FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

2570-2590 ARGYLE ROAD

CITY OF MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

RANEE MANAGEMENT

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
2800 HIGH POINT DRIVE, SUITE 100
MILTON, ON L9T 6P4

AUGUST 2020

CFCA FILE NO. 1788-5379

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev. 0	August 12, 2020	Issued for 1st Submission

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by Ranee Management to prepare a Functional Servicing & Preliminary Stormwater Management Report to support the Official Plan and Zoning By-Law Amendment applications for the proposed infill development located at 2570-2590 Argyle Road in the City of Mississauga, Regional Municipality of Peel (Peel Region). Please note that the appended drawings are dated June 2020 and based on the June 2020 architectural drawings. The issued for submission architectural package dated July 31, 2020 exhibits the exact same Site Plan with minor note changes, therefore, the base for the civil design is unchanged.

This report provides information about water and sanitary servicing as well as stormwater management according to the applicable standards and requirements of the City of Mississauga, Peel Region and Credit Valley Conservation.

2.0 Site Description

The subject property is approximately 2.15 ha and currently consists of two 12-storey residential apartment buildings with associated surface parking areas and landscaped areas. Approximately 0.12 ha of the area within the property boundary is the watercourse. The site is bounded by:

- Argyle Road to the north
- A residential apartment complex to the east
- A watercourse and single-family residential dwellings to the south
- A commercial building with parking structure to the west

The proposed development is an infill and envisioned for the development is one residential tower complete with one layer of underground parking and a 4-storey above-grade parking structure. The tower is stepped with a maximum height of 15 storeys in the center. The proposed residential development will have an individual municipal address. In addition to the construction of the new building, the existing internal roadway, surface parking and associated landscaping will be modified as required to accommodate the development and improve traffic flow.

3.0 Water Servicing

The Region of Peel is responsible for the operation and maintenance of the public water supply and treatment system in the City of Mississauga. Any local water supply system will connect to the Region's municipal water network.

3.1 Existing Water Servicing

A review of City of Mississauga and Peel Region as-constructed drawings indicate that there is an existing 300 mm diameter ductile iron watermain on the south side of Argyle Road (Peel Region drawing 12661-D dated as-constructed November 13, 1992).

Review of the Subsurface Utility Plan prepared for the site (Onsite Locates, December 16, 2019) shows that existing Building A and B both have individual water connections to the 300 mm PVC watermain along Argyle Road. The plan also shows one fire hydrant located on site at the north-west corner of Building B.

3.2 Design Water Demand

The Region of Peel Linear Infrastructure Sanitary Sewer Manual (March 2017) was used to determine the equivalent population estimate for the existing and proposed buildings. Table 1 uses a unit rate occupancy density of 2.7 persons/unit to determine the equivalent population for each building. The detailed calculations are provided in Appendix A.

Table 1: Equivalent Population Estimate

Type	Building	Number of Units	Total Persons
Existing	A	126	340
	B	127	343
Proposed	**C**	**256**	**675**
Entire Site Total	--	*767*	*1358*

The total population for the proposed building is 675 persons which brings the site total to 1358 including the existing buildings.

The Region of Peel Linear Infrastructure Watermain Design Criteria (June 2010) was used to determine the maximum domestic water demand generated by the proposed development based on the equivalent population estimate. An average daily water demand of 280 L/cap/day was used. Table 2 summarizes the estimated design water demand. Appendix A contains detailed water demand calculations.

Table 2: Existing/ Proposed Domestic Water Demand

Standard	Building	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Peak Hourly Demand (L/s)
Region of Peel Public Works Design, Specification & Procedures Manual – Linear Infrastructure Watermain Design Criteria (June 2010)	Existing Buildings A and B	2.21	4.43	6.64
	Proposed Building C	**2.19**	**4.38**	**6.56**
	Entire Site Total	*4.40*	*8.80*	*13.20*

Note: Site total domestic water demand is the sum of the existing buildings and proposed building.

For this application, the domestic water service for proposed Building C will be designed to convey the peak hourly demand of 6.56 L/s, as shown in Table 2.

