3115 Hurontario Street Development Civil Works

Preliminary

Functional Servicing and Stormwater Management Report

Project Location:

3115 Hurontario Street, Mississauga, ON

Prepared for:

Clearbrook Development Ltd.
80 Front Street East, Suite 506, Toronto, ON

Prepared by:

MTE Consultants
1016 Sutton Drive, Unit A
Burlington, ON L7L 6B8

September 12, 2022
Revised: July 9, 2024

MTE File No.: 50347-200

Engineers, Scientists, Surveyors.

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1.0 Introduction

1.1 Overview

MTE Consultants Inc. were retained by Clearbrook Developments Ltd.to complete the site grading, servicing, and stormwater management design for the proposed development located at 3115 Hurontario Street in the City of Mississauga (see Figure 1 for Location Plan). This report will outline a functional servicing and stormwater management strategy for the proposed development.

The site is located on a 0.25ha parcel of land bounded by existing commercial developments to the north, east and south, and Hurontario St. to the west. The property is currently occupied by an asphalt drive way, landscaped areas, and an existing two (2) storey building. The proponent plans to construct a 42-storey mixed-used building to contain a combination of residential, charity, and commercial space. Parking will be provided on site for the proposed buildings via four (4) levels of underground (below grade) parking. Existing municipal storm and sanitary sewers and watermain services are located on the abutting right-of-way which will be utilized to service the proposed development.

The proposed development is located on Hurontario St., which is where the new Hurontario light-rapid transit (LRT) is proposed. The master planning of where the proposed development is located is to be dense with at least 25-storeys (Ref. 6), which aligns with this development which is proposed to be 35-storeys.

The functional servicing described in this report will provide additional detailed information on the proposed servicing scheme for the site. Please refer to the site plan and the enclosed MTE drawings for additional information.

1.2 Background Information

The following documents were referenced in the preparation of this report:

- Ref. 1: *MOE Stormwater Management Practices Planning and Design Manual* (Ministry of Environment, March 2003).
- Ref. 2: *Design Guidelines for Sewage Works, Ministry of the Environment and Climate Change (2008).*
- Ref. 3: *Design Guidelines for Drinking-Water Systems, Ministry of the Environment and Climate Change (2008).*
- Ref. 4: *Hurontario/ Main Street Corridor Master Plan*, MMM Group (October 2010).
- Ref. 5: *Low Impact Development Stormwater Management Planning and Design Guideline, Credit Valley Conservation & Toronto and Region Conservation for the Living City, Version 1.0 (2010).*
- Ref. 6: *Cooksville Creek Flood Evaluation Master Plan EA,* Aquafor Beech Ltd. (July 2012).
- Ref. 7: *Stormwater Management Criteria*, Credit Valley Conservation (August 2012).
- Ref. 8: *Development Requirements Manual, City of Mississauga Transportation and Works Department* (September, 2016).
- Ref. 9: *Public Works Stormwater Design Criteria and Procedural Manual*, Region of Peel (Version 2.1 June 2019).

- Ref. 10: *Erosion & Sediment Control Guide for Urban Construction* (2019).
- Ref. 11: *Development Charges Background Study, Region of Peel (2020).*
- Ref. 11: Ontario Building Code (2020).
- Ref. 12: *Water Supply for Public Fire Protection*, Fire Underwriters Survey (2020).
- Ref. 13: *3115 Hurontario Street, Mississauga Phase One Environmental Site Assessment*, MTE Consultants Inc. (March 2022).
- Ref. 14: *3115 Hurontario Street, Mississauga Phase Two Environmental Site Assessment*, MTE Consultants Inc. (May 2022).
- Ref. 15: *Proposed Mixed-Use Development Geotechnical Investigation*, MTE Consultants Inc. (July 2022).
- Ref. 16: *Proposed Mixed-Use Development Preliminary Hydrogeological Investigation Report*, MTE Consultants Inc. (July 2022).
- Ref. 17: *Linear Wastewater Standards, Region of Peel (2023).*

1.3 Geotechnical Background

A geotechnical investigation was undertaken by MTE Consultants Inc. dated July 26, 2022. Ten (10) boreholes were advanced to depths ranging from 1.2m to 15.6m below the existing grade. The investigation revealed fill underlain with granular sandy soil deposits, then glacial silty till, and bedrock at depths of 114.1 to 115.3 metres above sea level (masl). Groundwater monitoring wells were installed in four (4) of the boreholes to monitor groundwater. The results are discussed further in the Hydrogeological Report. The report by MTE includes recommendations for site servicing instillation, foundation design, and sub drainage of floor slabs.

1.4 Hydrogeological Background

A hydrogeological investigation was undertaken by MTE Consultants Inc. dated July 27, 2022. Groundwater monitoring was done from March 23 to June 27, 2022. Based on the groundwater readings groundwater elevations vary on-site from 116.15 to 114.66 masl. Groundwater measured within the bedrock was determined to vary from 112.76 to 112.42 masl. Groundwater quality samples were obtained for analysis, and it was determined that the quality of the groundwater met the Region of Peel Sanitary Sewer Discharge, but there were exceedances for Region of Peel Storm Sewer Discharge and City of Mississauga Storm Sewer. It is estimated that short-term dewatering amounts could vary from 18,747 to 3,718 L/day depending on the duration of dewatering required. For short-term dewatering within the bedrock unit the rates are estimated to be from 269,490 to 95,381 L/day depending on the dewatering duration. In addition to these quantities, rainfall could contribute an additional 62,643 L/day to short-term dewatering requirements. An Environmental Activity and Sector Registry (EASR) will be required for the proposed development. Site specific groundwater disposal during construction will be determined during the detailed design phase. The proposed development will be designed as a water tight structure, therefore, no long-term dewatering will be required.

1.5 Phase One and Phase Two Environmental Site Assessments

A phase one and two environmental site assessment (ESA) investigation was undertaken by MTE Consultants Inc. in March 11 and May 27, 2022. The phase one indicated that a phase two ESA would be required due to finding some potential areas of environmental concern. The phase two did not identify any soil or groundwater samples with any contaminants of potential concern within the potential areas of concern identified on site.

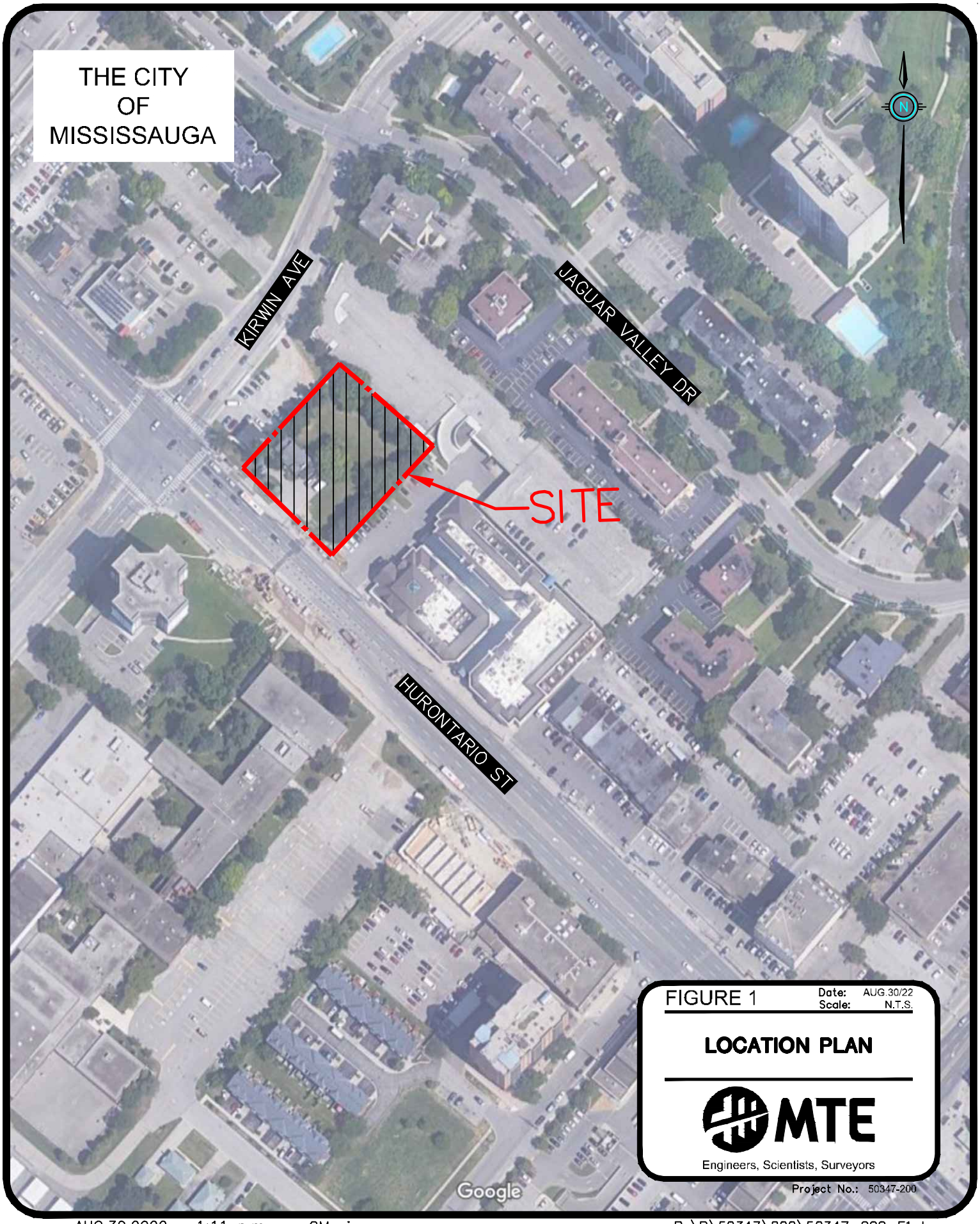

FIGURE 1 Date: AUG.30/22 Scale: N.T.S.

LOCATION PLAN

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2.0 Stormwater Management

The following sections will describe the proposed stormwater management (SWM) plan for the proposed development.

