

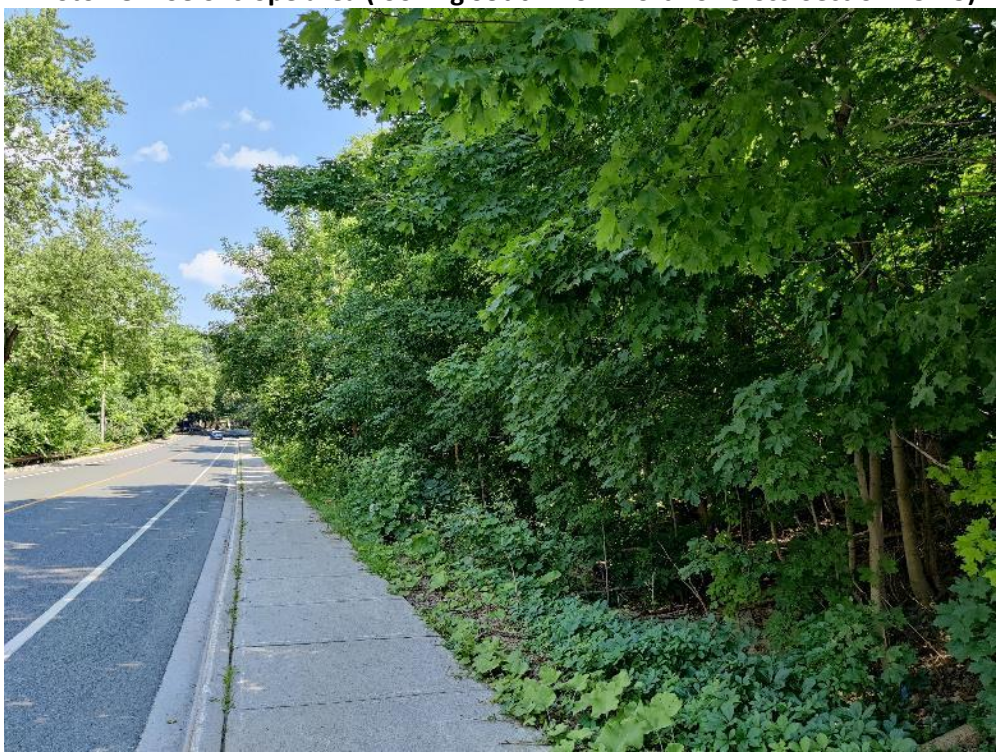


Photo B9: Slope conditions at north of Cross-Section X5-X5 (looking northwest from toe of slope)

Photo B10: Slope conditions at north of Cross-Section X5-X5 (looking southwest from toe of slope)

Photo B11: Top of slope area (looking north from near Cross-Section X7-X7)

Photo B12: Toe of slope area near Mississauga Rd
(looking north from near Cross-Section X7-X7)

Photo B13: Top of slope area (looking south from near Cross-Section X7-X7)

Photo B14: Steep slope conditions in area of Cross-Section X7-X7 (looking west – upward from toe of slope)

Photo B15: Top of slope area (looking north from near Cross-Section X11-X11)

Photo B16: Toe of slope area (looking north from near Cross-Section X11-X11)

Photo B17: Top of slope area (looking south from near Cross-Section X11-X11)

Photo B18: Toe of slope area (looking south from near Cross-Section X11-X11)

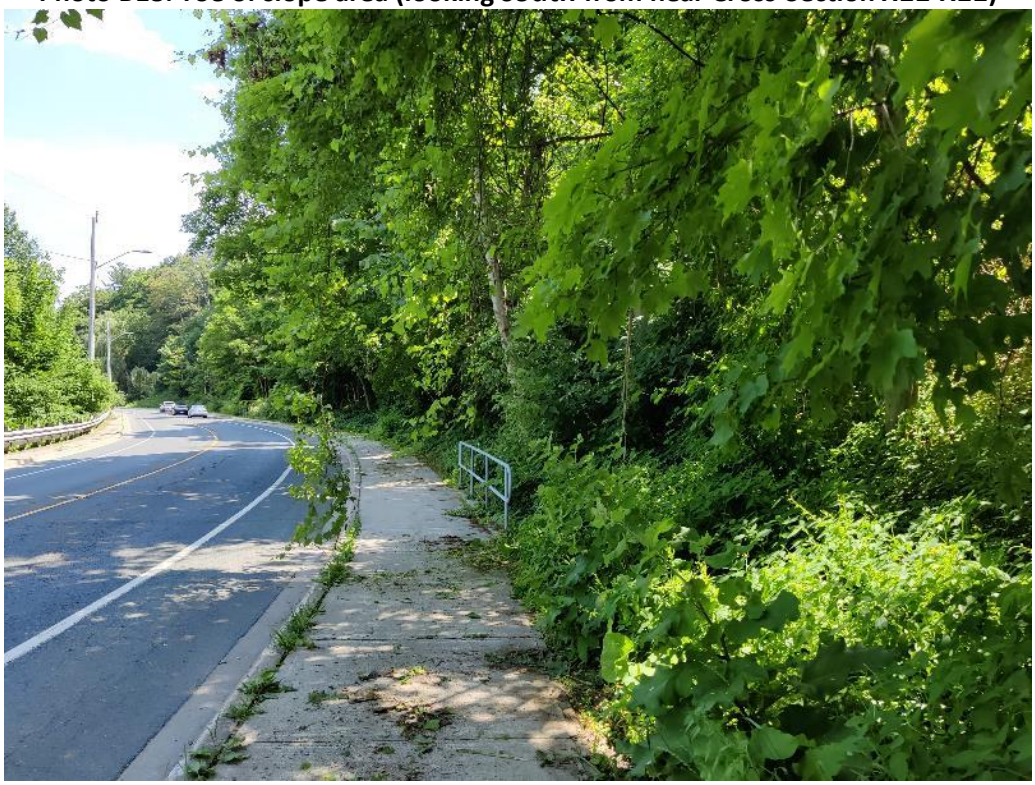


Photo B19: Slope conditions in area of Cross-Section X11-X11 (looking northwest from toe of slope)

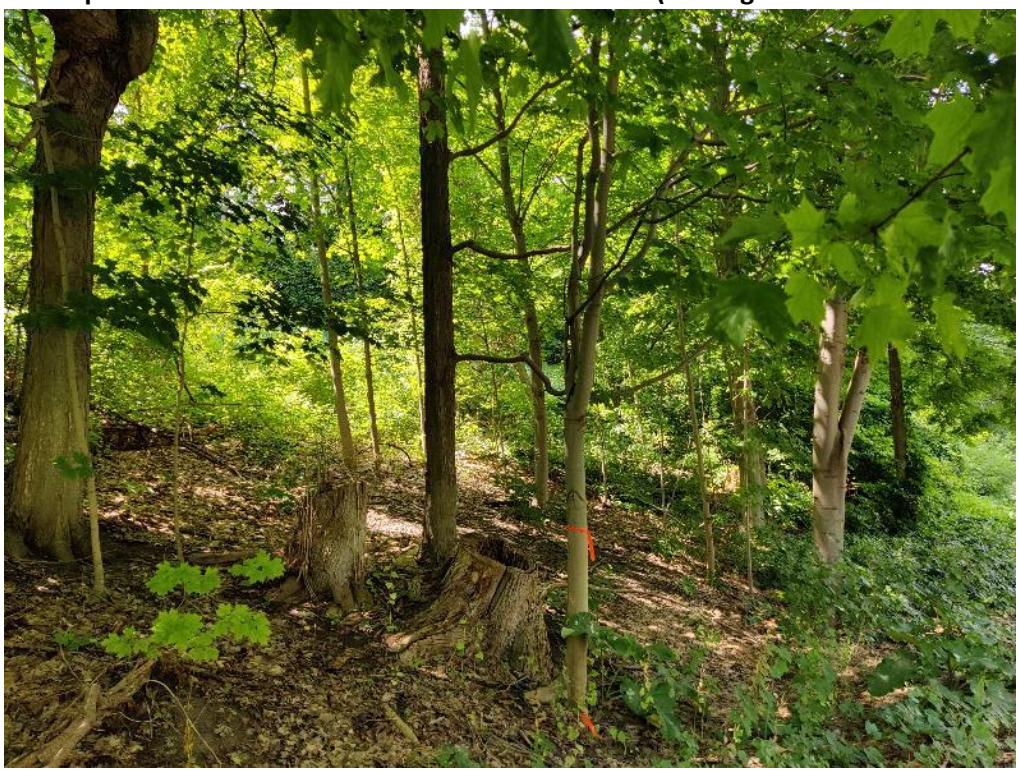
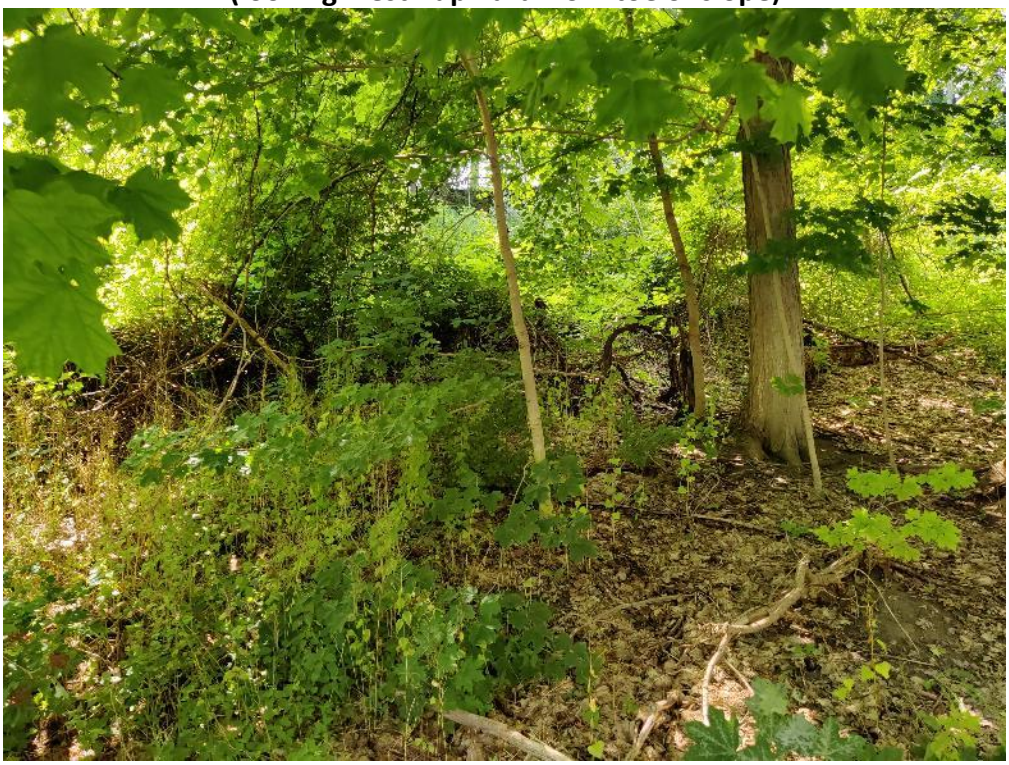


Photo B20: Slope conditions in area of Cross-Section X11-X11 (looking west - upward from toe of slope)



APPENDIX B

STORM DRAINAGE DESIGN

URBANTECH

STORM SEWER DESIGN SHEET

10 Year Storm

Sherwood Forrest Circle

City of Mississauga

PROJECT DETAILS

Project No: 23-747
Date: 24-May-24
Designed by: J.S.
Checked by: D.Z.

LICENSED PROFESSIONAL ENGINEER
J.L.STRAUSS
100513430
May 24, 2024
PROVINCE OF ONTARIO

DESIGN CRITERIA

Min. Diameter =	300	mm	Rainfall Intensity =	A / (Tc+B)^c
Mannings 'n'=	0.013			
Starting Tc =	15	min	A =	1010
			B =	4.6
Factor of Safety =	20	%	c =	0.78

NOMINAL PIPE SIZE USED

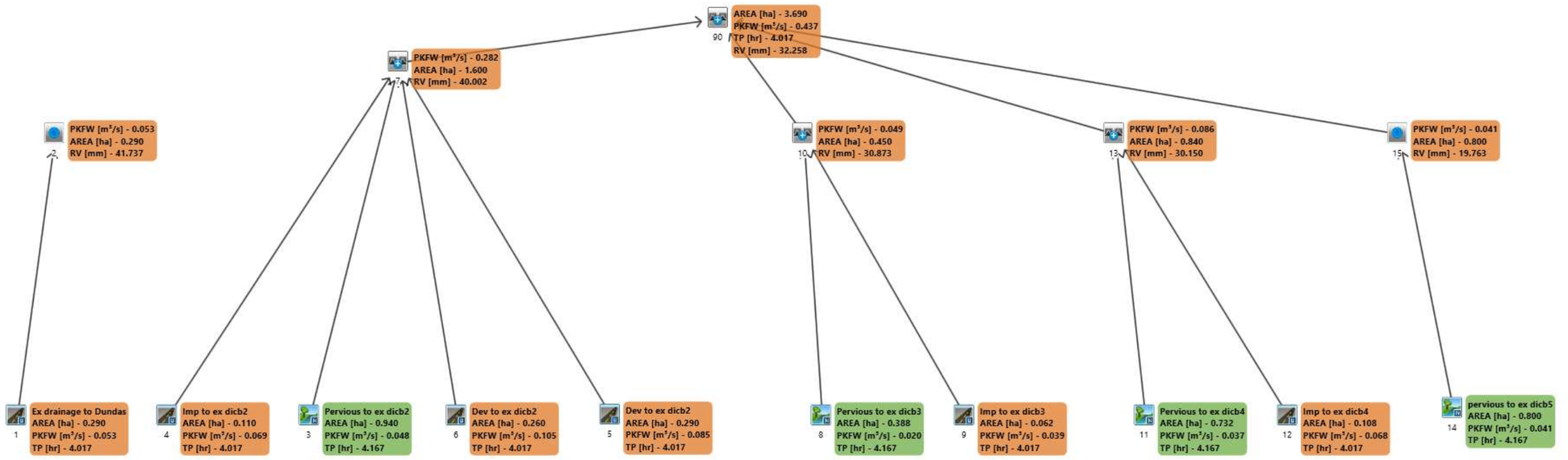
STREET	FROM MH	TO MH	AREA (ha)	RUNOFF COEFFICIENT "R"	'AR'	ACCUM. 'AR'	RAINFALL INTENSITY (mm/hr)	FLOW (m3/s)	CONSTANT FLOW (m3/s)	ACCUM. CONSTANT FLOW (m3/s)	TOTAL FLOW (m3/s)	LENGTH (m)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (m3/s)	FULL FLOW VELOCITY (m/s)	INITIAL Tc (min)	TIME OF CONCENTRATION (min)	ACC. TIME OF CONCENTRATION (min)	PERCENT FULL (%)
	MH117	MH109	0.14	0.55	0.08	0.08	99.2	0.021			0.021	40.1	0.30	250	0.033	0.66	15.00	1.01	16.01	65%
	MH112	MH111	0.06	0.55	0.03	0.03	99.2	0.009			0.009	16.9	0.30	250	0.033	0.66	15.00	0.42	15.42	28%
	MH111	MH110	0.03	0.90	0.03	0.06	97.5	0.016			0.016	10.5	0.30	250	0.033	0.66	15.42	0.26	15.69	50%
	MH110	MH109	0.36	0.55	0.20	0.26	96.5	0.069			0.069	74.5	0.30	375	0.096	0.87	15.69	1.43	17.12	72%
	MH109	MH108	0.41	0.55	0.23	0.56	91.5	0.143			0.143	105.4	0.30	525	0.236	1.09	17.12	1.61	18.73	61%
	MH116	MH115	0.32	0.55	0.18	0.18	99.2	0.048			0.048	48.0	0.30	375	0.096	0.87	15.00	0.92	15.92	50%
	MH115	MH114	0.07	0.55	0.04	0.21	95.7	0.057			0.057	20.9	0.30	375	0.096	0.87	15.92	0.40	16.32	59%
	MH114	MH113				0.21	94.2	0.056			0.056	11.9	0.30	375	0.096	0.87	16.32	0.23	16.55	58%
	MH113	MH108	0.12	0.55	0.07	0.28	93.5	0.073			0.073	39.6	0.30	375	0.096	0.87	16.55	0.76	17.31	76%
	MH108	MH107	0.46	0.55	0.25	1.09	86.6	0.263			0.263	106.1	0.30	600	0.336	1.19	18.73	1.49	20.22	78%
	MH107	MH106	0.01	0.90	0.01	1.10	82.5	0.253			0.253	11.8	0.30	600	0.336	1.19	20.22	0.17	20.38	75%
	MH106	MH105	0.10	0.55	0.06	1.16	82.1	0.264			0.264	17.4	0.30	600	0.336	1.19	20.38	0.24	20.63	78%
	MH105	OGS1				1.16	81.4	0.262			0.262	29.8	0.30	600	0.336	1.19	20.63	0.42	21.04	78%
	OGS1	TANK 1				1.16	80.4	0.259			0.259	2.0	0.30	600	0.336	1.19	21.04	0.03	21.07	77%
	TANK 1	MH104				1.16	80.3		0.058	0.058	0.058	14.6	0.30	375	0.096	0.87	21.07	0.28	21.35	60%
	MH104	MH103				1.16	79.7			0.058	0.058	125.5	0.30	375	0.096	0.87	21.35	2.41	23.76	60%
	MH103	MH102				1.16	74.3			0.058	0.058	17.2	0.30	375	0.096	0.87	23.76	0.33	24.09	60%
	MH102	MH101				1.16	73.7			0.058	0.058	11.5	0.30	375	0.096	0.87	24.09	0.22	24.31	60%