3.3 Fire Flow Demand

The Fire Underwriters Survey method was used to estimate the fire flow demand for the proposed building within the development area. This calculation estimates the preliminary watermain size required to service each building for fire protection and does not provide a recommendation for fire protection. We have assumed the tower will have non-combustible construction and therefore, a construction coefficient of 0.8 was applied to the fire flow calculations (Water Supply for Public Fire Protection by Fire Underwriters Survey, 1999). We have also assumed the proposed residential building will be equipped with automatic sprinkler systems which reduces the initial fire flow demand by up to 50%.

The automated sprinkler system is to be designed by the Mechanical Engineer; therefore, the detailed design of the system is not included in this report. Table 3 summarizes the required fire flow demand and duration of flow required for the proposed Building C.

Table 3: Estimated Fire Flow Demand

Method	Demand Flow (L/s)	Duration (h)
Water Supply for Public Fire Protection by Fire Underwriters Survey (1999)	100	2.0

Note: Floor area was determined by the largest floor plus 25% of each of the two immediately adjoining floors.

As shown in Table 3, the proposed fire line is required to accommodate a fire flow demand of 100 L/s for a duration of 2.0 hours. This is based on the fire flow demand of Level 08, with a floor area of 1642.49 m^2 and 25% of the adjoining floors, for total area of 2463.70 m^2. Detailed calculations are provided in Appendix A.

A hydrant flow test was carried out by Classic Fire Protection Inc. on October 16, 2019. The minimum projected fire flow at 20 psi residual pressure was determined to be 439.6 L/s (6,698 USGPM). Refer to Appendix A for detailed results of the hydrant flow test and projected fire flows.

3.4 Proposed Water Servicing

The proposed development will have a single connection into the existing 300 mm diameter PVC watermain on the south side of Argyle Road. The connection will split at the property line into an individual 100 mm diameter domestic water service and individual 200 mm diameter fire line. The services will extend to the underground parking limit for the new buildings. One fire hydrant is proposed across from Building C. The existing buildings will continue to use their existing water connections.

The proposed water servicing plan is shown on Figure 1 – Preliminary Site Servicing. The Mechanical Engineer will design the internal private water system including the internal sprinkler system within the building and underground parking structure.

4.0 Sanitary Servicing

Peel Region is responsible for the operation and maintenance of the public sewage collection and treatment system in the City of Mississauga. Any local sewage system will connect to the Region's municipal sanitary sewage network.

4.1 Existing Sanitary Servicing

A review of as-constructed drawings indicates that there is an existing 250 mm diameter PVC sanitary sewer running east-west within the Argyle Road R.O.W. (Peel Region drawing 12661-D dated as-recorded November 13, 1992).

Review of the Subsurface Utility (SUE) Plan prepared by Onsite Locates and dated December 16, 2019 shows that existing Building A and B both have individual sanitary connections. Both Buildings A and B ultimately outlet to manholes on Argyle Road. The SUE did not indicate property line manholes for either building.

4.2 Design Sanitary Flow

The sanitary design flow for the subject property was calculated using the Region of Peel Public Works Design, Specifications & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017) and the equivalent population estimate described in Section 3.2. A unit sewage flow of 302.8 L/cap/d was used, and infiltration flow and a peaking factor were applied to the unit sewage flow to obtain the total estimated design sewage flow.

A summary of the results is presented in Table 4 and detailed calculations are in Appendix B.

Table 4: Existing/ Proposed Sanitary Design Flows

Standard	Building	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Flow (L/s)
Region of Peel Public Works Design, Specification & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017)	Existing Buildings A and B	2.39	3.90	9.34	0.17	9.51
	Proposed Building C	**2.37**	**3.90**	**9.23**	**0.27**	**9.50**
	Entire Site Total	*4.76*	-	*18.57*	*0.44*	*19.01*

Note: Site total sanitary flow is the sum of the existing buildings and proposed building.

The proposed sanitary service for Building C must convey a total design sanitary flow of 9.50 L/s according to the total flow indicated in Table 4.

4.3 Proposed Sanitary Servicing

The development is proposed to be serviced by a 200 mm diameter sanitary sewer at a slope of 2% which has a capacity of 46 L/s. The service lateral capacity exceeds the sanitary design flow and therefore is sufficient to convey the flow. The service lateral will extend from the underground parking structure to the existing 250 mm PVC sanitary sewer in the Argyle Road R.O.W. Existing Buildings A and B will continue to use their respective individual connections. The proposed sanitary servicing plan is shown on Figure 1 – Preliminary Site Servicing. The internal building plumbing will be designed by the Mechanical Engineer's details and specifications.