2.1 Stormwater Management Criteria

Based on email correspondence with City of Mississauga Staff (see Appendix D), the following stormwater management (SWM) criteria will be applied to the site:

2.1.1 Quantity Control

The site is located in the Cooksville Creek watershed, therefore attenuation of the proposed development peak flows for the 2 through 100-year storm events to the 2-year City of Mississauga pre-development conditions peak flow rate is required. Design Runoff Coefficients provided by City. The pre-development runoff coefficient cannot exceed 0.50 for developed parcels, and cannot be lower than 0.25 for undeveloped parcels. Please refer to Appendix D for City Correspondence.

2.1.2 Quality Control

An enhanced (Level 1) water quality treatment (80% TSS Removal) is required for all impacted surface runoff prior to discharging to the receiving system.

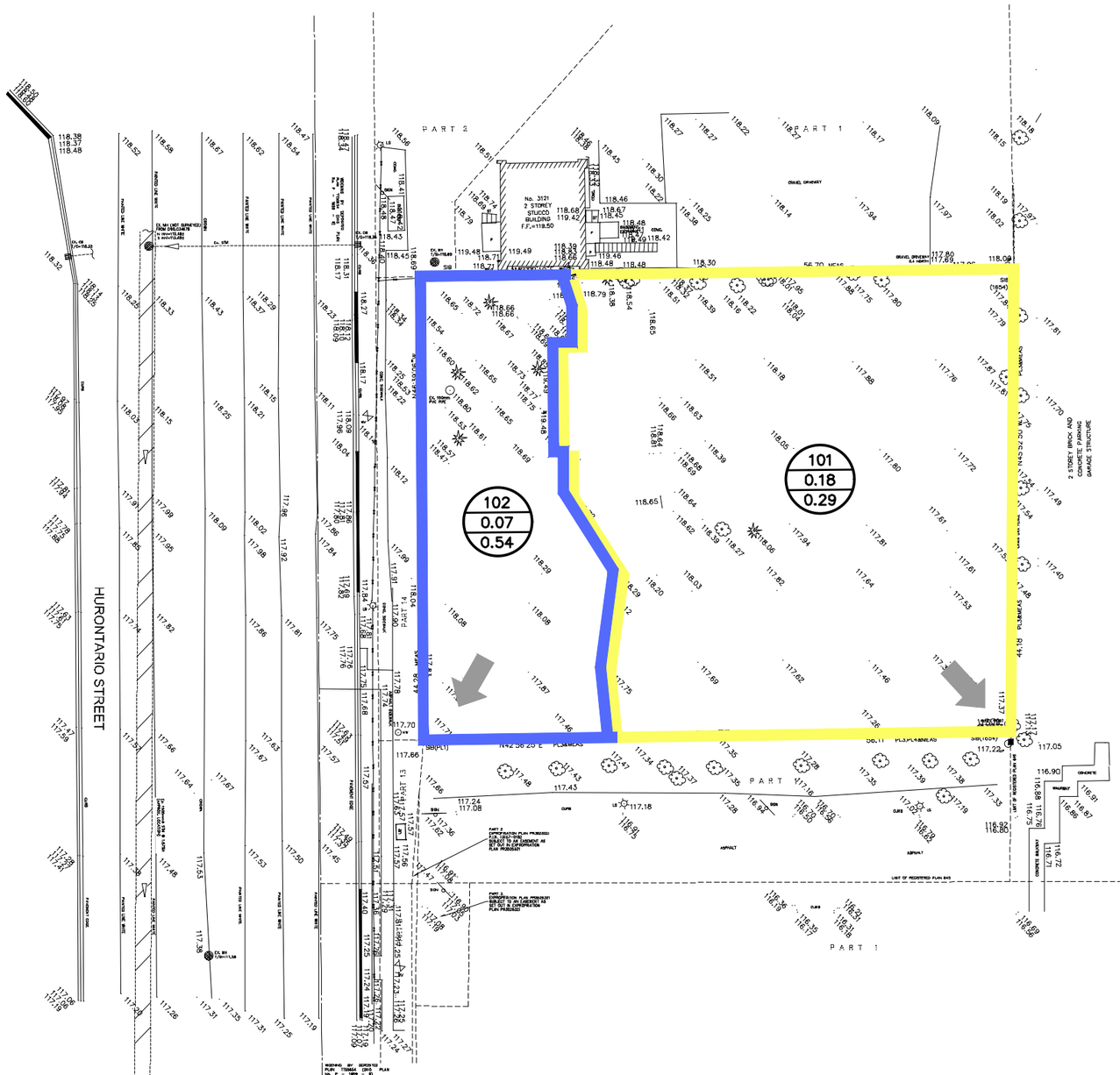
2.1.3 Water Balance

Retention of the first 5mm of stormwater on-site through infiltration, reuse, or evaporation.

2.2 Existing Conditions

Under existing conditions, the majority of the site is comprised of landscape, with a small asphalt driveway and two (2) storey building. There is an existing 1500mm diameter storm sewer sloped at approximately 1.57% in the southerly direction. The front of the site slopes to the south-west and drains uncontrolled to Hurontario St, and the back of the site slopes to the south-east and drains to existing catchbasins located within the existing parking lot on the adjacent commercial property. There is no known existing storm infrastructure on-site, or existing stormwater management quantity or quality controls on site.

The existing conditions have been defined by two (2) catchment areas (see Table 2.1 and Figure 2). The average runoff coefficients of the existing site were provided by City of Mississauga Staff (see Appendix D for correspondence).



LEGEND

CATCHMENT 101

CATCHMENT 102

101 — ID No.
0.18 — AREA (Ha)
0.29 — RUNOFF COEFFICIENT

OVERLAND FLOW ROUTE
(MAJOR STORM)

+ 326.23 — EXISTING SPOT ELEVATIONS

FIGURE 2

Date: AUG.30/22
Scale: 1:500

EXISTING CONDITIONS STORMWATER CATCHMENT FIGURE

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Table 2.1 - Existing Conditions Catchment Area

Catchment ID	Description	Area (ha)	% Imp.	Runoff Coefficient
101	Existing site drainage to Jaguar Valley Dr.	0.18	13	0.29
102	Existing site drainage to Hurontario St.	0.07	49	0.54 [A]
	TOTAL	**0.25**	**16**	**0.36**

[A] Based on actual calculations. As per City guidelines the maximum runoff coefficient to be used for allowable calculations is 0.50, thus 0.50 was used in determining the allowable release rate.

The existing conditions were assessed using the rational method for the 2-year to 100-year City of Mississauga design storms. Table 2.2 summarizes the pre-development runoff rates for the 2-year storm event. Appendix A contains detailed hydrologic modeling parameters and calculations.

Table 2.2 - Allowable Site Discharge

Catchment	Area (ha)	Allowable Peak Discharge Rate (2-Year Storm)[A] (m^3/s)
101 (Area uncontrolled to Jaguar Valley Dr.)	0.18	0.009
102 (Area uncontrolled Hurontario St.)	0.07	0.006
TOTAL	**0.25**	**0.015**

[A] Discharge rate taken from rational method calculations (see Appendix A).

2.3 Proposed Conditions

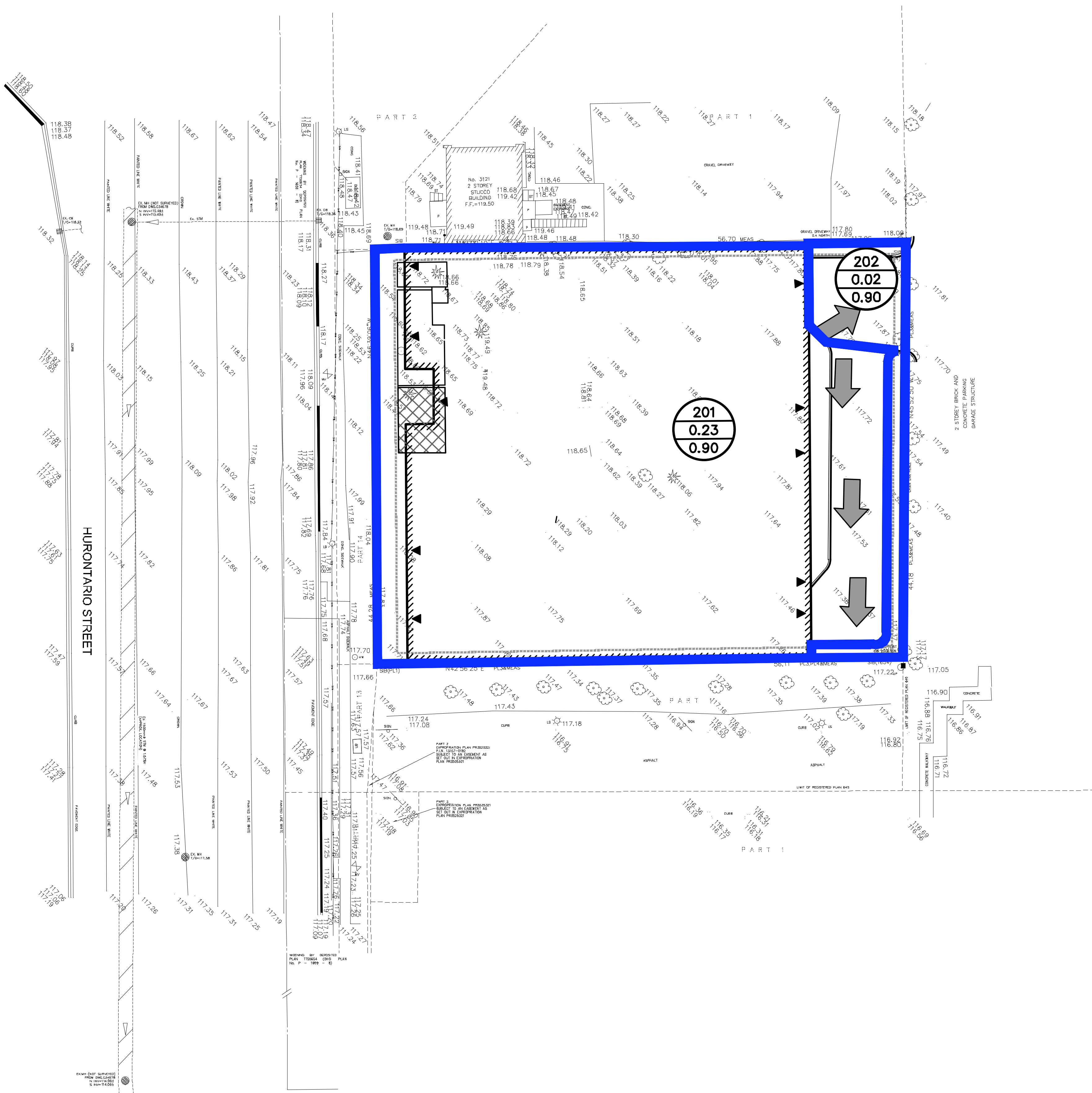
Under proposed conditions, the proponent plans to construct a 42-storey mixed-used building. Underground parking will be included. Charity space will be included s on levels one (1) and two (2), retail space will be included on level one (1), amenity space will be included in levels two (2) and three (3), and the rest of the building will be 520 residential units. The perimeter of the site will consist of walkways and landscaped area.