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

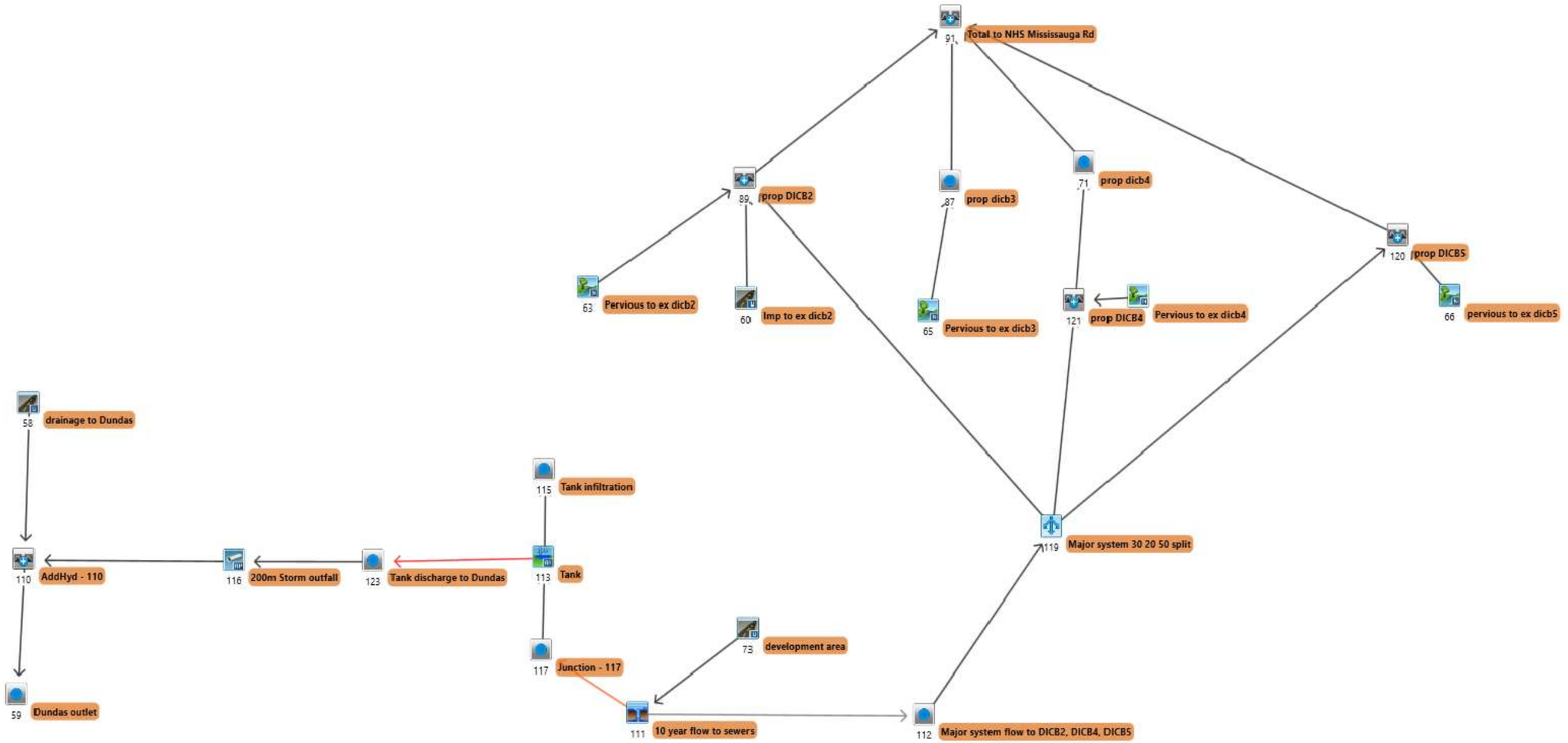
APPENDIX C

STORMWATER MANAGEMENT DESIGN

EXISTING VISUAL OTTHYMO SCHEMATIC



PROPOSED VISUAL OTTHYMO SCHEMATIC



Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

05/22/2024

Province:	Ontario
City:	mississauga
Nearest Rainfall Station:	TORONTO INTL AP
Climate Station Id:	6158731
Years of Rainfall Data:	20

Site Name:	

Drainage Area (ha):	2.01
% Imperviousness:	70.00

Runoff Coefficient 'c': 0.72

Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	45.00
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	1054
Estimated Average Annual Sediment Volume (L/yr):	857

Project Name:	Sherwood Forrest
Project Number:	23-747
Designer Name:	Urbantech Water
Designer Company:	Urbantech
Designer Email:	avanginkel@urbantech.com
Designer Phone:	416-333-5360
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	42
EFO6	52
EFO8	58
EFO10	61
EFO12	64

Recommended Stormceptor EFO Model: EFO10

Estimated Net Annual Sediment (TSS) Load Reduction (%): 61

Water Quality Runoff Volume Capture (%): > 90

imbrium

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

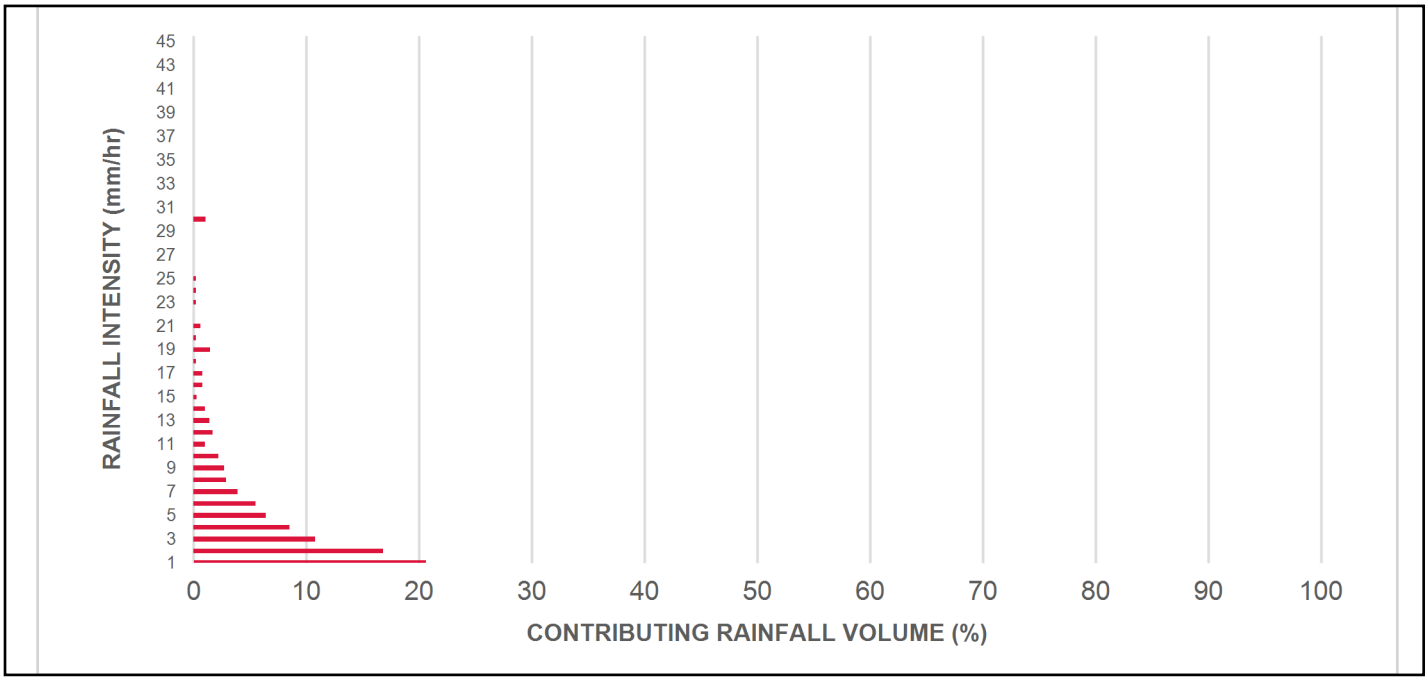
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

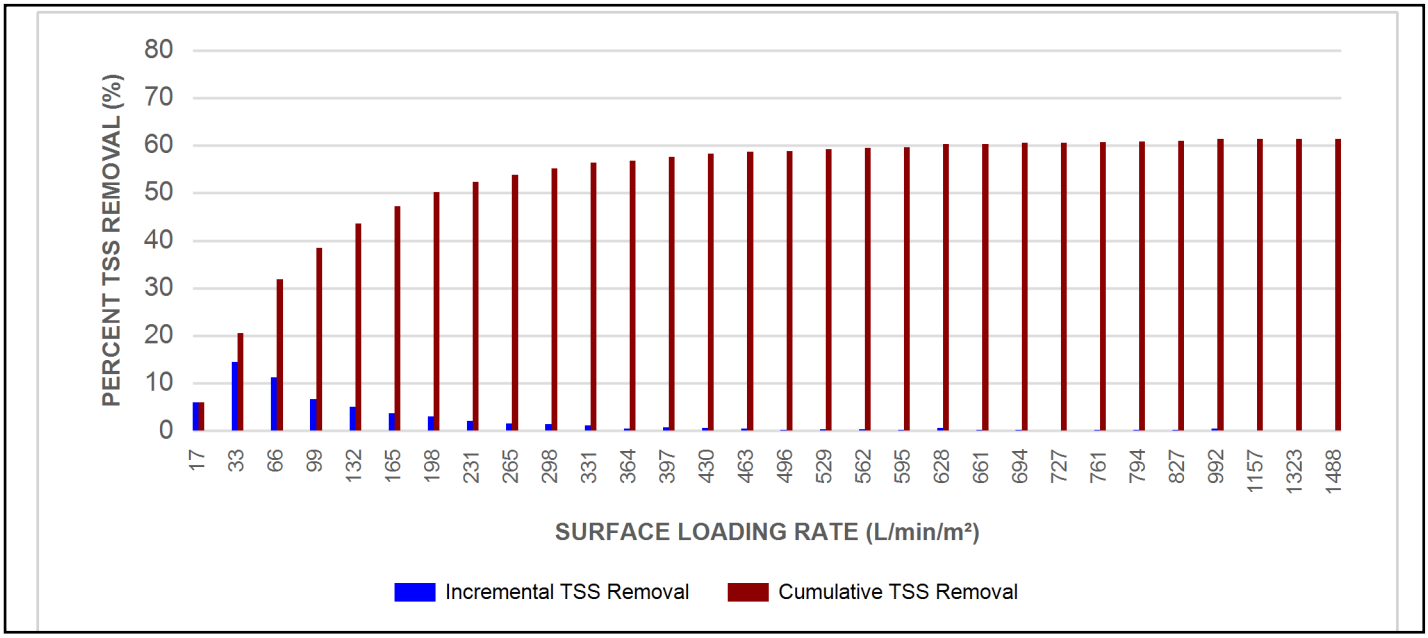
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	2.01	121.0	17.0	70	6.0	6.0
1.00	20.6	29.1	4.02	241.0	33.0	70	14.5	20.5
2.00	16.8	45.9	8.05	483.0	66.0	67	11.3	31.8
3.00	10.8	56.7	12.07	724.0	99.0	62	6.7	38.5
4.00	8.5	65.2	16.09	966.0	132.0	60	5.1	43.6
5.00	6.4	71.6	20.12	1207.0	165.0	57	3.7	47.2
6.00	5.5	77.0	24.14	1448.0	198.0	55	3.0	50.2
7.00	3.9	81.0	28.16	1690.0	231.0	53	2.1	52.3
8.00	2.9	83.9	32.19	1931.0	265.0	52	1.5	53.8
9.00	2.7	86.5	36.21	2173.0	298.0	51	1.4	55.2
10.00	2.2	88.7	40.23	2414.0	331.0	50	1.1	56.3
11.00	1.0	89.7	44.26	2655.0	364.0	49	0.5	56.8
12.00	1.7	91.3	48.28	2897.0	397.0	48	0.8	57.6
13.00	1.4	92.8	52.30	3138.0	430.0	47	0.7	58.3
14.00	1.0	93.7	56.33	3380.0	463.0	46	0.4	58.7
15.00	0.3	94.0	60.35	3621.0	496.0	45	0.1	58.8
16.00	0.8	94.8	64.37	3862.0	529.0	44	0.3	59.2
17.00	0.8	95.7	68.39	4104.0	562.0	43	0.4	59.5
18.00	0.2	95.8	72.42	4345.0	595.0	42	0.1	59.6
19.00	1.5	97.3	76.44	4586.0	628.0	42	0.6	60.3
20.00	0.2	97.5	80.46	4828.0	661.0	42	0.1	60.3
21.00	0.6	98.2	84.49	5069.0	694.0	42	0.3	60.6
22.00	0.0	98.2	88.51	5311.0	727.0	41	0.0	60.6
23.00	0.2	98.4	92.53	5552.0	761.0	41	0.1	60.7
24.00	0.2	98.6	96.56	5793.0	794.0	41	0.1	60.8
25.00	0.2	98.9	100.58	6035.0	827.0	41	0.1	60.9
30.00	1.1	100.0	120.70	7242.0	992.0	40	0.5	61.3
35.00	0.0	100.0	140.81	8449.0	1157.0	38	0.0	61.3
40.00	0.0	100.0	160.93	9656.0	1323.0	35	0.0	61.3
45.00	0.0	100.0	181.04	10863.0	1488.0	32	0.0	61.3
Estimated Net Annual Sediment (TSS) Load Reduction =								**61 %**

Climate Station ID: 6158731 *Years of Rainfall Data*: 20

RAINFALL DATA FROM TORONTO INTL AP RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

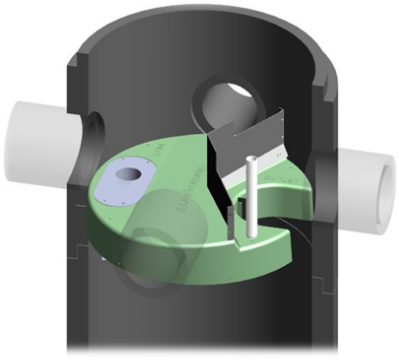
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

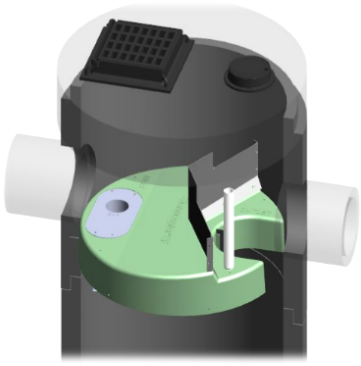
DESIGN FLEXIBILITY

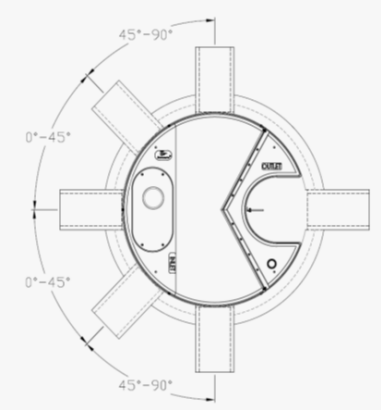
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to

assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

APPENDIX D

SANITARY SERVICING DESIGN

URBANTECH®

SANITARY DESIGN CALCULATIONS

Project Name: 1720 Sherwood Forrest Circle
Municipality: City of Mississauga
Project No.: 23-747

Prepared by: DT
Checked by: JS
Last Revised: 24-May-24

Acroynms

ADWF	Average Dry Weather Flow (L/s)
PF	Peaking Factor (Ratio of PDWF to ADWF)
PDWF	Peak Dry Weather Flow (L/s) = ADWF x PF
$Q_{I\&I}$	Extraneous Flow; Inflow and Infiltration (L/s)
PWWF	Peak Wet Weather Flow (L/s) = PDWF + $Q_{I\&I}$
Q_{des}	Design Flow (L/s) = PWWF

Proposed Residential

	Site Area =	2.08	ha
	Total Single Detached Units =	56	units
	Population per Unit =	4.2	ppu
	Population =	236	persons
	Unit Sewage Flow =	290.0	L/person/day
ADWF	Average Day Design Flow	0.79	L/s
	Harmon Peaking Factor for Site, M =	$1+(14/(4+P^{0.5}))$	
PF	=	4.000	(Min. 2.0, Max 4.0)
PDWF	Peak Design Flow =	3.17	L/s
	Infiltration Allowance =	0.26	L/s/ha
$Q_{I\&I}$	Total Infiltration Flow =	0.54	L/s
PWWF = Q_{des}	Total Sanitary Design Flow =	3.7	L/s

Proposed Service Connection

Capacity					
Diameter (mm)	Slope (%)	Velocity (m/s)	Capacity (L/s)	Spare Capacity (L/s)	Percent Full
250	1.00	1.21	59.5	55.8	6.2%

Notes:

1. Site Plan and Statistics per Preliminary Development Concept (CP-16) prepared by Gerrard Design.

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

URBANTECH

SANITARY SEWER DESIGN SHEET

1720 Sherwood Forrest Circle

CITY OF MISSISSAUGA, REGION OF PEEL

PROJECT DETAILS

Project No: 23-747
Date: 24-May-24
Designed by: J.S.
Checked by: D.Z.

DESIGN CRITERIA

Min Diameter =	200	mm	Avg. Domestic Flow =	290.0	l/c/d
Mannings 'n'=	0.013		Infiltration =	0.260	l/s/ha
Min. Velocity =	0.75	m/s	Max. Peaking Factor =	4.00	
Max. Velocity =	3.50	m/s	Min. Peaking Factor=	2.00	
			Domestic Sewage flow for < 1000 ppl = 0.013m^3/s		
Factor of Safety =	30	%	(Region of Peel Std. 2-5-2)		

LICENSED PROFESSIONAL ENGINEER
J.L.STRAUSS
100513430
May 24, 2024
PROVINCE OF ONTARIO

NOMINAL PIPE SIZE USED

STREET	FROM MH	TO MH	RESIDENTIAL							COMMERCIAL/INDUSTRIAL/INSTITUTIONAL						FLOW CALCULATIONS							PIPE DATA					
			AREA (ha)	ACC. AREA (ha)	UNITS (#)	DENSITY (P/ha)	DENSITY (P/unit)	POP	ACCUM. RES. POP.	AREA (ha)	ACC. AREA (ha)	EQUIV. POP. (p/ha)	FLOW RATE (l/s/ha)	EQUIV. POP.	ACCUM. EQUIV. POP.	INFILTRATION (l/s)	TOTAL ACCUM. POP.	PEAKING FACTOR	RES. FLOW (l/s)	COMM. FLOW (l/s)	ACCUM. COMM. FLOW (l/s)	TOTAL FLOW (l/s)	SLOPE (%)	PIPE DIAMETER (mm)	FULL FLOW CAPACITY (l/s)	FULL FLOW VELOCITY (m/s)	ACTUAL VELOCITY (m/s)	PERCENT FULL (%)
	MH114A	MH109A	0.17	0.17	4		4.2	17	17							0.0	17	4.00	0.2			0.3	2.00	200	46.4	1.48	0.38	1%
	MH113A	MH112A	0.05	0.05	1		4.2	5	5							0.0	5	4.00	0.1			0.1	1.00	200	32.8	1.04	0.27	0%
	MH112A	MH111A		0.05					5							0.0	5	4.00	0.1			0.1	0.50	200	23.2	0.74	0.19	0%
	MH111A	MH110A	0.24	0.29	6		4.2	26	31							0.1	31	4.00	0.4			0.5	0.50	200	23.2	0.74	0.26	2%
	MH110A	MH109A	0.27	0.56	9		4.2	38	69							0.1	69	4.00	0.9			1.1	0.50	200	23.2	0.74	0.36	5%
	MH109A	MH101A	0.18	0.91	6		4.2	26	112							0.2	112	4.00	1.5			1.7	0.50	200	23.2	0.74	0.44	8%
		MH108A	0.04	0.04												0.0						0.0						
	MH108A	MH107A	0.19	0.23	5		4.2	21	21							0.1	21	4.00	0.3			0.3	1.00	200	32.8	1.04	0.27	1%
	MH107A	MH106A	0.04	0.27					21							0.1	21	4.00	0.3			0.4	0.50	200	23.2	0.74	0.23	2%
	MH106A	MH102A	0.16	0.43	4		4.2	17	38							0.1	38	4.00	0.5			0.6	0.50	200	23.2	0.74	0.29	3%
	MH105A	MH104A	0.07	0.07	1		4.2	5	5							0.0	5	4.00	0.1			0.1	1.00	200	32.8	1.04	0.27	0%
	MH104A	MH103A	0.04	0.11					5							0.0	5	4.00	0.1			0.1	0.50	200	23.2	0.74	0.19	0%
	MH103A	MH102A	0.37	0.48	11		4.2	47	52							0.1	52	4.00	0.7			0.8	0.50	200	23.2	0.74	0.33	4%
	MH102A	MH101A	0.26	1.17	9		4.2	38	128							0.3	128	4.00	1.7			2.0	0.50	200	23.2	0.74	0.46	9%
	MH101A	EX. PLUG		2.08					240							0.5	240	4.00	3.2			3.8	0.50	250	42.0	0.86	0.53	9%
				TOTAL:	**56**																							