5.0 Drainage Conditions

5.1 Existing Drainage

The subject property currently consists of two 12-storey residential apartment buildings with associated surface parking areas and landscaped areas.

According to the Subsurface Utility Plan prepared (Onsite Locates, December 16, 2019) a 375 mm diameter storm sewer and 450 mm diameter storm sewer convey stormwater along Argyle Road.

The Storm Drainage Area Plan (Argyle Road – Dunbar Road; no Plan No.) provided by the City provides more information regarding the surrounding storm network. The above 375 mm is the first sewer, and the run goes west down Argyle Road connecting into a 450 mm diameter sewer which ultimately outlets to the watercourse.

There is a 300 mm diameter sewer on the property that outlets directly to the watercourse on site.

According to the topographic survey completed by Speight, Van Nostrand & Gibson Limited (Ref No. 1-E23 PEEL) the existing topography splits the stormwater flows into the following catchments:

- Catchments 101 and 102 (0.70 ha total): No minor system controls. Conveys major system drainage uncontrolled to the Argyle Road R.O.W. This drainage is accounted for in the Storm Drainage Area Plan (Argyle Road – Dunbar Road; no Plan No.) provided by the City.

- Catchments 103 (1.33 ha): Minor system drainage is collected in an internal storm sewer network that consists of one catch basin and one manhole. This outlets to the watercourse through a 300 mm diameter sewer. Major system drainage is generally conveyed overland to a low point of 111.40 in the south-east corner of the rear parking lot and is ultimately conveyed to the watercourse. Majority of the drainage in catchment 103 is uncontrolled.

A subsurface utility locate survey prepared by Onsite Locates (December 2019) indicates no storm connection exists for either Building A or B to the municipal sewer system. Catchment 101 conveys stormwater overland to Argyle Road. Stormwater is then conveyed east through an existing 375 mm diameter sewer. Catchment 102 conveys stormwater overland to Argyle Road. Stormwater is then conveyed east through an existing 450 mm diameter sewer.

The existing drainage conditions are illustrated on Figure 3 – Pre- Development Drainage Plan.

5.2 Proposed Drainage

The proposed development, as described in Section 2.0 is a residential tower infill complete with one level of underground parking and a 4-storey above grade parking structure. In addition to the construction of the new building, the existing internal roadway, surface parking and associated landscaping will be modified as required to accommodate the development and improve traffic flow.

The proposed drainage design maintains the current drainage divide and generally maintains the site elevations. The main overland flow route for the site will continue to utilize the outlet along the south-east property line and outlet to the watercourse.

The grading of the site results in the following catchments:

- Catchment 201 (0.48 ha) – Maintains existing drainage pattern. Major system flows are conveyed overland to Argyle Road. Catchment remains unchanged in post-development scenario.

- Catchment 202 (0.22 ha) – Maintains existing drainage pattern. Major system flows are conveyed overland to Argyle Road. Catchment remains unchanged in post-development scenario.

- Catchment 203 (0.93 ha) – Conveys most of the minor system stormwater flows controlled to the existing 300 mm storm sewer that outlets to the watercourse. Major system drainage is maintained as stormwater flows overland to a low point of 111.40 at the south-east corner and is ultimately conveyed to the watercourse.

- Catchment UC01 (0.40 ha) – Conveys drainage overland to the watercourse in the rear of the property. The area generally follows pre-development drainage conditions as no minor storm conveyance system existed.

The proposed conditions are illustrated on Figure 4 – Post-Development Drainage Plan. As shown in Figure 4, stormwater runoff from the proposed development, Catchment 203, will be captured in area drains located throughout the roadway and parking surfaces. Minor system drainage will be conveyed through the underground parking structure. Stormwater will then outlet from the underground structure through an OGS, then using the existing 300 mm diameter outlet to the watercourse. As Catchment UC01 is located within the floodplain, no infrastructure will be constructed in the parking area to the east of the building. This drainage will maintain existing conditions and drain overland to the watercourse.