The proposed conditions drainage pattern is delineated by two (2) catchment areas. Stormwater runoff from the site will be collected by a series of roof drains and area drains on the parking surface. These drains will connect to the internal plumbing of the building and therefore will be detailed by the mechanical consultant. The storm sewer outlet for the development will convey flows to the existing 1500mm diameter storm sewer located on Hurontario St. Stormwater management controls in the form of an orifice + storm tank will be implemented to control proposed development discharge rates to the allowable release rate for the site. Due to grading constraints, the northeast area of the site will drain uncontrolled to the abutting proposed roads by others via overland sheet flow. Please refer to Functional Servicing and Stormwater Report for 3085 Hurontario (Urbantech August 2023) for detailed information for the proposed adjacent roads.

Table 2.3 provides a brief description of each catchment area as well as the size, impervious cover and stormwater runoff coefficients associated with each. Figure 3 provides an illustration of the proposed development catchment areas. Appendix A contains detailed information pertaining to the stormwater management model.

Table 2.3 - Proposed Conditions Catchment Areas

Catchment ID	Description	Area (ha)	%Imp.	Runoff Coefficient
201	Stormwater Tank (controlled to Hurontario St.)	0.23	99	0.90
202	Landscape and driveway (uncontrolled off site, accounted for by adjacent development in SWM)	0.02	99	0.90
	Total	**025**	**99**	**0.90**



LEGEND

CATCHMENT AREA

201 / 0.21 / 0.90 — ID No. / AREA (Ha) / RUNOFF COEFFICIENT

OVERLAND FLOW ROUTE (MAJOR STORM)

+ 326.23 EXISTING SPOT ELEVATIONS

FIGURE 3 Date: AUG.30/22 Scale: 1:500

PROPOSED CONDITIONS STORMWATER CATCHMENT FIGURE

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2.3.1 Quantity Controls

Stormwater management quantity controls for the site will be provided by an underground storage tank coupled with an orifice control located within the underground parking structure. The tank will form part of the underground parking structure and will require structural design and waterproofing (to be designed by others at the building permit stage). Backwater valves are to be installed within the building as indicated on drawing C2.2 for the proposed storm and sanitary services.

Tables 2.4 summarizes the stage-storage-discharge relationship of the proposed storm tank and orifice control. This information is used to ensure the proposed development meets the allowable stormwater management criteria.

Table 2.4 - Stage-Storage-Discharge Calculations for Underground Storm Tank

Elevation (m)	Head, H (m)	Cumulative Storage Volume (m^3)[A]	Discharge Q (m^3/s)[B]	Comments
113.89	N/A	0.00	N/A	Bottom of tank
114.25	0.000	12.50	0.0000	Orifice Invert / beginning of active storage
114.27	0.000	0.67	0.0000	CL of orifice
115.25	0.981	35.00	0.0031	
116.25	1.981	70.00	0.0045	
117.25	2.981	105.00	0.0055	
117.70	3.431	120.75	0.0059	Top of Tank

[A] Storage volume based on a tank with internal footprint of 105.0m^2 and an internal height of 3.43m for an overall internal storage volume of 120.75m^3. See Appendix A and drawing C2.2 for more details.
[B] From orifice equation $Q = CA(2gH)^{0.5}$ for a 38 mm diameter orifice plate (since orifice pipe is not commercially available in that size, therefore orifice plate is recommended).
Where: C = 0.63, A=cross-sectional area, g=9.81, H=pressure head

The proposed conditions were assessed using rational and modified rational methods to assess required storage to achieve the allowable release rate for the 100-year City of Mississauga design storms. Appendix A contains detailed hydrologic modeling parameters and input/output printouts for the proposed conditions.

Table 2.5 summarizes the proposed conditions site peak discharge rates for the site with the aforementioned stormwater management controls and compares them to the 2-year pre-development peak discharge (i.e. allowable discharge rate). Table 2.6 summarizes the proposed conditions storage volume requirements vs. storage volume provided for in the storm tank and orifice control.

Table 2.5 - Proposed Conditions Peak Discharge Rate to Hurontario St.

Storm Event	Post-Development Conditions	
	Total Peak Discharge Rate to Hurontario St. (m^3/s) [A]	Allowable Site Peak Discharge Rate to Hurontario St. (m^3/s) [B]
100-yr	**0.0059**	**0.0060**

[A] Discharge rate taken from Table 2.4 maximum flow from the proposed stormwater tank (see Appendix A for details).
[B] See Table 2.2

As seen in Table 2.5 above, the proposed peak flow rates to Hurontario St. are less than the allowable peak flow rates for all storm events. Catchment 202 drains of the proposed development uncontrolled to the adjacent development. The adjacent development has included this area in their stormwater management already.

Table 2.6 - Proposed Conditions Storage Volume Requirements

Underground Storm Tank	
Storage Volume Req. [A] (m^3)	Storage Volume Provided [B] (m^3)
119.49	120.75

[A] Storage volume per modified rational method (see Appendix A).
[B] See Table 2.4

The analysis indicates the following:

- For the 2-year to 100-year events, the total proposed conditions peak discharge rates from the site do not exceed the allowable release rate as illustrated in Table 2.5. This satisfies the stormwater management quantity control requirement set by the City of Mississauga.
- Sufficient storage volume is provided on the apartment building and hotel rooftops as well as within the storm tank to contain stormwater as illustrated within Table 2.6 and Appendix A.
- Overland flow to Hurontario St. for proposed conditions will be less than existing conditions.

2.3.2 Water Quality Control

Water quality control for the proposed development will be provided by a Stormceptor oil/grit separator (or approved equivalent) that will be installed at the downstream end of the stormwater management system prior to connecting into the existing 1500mm diameter storm sewer within the Hurontario St. ROW. The following parameters were used to size the oil/grit separator:

- Upstream Catchment Area = 0.23ha (Catchments 201+203);
- % Impervious = 99%;
- Particle Distribution = FINE ; and
- Upstream storage = none (per City requirements).

The analysis indicates that a Stormceptor EFO4 will provide 93% TSS Removal and treat over 90% of the average annual runoff, which meets the requirements for an “Enhanced” (Level 1 or 80% TSS removal) level of water quality protection. Stormceptor sizing output information is included in Appendix A.

Stormwater runoff generated from the remainder of the site perimeter (Catchment 202 + 203) will flow overland uncontrolled to the abutting roads. Since these areas are comprised of walkways and landscaped areas, stormwater runoff is generally considered to be clean and therefore no water quality controls will be provided for these areas.

Due to grading constraints and the nature of the proposed development with the buildings and parking lot taking up the majority of the subject site, there are limited opportunities for proposed low impact development (LID) features on the site. As such, the proposed OGS unit will be the only form of quality control proposed.

2.3.3 Private Storm Service Connection

The proposed 38mm diameter orifice plate (downstream end of MH2) will outlet into the proposed EFO4, then to a 200mm diameter sewer which will connect to the existing 1500mm diameter storm sewer on Hurontario St. The proposed 200mm diameter sewer has a full flow capacity of approximately 3.29 L/s which is greater than the 100-year controlled peak discharge of 0.0054 L/s from the orifice (see Table 2.4). Therefore, the proposed storm lateral will have sufficient capacity to convey the proposed 100-year controlled peak flow from the site. Please refer to Drawing C2.2 for further site servicing details.

2.3.4 Water Retention

As per T&W Development Requirements Manual, the site is required to retain the first 5mm of rainfall. Based on the site developed area, the volume of water required to be retained on-site is calculated as follows:

Volume = Site Developed Area (m^2) x Depth of Rainfall (m)

= 2500m^2 x 0.005m

= 12.50m^3

Given the extent of the underground parking garage, there is limited opportunity to retain infiltrate stormwater on-site. The required volume of water retention will be accommodated through stormwater harvesting and re-use for either irrigation and/or toilet flushing, maintenance, etc.. The preferred methods and systems will be confirmed during the detailed design stage as part of the Site Plan Approval. The required 12.5m^3 retention volume is being provided by the dead storage of the proposed storm tank below the invert elevation of the orifice plate. Please refer to the Tank Volume Calculations in Appendix A for the total retention volume being provided by the storm tank.

2.4 Sediment and Erosion Control

Sediment and erosion control measures will be implemented on site during construction and will conform to the Erosion & Sediment Control Guideline for Urban Construction (Ref 3) and City of Hamilton Standards.

Sediment and erosion control measures will include:

- Installation of silt control fencing at strategic locations around the perimeter of the site where feasible.
- Preventing silt or sediment laden water from entering inlets (catch basins / catch basin manholes) by wrapping their tops with filter fabric or installing silt sacks.
- Construction of 9m x 9m mud mat at the exit from the site to the adjacent proposed road to mitigate the transportation of sediments to the surrounding roads.
- Maintaining sediment and erosion control structures in good repair (including periodic cleaning as required) until such time that the Engineer or City of Mississauga approves their removal. Erosion control measures to be inspected daily and after any rainfall event.

3.0 Sanitary Sewer Servicing

3.1 Existing Conditions

There is an existing 300mm diameter sanitary sewer flowing south at approximately 1.7% within the Hurontario St. right-of-way. This sewer has a full flow capacity of approximately 126 L/s.