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3760 14th Avenue, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

APPENDIX E

WATER DEMAND CALCULATIONS

URBANTECH

WATER DEMAND CALCULATIONS

Project Name: 1720 Sherwood Forrest Circle
Municipality: City of Mississauga
Project No.: 23-747

Prepared by: DT
Checked by: JS
Date: 24-May-24

Domestic Flow Calculations

Population =	236	persons, from Sanitary Design Calculations
Average Consumption Rate =	280	L/person/day, for Residential (Section 2.3, Table 1)
Average Water Demand =	0.76	L/s

Use Peaking Factor the Greater of

Max Day Factor =	2.0	for Residential (Section 2.3, Table 1)
Max Day Demand =	1.53	L/s

or

Peak Hour Factor =	3.0	for Residential (Section 2.3, Table 1)
Peak Hour Demand =	2.29	L/s

Therefore

Domestic Flow Demand =	2.3	L/s
=	36	USGPM

Notes:

1. Site Plan and Statistics per Preliminary Development Concept (CP-22) prepared by Gerrard Design.

Urbantech Consulting, A Division of Leighton-Zec Ltd.
3760 14th, Suite 301 Markham, Ontario L3R 3T7
TEL: 905.946.9461 FAX: 905.946.9595
www.urbantech.com

Hydrant Flow Test Report

Residual Hydrant Number _____

Operator: Colin Powell

Date: 08-Feb-24 Time: 9:15 AM

Witness: Region of Peel

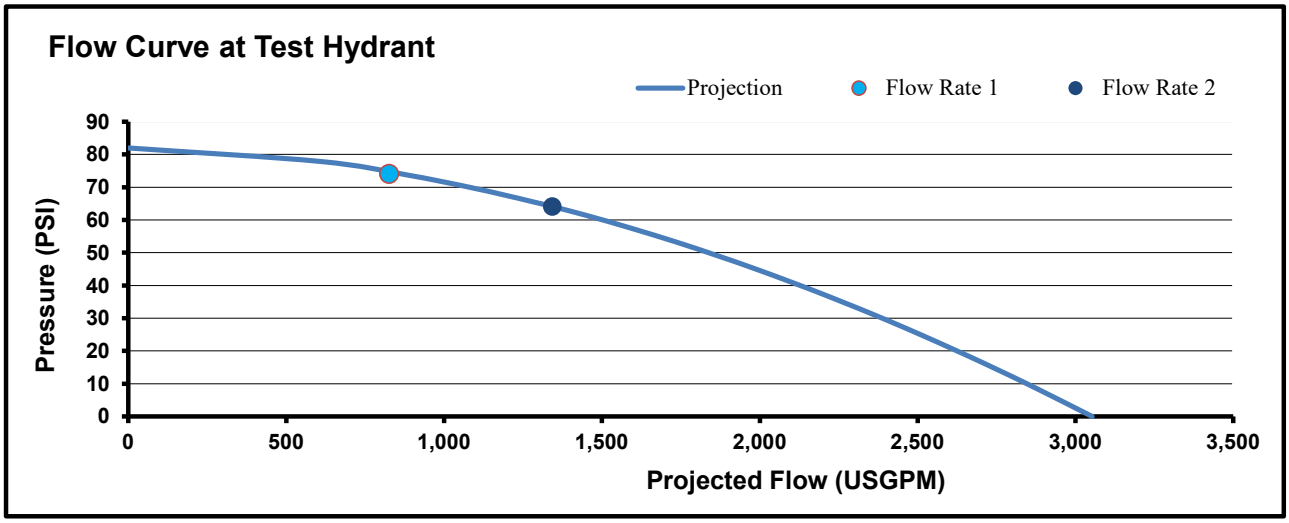
Residual Test Hydrant:	1762 Sherwood Forrest Circle		
Hydrant Number:	2019562	NFPA Colour Code:	**CLASS AA - BLUE**
Owner:	Regon of Peel		

STATIC PRESSURE:	82 psi	565 kPa	Pressure Drop
RESIDUAL PRESSURE 1:	74.1 psi	511 kPa	9.6%
RESIDUAL PRESSURE 2:	64.1 psi	442 kPa	21.8%

Flow Hydrants:			**Hydrant Number**
	A	1716 Sherwood Forrest Circle	2019565
	B		
	C		

Hydrant No.	Flow Device	Outlet Dia. (in.)	Flow Rate 1 Reading (psi)	Flow Rate 1 (USGPM)	Flow Rate 2 Reading (psi)	Flow Rate 2 (USGPM)
A	Pitot	2.5	28	825	18	662
A	Pitot	2.5		0	19	680
A	HoseMonster	4"				
Total Flow (USGPM)			825		1342	
Total Flow (L/second)			52		85	
Available Flow At Test Hydrant at 20 ps			2,511	USGPM	2,625	USGPM
			158	L/second	166	L/second

Average Projection at 20 PSI 2,568 USGPM



Comments/Discrepencies/Diagram:

Watermark Solutions Limited
(705) 250-0368 www.watermark.ca

Hydrant Flow Test Report

Residual Hydrant Number _____

Operator: Colin Powell

Date: 08-Feb-24 Time: 10:05 AM

Witness: Region of Peel

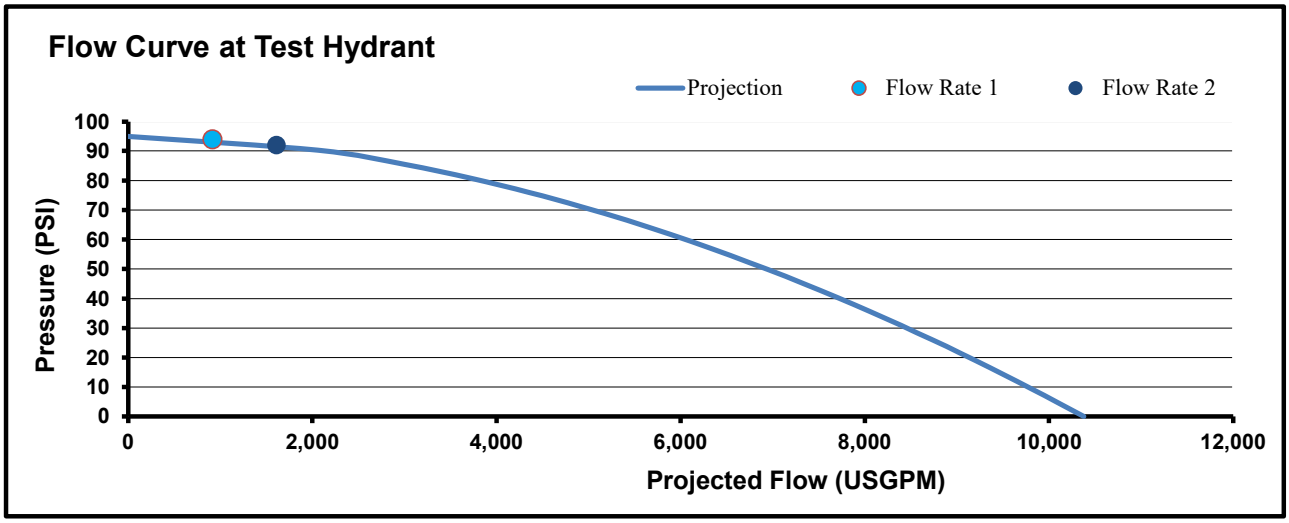
Residual Test Hydrant:	Mississauga Road at U of T Entrance		
Hydrant Number:	2020959	NFPA Colour Code:	**CLASS AA - BLUE**
Owner:	Regon of Peel		

STATIC PRESSURE:	95 psi	655 kPa	Pressure Drop
RESIDUAL PRESSURE 1:	94 psi	648 kPa	1.1%
RESIDUAL PRESSURE 2:	92 psi	634 kPa	3.2%

			Hydrant Number
Flow Hydrants:	A	3041 Mississauga Road	2020960
	B		
	C		

Hydrant No.	Flow Device	Outlet Dia. (in.)	Flow Rate 1 Reading (psi)	Flow Rate 1 (USGPM)	Flow Rate 2 Reading (psi)	Flow Rate 2 (USGPM)
A	Pitot	2.5	34	910	26	795
A	Pitot	2.5		0	27	811
A	HoseMonster	4"		0		
Total Flow (USGPM)			910		1606	
Total Flow (L/second)			57		101	
Available Flow At Test Hydrant at 20 ps			9,363	USGPM	9,134	USGPM
			591	L/second	576	L/second

Average Projection at 20 PSI 9,248 USGPM



Comments/Discrepencies/Diagram:

Watermark Solutions Limited
(705) 250-0368 www.watermark.ca

APPENDIX F

REGION OF PEEL CONNECTION DEMAND TABLE

Project Name: 1720 Sherwood Forrest Circle
Project Number: 23-747
Date: May 24, 2024

Water and Wastewater Modelling Demand Table - Site Plan applications

Version - January 2023

		units	persons
Proposed Residential[1)]			
	Singles/Semis	56	236
	townhouses		
	large apartments (>750sqft)		
	small apartments (<=750sqft)		
Total Proposed Residential		56	236
Proposed Institutional Population[2)]			
Proposed Employment Population[3)]			
Total		56	236

Proposed GFA (commercial/retail) (sqm)	

WATER CONNECTION

Hydrant flow test				
	Hydrant flow test locations [4)]			
		HYD 2019562, HYD 2020959		
		Pressure (kPa)	Flow (in l/s)	Time
	Minimum water pressure			
	Maximum water pressure			

See below. Refer to Hydrant Flow Test Results in Appendix E for details.

HYD 2019562 - 150mm WM Sherwood
162 L/s (2,568 USGPM) @ 20 psi

HYD 2020959 - 400mm WM Mississauga
583 L/s (9,248 USGPM) @ 20 psi

No.	**Water demands**				
	Demand type	**Demand (in l/s)**			
		Use 1 [6)]	**Use 2 [6)]**	**Use 3 [6)]**	**Total**
1	Average day flow	0.8			0.8
2	Maximum day flow	1.5			1.5
3	Peak hour flow	2.3			2.3
4	Fire flow [5)]	150.0			150.0
Analysis					
5	Maximum day plus fire flow	152.3			152.3

Residential use only.
Refer to Watermain Servicing Plan (Drawing C103) and Water Demand Calculations for details.

WASTEWATER CONNECTION

		Discharge Location[7)]	**Flow**
6	Wastewater sewer effluent (in l/s)	Ex. 250 mm sanitary sewer	3.7 L/s
7	Wastewater sewer effluent (in l/s)	along Sherwood Forrest circle	
8	Wastewater sewer effluent (in l/s)		
9	Total Wastewater sewer effluent (in l/s)		3.7 L/s

ADWF = 0.79 L/s
PF = 4.00
PDWF = 3.17 L/s
$Q_{I\&I}$ = 0.54 L/s
PWWF = 3.7 L/s
Q_{des} = 3.7 L/s

One discharge location and residential use only.
Refer to Sanitary Drainage Plan (Drawing C303) and Sanitary Design Calculations for Details.

[1)] For the design flow calculations, please consider the following PPU's, which are found in the Region of Peel 2020 DC Background Study

- Singles/Semi – 4.2

☐Multiples (Townhouses) – 3.4
☐Large Apartments (larger than 750 square feet) – 3.0
☐Small Apartments (equal to or less than 750 square feet) – 1.6

[2)] refer to Region of Peel design criteria

[3)] For the commercial and industrial design flow calculations, please use your site specific estimated population or the most current Ontario Building Code Occupant Load determination

[4)] Please include the graphs associated with the hydrant flow test information table

[4)] Hydrant flow tests should be performed within 2 years of submisison to the Region.
The Region will not permit hydrant flow tests during the winter, please check with the Region for scheduling

[5)] Please reference the Fire Underwriters Survey Document

[6)] Please identify the flows for each use type, if applicable

[7)] Please include drainage plan for mutliple discharge locations

The calculations should be based on the development proposal
All required calculations must be submitted with the demand table submission
Table shall include Professional Engineer's signature and stamp
Site servicing concept shall be included

This table will be deemed complete when all the above is submitted and/or included. Modelling will commence with a complete table.

APPENDIX G

DRAWINGS AND FIGURES

- Preliminary Development Concept
- Draft Plan of Subdivision
- Figure 1 – Constraints Mapping
- C101 – Servicing Plan (Part 1)
- C102 – Servicing Plan (Part 2)
- C103 – Watermain Servicing Plan
- C201 – Grading Plan (Part 1)
- C202 – Grading Plan (Part 2)
- C203, C204, C205 – Grading Sections
- C301 – Existing Storm Drainage Plan
- C302 – Storm Drainage Plan
- C303 – Sanitary Drainage Plan
- C401 – Erosion and Sediment Control Plan

LAND USE SUMMARY

1720 Sherwood Forrest Circle	4.63 ha.	11.44 ac.	
Block F (to be acquired from City of Mississauga)	0.05 ha.	0.12 ac.	
Total Site Area	4.68 ha.	11.56 ac.	
NON-DEVELOPABLE			
NHS	2.34 ha.	5.78 ac.	
Road Widening	0.09 ha.	0.22 ac.	
Net Area	2.25 ha.	5.56 ac.	100.0%
DEVELOPABLE			
Residential (see 'UNIT SUMMARY')	1.45 ha.	3.58 ac.	64.4%
Open Space	0.22 ha.	0.54 ac.	9.8%
Condo Roads	0.58 ha.	1.43 ac.	25.8%
TOTAL (Net Developable)	2.25 ha.	5.56 ac.	100.0%

UNIT SUMMARY

	Unit width		Unit Depth	Unit Count	Lot Mix	Frontage (m)	Area		% Net Res
Condo Block									
Detached Homes	(33) 10.00	x	23.0	50	89%	500.0	1.22 ha.	3.01 ac.	84.4%
Detached Homes (custom)	(33) 10.00	x	23.0	1	2%	10.0	0.03 ha.	0.08 ac.	2.4%
Custom Homes (approximately)	(57) 12.80	x	23.0	1	2%	12.8	0.03 ha.	0.08 ac.	2.4%
Custom Homes (approximately)	(57) 17.37	x	N/A	3	5%	52.1	0.12 ha.	0.31 ac.	8.6%
Custom Homes (approximately)	(57) 17.37	x	N/A	1	2%	17.4	0.03 ha.	0.08 ac.	2.4%
TOTAL				56	100%	592.3	1.45 ha.	3.57 ac.	100.0%

ROW SCHEDULE

	(m) width	(lin.m)	(lin.m) Half
Condo Road	9.4	511.2	0.0
Existing driveway to Sherwood Forrest Circle (Block F)		37.4	0.0
Condo Road	7.4	20.1	0.0
Condo Road	6.4	22.1	0.0
ROW TOTAL		590.7	0.0

PARKING

	Reqd	Provided
Resident- 2 spaces per unit	112	112
Visitor - 0.25 spaces per unit	14	14
TOTAL PARKING	126	126

DRAFT

- All Units In Metric Unless Otherwise Noted.
- Base Information Obtained From Various Sources And Is Approximate.
- Schedule / Plan Information Is Conceptual And Requires Verification by Appropriate Agency.
- Aerial Photo: Google Earth, Approx. Spring 2015

GERRARD DESIGN

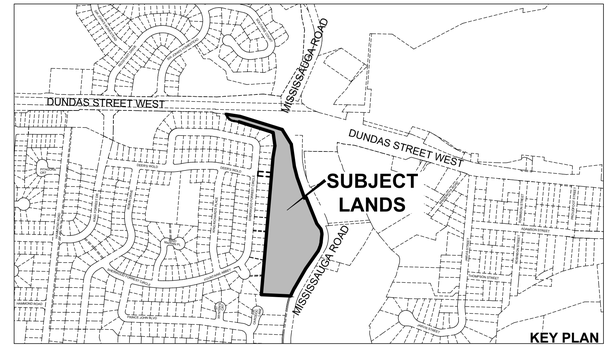
1720 SHERWOOD FORREST CIRCLE | Mississauga, Ontario

PRELIMINARY DEVELOPMENT CONCEPT

APR 29, 2024
PROJECT 20108
SCALE 1:750

CP-22

P:\792-027\4. Drawings\2024 05 May\DP May 1 24.dwg



DRAFT PLAN OF SUBDIVISION

ARGO SHERWOOD FORREST LIMITED

FILE # _____

1720 SHERWOOD FORREST CIRCLE
LOT 3, RANGE 1, S.D.S., RACEY TRACT
(GEOGRAPHIC TOWNSHIP OF TORONTO)
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

OWNERS CERTIFICATE

I HEREBY AUTHORIZE GLEN SCHNARR & ASSOCIATES INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF MISSISSAUGA FOR APPROVAL.

SIGNED _____ DATE SEPT. 12, 2023

SCOTT BLAND, A.S.O.
ARGO SHERWOOD FORREST LIMITED

SURVEYORS CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO ADJACENT LANDS ARE CORRECTLY AND ACCURATELY SHOWN.

SIGNED _____ DATE AUGUST 9, 2023

ROSS DENBROEDER, O.L.S.
R-PE SURVEYING LTD.

ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT) INFORMATION REQUIRED BY CLAUSES A,B,C,D,E,F,G, J & L ARE SHOWN ON THE DRAFT AND KEY PLANS.