6.0 Stormwater Management

Upon reviewing Credit Valley Conservation (CVC) Regulation Mapping, we found that the site is classified as parcels that touch regulation limits. The stormwater management quantity control criteria were provided by the CVC through email correspondence. The governing stormwater management criteria include:

Water Quantity Control

Peak flows from Catchment 203 (Post) will be controlled to the 100-year pre-development flow rates calculated for Catchment 103 (Pre) minus the run-off rate from Catchment UC01. The City of Mississauga Development Requirements Manual (January 2020) indicates that a run-off coefficient no greater than 0.50 is to be used for already developed land.

Water Quality Control

Private stormwater discharging from the proposed development must achieve Ontario Ministry of the Environment, Conservation and Parks (MOECP) Enhanced Level of protection (80% total suspended solids (TSS) removal) for water quality control prior to discharging to the City's storm sewer network.

Water Balance

Retention of the first 5 mm of rainfall on impervious areas for private development areas is required by the City of Mississauga Development Requirements Manual (September 2016) to achieve the water balance criteria.

6.1 Stormwater Quantity Control

The subject site requires that the 100-year pre-development flow rate minus the flow rate from UC01 be used as the target release rate for the site. The pre-development run-off was calculated using the 1.33 ha Catchment 103 with a run-off coefficient of 0.50.

Using the City of Mississauga intensity-duration frequency data (IDF), the Modified Rational Method was used to determine the pre- and post-development peak flow rates for stormwater runoff for Catchments 103, 203 and UC01. The amount of on-site storage was determined by comparing the post-development peak flow rates to the target release rate for the 100-year storm event.

Stormwater runoff for Catchment 203 is proposed to discharge to the watercourse via the existing 300 mm diameter storm sewer outlet. The existing outlet will be connected to an oil-grit separator (OGS) and a new 300 mm diameter sewer will tie the OGS into the proposed underground for Building C.

The stormwater runoff from Catchments 101 and 102 will remain unchanged from their pre-development conditions. Since these catchments are unchanged from the pre-development scenario, no stormwater management controls were included or revised for these areas.

Table 5: Summary of Peak Flow and Storage Volume (Catchment 203)

Storm Event (Year)	Catchment 203 Peak Flow Rate (L/s)		Storage Volume Required with 200 mm Orifice (m^3)
	Post Development		
	Target Release Rate[1]	Provided Release Rate (200 mm Orifice)	
100	233.62	136.93	258.30

A 200 mm orifice tube will be installed upstream of the OGS. As shown in Table 5, the post-development peak stormwater flows for Catchment 203 are controlled to below the allowable release rate based on the calculated pre-development peak flows minus the uncontrolled flow. On-site storage is required during the 100-year post-development storm event to meet the pre-development release rate. The storage volume of 258.30m^3 will be provided by an underground stormwater tank. Detailed tank sizing will be provided with the Architectural and Structural design and specifications during detailed design when the underground parking structure design is finalized. Appendix C contains the orifice sizing calculations.

6.2 Stormwater Quality Control

Stormwater quality controls for the site must incorporate measures to provide an Enhanced Level of Protection (Level 1) according to the MOECP (March 2003) guidelines. Enhanced water quality protection involved the removal of at least 80% of TSS from 90% of the annual runoff volume. Water quality control will be provided using an oil/grit separator (OGS).

A treatment train approach including an OGS and LID measures will be used to achieve the stormwater quality control criteria. A Stormceptor EF6 will be provided downstream of the underground stormwater tank and orifice tube, to provide quality control for Buildings C prior to discharging to the watercourse.

The new Stormceptor EF/EFO model's sized for 60% removal of the ETV PSD is comparable to sizing for 80% removal of the Stormceptor Fine PSD. The sizing results in Appendix C reflects this qualification. A technical bulletin explaining the equivalency is included in Appendix C.

In addition, the roof drains will be directed towards a bioswale at the west side of the building. The bioswale will provide pre-treatment of stormwater runoff prior to entering the watercourse. The bioswale will be detailed during detailed design but will include an underdrain and a flat bottom.