3.2 Sanitary Demands

The anticipated sanitary discharge from the proposed development was estimated using Region of Peel design criteria and the Ontario Building Code (2012) based on the proposed building use. Table 3.1 provides an estimate of the residential population and the number of units in each type of building.

Table 3.1 - Population Estimate

Unit Types	Total Number of Units [C]	Area (m^2) [C]	Population Density [A]	Population (people) [B]
Proposed building				
Residential units	520		2.7 p/unit	1404
Commercial Space	N/a	222	50 p/ ha	1
Charity Space	N/a	943	0.75 p/ha	707
			Total Estimated Population	**2112**

[A] Population density based on Region of Peel population density.
[B] Population calculated as (Total # of Units) X (Persons per Unit).
[C] Room/Unit count breakdown provided by Sweeny & Co Architects (June 4, 2024).

Region of Peel Linear Wastewater Standards were used to calculate discharge rates instead of Development Charges Background Study for the apartments, commercial and charity spaces, as it produces a higher demand. The sanitary sewer discharge rates from the development are summarized in Table 3.2 and detailed calculations are found in Appendix B.

Table 3.2 - Sanitary Sewer Discharge from Site

Land Use	Population (people) [A]	Average Flow [B] (L/s)	Peak Flow (L/s) [C]
Residential units	1404	4.921	17.552
Commercial Space	1	0.004	0.014
Charity Space	707	2.479	8.842
		Total Peak Sanitary Discharge for Site	26.41
		Total Peak Sanitary Discharge for Site (with infiltration allowance)	**26.47**

[A] Population Estimate: see Table 3.1
[B] Average flow based on 302.8 L/ca/day. Avg Flow = 302.8*1164/(24*60*60) = 4.078 L/s
[C] Peak flow = Average Flow*PF, where Harmon Peaking Factor (PF) = 1+(14/(4+P^(1/2))) = 3.5 (max 5.0)
[D] Total Peak flow = Peak flow from residential + commercial + charity
[G] Total Peak flow with infiltration = Total Peak flow + infiltration allowance = 27.70 + 0.05 = 27.75 L/s
Where infiltration is based on 0.40 l/s/ha. Area reflects site area (0.72 ha), I = 0.40*0.72 = 0.288 L/s

3.3 Proposed Sanitary Servicing Plan and Capacity Analysis

As calculated in Table 3.2, the total peak sanitary discharge from the site is 26.47 L/s.

There are two options being considered and suitable for providing the development with an acceptable sanitary outlet.

Option 1 – Discharge to Hurontario Street Sanitary System

Based on our understanding, a new sanitary sewer will be installed along Hurontario Street as part of the Metrolinx LRT project. The proposed building can be serviced by a 200mm diameter sanitary service at 1.0% slope (full flow capacity = 32.78 L/s) that will connect to the Hurontario

Street sanitary sewer (see Option 1 on Drawing C2.2). The calculated sanitary discharge rate of 26.47 L/s (per Table 3.2) is less than the capacity of the Hurontario St. sewer (126 L/s) and represents 22% of the total sewer capacity. As part of the engineering materials submitted in support of the adjacent development at 3085 Hurontario Street, it was identified that external upgrades to the existing municipal sanitary sewer system were required to accommodate sanitary flows from 3115 Hurontario Street as well as the adjacent development at 3085 Hurontario Street:

- Replacement of 116m of existing 300mm diameter sanitary sewer location on Hurontario St. north of Dundas St. and replacement of 15m of existing 375mm diameter sanitary sewer at Jaguar Valley Dr. and Dundas St.

Option 2 – Discharge to Future Sanitary Sewer on Kirwin Ave

As part of the engineering materials submitted in support of the adjacent development at 3085 Hurontario Street, it was identified that external upgrades to the existing municipal sanitary sewer system were required. In addition, a new sanitary sewer on Kirwin Avenue is being considered. The following upgrades were identified to provide sanitary service 3085 Hurontario Street:

- A 200mm diameter sanitary sewer extension on Kirwin Avenue from site towards including a 200mm diameter sanitary service from 3085 Hurontario Street to the new Kirwin Avenue sewer.

The above mentioned sanitary service could also be designed to accommodate sanitary drainage from 3115 Hurontario Street. (see Option 2 on MTE Dwg C2.2)

It is recommended that the Region confirm the preferred sanitary servicing approach and outlet for 3115 Hurontario Street. Either option is acceptable and can accommodate the sanitary drainage from 3115 Hurontario Street.

4.0 Domestic and Fire Water Supply Servicing

4.1 Existing Conditions

The existing municipal water distribution system around the site consists of a 400mm diameter watermain within the Hurontario St. right-of-way.

4.2 Domestic Water Demands

The expected domestic water demands for the proposed development were estimated using Region of Peel design criteria. Table 4.1 summarizes the domestic water demand requirements for the Average Day, Maximum Day and Peak Hour demand scenarios and detailed calculations are provided in Appendix C. It should be noted that average day peak factor is 1.0, the max day peak factor is 2.0 for residential and 1.4 for ICI, and the peak hour factor is 3.0 in accordance with Region of Peel standards.

Table 4.1 - Domestic Water Demands

Apartment Demands		
Population:	1404 people (see Table 3.1)	
Average Day Demand:	280 L/c/d x 1404 people =	4.550 L/s
Maximum Day Demand:	2.0 x 4.550 L/s =	9.100 L/s
Peak Hour Demand:	3.0 x 4.550 L/s =	13.650 L/s
Commercial Demands		
Population:	1 people (see Table 3.1)	
Average Day Demand:	300 L/c/d x 1 people=	0.004 L/s
Maximum Day Demand:	1.4 x 0.004 L/s =	0.005 L/s
Peak Hour Demand:	3.0 x 0.004 L/s =	0.012 L/s
Charity Demands		
Population:	707 people (see Appendix D)	
Average Day Demand:	300 L/c/d x 707 people=	2.456 L/s
Maximum Day Demand:	1.4 x 2.456 L/s =	3.438 L/s
Peak Hour Demand:	3.0 x 2.456 L/s =	7.367 L/s

4.3 Fire Flow Demands

Fire flow demands for the proposed development were also determined using the methodology outlined in Water Supply for Public Fire Protection (Fire Underwriters Survey (FUS), 2020). The fire demands are summarized in Table 4.3 and detailed calculations are provided in Appendix C.

Table 4.2 - FUS Fire Flow Requirements

Building	Fire Underwriters Survey (FUS) Flow Rate
42-Storey Mixed-use building	112 L/s (6,700 L/min)

4.4 Proposed Water Servicing Plan and Analysis

Based on our understanding, a new 600mm diameter watermain will be installed along the east side of Hurontario Street as part of the Metrolinx LRT project. Water servicing for the site will include the installation of a 200mm diameter water service teed off the proposed 600mm diameter watermain on Hurontario St. to service the existing building. The service will be split at property line into a dual 150mm diameter domestic service and 200mm diameter fire service. Please refer to Drawing C2.2 for further details. A second water service can also be provided for redundancy if required.

5.0 Conclusions and Recommendations

Based on the information provided herein, it is concluded that the development can be constructed to meet the requirements of the City of Mississauga and Region of Peel. Therefore, it is recommended that:

i. A stormwater storage tank complete with orifice controls be provided to control proposed conditions stormwater site discharge rates to the allowable release rate as described in Section 2.3 of this report.

ii. Erosion and sediment controls be installed as described in Section 2.4 of this report.

iii. Sanitary servicing for the development be installed as described in Section 3.3 of this report.

iv. Water servicing for the development be installed as described in Section 4.4 of this report to meet OBC minimum water supply requirements.

v. The proposed stormwater management plan presented in this report and the site servicing works described in this report and as shown on Drawings C2.1 and C2.2 be accepted in support of the approval process.

We trust the information enclosed herein is satisfactory. Should you have any questions please do not hesitate to contact our office.

All of which is respectfully submitted,

MTE Consultants Inc.

Mike Xu
Designer
905-639-2552 ext. 2484
mxu@mte85.com

George Berenyi, P. Eng.
Technical Manager, Civil Engineering
905-639-2552 ext. 2461
gberenyi@mte85.com

Appendix A

Stormwater Management Information

3115 Hurontario Street Development Civil Works
Mississauga, Ontario
STORMWATER MANAGEMENT - HYDROLOGIC PARAMETERS

EXISTING DEVELOPMENT CONDITIONS HYDROLOGIC MODELING PARAMETERS

Catchment ID	Catchment Description	Hydrograph Method	Area (ha)	Impervious (%)	Runoff C
101	Existing site drainage to Jaguar Valley Dr.	Modified Rational Method	0.18	13	0.29
102	Existing site drainage to Hurontario St.	Modified Rational Method	0.07	49	0.54
		TOTAL	**0.25**	**16**	**0.36**

PROPOSED DEVELOPMENT CONDITIONS HYDROLOGIC MODELING PARAMETERS

Catchment ID	Catchment Description	Hydrograph Method	Area (ha)	Impervious (%)	Runoff C
201	Drainage to SWM tank controlled to Hurontario St.	Modified Rational Method	0.23	99	0.90
202	Drainage uncontrolled to Jaguar Valley Dr. (area included in adjacent developments SWM)	Modified Rational Method	0.02	99	0.90
		TOTAL	**0.25**	**99**	**0.90**

Notes:

OGS Unit Sizing Information:

Drainage to OGS Unit #1 (South) includes catchment 201

Total Area draining to OGS #1:	0.23
% Imp of areas draining to the OGS:	99

3115 Hurontario Street Development Civil Works
Mississauga, Ontario
STORMWATER MANAGEMENT RATIONAL METHOD - ALLOWABLE RELEASE RATES

Design Storm Information

Intensity-Duration-Frequency (IDF) equations for the City of Mississauga [(A)] in the form:

$$i = \frac{A}{(t + B)^C}$$

Where: i = Rainfall intensity (mm/hr)
t = Time of duration (15min)
A, B and C = Constant (see below)

The value of the parameters for the various storm events is provided below:

Catchment 101 - to Jaguar Valley Dr.
Area = 0.18 ha
Runoff C= 0.29

Catchment 102 - to Hurontario St.
Area = 0.07 ha
Runoff C= 0.50 (Pre-development has a max runoff coefficient of 0.50 per City stds.)