H) MUNICIPAL AND PIPED WATER TO BE PROVIDED
I) SANDY LOAM AND CLAY LOAM
K) SANITARY AND STORM SEWERS TO BE PROVIDED

LAND USE SCHEDULE

LAND USE	BLOCKS	AREA (ha)	AREA (ac)	UNITS
CONDOMINIUM DETACHED RESIDENTIAL	1	2.08	5.14	56
OPEN SPACE	2	0.12	0.30	
NATURAL HERITAGE SYSTEM (NHS)	3	1.71	4.23	
NHS BUFFER	4	0.63	1.56	
ROAD WIDENING	5	0.09	0.22	
TOTAL	**5**	**4.63**	**11.44**	**56**

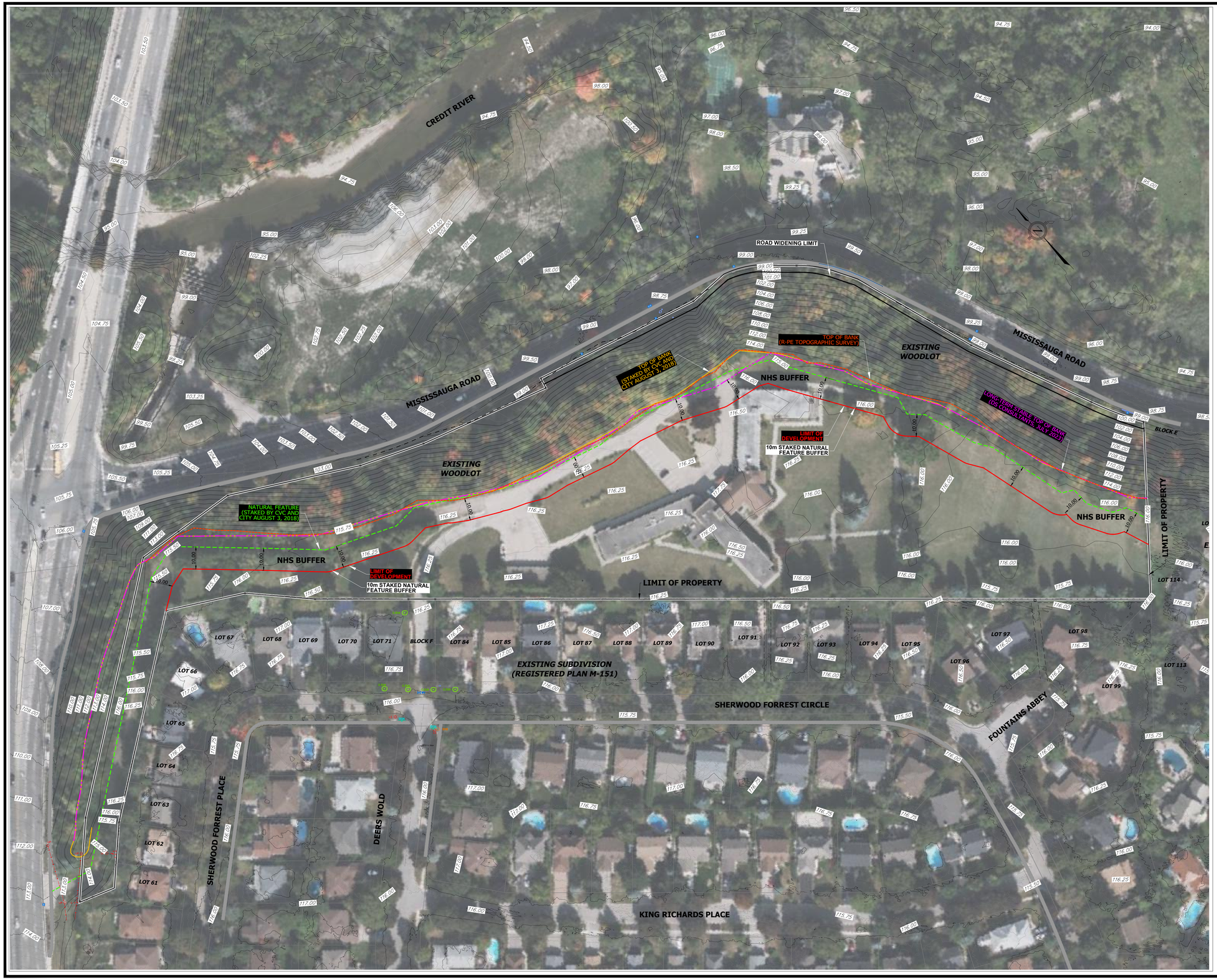
NOTES

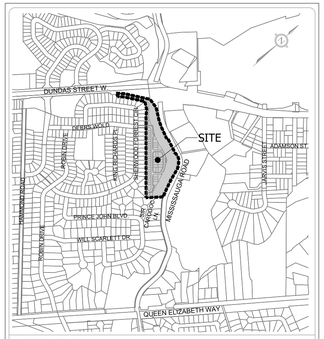
- EXISTING STRUCTURES TO BE REMOVED
- BLOCKS 3 & 4 TO BE CONVEYED TO THE CITY OF MISSISSAUGA FOR THE PURPOSE OF LONG TERM PRESERVATION

SCALE: 1:1000
(24 x 36)
MAY 1, 2024

ARGO DEVELOPMENT CORP

GSAI Glen Schnarr & Associates Inc.





KEY PLAN
N.T.S.

Legend:

- 116.50 — EXISTING CONTOUR AND ELEVATION
- PROPERTY BOUNDARY
- NATURAL FEATURE STAKED BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK STAKED BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK FROM R-PE TOPOGRAPHIC SURVEY
- LONG TERM STABLE SLOPE LINE BY DS CONSULTANTS (JULY 2023)
- ROAD WIDENING LIMIT
- DEVELOPMENT LIMIT

NOTES:

1. FOLLOWING BUFFERS WERE ADDED TO FEATURE LIMITS:
   a) 10m FROM STAKED NATURAL FEATURE
   b) 10m FROM STAKED TOP OF BANK
   c) 10m FROM LONG TERM STABLE TOP OF SLOPE

URBANTECH®
Urbantech® Consulting
A Division of Leighton-Tec West Ltd.
3760 14th Avenue, Suite 301,
Markham, ON. L3R 3T7
TEL 905.946.9461 • urbantech.com

1720 SHERWOOD FORREST CIRCLE
CITY OF MISSISSAUGA

CONSTRAINTS MAPPING

PROJECT No.	DATE	SCALE	DWG No.
23-747	MAY 2024	1:750	DWG 1

P:\PROJECTS\23-747\1720 SHERWOOD FORREST CIRCLE\AUTOCAD\MSS_1\REPORTS\FUNCTIONAL SERVICING REPORT\DRAWINGS & FIGURES\DWG 1_CONSTRAINTS MAPPING.DWG

STORM SEWER STRUCTURE SUMMARY TABLE

STM MH	MH SIZE (CIRCULAR)	TOP EL.	IN INV.	OUT INV.
MH101	1200mm (OPSD 701.010)	112.91	111.650	
MH102	1200mm (OPSD 701.010)	113.21	111.734	111.684
MH103	1200mm (OPSD 701.010)	114.49	111.836	111.786
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MH105	1200mm (OPSD 701.010)	116.24	112.937	112.857
MH106	1200mm (OPSD 701.010)	116.23	113.039	112.989
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MH108	1500mm (OPSD 701.011)	116.52	113.668 113.518	113.443
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MH111	1200mm (OPSD 701.010)	116.02	114.414	114.364
MH112	1200mm (OPSD 701.010)	116.14		114.464
MH113	1200mm (OPSD 701.010)	116.45	113.837	113.787
MH114	1200mm (OPSD 701.010)	116.37	113.922	113.872
MH115	1200mm (OPSD 701.010)	116.25	114.035	113.985
MH116	1200mm (OPSD 701.010)	116.06		114.179
MH117	1200mm (OPSD 701.010)	116.27		114.229
OGS 1	EFO10 (OR APPROVED EQUIV.)	116.45	112.767	112.687

SANITARY SEWER STRUCTURE SUMMARY TABLE

SAN MH	MH SIZE	TOP EL.	IN INV.	OUT INV.
EX. SAN PLUG	250mm PLUG	116.23	111.840	
MH101A	1200mm (OPSD 701.010)	116.65	112.147 112.147	112.097
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MH103A	1200mm (OPSD 701.010)	116.08	112.918	112.858
MH104A	1200mm (OPSD 701.010)	116.06	113.022	112.962
MH105A	1200mm (OPSD 701.010)	116.13		113.162
MH106A	1200mm (OPSD 701.010)	116.23	112.835	112.775
MH107A	1200mm (OPSD 701.010)	116.06	113.071	113.011
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MH112A	1200mm (OPSD 701.010)	116.27	113.119	113.059
MH113A	1200mm (OPSD 701.010)	116.23		113.270
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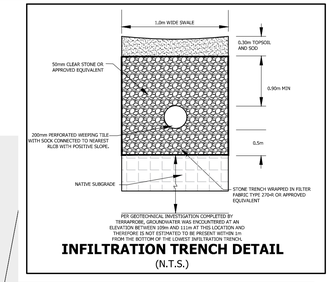
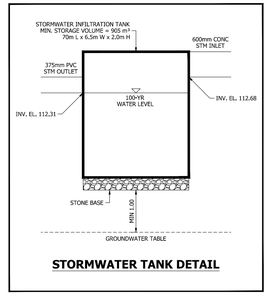


INFILTRATION TRENCH DETAIL
(N.T.S.)



STORMWATER TANK DETAIL

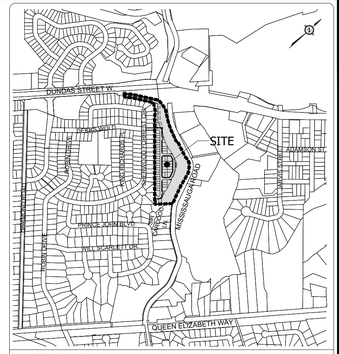
SWM DESIGN SUMMARY

QUANTITY CONTROL

MINIMUM REQUIRED STORAGE VOLUME = 905 m

QUALITY CONTROL

OGS 1 (EFO10 OR APPROVED EQUIVALENT)



KEY PLAN
1:10,000

LEGEND

- PROPERTY BOUNDARY
- EXISTING WOODLOT
- 10m WIDE NHS BUFFER
- ROAD WIDENING
- NATURAL FEATURE STAKE BY CVC AND CITY (AUGUST 3, 2018)
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BENCHMARK:
ELEVATIONS ARE REFERRED TO CANADIAN GEODETIC VERTICAL DATUM-1928, AND WERE DERIVED FROM CITY OF MISSISSAUGA BENCHMARK No. 58, HAVING A PUBLISHED ELEVATION OF 108.293 METRES.

No.	REVISION	DATE	BY
3	THIRD SUBMISSION	MAY 24/24	J.S.
2	SECOND SUBMISSION	NOV. 11/23	J.S.
1	FIRST SUBMISSION	OCT. 2/23	J.S.

REGISTERED PROFESSIONAL ENGINEER
J.L. STRAUSS
100513430
MAY 24, 2024
PROVINCE OF ONTARIO

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1720 SHERWOOD FORREST CIRCLE
CONDOMINIUM DETACHED RESIDENTIAL BLOCK

SHERWOOD FORREST LIMITED PARTNERSHIP
4900 PALLADIUM WAY, UNIT 105
BURLINGTON, ON, L7M 0W7
(905)-336-5545

Region of Peel Working for you

MISSISSAUGA

SERVICING PLAN
(PART 1)

PROJECT #: 23-747	DRAWING: C101
SITE PLAN FILE No.:	
SUBDIVISION FILE No.:	
CITY FILE No.:	
REGION FILE No.:	
REGION CONNECTION FILE No.:	
DESIGNED: J.S.	CHECKED: D.Z.
DRAWN: J.S.	DATE: AUGUST 2023
SCALE: 1:500	

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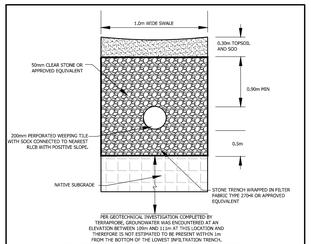
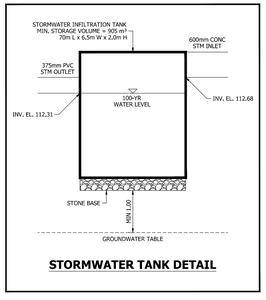


INFILTRATION TRENCH DETAIL
(N.T.S.)



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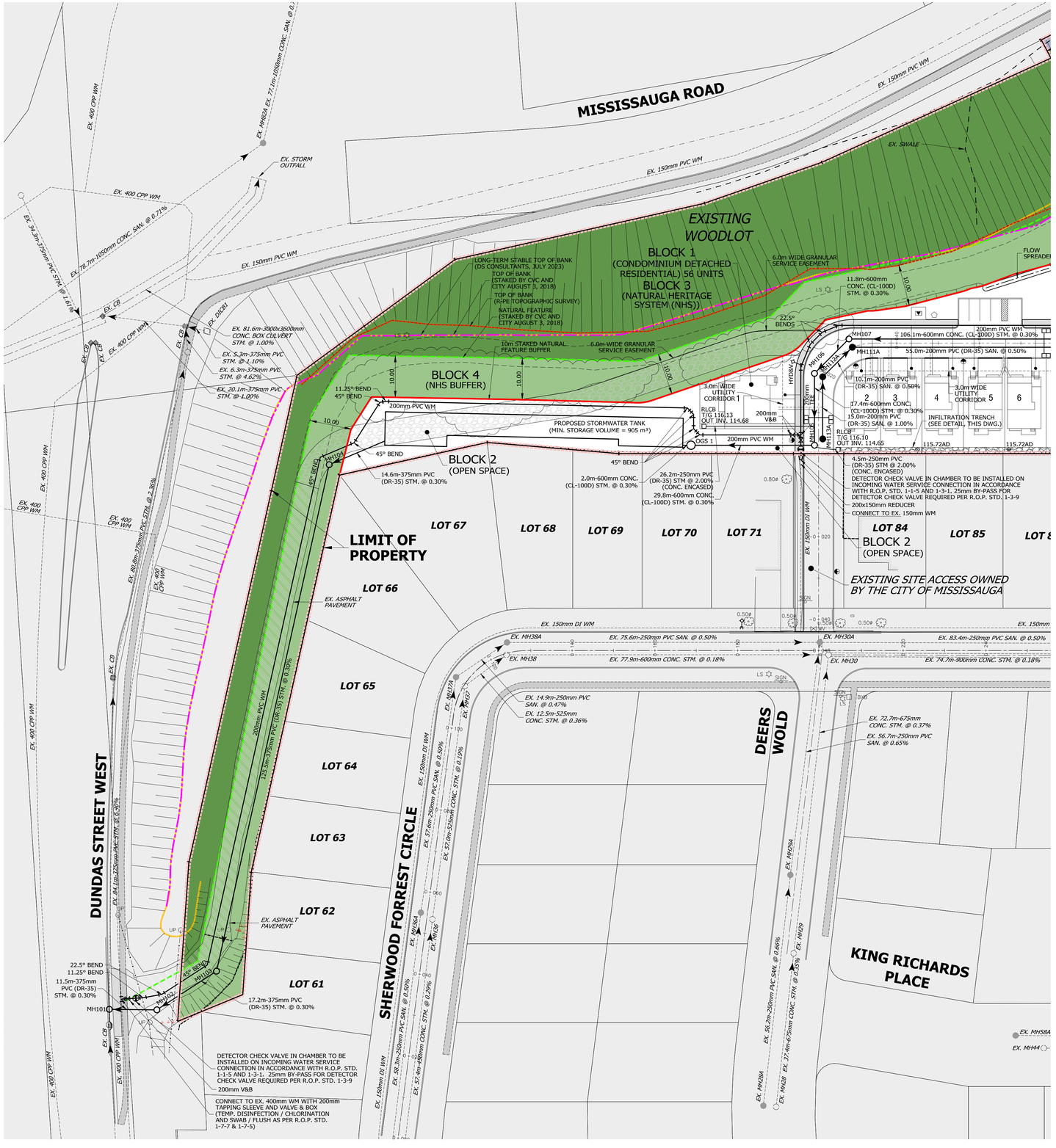
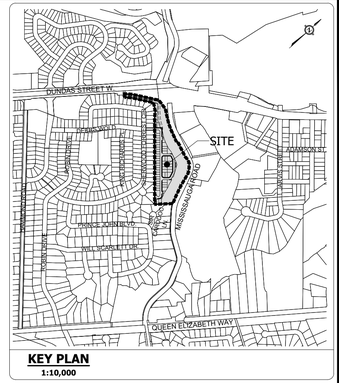


REFER TO DRAWING 101



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1:10,000

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REGISTERED PROFESSIONAL ENGINEER
J.L.STRAUSS
100513430
MAY 24, 2024
PROVINCE OF ONTARIO

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1720 SHERWOOD FORREST CIRCLE
CONDOMINIUM DETACHED RESIDENTIAL BLOCK

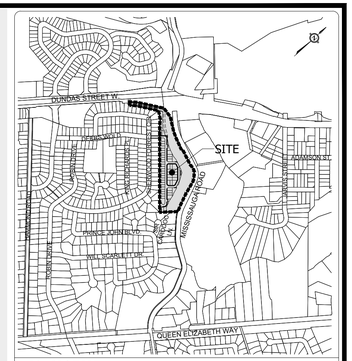
SHERWOOD FORREST LIMITED PARTNERSHIP
4900 PALLADIUAM WAY, UNIT 105
BURLINGTON, ON, L7M 0W7
(905)-336-5545

Region of Peel
Working for you

MISSISSAUGA

SERVICING PLAN
(PART 2)

PROJECT #:	23-747	DRAWING:	C102
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:500	5m 0m 5m 10m 20m	



KEY PLAN
1:10,000

LEGEND

- PROPERTY BOUNDARY
- EXISTING WOODLOT
- 10m WIDE NHS BUFFER
- ROAD WIDENING
- NATURAL FEATURE STAKE BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK STAKED BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK FROM R-PE TOPOGRAPHIC SURVEY
- LONG TERM STABLE SLOPE LINE BY DS CONSULTANTS (JULY 2023)
- DEVELOPMENT LIMIT
- WATERMAIN
- EXISTING WATERMAIN
- WATER CONNECTION
- HYDRANT AND VALVE
- VALVE AND BOX
- TRANSFORMER
- STREET LIGHT
- PEDESTAL

BENCHMARK:
ELEVATIONS ARE REFERRED TO CANADIAN GEODETIC VERTICAL DATUM-1928, AND WERE DERIVED FROM CITY OF MISSISSAUGA BENCHMARK No. 58, HAVING A PUBLISHED ELEVATION OF 108.293 METRES.

No.	REVISION	DATE	BY
3	THIRD SUBMISSION	MAY 24/24	J.S.
2	SECOND SUBMISSION	NOV. 11/23	J.S.
1	FIRST SUBMISSION	OCT. 2/23	J.S.

REGISTERED PROFESSIONAL ENGINEER — J.L. STRAUSS — 100513430 — MAY 24, 2024 — PROVINCE OF ONTARIO

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Region of Peel
Working for you

MISSISSAUGA

WATERMAIN SERVICING PLAN

PROJECT #:	23-747	DRAWING:	C103
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:750	7.5m 0m 7.5m 15m 30m	

GRADING NOTES:

A. ALL SURFACE DRAINAGE WILL BE SELF-CONTAINED, COLLECTED AND DISCHARGED AT A LOCATION TO BE APPROVED PRIOR TO THE ISSUANCE OF A BUILDING PERMIT.
B. THE PORTIONS OF THE DRIVEWAY WITHIN THE MUNICIPAL BOULEVARD WILL BE PAVED BY THE APPLICANT.
C. AT THE ENTRANCES TO THE SITE, THE MUNICIPAL CURB AND SIDEWALK WILL BE CONTINUOUS THROUGH THE DRIVEWAY AND A CURB DEPRESSION WILL BE PROVIDED FOR EACH ENTRANCE.
D. ALL PROPOSED CURBING WITHIN THE MUNICIPAL BOULEVARD AREA FOR THE SITE IS TO SUIT AS FOLLOWS:
   I) FOR ALL SINGLE FAMILY RESIDENTIAL PROPERTIES INCLUDING ON STREET TOWNHOUSES, ALL CURBING IS TO STOP AT THE PROPERTY LIMIT OR THE BACK OF THE MUNICIPAL SIDEWALK, WHICHEVER IS APPLICABLE; OR
   II) FOR ALL OTHER PROPOSALS INCLUDING INDUSTRIAL, COMMERCIAL AND MULTI-UNIT RESIDENTIAL DEVELOPMENTS, ALL ENTRANCES TO THE SITE ARE TO BE IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARDS 2240.030/2240.031 (AS APPLICABLE) AND 2230.20. DRIVEWAY AND ENTRANCE CURB RADII DIMENSIONS SHALL BE IN ACCORDANCE WITH OSPD 350.010.
E. ALL EXCESS EXCAVATED MATERIAL WILL BE REMOVED FROM THE SITE.
F. THE EXISTING DRAINAGE PATTERN WILL BE MAINTAINED EXCEPT WHERE NOTED.
G. THE APPLICANT WILL BE REQUIRED TO CONTACT ALL UTILITY COMPANIES TO OBTAIN ALL REQUIRED LOCATES PRIOR TO THE INSTALLATION OF HOARDING WITHIN THE MUNICIPAL RIGHT-OF-WAY.
H. THE APPLICANT WILL BE RESPONSIBLE FOR THE COST OF ANY UTILITY RELOCATIONS NECESSITATED BY THE SITE PLAN.
I. PRIOR TO COMMENCING CONSTRUCTION, ALL REQUIRED HOARDING, IN ACCORDANCE WITH THE ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS, MUST BE ERECTED AND THEN MAINTAINED THROUGHOUT ALL PHASES OF CONSTRUCTION.
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https://www.mississauga.ca/services-and-programs/transportation-and-streets/roads-andsidewalks/apply-for-a-road-occupancy-permit/

GRADING CERTIFICATION NOTE:

I HAVE REVIEWED THE PLANS FOR THE CONSTRUCTION OF LOT 1-57 LOCATED AT 1720 SHERWOOD FORREST CIRCLE AND HAVE PREPARED THIS PLAN TO INDICATE THE COMPATIBILITY OF THE PROPOSAL TO EXISTING ADJACENT PROPERTIES AND MUNICIPAL SERVICES. IT IS MY BELIEF THAT ADHERENCE TO THE PROPOSED GRADES AS SHOWN WILL PRODUCE ADEQUATE SURFACE DRAINAGE AND PROPER FACILITY OF THE MUNICIPAL SERVICES WITHOUT ANY DETRIMENTAL EFFECT TO THE EXISTING DRAINAGE PATTERNS OR ADJACENT PROPERTIES.

SIGNATURE

PAVEMENT STRUCTURE:

LIGHT DUTY PAVEMENT	
40mm	HL 3 OR SP 12.5
40mm	HL 8 OR SP 19.0
150mm	OPSS GRANULAR A OR 20mm CRLS
250mm	OPSS GRANULAR B OR 50mm CRLS
HEAVY DUTY PAVEMENT	
40mm	HL 3 OR SP 12.5
80mm	HL 8 OR SP 19.0
150mm	OPSS GRANULAR A OR 20mm CRLS
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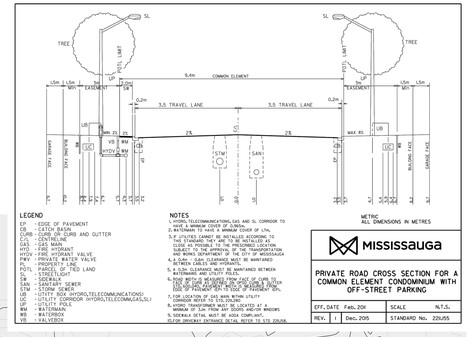

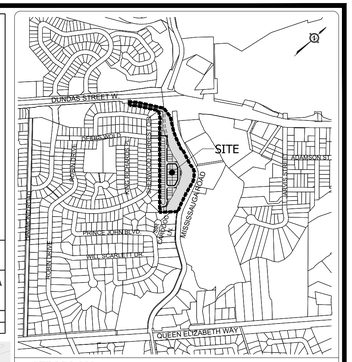

KEY PLAN
1:10,000

LEGEND

- PROPERTY BOUNDARY
- EXISTING WOODLOT
- 10m WIDE NHS BUFFER
- ROAD WIDENING
- NATURAL FEATURE STAKED BY CVC AND CITY (AUGUST 3, 2018)
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- DEVELOPMENT LIMIT
- 147.00 EXISTING CONTOUR AND ELEVATION (METRES)
- +115.79 EXISTING ELEVATION
- +115.50 PROPOSED ELEVATION
- 115.50TC/BC TOP/BOTTOM OF CURB ELEVATION
- STANDARD CURB AND GUTTER
- SEMI-MOUNTABLE CURB AND GUTTER
- STORM MANHOLE
- SANITARY MANHOLE
- EXISTING STORM MANHOLE
- EXISTING SANITARY MANHOLE
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- HYDRANT AND VALVE
- VALVE AND BOX
- TRANSFORMER
- STREET LIGHT
- PEDESTAL
- EXTERNAL OVERLAND FLOW ROUTE
- PROPOSED OVERLAND FLOW ROUTE

REFER TO GRADING SECTIONS 203-205 FOR GRADING CROSS SECTIONS 1-1 TO 12-12

BENCHMARK:
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REGISTERED PROFESSIONAL ENGINEER
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100513430
MAY 24, 2024
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Region of Peel
Working for you

MISSISSAUGA

GRADING PLAN
(PART 1)

PROJECT #:	23-747	DRAWING:	C201
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:500		

FLOW SPREADER 1 DETAIL

FLOW SPREADER 2 DETAIL

FLOW SPREADER 3 DETAIL

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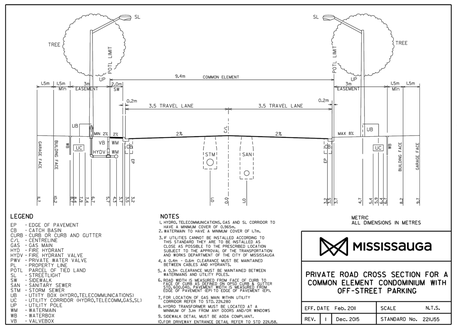
SIGNATURE



PAVEMENT STRUCTURE:

LIGHT DUTY PAVEMENT	
40mm	HL 3 OR SP 12.5
40mm	HL 8 OR SP 19.0
150mm	OPSS GRANULAR A OR 20mm CRLS
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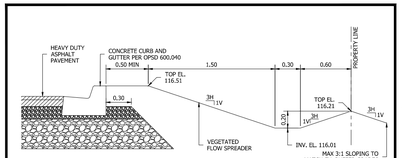
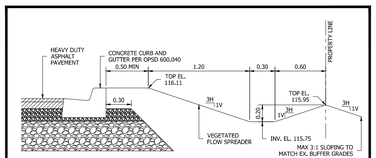
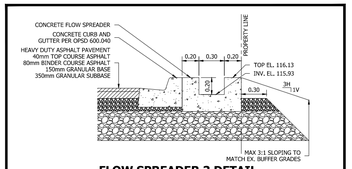


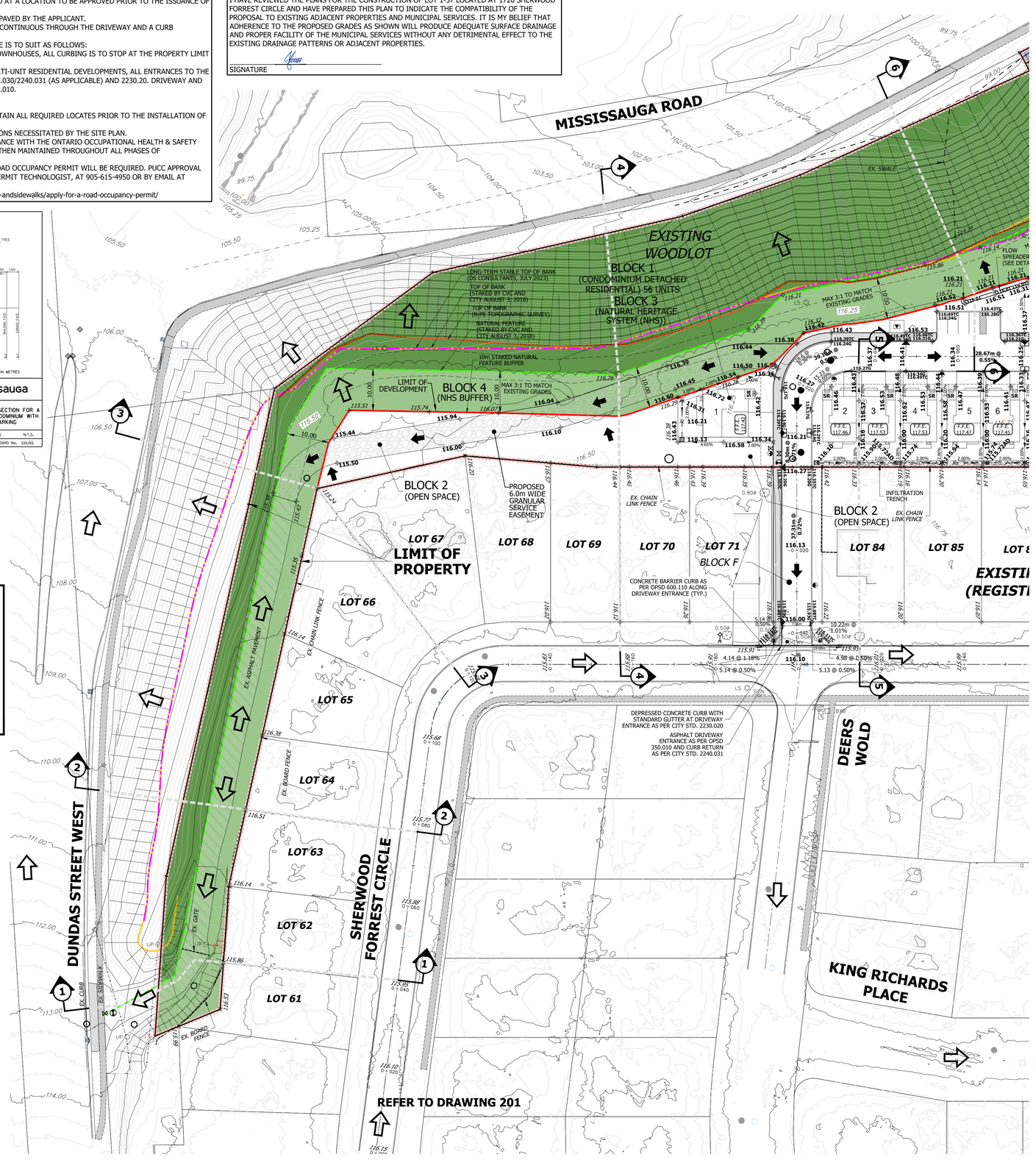
FLOW SPREADER 1 DETAIL

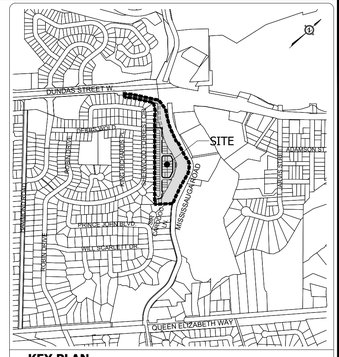


FLOW SPREADER 2 DETAIL



FLOW SPREADER 3 DETAIL





KEY PLAN
1:10,000

LEGEND

- PROPERTY BOUNDARY
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REGISTERED PROFESSIONAL ENGINEER
L.J. STRAUSS
100513430
MAY 24, 2024
PROVINCE OF ONTARIO

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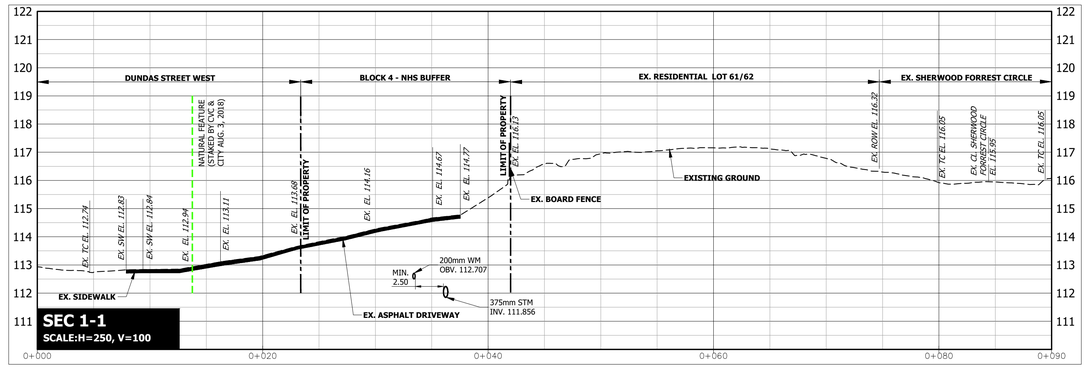
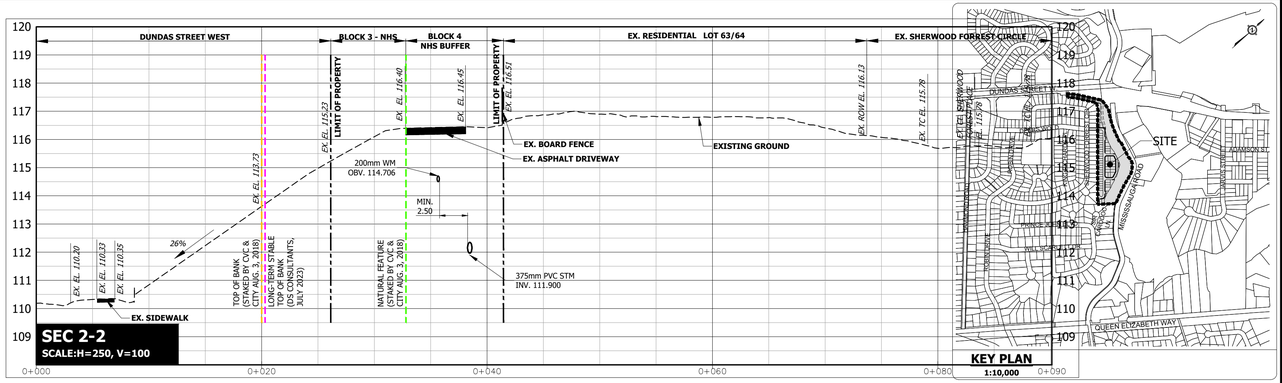
Region of Peel Working for you

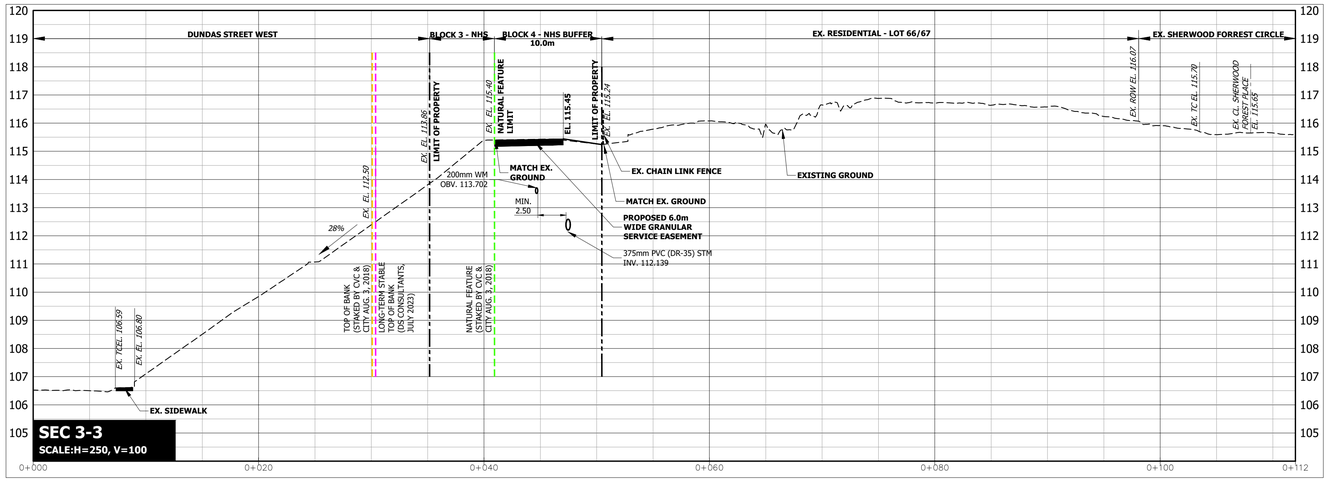
MISSISSAUGA

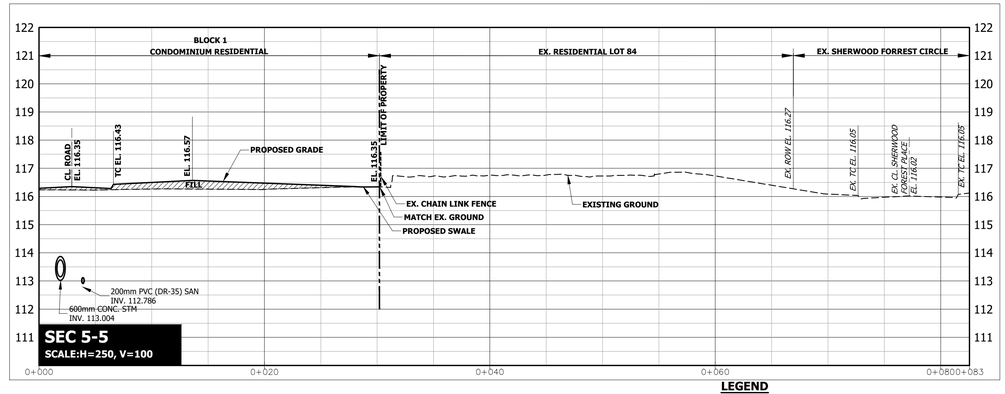
GRADING PLAN
(PART 2)