Constant	2-Yr.	5-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9
C	0.78	0.78	0.78	0.78	0.78	0.78
Runoff Rate Q (m3/s)						
Catchment 101	0.009	0.012	0.014	0.017	0.018	0.020
Catchment 102	0.006	0.008	0.010	0.011	0.012	0.014
Total	0.015	0.020	0.024	0.028	0.031	0.034

[(A)] IDF parameters from City of Mississagua Engineering Standards Manual (November 2020)
Note: IDF equations used to generate rainfall files with time of duration = 5min

As per City standards for Cooksville Creek, 100year post must match 2-year pre development.
Pre-development has a max runoff coefficient of 0.50
Therefore,
Max stormwater flow to Kirwin Ave. = **0.009** m3/s
Max stormwater flow to Hurontario St. = **0.006** m3/s

Based on Drawing STM-1 (August 2023) by Urbantech, 0.20 ha of area with C = 0.90 from 3115 Hurontario St. is accounted for in the SWM of the adjacent development. Therefore, 0.20 ha with a runoff value of C= 0.90 can be directed uncontrolled of the site to the adjacent property.

3115 Hurontario Street Development Civil Works
Mississauga, Ontario
STORMWATER MANAGEMENT RATIONAL METHOD - CATCHMNET 202
RELEASE RATES

Design Storm Information

Intensity-Duration-Frequency (IDF) equations for the City of Mississauga [(A)] in the form:

$$i = \frac{A}{(t + B)^C}$$

Where: i = Rainfall intensity (mm/hr)
t = Time of duration (15min)
A, B and C = Constant (see below)

The value of the parameters for the various storm events is provided below:

Catchment 202- uncontrolled to Kirwin Ave.

Area = 0.02 ha
Runoff C= 0.90

Constant	2-Yr.	5-Yr.	10-Yr.	25-Yr.	50-Yr.	100-Yr.
A	610	820	1010	1160	1300	1450
B	4.6	4.6	4.6	4.6	4.7	4.9
C	0.78	0.78	0.78	0.78	0.78	0.78
Runoff Rate Q (m3/s)						
Catchment 202	0.003	0.004	0.005	0.006	0.006	0.007
Total	0.003	0.004	0.005	0.006	0.006	0.007

[(A)] IDF parameters from City of Mississagua Engineering Standards Manual (November 2020)
Note: IDF equations used to generate rainfall files with time of duration = 5min

3115 Hurontario Street Development Civil Works
Mississauga, Ontario
MODIFIED RATIONAL STORM WATER STORAGE REQUIREMENTS -
TANK TO HURONTARIO ST.

Chicago Storm Rainfall Information		
City/Town:	**Mississauga**	
Return Period:	**100**	Years
A =	**1450**	
B =	**4.9**	
C =	**0.78**	
Tc =	**15**	minutes
	900	seconds

Area of site being investigated (ha) = **0.230** (Catchment 201)
Composite Runoff Coeff. (C) = **0.90**
Allowable Release Rate - Q_{ALLOW} (m^3/s) = **0.006** ($Q_{Allow} = Q_{102} - Q_{203}$)

Flows from site area calculated from area indicated above

Roof flows (Q_{ROOF}) added in as a constant flow rate into the orifice controlled system (if applicable)

Duration (T_D)		Rainfall Intensity		Post-Development Runoff			Runoff Volume	Release Volume	Storage Volume
				Site	Roof	Total "Q_{POST}"			
(min)	(sec)	(mm/hr)	(m/s)	(m^3/s)	(m^3/s)	(m^3/ha)	(m^3)	(m^3)	(m^3)
5	300	242.534	0.0000674	0.139	0.00000	0.1395	41.84	3.49	38.34
10	600	176.312	0.0000490	0.101	0.00000	0.1014	60.83	4.37	56.46
15	900	140.690	0.0000391	0.081	0.00000	0.0809	72.81	5.24	67.57
20	1200	118.122	0.0000328	0.068	0.00000	0.0679	81.50	6.11	75.39
25	1500	102.410	0.0000284	0.059	0.00000	0.0589	88.33	6.99	81.34
30	1800	90.775	0.0000252	0.052	0.00000	0.0522	93.95	7.86	86.09
35	2100	81.773	0.0000227	0.047	0.00000	0.0470	98.74	8.73	90.01
40	2400	74.579	0.0000207	0.043	0.00000	0.0429	102.92	9.61	93.31
45	2700	68.683	0.0000191	0.039	0.00000	0.0395	106.63	10.48	96.15
50	3000	63.753	0.0000177	0.037	0.00000	0.0367	109.97	11.35	98.62
55	3300	59.563	0.0000165	0.034	0.00000	0.0342	113.02	12.23	100.79
60	3600	55.952	0.0000155	0.032	0.00000	0.0322	115.82	13.10	102.72
65	3900	52.805	0.0000147	0.030	0.00000	0.0304	118.42	13.97	104.44
70	4200	50.035	0.0000139	0.029	0.00000	0.0288	120.83	14.85	105.99
75	4500	47.575	0.0000132	0.027	0.00000	0.0274	123.10	15.72	107.38
80	4800	45.375	0.0000126	0.026	0.00000	0.0261	125.24	16.60	108.64
85	5100	43.395	0.0000121	0.025	0.00000	0.0250	127.25	17.47	109.79
90	5400	41.601	0.0000116	0.024	0.00000	0.0239	129.17	18.34	110.83
95	5700	39.967	0.0000111	0.023	0.00000	0.0230	130.99	19.22	111.78
100	6000	38.474	0.0000107	0.022	0.00000	0.0221	132.73	20.09	112.65
105	6300	37.101	0.0000103	0.021	0.00000	0.0213	134.40	20.96	113.44
110	6600	35.836	0.0000100	0.021	0.00000	0.0206	136.00	21.84	114.16
115	6900	34.665	0.0000096	0.020	0.00000	0.0199	137.53	22.71	114.82
120	7200	33.578	0.0000093	0.019	0.00000	0.0193	139.01	23.58	115.43
125	7500	32.565	0.0000090	0.019	0.00000	0.0187	140.44	24.46	115.98
130	7800	31.620	0.0000088	0.018	0.00000	0.0182	141.81	25.33	116.49
135	8100	30.735	0.0000085	0.018	0.00000	0.0177	143.15	26.20	116.94
140	8400	29.904	0.0000083	0.017	0.00000	0.0172	144.44	27.08	117.36
145	8700	29.123	0.0000081	0.017	0.00000	0.0167	145.69	27.95	117.74
150	9000	28.388	0.0000079	0.016	0.00000	0.0163	146.91	28.82	118.08
155	9300	27.693	0.0000077	0.016	0.00000	0.0159	148.09	29.70	118.39
160	9600	27.036	0.0000075	0.016	0.00000	0.0155	149.24	30.57	118.67
165	9900	26.413	0.0000073	0.015	0.00000	0.0152	150.36	31.44	118.91
170	10200	25.822	0.0000072	0.015	0.00000	0.0148	151.45	32.32	119.13
175	10500	25.261	0.0000070	0.015	0.00000	0.0145	152.51	33.19	119.32
180	10800	24.726	0.0000069	0.014	0.00000	0.0142	153.55	34.06	119.49

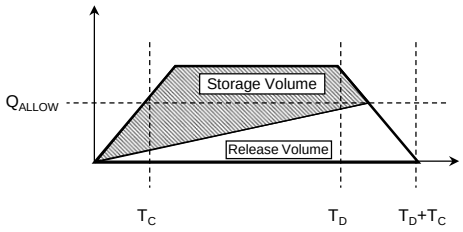
Max. required storage volume = **119.49 m^3**

Q_{POST} = (C i A) x 10000 m^2/ha (Rational Method)

Runoff Volume = Area under trapezoidal hydrograph
= $(T_D - T_C)Q_{POST} + (T_C Q_{POST})$

Release Volume = Area under triangular outflow hydrograph
= ½ $(T_D + T_C)$ Q_{ALLOW}

Storage Volume = Runoff Volume - Release Volume



3115 Hurontario Street Development Civil Works
Mississauga, Ontario
STORMWATER MANAGEMENT

Water Balance

Site Area =	0.25	ha
	2500	m2
Required on-site stormwater retention =	5	mm
Required volume =	**12.5**	**m3**

3115 Hurontario Street Development Civil Works
Mississauga, Ontario

STORMWATER MANAGEMENT

TANK Stage Storage Discharge Curve

Outlet Device No. 1 (Quantity)	
Type:	Orifice Plate
Diameter (mm)	38
Area (m^2)	0.00113
Invert Elev. (m)	114.25
C/L Elev. (m)	114.27
Disch. Coeff. (C_d)	0.63
Discharge (Q) =	C_d A (2 g H)$^{0.5}$
Number of Orifices:	1

Tank Size Requirement		
For water retention (cistern) =	12.5	m3
Total active storage required =	119.49	m3
Total tank volume required =	131.99	m3

		SWM Storage Volumes			Outlet No. 1		Total
Description	Elevation m	Area m^2	Increm. Volume m^3	Cumulative Volume m^3	Head m	Discharge m^3/s	Discharge m^3/s
Bottom of tank	113.89	35	0	0.00	N/A	N/A	N/A
Orifice Invert / beginning of active storage	114.25	35	12.5	12.50	0.000	0.0000	0.0000
CL of orifice	114.27	35	0.7	0.67	0.000	0.0000	0.0000
	115.25	35	34.3	35.00	0.981	0.0031	0.0031
	116.25	35	35.0	70.00	1.981	0.0045	0.0045
	117.25	35	35.0	105.00	2.981	0.0055	0.0055
Top of Tank	117.70	35	15.8	120.75	3.431	0.0059	0.0059

* Dead storage for cistern, not included in cumulative active volume

Stormceptor®

Rinker MATERIALS™

Stormceptor® EF Sizing Report

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

06/18/2024

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

Project Name:	3115 Hurontario St
Project Number:	50347-200
Designer Name:	Mike Xu
Designer Company:	MTE Consultants
Designer Email:	mxu@mte85.com
Designer Phone:	905-639-2552
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Site Name:	

Drainage Area (ha):	0.23
% Imperviousness:	99.00

Runoff Coefficient 'c': 0.89

Particle Size Distribution:	Fine
Target TSS Removal (%):	80.0

Required Water Quality Runoff Volume Capture (%):	
Estimated Water Quality Flow Rate (L/s):	6.39
Oil / Fuel Spill Risk Site?	No
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	
Estimated Average Annual Sediment Volume (L/yr):	200

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EF4	93
EF6	98
EF8	99
EF10	100
EF12	100

Recommended Stormceptor EF Model: EF4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 93

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.