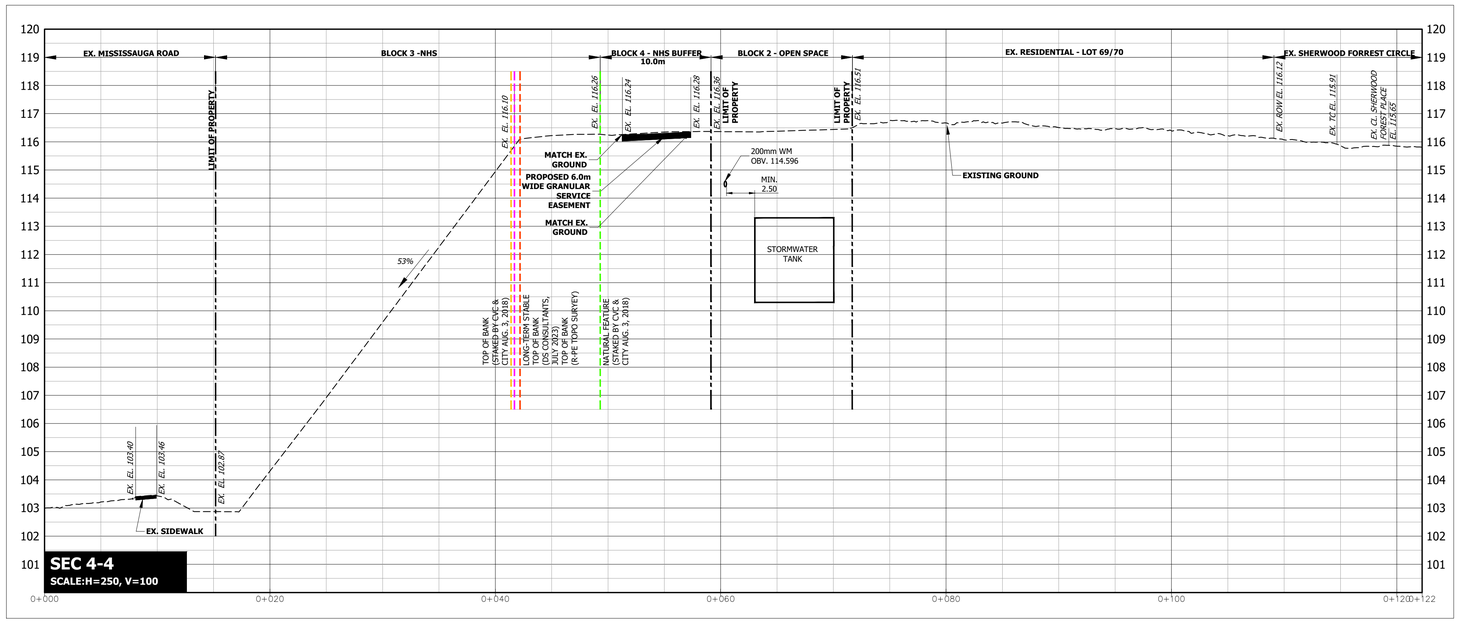
PROJECT #:	23-747	DRAWING:	C202
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:500	5m 0m 5m 10m 20m	











LEGEND

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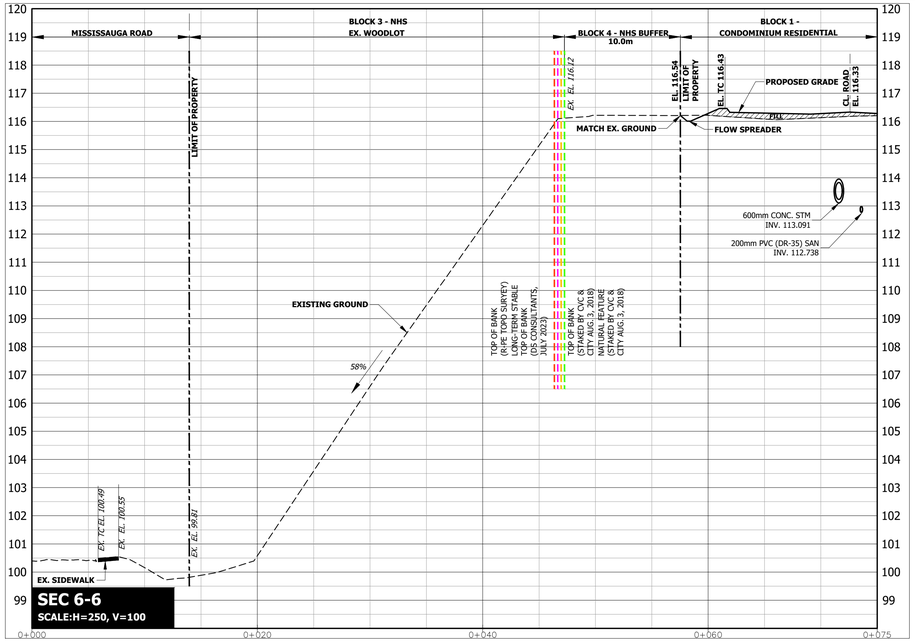
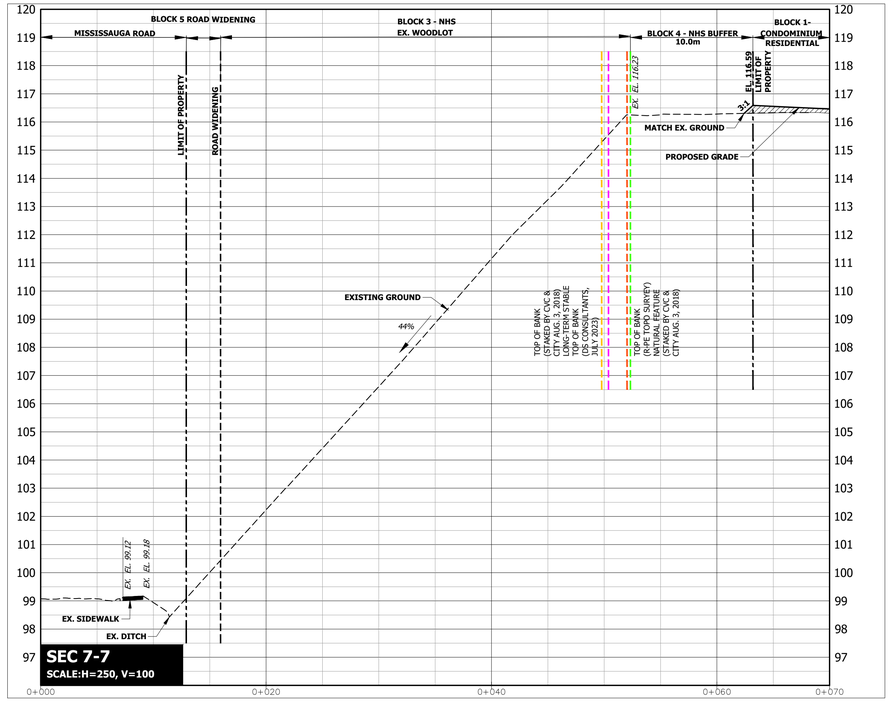
Region of Peel — Working for you

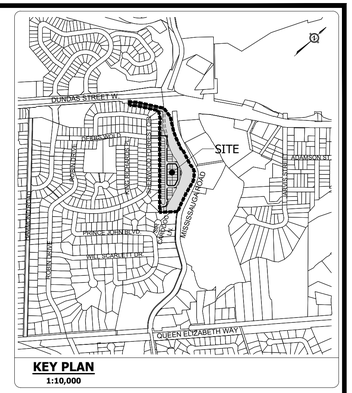
MISSISSAUGA

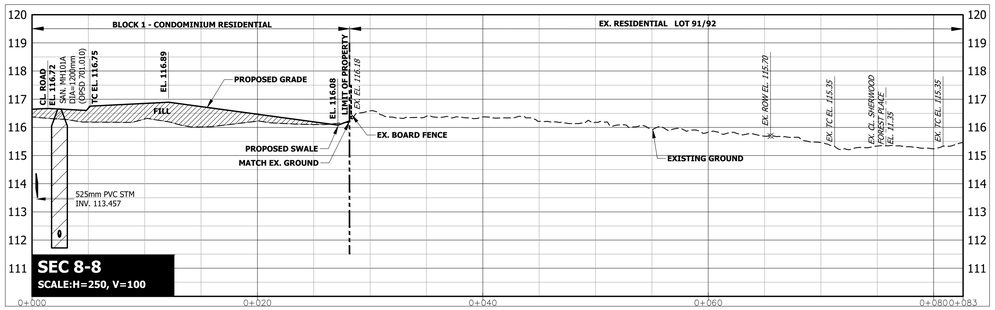
GRADING SECTIONS (PART 1)

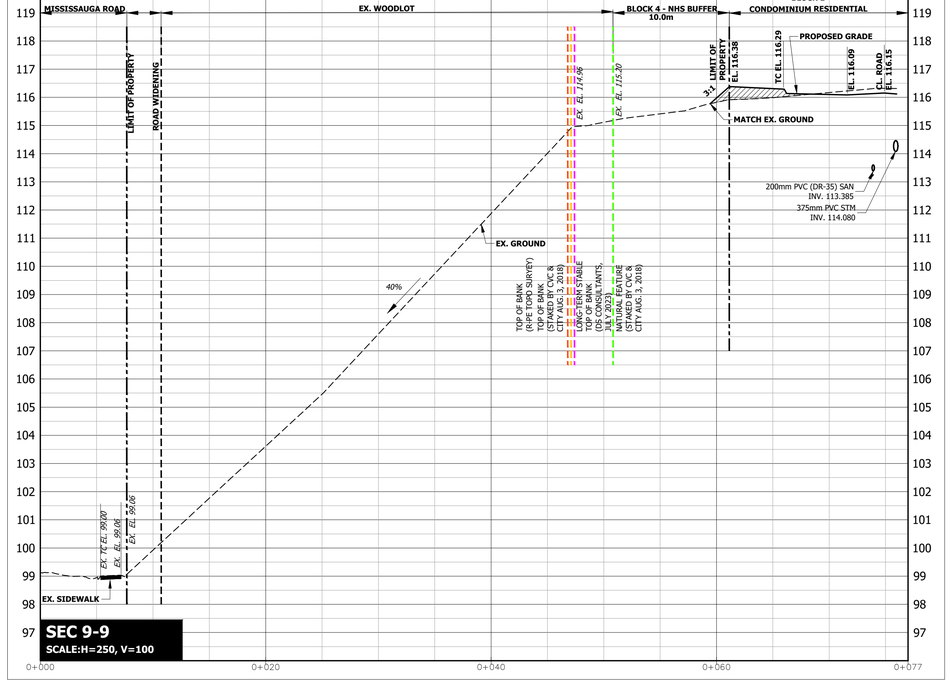
PROJECT #:	23-747	DRAWING:	C203
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:250 H, 1:100 V		

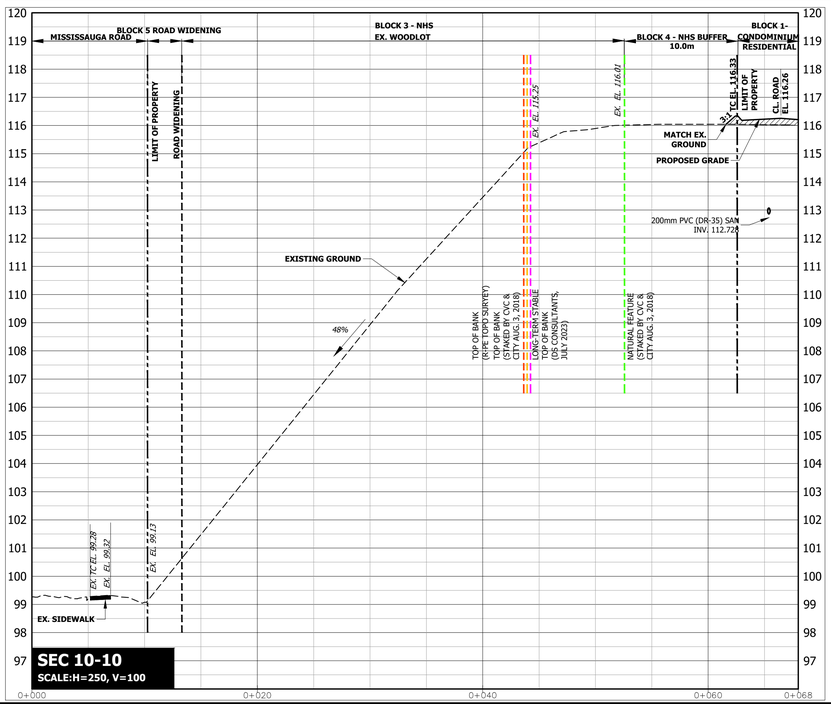












LEGEND

- NATURAL FEATURE STAKE BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK STAKED BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK FROM R-PE TOPOGRAPHIC SURVEY
- LONG TERM STABLE SLOPE LINE BY DS CONSULTANTS (JULY 2023)

BENCHMARK:

ELEVATIONS ARE REFERRED TO CANADIAN GEODETIC VERTICAL DATUM-1928, AND WERE DERIVED FROM CITY OF MISSISSAUGA BENCHMARK No. 58, HAVING A PUBLISHED ELEVATION OF 108.293 METRES.

No.	REVISION	DATE	BY
3	THIRD SUBMISSION	MAY 24/24	J.S.
2	SECOND SUBMISSION	NOV. 11/23	J.S.
1	FIRST SUBMISSION	OCT. 2/23	J.S.

REGISTERED PROFESSIONAL ENGINEER — J.L.STRAUSS — 100513430 — MAY 24, 2024 — PROVINCE OF ONTARIO

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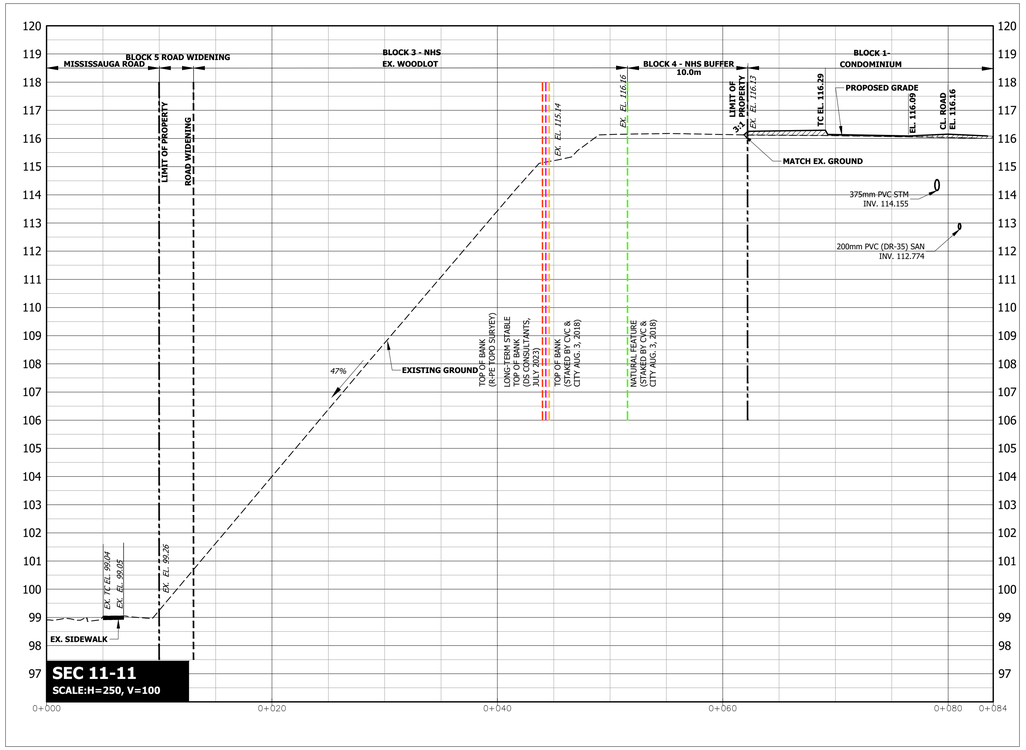
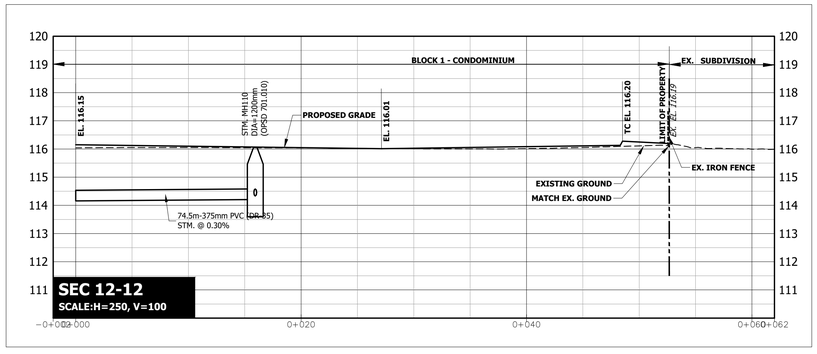
Region of Peel — Working for you

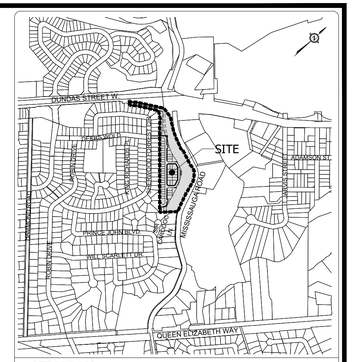
MISSISSAUGA

GRADING SECTIONS (PART 2)

PROJECT #:	23-747	DRAWING:	C204
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:250 H 1:100 V		







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- TOP OF BANK STAKED BY CVC AND CITY (AUGUST 3, 2018)
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2	SECOND SUBMISSION	NOV. 11/23	J.S.
1	FIRST SUBMISSION	OCT. 2/23	J.S.

REGISTERED PROFESSIONAL ENGINEER
J.L. STRAUSS
100513430
MAY 24, 2024
PROVINCE OF ONTARIO

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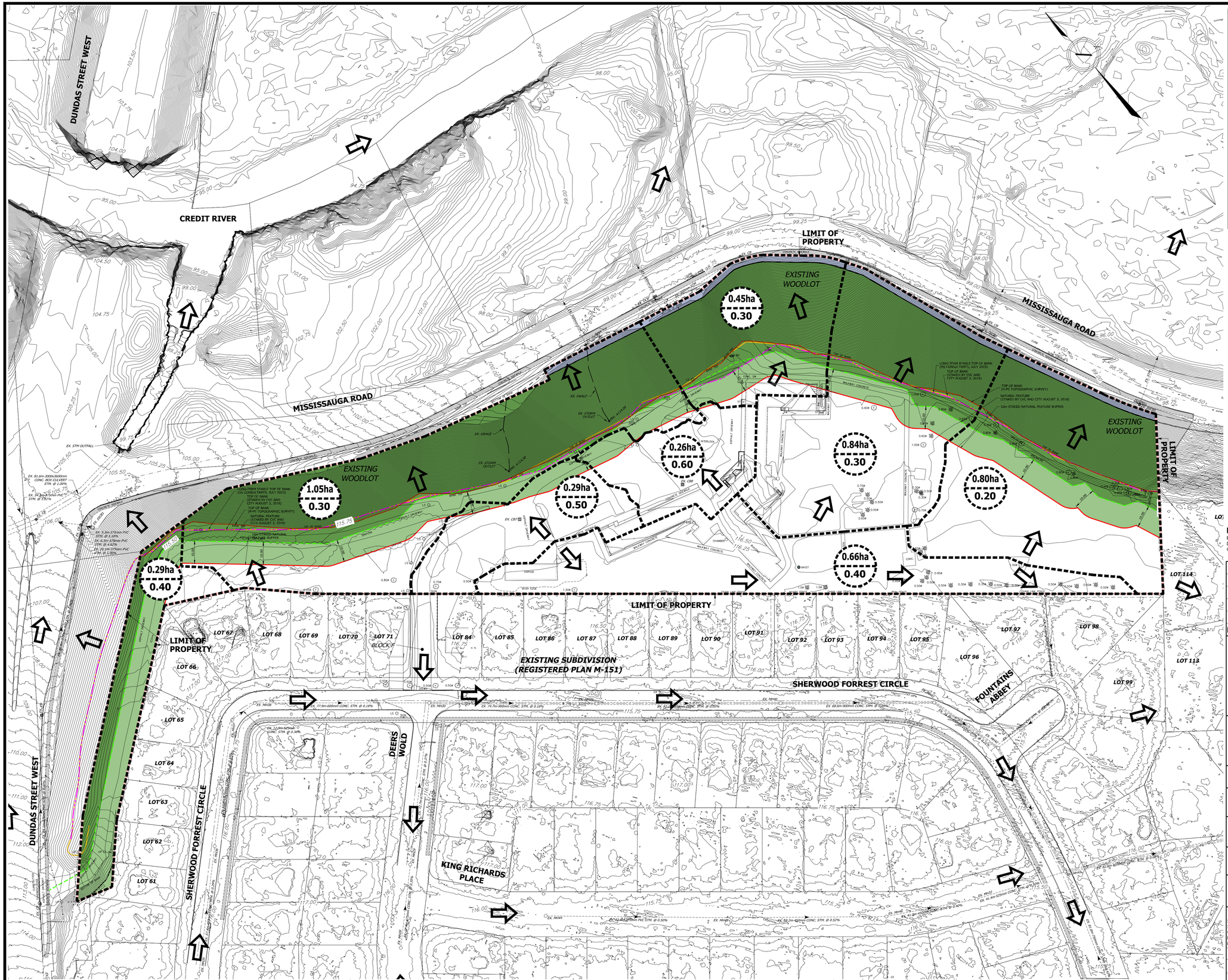
GRADING SECTIONS
(PART 3)

PROJECT #:	23-747	DRAWING:	C205
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:250 H 1:100 V		



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REGISTERED PROFESSIONAL ENGINEER — J.L.STRAUSS — 100513430 — MAY 24, 2024 — PROVINCE OF ONTARIO

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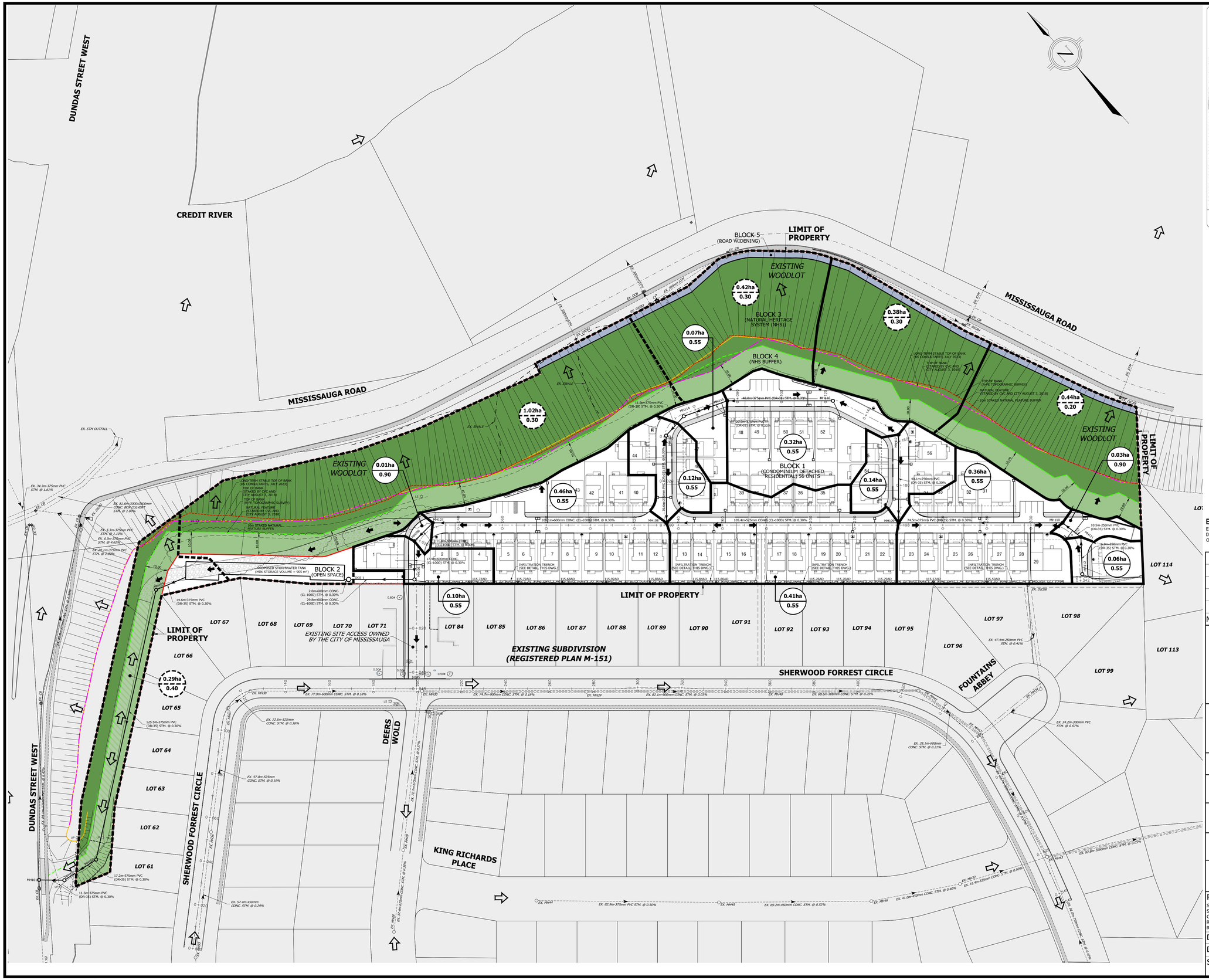
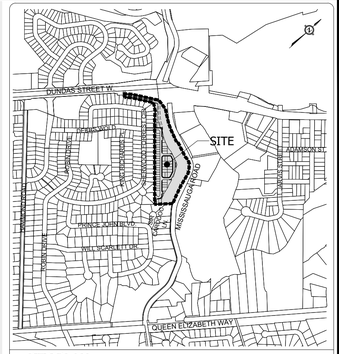
MISSISSAUGA

EXISTING STORM DRAINAGE PLAN

PROJECT #:	23-747	DRAWING:	C301
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:750	7.5m 0m 7.5m 15m 30m	





KEY PLAN
1:10,000

LEGEND

- PROPERTY BOUNDARY
- EXISTING WOODLOT
- 10m WIDE NHS BUFFER
- ROAD WIDENING
- NATURAL FEATURE STAKE BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK STAKED BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK FROM R-PE TOPOGRAPHIC SURVEY
- LONG TERM STABLE SLOPE LINE BY DS CONSULTANTS (JULY 2023)
- DEVELOPMENT LIMIT
- STORM SEWER AND MANHOLE
- EXISTING STORM SEWER AND MANHOLE
- DRAINAGE AREA BOUNDARY
- EXISTING DRAINAGE AREA BOUNDARY
- OVERLAND FLOW ROUTE
- EXISTING OVERLAND FLOW ROUTE
- CATCHBASIN / DOUBLE CATCHBASIN / AREA DRAIN
- INFILTRATION TRENCH
- 0.26ha / 0.90 — DRAINAGE AREA (ha) / RUNOFF COEFFICIENT
- 0.26ha / 0.90 — EXISTING DRAINAGE AREA (ha) / EXISTING RUNOFF COEFFICIENT

BENCHMARK:
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REGISTERED PROFESSIONAL ENGINEER — J.L. STRAUSS — 100513430 — MAY 24, 2024 — PROVINCE OF ONTARIO

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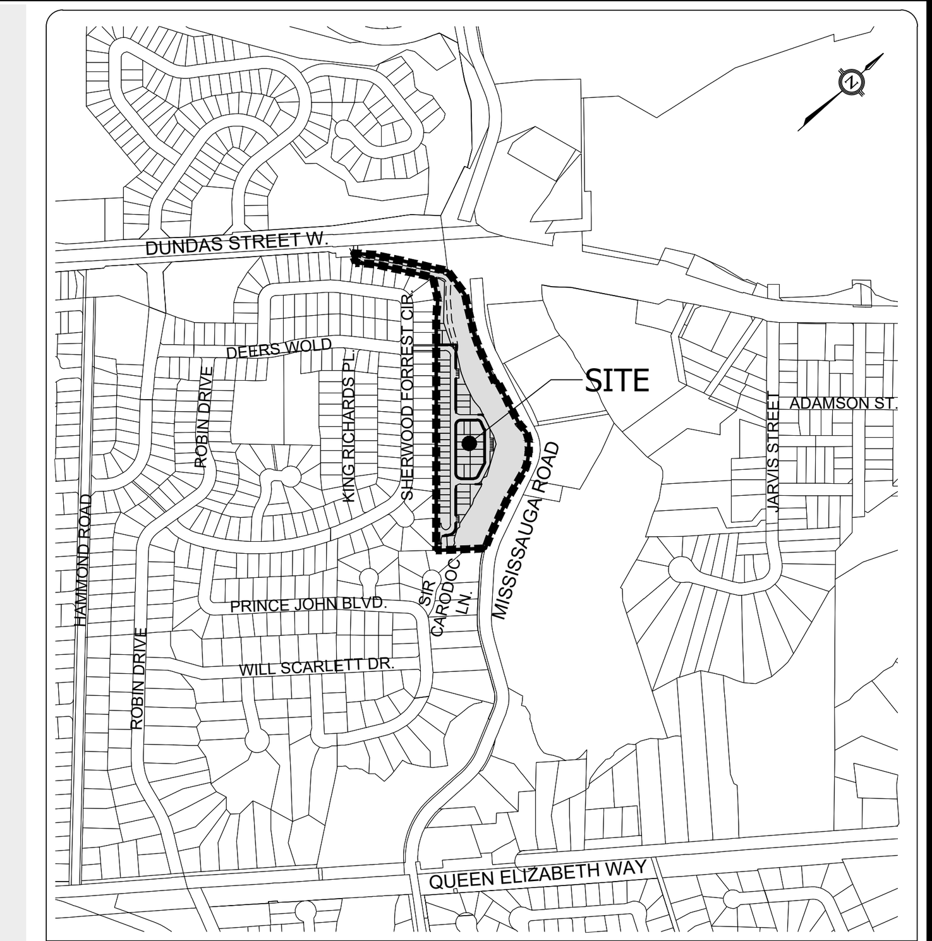
Region of Peel — Working for you

MISSISSAUGA

STORM DRAINAGE PLAN

PROJECT #:	23-747	DRAWING:	C302
SITE PLAN FILE No.:			
SUBDIVISION FILE No.:			
CITY FILE No.:			
REGION FILE No.:			
REGION CONNECTION FILE No.:			
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:750	7.5m 0m 7.5m 15m 30m	

FILE: P:\PROJECTS\23-747-1720 SHERWOOD FORREST CIRCLE(ARGO-MISS.)\DRAWINGS\300 - DRAINAGE\302-STM.DWG REVISED BY [JSTRAUSS] ON May 26, 2024 AT 6:27 PM



KEY PLAN
1:10,000

LEGEND

- PROPERTY BOUNDARY
- EXISTING WOODLOT
- BUFFER
- ROAD WIDENING
- NATURAL FEATURE STAKE BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK STAKED BY CVC AND CITY (AUGUST 3, 2018)
- LONG TERM STABLE SLOPE LINE BY DS CONSULTANTS (JULY 2023)
- DEVELOPMENT LIMIT
- SANITARY SEWER AND MANHOLE
- EXISTING SANITARY SEWER AND MANHOLE
- DRAINAGE AREA BOUNDARY
- 0.26ha / 9 / 38: DRAINAGE AREA (HECTARES); POPULATION; NUMBER OF UNITS (4.2 PERSONS/UNIT FOR SINGLE FAMILY HOUSING TYPE BASED ON TABLE 2-2)

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J.L. STRAUSS
100513430
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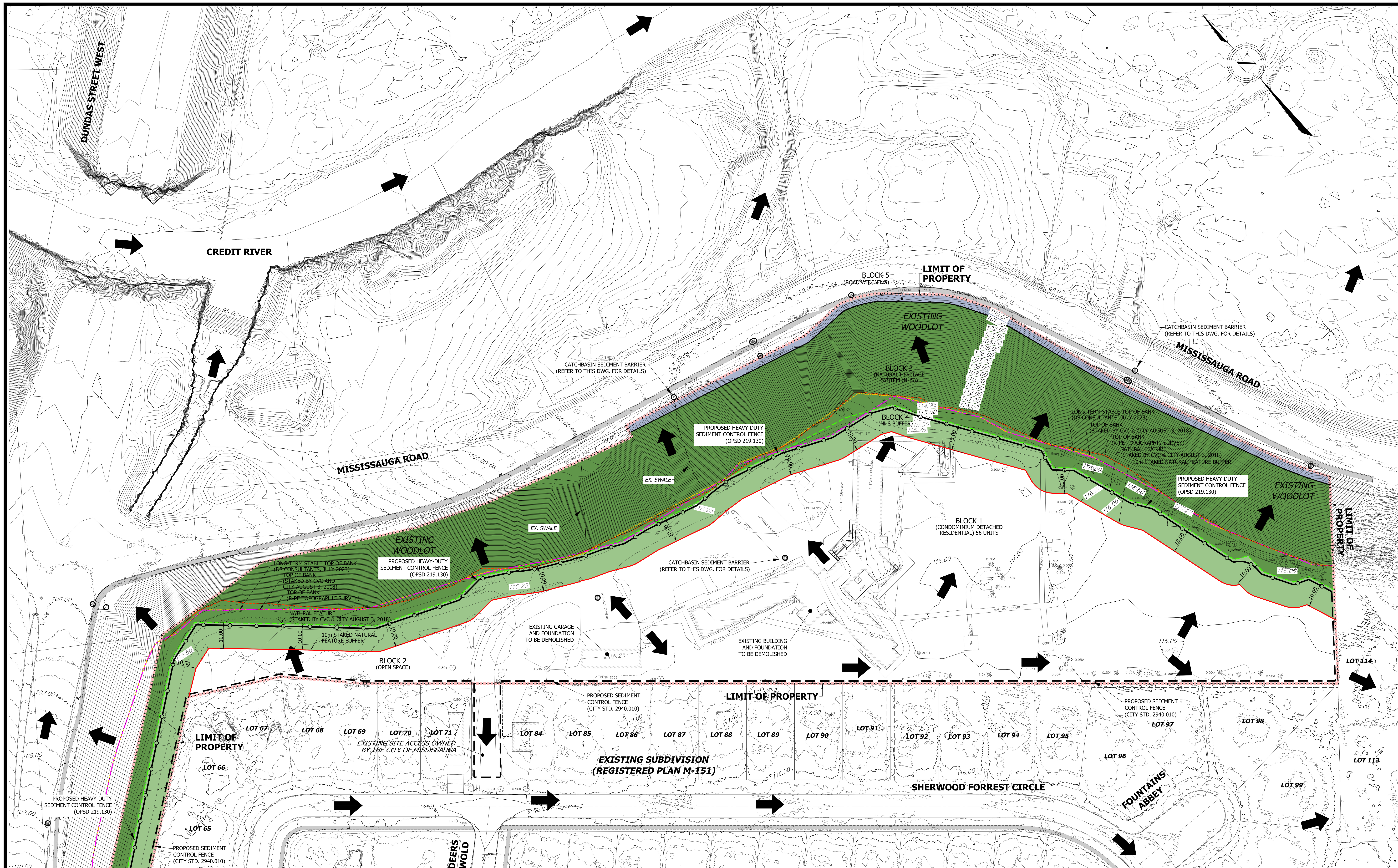
Region of Peel
Working for you

MISSISSAUGA

SANITARY DRAINAGE PLAN

PROJECT #: 23-747 SITE PLAN FILE No.: SUBDIVISION FILE No.: CITY FILE No.: REGION FILE No.: REGION CONNECTION FILE No.:	DRAWING: **C303**
DESIGNED: J.S.	CHECKED: D.Z.
DRAWN: J.S.	DATE: AUGUST 2023
SCALE: 1:750	7.5m 0m 7.5m 15m 30m

FILE: P:\PROJECTS\23-747-1720 SHERWOOD FORREST CIRCLE(ARGO-MISS.)\DRAWINGS\300 - DRAINAGE\303-SAN.DWG REVISED BY [JSTRAUSS] ON May 26, 2024 AT 7:27 PM