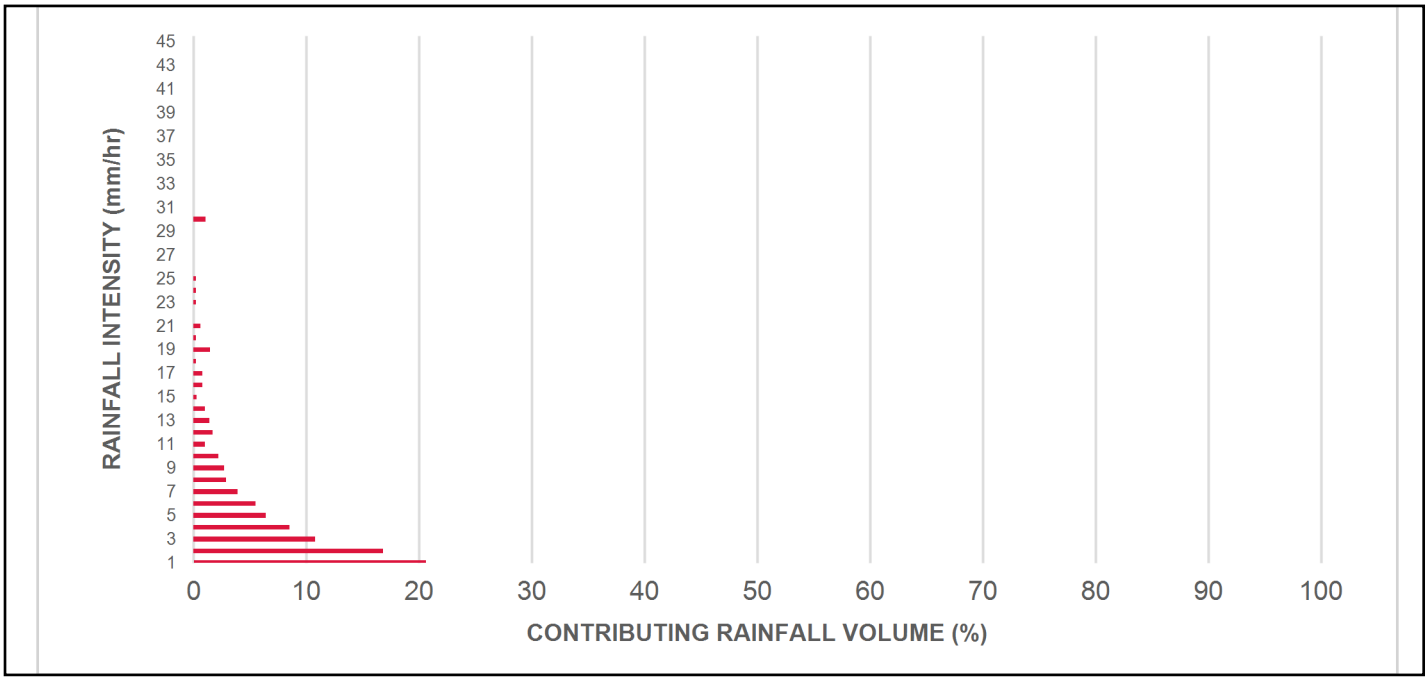
Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

Stormceptor® EF Sizing Report

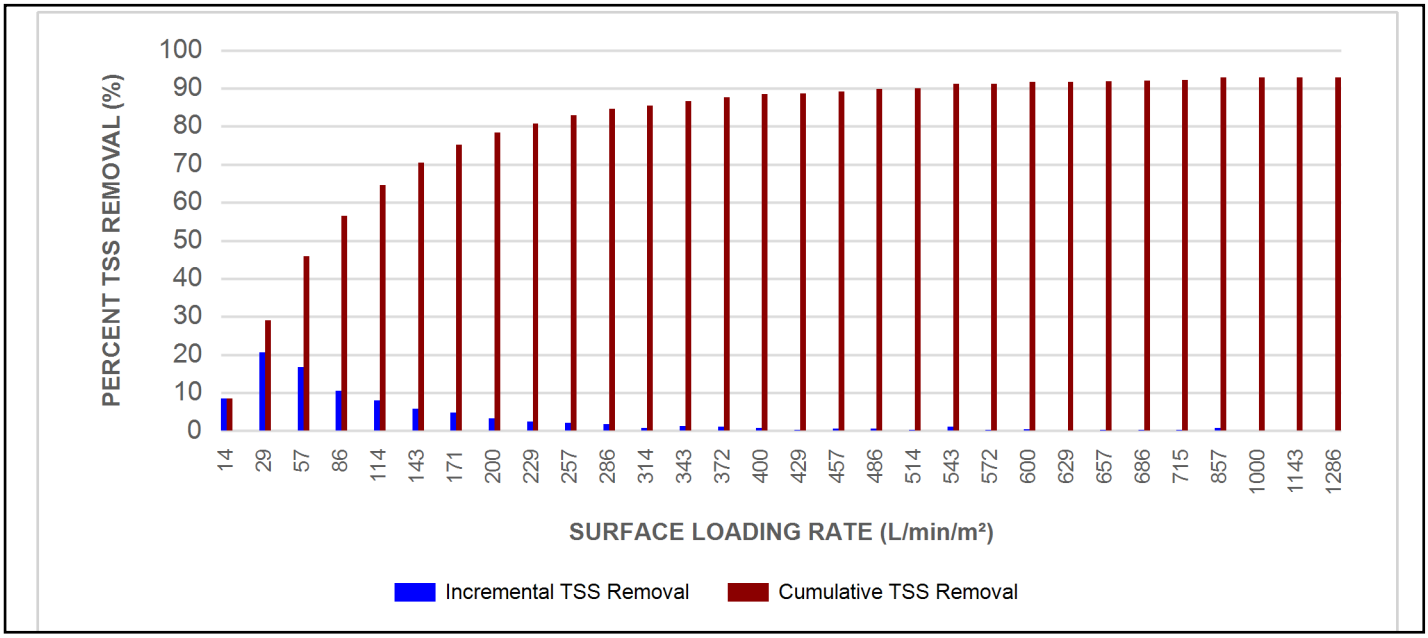
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.5	8.5	0.29	17.0	14.0	100	8.5	8.5
1.00	20.6	29.1	0.57	34.0	29.0	100	20.6	29.1
2.00	16.8	45.9	1.14	69.0	57.0	100	16.8	45.9
3.00	10.8	56.7	1.71	103.0	86.0	98	10.6	56.5
4.00	8.5	65.2	2.29	137.0	114.0	95	8.0	64.5
5.00	6.4	71.6	2.86	171.0	143.0	91	5.8	70.4
6.00	5.5	77.0	3.43	206.0	171.0	87	4.7	75.1
7.00	3.9	81.0	4.00	240.0	200.0	83	3.3	78.4
8.00	2.9	83.9	4.57	274.0	229.0	82	2.4	80.7
9.00	2.7	86.5	5.14	309.0	257.0	81	2.2	82.9
10.00	2.2	88.7	5.72	343.0	286.0	79	1.7	84.6
11.00	1.0	89.7	6.29	377.0	314.0	78	0.8	85.4
12.00	1.7	91.3	6.86	412.0	343.0	77	1.3	86.7
13.00	1.4	92.8	7.43	446.0	372.0	75	1.1	87.7
14.00	1.0	93.7	8.00	480.0	400.0	74	0.7	88.5
15.00	0.3	94.0	8.57	514.0	429.0	74	0.2	88.7
16.00	0.8	94.8	9.15	549.0	457.0	73	0.6	89.2
17.00	0.8	95.7	9.72	583.0	486.0	73	0.6	89.9
18.00	0.2	95.8	10.29	617.0	514.0	72	0.1	90.0
19.00	1.5	97.3	10.86	652.0	543.0	72	1.1	91.1
20.00	0.2	97.5	11.43	686.0	572.0	71	0.1	91.2
21.00	0.6	98.2	12.00	720.0	600.0	71	0.4	91.6
22.00	0.0	98.2	12.58	755.0	629.0	71	0.0	91.6
23.00	0.2	98.4	13.15	789.0	657.0	70	0.2	91.8
24.00	0.2	98.6	13.72	823.0	686.0	70	0.2	92.0
25.00	0.2	98.9	14.29	857.0	715.0	70	0.2	92.1
30.00	1.1	100.0	17.15	1029.0	857.0	69	0.8	92.9
35.00	0.0	100.0	20.01	1200.0	1000.0	68	0.0	92.9
40.00	0.0	100.0	22.86	1372.0	1143.0	70	0.0	92.9
45.00	0.0	100.0	25.72	1543.0	1286.0	73	0.0	92.9
Estimated Net Annual Sediment (TSS) Load Reduction =								**93 %**

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

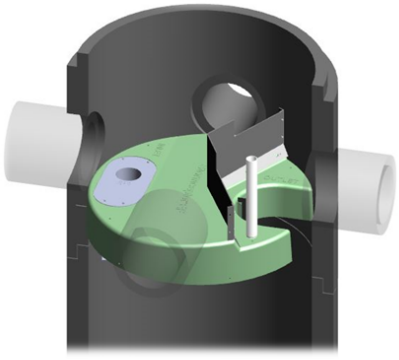
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test 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.