DUNDAS STREET WEST
CREDIT RIVER
MISSISSAUGA ROAD
BLOCK 5 (ROAD WIDENING)
LIMIT OF PROPERTY
EXISTING WOODLOT
BLOCK 3 (NATURAL HERITAGE SYSTEM (NHS))
BLOCK 4 (NHS BUFFER)
BLOCK 1 (CONDOMINIUM DETACHED RESIDENTIAL) 56 UNITS
BLOCK 2 (OPEN SPACE)
CATCHBASIN SEDIMENT BARRIER (REFER TO THIS DWG. FOR DETAILS)
PROPOSED HEAVY-DUTY SEDIMENT CONTROL FENCE (OPSD 219.130)
PROPOSED SEDIMENT CONTROL FENCE (CITY STD. 2940.010)
PROPOSED STONE PAD CONSTRUCTION ENTRANCE (CITY STD. 2970.010)
LONG-TERM STABLE TOP OF BANK (DS CONSULTANTS, JULY 2023)
TOP OF BANK (STAKED BY CVC AND CITY AUGUST 3, 2018)
TOP OF BANK (R-PE TOPOGRAPHIC SURVEY)
NATURAL FEATURE (STAKED BY CVC & CITY AUGUST 3, 2018)
10m STAKED NATURAL FEATURE BUFFER
EX. SWALE
EXISTING GARAGE AND FOUNDATION TO BE DEMOLISHED
EXISTING BUILDING AND FOUNDATION TO BE DEMOLISHED
EXISTING SITE ACCESS OWNED BY THE CITY OF MISSISSAUGA
EXISTING SUBDIVISION (REGISTERED PLAN M-151)
SHERWOOD FORREST CIRCLE
FOUNTAINS ABBEY
DEERS WOLD
LOT 61
LOT 62
LOT 63
LOT 64
LOT 65
LOT 66
LOT 67
LOT 68
LOT 69
LOT 70
LOT 71
LOT 84
LOT 85
LOT 86
LOT 87
LOT 88
LOT 89
LOT 90
LOT 91
LOT 92
LOT 93
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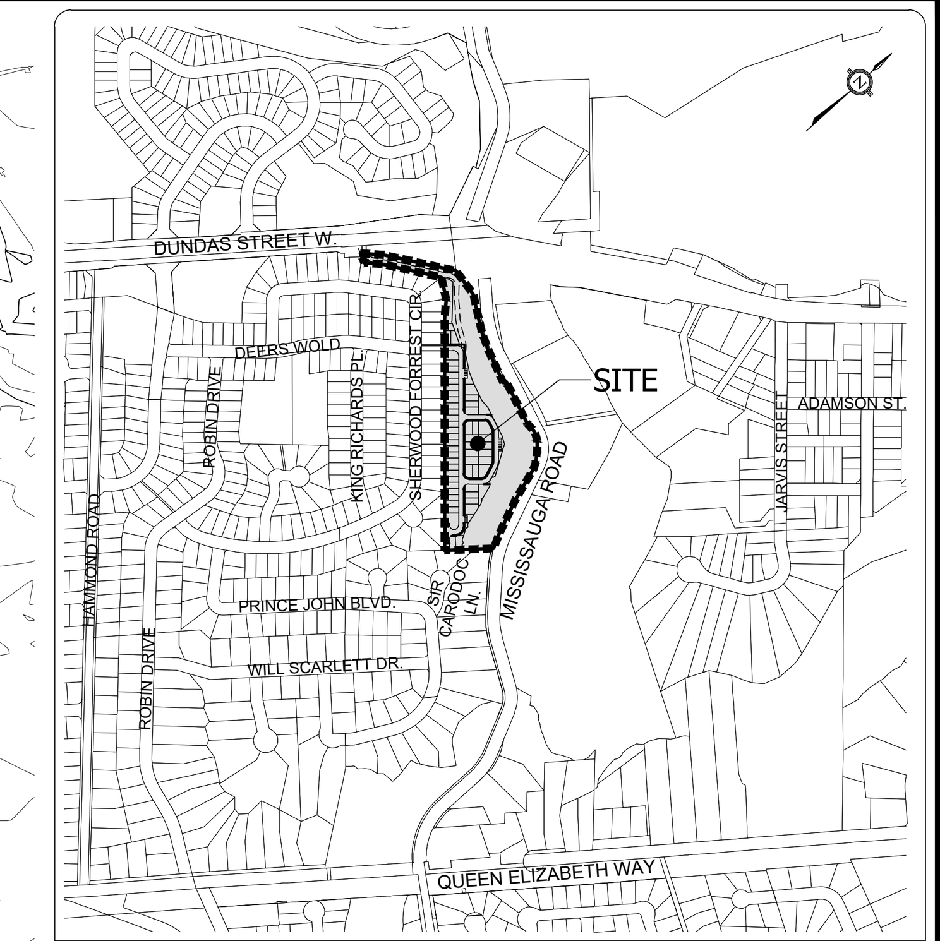
LOT 95
LOT 96
LOT 97
LOT 98
LOT 99
LOT 113
LOT 114



KEY PLAN
1:10,000

LEGEND

- PROPERTY BOUNDARY
- EXISTING WOODLOT
- 10m WIDE NHS BUFFER
- ROAD WIDENING
- NATURAL FEATURE STAKE BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK STAKED BY CVC AND CITY (AUGUST 3, 2018)
- TOP OF BANK FROM R-PE TOPOGRAPHIC SURVEY
- LONG TERM STABLE SLOPE LINE BY DS CONSULTANTS (JULY 2023)
- DEVELOPMENT LIMIT
- 147.00 EXISTING CONTOUR AND ELEVATION (m)
- EXISTING OVERLAND FLOW ROUTE
- PROPOSED HEAVY-DUTY SEDIMENT CONTROL FENCE (REFER TO DETAIL ON DWG 1001)
- PROPOSED SEDIMENT CONTROL FENCE (REFER TO DETAIL ON DWG 1001)
- PROPOSED CATCHBASIN SEDIMENT BARRIER (REFER TO DETAIL ON DWG. 1001)
- PROPOSED STONE PAD CONSTRUCTION ENTRANCE (REFER TO DETAIL ON DWG. 1001)

BENCHMARK:
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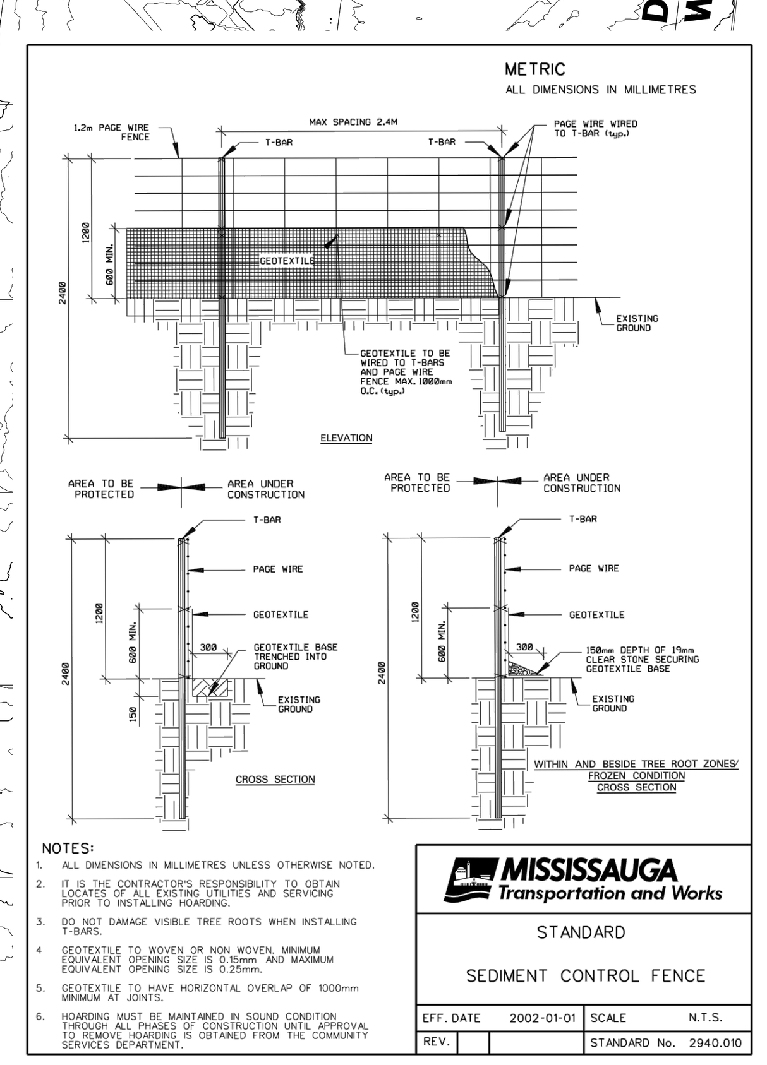

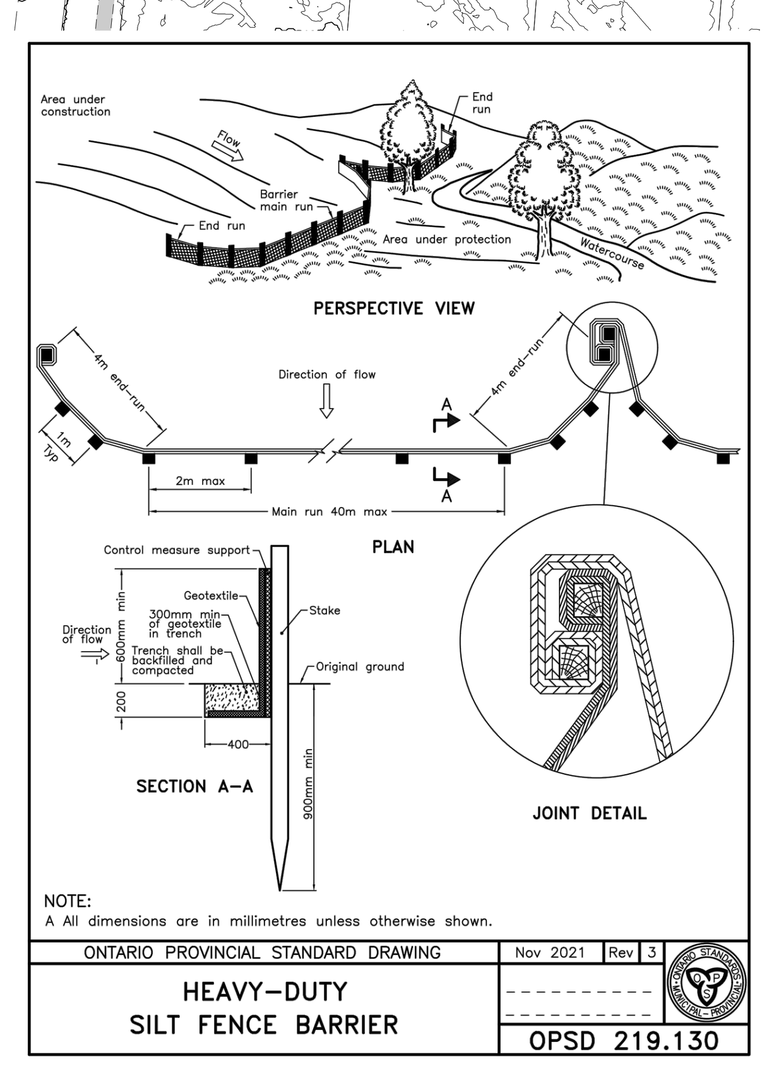

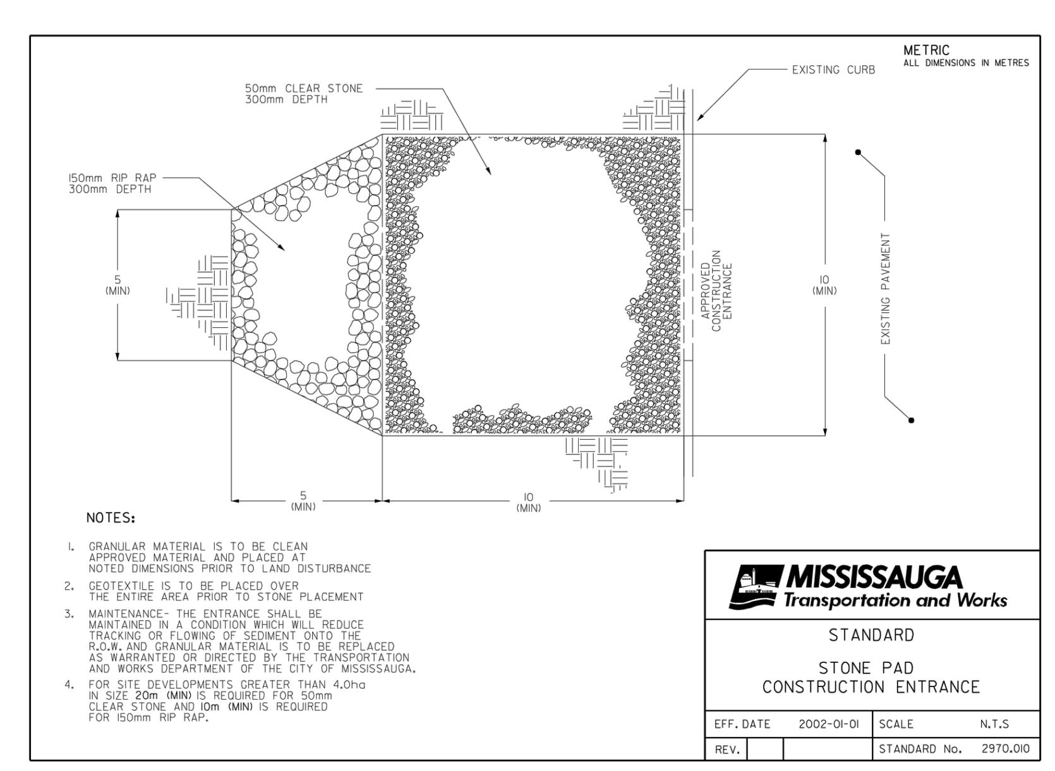

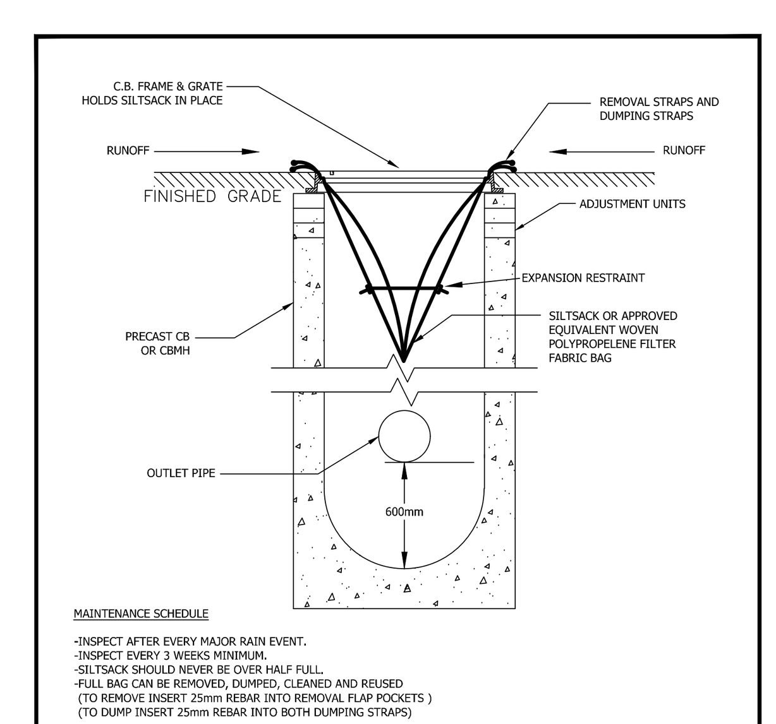

CATCHBASIN SEDIMENT BARRIER
N.T.S.

EROSION AND SEDIMENT CONTROL

1.1. CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS SHOWN PRIOR TO CONSTRUCTION AND MAINTAIN IN GOOD CONDITION UNTIL CONSTRUCTION IS COMPLETED AND ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED EITHER BY PAVING OR RESTORATION OF VEGETATIVE COVER.

1.2. ALL SILT FENCING TO BE INSTALLED PRIOR TO ANY AREA GRADING, EXCAVATING OR DEMOLITION COMMENCING.

1.3. EROSION CONTROL FENCING TO BE INSTALLED AROUND BASE OF ALL LONG TERM STOCKPILES. ALL STOCKPILES TO BE KEPT OUTSIDE OF THE SIGNIFICANT WOODLAND DRIPLINE AND THE 10m WIDE NATURAL HERITAGE SYSTEM (NHS) BUFFER.

1.4. EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM CBS.

1.5. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.

1.6. EROSION CONTROL STRUCTURES TO REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED.

1.7. NO ALTERNATE METHODS OF EROSION PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE ENGINEER AND THE CITY.

1.8. CONTRACTOR TO CLEAN ROADWAY AND SIDEWALKS OF SEDIMENTS RESULTING FROM CONSTRUCTION TRAFFIC FROM THE SITE EACH DAY.

1.9. CONTRACTOR MUST REMOVE EROSION AND SEDIMENTATION FENCING PRIOR TO COMPLETION OF PROJECT. CONTRACTOR TO HAVE EROSION AND SEDIMENTATION FENCE INSPECTED WHEN VEGETATION HAS ESTABLISHED, BUT PRIOR TO FENCE BECOMING OVERGROWN. ENGINEER'S REPRESENTATIVE TO DETERMINE IF VEGETATION HAS REACHED THE CRITICAL POINT AND WILL THEN INSTRUCT CONTRACTOR TO REMOVE FENCE.

1.10. THE CONTRACTOR SHALL ALSO BE RESPONSIBLE TO CONTROL DUST IN THE PROJECT AND SHALL PROVIDE, AT HIS OWN EXPENSE, CONTROLLING MEASURES AS DIRECTED BY THE ENGINEER AND THE CITY.

1.11. SHOULD EXCESSIVE MUD TRACKING BE NOTED ON THE CITY/REGION ROADS, IT MAY BE DIRECTED BY THE CITY/REGION ENGINEER TO INSTALL A WHEEL WASHING DEVICE WHICH WILL BE THE RESPONSIBLITY OF THE CONTRACTOR.

1.12. ALL SEDIMENT CONTROLS MUST BE MONITORED ON A WEEKLY BASIS BY THE THIRD PARTY AND A REPORT WILL BE SUBMITTED TO CVC, MNRF AND THE CITY OF MISSISSAUGA. DURING OR IMMEDIATELY AFTER A SIGNIFICANT RAINFALL EVENT AN INSPECTION MUST BE DONE, AND THE RECEIVING SYSTEM SHOULD BE INSPECTED FOR EXCESS SEDIMENT LOAD. IF EXCESS SEDIMENT LOAD IS NOTED, THE SEDIMENT EROSION CONTROL PLAN SHOULD BE ADJUSTED TO CONTROL EXCESS SEDIMENT TO THE EXTENT FEASIBLE AS SOON AS POSSIBLE. MODIFICATIONS & MAINTENANCE MAY BE REQUIRED AS SITE CONDITIONS WARRANT. THE CVC AND CITY OF MISSISSAUGA APPROVAL IS REQUIRED PRIOR TO MODIFICATIONS.

1.13. ALL EXTERNAL AREAS DISTURBED DUE TO CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE CITY OF MISSISSAUGA OR REGION OF PEEL.

MAINTENANCE RECOMMENDATIONS

2.1. REMOVE SEDIMENT AND CONTAMINANTS ANNUALLY AND REINSTATE STORM WATER MANAGEMENT FACILITY ACCORDING TO THE DESIGN OUTLINED ON THIS PLAN.

2.2. EROSION CONTROL STRUCTURES TO BE MONITORED REGULARLY AND ANY DAMAGE REPAIRED IMMEDIATELY. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 1/3 THE HEIGHT OF THE FENCE. ALL REMOVED SEDIMENTS ARE TO BE DISPOSED OF OFFSITE AT APPROPRIATE FACILITIES.

2.3. OWNER'S REPRESENTATIVE TO MONITOR EROSION CONTROL STRUCTURES TO ENSURE FENCING IS INSTALLED AND MAINTENANCE IS PERFORMED TO CITY REQUIREMENTS.

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Region of Peel *Working for you*
MISSISSAUGA

EROSION AND SEDIMENT CONTROL PLAN

PROJECT #:	23-747	DRAWING:	C401
DESIGNED:	J.S.	CHECKED:	D.Z.
DRAWN:	J.S.	DATE:	AUGUST 2023
SCALE:	1:750		

SITE PLAN FILE No.:
SUBDIVISION FILE No.:
CITY FILE No.:
REGION FILE No.:
REGION CONNECTION FILE No.:

FILE: P:\PROJECTS\23-747-1720 SHERWOOD FORREST CIRCLE(ARGO-MISS.)\DRAWINGS\400 - EROSION\401-ESC.DWG REVISED BY [JSTRAUSS] ON May 26, 2024 AT 6:16 PM