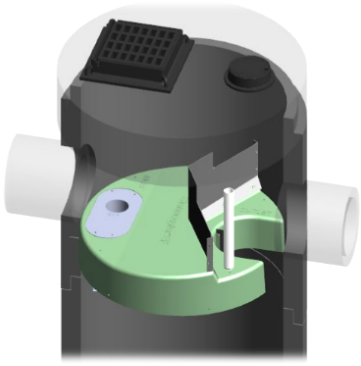
DESIGN FLEXIBILITY

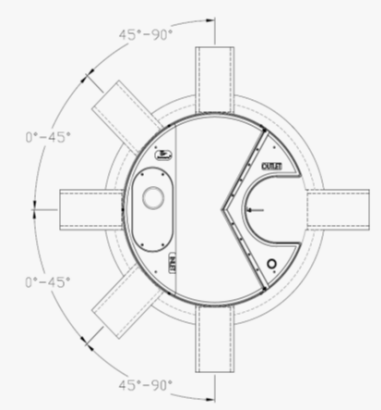
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

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 Separators.**

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.

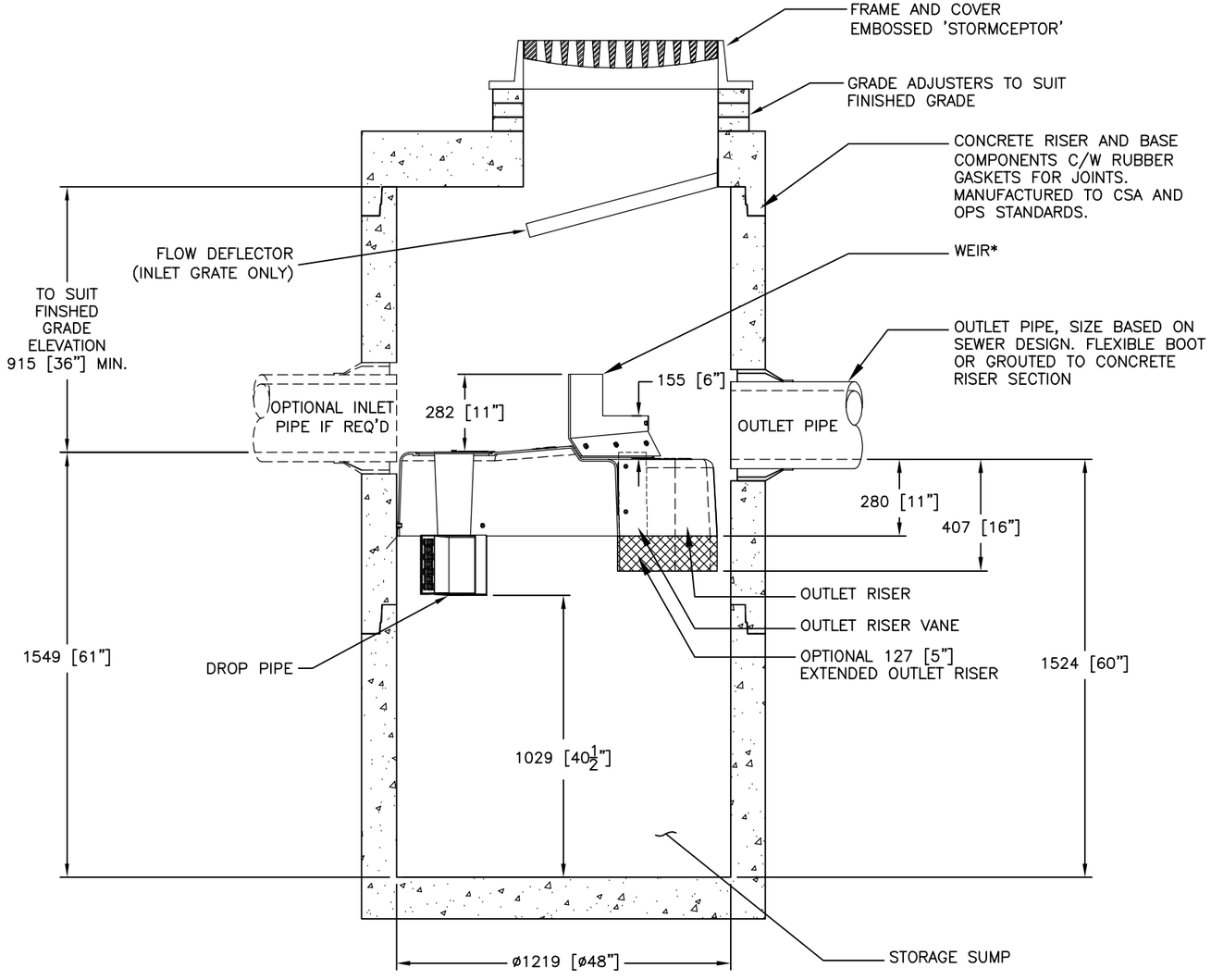
3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2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

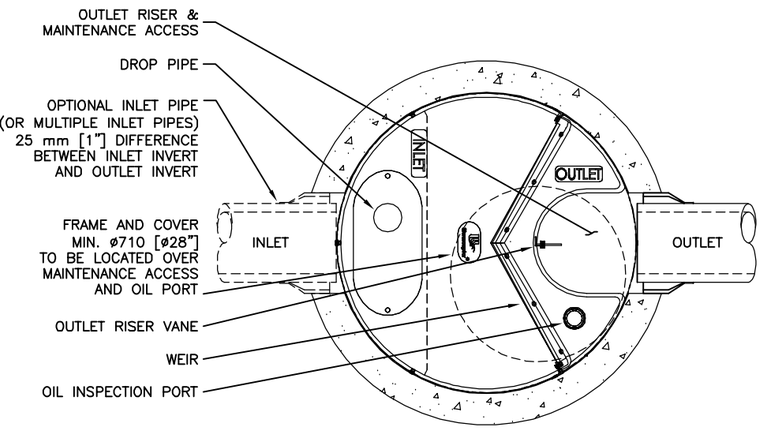
3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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.**

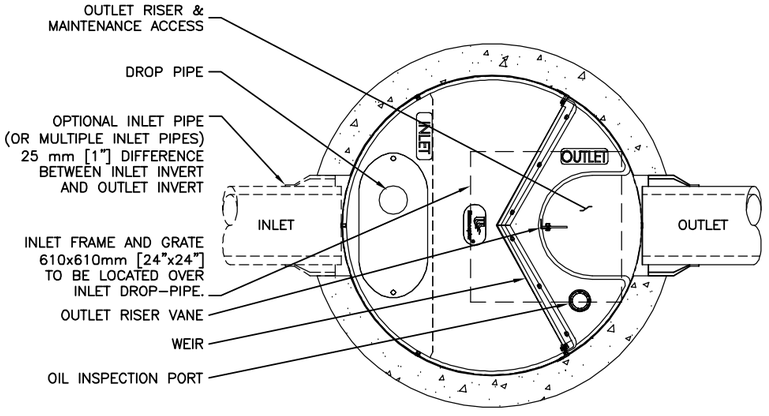
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.



SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	UPDATES	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON, L1N 9A9
TF 800-565-4501 CA 416-800-9000 INTL +1-416-800-9000

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO4	*

SHEET: 1 OF 1

Appendix B

Sanitary Demand Calculations

3115 Hurontario Street

City of Mississauga

Project No: 50347-200

Date: 6/3/2024

By: MKX

Sanitary Demand Calculations

Land Use	Calculation				Final Demand		
	Units/ Area (m^2) [1]	Population Density [2]	Population (persons)	Demand (L/s)	Total Average Demand (L/s)	Total Peaked Demand (L/s)	Total Peaked Demand + Infiltration (L/s)
Proposed Building							
Residential units	520	2.7	1404	4.921	4.921	17.552	
		Check of sanitary demand using DC Background Study					
Bachelor (340 ft^2)	39	1.612	63	0.220	n/a	n/a	
1 Bedroom (484 ft^2)	321	1.612	517	1.813	n/a	n/a	
2 Bedroom (718 ft^2)	122	1.612	197	0.689	n/a	n/a	
3 Bedroom (904 ft^2)	38	3.048	116	0.406	n/a	n/a	
			893	3.129			
		...is < using 2.7 per/unit, therefore this calculation N/A					
Commercial Space [7]	222	50.0	1	0.004	0.004	0.014	
Charity Space [8]	943	0.75	707	2.479	2.479	8.842	
Total			**2112**	**7.40**	**7.40**	**26.41**	**26.47**

Sanitary Demand		
Residential Daily Demands[4]	302.8	L/d/person
	0.0035	L/ca/s
Harmon Peaking Factor (Residential) [5]	3.6	
Site Area [3]	0.25	ha
Infiltration Allowance [6]	0.26	L/s/ha
	0.07	L/s

Note 1: Room/Unit count breakdown provided by Sweeny & Co Architects (2024-05-01)

Note 2: Population density of 2.7 per/unit based Region of Peel unitary rates

Note 3: Site Area obtained from Sweeny & Co Architects (2024-05-01)

Note 4: Residential daily demands based on Region of Peel Standards

Note 5: Harmon Peaking Factor Kh = 1+(14/(4+P^(1/2))) where P = population in thousands

Note 6: Infiltration allowance based on Region of Peel Linear Watewater Standards (2022)

Note 7: Population density person/ ha as per Region of Peel Stds.

Note 8: Design population based on the occupant load for assembly spaces with non-fixed seats (Refer to OBC Table 3.1.17.1, 0.75 m^2/person)

Note 9: Population density based on Region of Peel Development Charges Background Study - Consolidation Report, December 16, 2020 (Page 3-7, >750ft^2 = 3.048, <=750ft^2 = 1.612)

Appendix C

Water Demand Calculations & Analysis

3115 Hurontario Street

City of Mississauga

Project No: 50347-200
Date: 6/6/2024
By: MKX

Res. Peaking Factors[1]:	
Avg. Day	1.0
Max. Day- Res	2.0
Max. Day- ICI	1.4
Peak Hour	3.0

Demand Calculations

Land use	Calculation				Final Demand		
	Units/ Area (m^2) [1]	Population Density (person/unit)[2]	Population (persons)	Demand (l/s)	Avg Day Demand Qavg (l/s)	Max Day Demand Qmax.day (l/s)	Peak Hour Demand Qpeak (l/s)
Proposed Building							
Residential units	520	2.7	1404	4.550	4.550	9.100	13.650
Commercial Space	222	50.0	1	0.004	0.004	0.005	0.012
Charity Space	943	0.75	707	2.456	2.456	3.438	7.367
Totals			**2112**	**7.010**	**7.010**	**12.543**	**21.029**

Water Demand [1]		
Average Residential Daily Demands	280	l/d/person
	0.0032	l/s/person
Average ICI Daily Demands	300	l/d/person
	0.0035	l/s/person

Max Day + Fire Flow Demand		
Qmax.day+fire	124.2	l/s

Note 1: Water Demands and peaking factors from Section 2.3 "Water Demands" of the Region of Peel Public Works Watermain Design Criteria (2010).

Note 2: Design population based on Region of Peel unitary rates. Residential 2.7 per/unit is > using densities from Region of Peel Development Charges Background Study - Consolidation Report, December 16, 2020 (refer to population check in the Sanitary Demand Calculation)

Note 3: Fire flows from FUS (2020) - See attached worksheets

Fire Flow[3]		
Fire Flow	6,700	l/min
	111.7	l/s

3115 Hurontario Street

City of Mississauga

Project No: 50347-200

Date: 6/6/2024

By: MKX

FIRE FLOW DEMAND REQUIREMENTS - FIRE UNDERWRITERS SURVEY (FUS GUIDELINES)

Fire flow demands for the FUS method is based on information and guidance provided in "Water Supply for Public Protection" (Fire Underwriters Survey, 2020).

An estimate of the fire flow required is given by the following formula:

where:

RFF = the required fire flow in litres per minute

C = coefficient related to the type of construction
- = 1.5 for **Type V** Wood Frame Construction
- = 0.8 for **Type IV-A** Mass Timber Construction
- = 0.9 for **Type IV-B** Mass Timber Construction
- = 1.0 for **Type IV-C** Mass Timber Construction
- = 1.5 for **Type IV-D** Mass Timber Construction
- = 1.0 for **Type III** Ordinary Construction
- = 0.8 for **Type II** Noncombustible Construction
- = 0.6 for **Type I** Fire Resistive Construction

A = Total floor area in square metres from Site Plan
(for Type II Noncombustible Costruction,
A = Gross Floor Area in Square Meters (Refer to Siteplan by Sweeny&Co Architects)

Adjustments to the calculated fire flow can be made based on occupancy, sprinkler protection and exposure to other structures. The table below summarizes the adjustments made to the basic fire flow demand.

Building	Area "A" (m^2)	C (Type II)	(1) Fire Flow "RFF" (l/min)	(1) Fire Flow "RFF" (l/s)	(2) Occupancy %	(2) Occupancy Adjusted Fire Flow (L/min)	(3) Sprinkler %	(3) Sprinkler Adjustment (L/min)	(4) Exposure %	(4) Exposure Adjustment (L/min)	**Final Adjusted Fire Flow (L/min)**	**Final Adjusted Fire Flow Rounded (L/min)**	**Final Adjusted Fire Flow (L/s)**
Proposed Building	2,530	0.6	6,600	110.0	-15	5,610	-40	-2,244	60	3,366	6,732	6,700	**111.7**

(2) Occupancy

Non-Combustible	-25%
Limited Combustible	-15%
Combustible	No charge
Free Burning	15%
Rapid Burning	25%

(3) Sprinkler

30% - Automatic sprinkler protection designed and installed in accordance with NFPA 13

+10% - Water supply is standard for both the system and Fire Department hose line

(4) Exposure

0 to 3m	25%	Calculate for all sides. Maximum charge shall not exceed 75%
3.1 to 10m	20%	
10.1 to 20m	15%	
20.1 to 30m	10%	
>30	0%	

Building A

Direction	**Distance**	**%**
N	0m	25
E	22m	10
S	1.9m	25
W	>30m	0
	Total	60

Notes:

1) For Fire-Resistive Construction, consider the two largest adjoining floors plus 50% of each of any floors immediately above them up to 8, however...
for this new building, all vertical openings are protected per NBC & OBC, therefore: use single largest floor area (Level 1) + 25% of each of the two immediately adjoining floors.

Appendix D

Reference Material

Adam Lucas, MCIP, RPP
Planner, Development Central
Planning and Building Department
City of Mississauga

Re: Water Distribution and Fire Demand – 3115 Hurontario St.
Application No. OZ/OPA 22-24 W7

The Ontario Building Code 2012 (OBC) classifies a building according to its major occupancy. Table 3.1.2.1 and the associated Appendix A [A-3.1.2.1.(1)] of the OBC qualifies the proposed multi-unit residential building as belonging to a Group C major occupancy.

The construction of the building will comply with all applicable sections of OBC Part 3. Given the number of storeys and building area, sentence 3.2.2.42 of the OBC [Group C, Any Height, Any Area, Sprinklered] applies.

Supplementary Standard SB-2 of the OBC outlines fire performance ratings for building materials and their associated assembly. The proposed development will utilize reinforced concrete columns and walls, monolithic floor and roof slabs of reinforced concrete with equivalent thicknesses and reinforcement coverage that satisfy the requirements for fire-resistive construction per the definitions in OBC SB-2. The fully protected structural frame, floors and roof will provide a construction coefficient of 0.6.

Yours very truly,

Dermot J. Sweeny

B.E.S., B. Arch., OAA, FRAIC
Founding Principal

RE: 3115 Hurontario Street redevelopment; STM record drawings and SWM criteria.

Walter Copping <Walter.Copping@mississauga.ca>

Thu 2022-01-13 2:52 PM

To:Chris Falchuk <CFalchuk@mte85.com>

4 attachments (4 MB)

Ref. Plan C11313.pdf; Storm Sewer Design Chart.pdf; Hurontario St Trunk Storm Sewer.pdf; Catchements and Drainage.pdf;

Hi Chris,
Please find attached the plans we have on record pertaining to your site. Any plan and profile drawings can be obtained through Bethany Gonzalez (Bethany.Gonzalez2@mississauga.ca).
In terms of current SWM Requirements, we would expect the following:

- Quantity Control (Cooksville Creek is the 100 year post dev to 2 year pre dev). Pre development Rc cannot exceed 0.5 and might be lower for undeveloped parcels (i.e. 0.25).
- Quality Control (80% TSS Removal)
- Retain the 5mm water balance using a Low Impact Development (LID) feature, must retain the first 5mm by way of infiltration, reuse or evapotranspiration. If those are not feasible then filtration may be considered.
- If there is a basement or underground parking foundation a Hydro G report might be required to determine if groundwater would be discharged to a municipal storm sewer. If no basement is proposed this is not required.

The full document we use for Storm Drainage Design Requirements is available here:
http://www7.mississauga.ca/Departments/Marketing/documents/tw/FINAL-Section-8-Storm-Drainage-Design-Requirements-Jan2020.pdf.
As a final, note, since this site is within the HuLRT project area, please be advised that HuLRT office approval will be required during the formal review process. Please contact Ghazwan Yousif from the LRT office for assistance at that stage.
I hope this helps, feel free to reach out with any further questions you may have.
Kind Regards,

Walter Copping
Storm Drainage Technologist, Environmental Services
T 905-615-3200 ext. 5831
walter.copping@mississauga.ca
City of Mississauga | Transportation & Works Department,
Infrastructure Planning & Engineering Services Division

From: Ghazwan Yousif
Sent: Wednesday, January 12, 2022 12:59 PM
To: 'Chris Falchuk' <CFalchuk@mte85.com>
Cc: Samer Elhallak <Samer.Elhallak@mississauga.ca>; Walter Copping <Walter.Copping@mississauga.ca>
Subject: RE: 3115 Hurontario Street redevelopment; STM record drawings and SWM criteria.
Hi Chris,
Yes, he left last year around July to the City of Gulf. And I am currently on one year or so contract job with the HuLRT office. So you will need to contact either **Samer Elhallak** for any inquiry north of Burnhamthorpe Rd. or anything south of Burnhamthorpe Rd. **Walter Copping** . Both of them have been copied on this email.
Regards,

Ghazwan Yousif M.Sc., P. Eng.
Utility and Permit Coordinator, Hurontario LRT Project Office
City of Mississauga | Transportation and Works Department
T 905-615-3200 x 3526

ghazwan.yousif@mississauga.ca

****Please note that due to the ever-evolving situation with Covid-19, response times to calls, emails, and matters relating to planning applications may be impacted or delayed. We appreciate your patience and understanding.****.

From: Chris Falchuk <CFalchuk@mte85.com>
Sent: Wednesday, January 12, 2022 12:51 PM
To: Ghazwan Yousif <Ghazwan.Yousif@mississauga.ca>
Subject: FW: 3115 Hurontario Street redevelopment; STM record drawings and SWM criteria.

Whoops, got a message Nathan was not with the City anymore… and to check with you.
Cheers,

Chris Falchuk, P.Eng. | Design Engineer
MTE Consultants Inc.
T: 905-639-2552 x2436 | CFalchuk@mte85.com
1016 Sutton Drive, Unit A, Burlington, Ontario L7L 6B8
www.mte85.com | Twitter | LinkedIn | Instagram | Facebook

COVID-19 Update: We remain operational and are currently available by email and phone, however, our offices are closed. Staff that are required to visit job sites or perform field work are required to follow MTE health and safety policies and procedures, as well as additional COVID-19 protocols, which can be viewed here.

From: Chris Falchuk
Sent: Wednesday, January 12, 2022 12:48 PM
To: 'Nathan.McFadden@mississauga.ca' <Nathan.McFadden@mississauga.ca>; 'Bethany.Gonzalez2@mississauga.ca' <Bethany.Gonzalez2@mississauga.ca>
Subject: 3115 Hurontario Street redevelopment; STM record drawings and SWM criteria.

Good day,
In order to advance a site redevelopment design for a mixed use high-rise, we are looking for (a) record drawings of all the existing Storm services you have on Hurontario Street in Mississauga for 3115 Hurontario Street (see the attached sketch). It would be ideal if you could find Plan & Profiles which encompass the next MHs west and east of our frontage, so for example from the intersection of Kirwin Avenue to the east as sketched.
Also, can you provide the (b) storm drainage plan & design sheet which applies to the site and (c) confirm what the specific stormwater management criteria will be?
Regards,