6.3 Water Balance

As stated by the City of Mississauga Development Requirements Manual (September 2016), the minimum requirement to promote water balance is retention of the 5 mm rainfall event. The water balance retention volume was calculated considering initial abstraction of runoff based on impervious areas. Table 6 describes the dead storage volume required below the invert of each underground tank to satisfy the water balance criteria.

Table 6: Water Balance Storage Requirement

Standard	Criteria	Impervious Area (ha)	Storage Required (m^3)
City of Mississauga Development Requirements Manual (September 2016)	Retention of first 5 mm	1.10	55

Once the final plan area of the underground stormwater tank has been established during detailed design, a depth will be indicated to achieve the required volume. Water in dead storage can be reused throughout the development as grey water or for irrigation purposes. On-site LID's illustrated can also be used for water balance and will be detailed in the detailed design stage.

6.4 Sustainable Stormwater Management

Low Impact Development (LID) strategies will be considered for use throughout the proposed development during the detailed design stage. The following LID strategies may be applicable for this site:

- **Rainwater Harvesting**: With minimal pretreatment, the captured rainwater within the underground storage tanks can be used for outdoor non-potable water uses such as irrigation, or in the buildings as gray water.
- **Green Roofs**: This method is beneficial due to its water quality, water balance, and peak flow control benefits. In addition to water resource management, green roofs improve energy efficiency, reduce urban heat island effects, and create greenspace for passive recreation.
- **Enhanced Grass Swale and Bioretention**: Enhanced grass swales are designed to convey, treat and attenuate stormwater runoff. This feature slows the water to allow sedimentation, filtration through the soil matrix, evapotranspiration, and infiltration into the underlying native soil. Bioretention methods, such as rain gardens and stormwater planters, allow to temporarily store, treat and infiltrate runoff. It is typically designed to capture small storm events. Where underground parking facilities exists, infiltration is not a feasible option.
- **Permeable Pavement**: Porous asphalt, pervious concrete, permeable paver and plastic grid filled with gravel can be used for driveways and walkways to reduce the amount of impervious area throughout the site. This approach encourages infiltration and reduces runoff volumes. Again, where underground parking facilities exists, infiltration is not an option.
- **Enhanced Topsoil**: Enhanced topsoil provides water quality benefits in addition to water balance storage which will reduce the infrastructure required to store the required water balance volume.

LID strategies and an overall treatment train approach, where possible, will be specified during detailed design.

7.0 Conclusions and Recommendations

The proposed development can be serviced for water, sanitary, and stormwater in accordance with the City of Mississauga and CVC requirements and standards. Our conclusions and recommendations include:

1. Existing buildings A and B will maintain their existing water and sanitary servicing schemes. Drainage catchments for the existing buildings will remain unchanged.

2. Water demand for proposed Building C will be provided using a 200 mm diameter fire line and 100 mm diameter domestic line extending from the existing 300 mm diameter watermain located in the Argyle Road R.O.W.

3. Sanitary servicing for Building C will be provided with a 200 mm diameter sanitary sewer at a slope of 2% extending from the underground limit to a proposed property line manhole, ultimately connecting to the existing 250 mm sanitary sewer within Argyle Road by a proposed manhole in the R.O.W.

4. Stormwater runoff from Catchment 203 will be controlled to the pre-development flow rates less the uncontrolled flow rates and will outlet via the existing 300 mm storm outlet located on the property to the watercourse. Quantity control has been provided using an underground stormwater tank and a 200 mm orifice tube.

5. Water quality for Catchment 203 will be provided through a treatment train approach including a bioswale and an OGS (Stormceptor Model EF6 or equivalent) to achieve enhanced protection (80% TSS removal).

6. Water balance for the Site will be provided through the retention of the 5 mm rainfall event as dead storage below the invert in each stormwater tank.

Based on the above conclusions we support the proposed development application from the perspective of water supply, sanitary servicing, and stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Daniel Doherty, E.I.T.
Land Development

C.F. CROZIER & ASSOCIATES INC.

Nicole Segal, M.M.Sc., E.I.T.
Land Development

DD:NS/ko

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APPENDIX A

Water Demand Calculations

Connection Demand Table

WATER CONNECTION

Connection point [3] Argyle Road – Ex. 300mm dia. DI watermain			
Pressure zone of connection point		2	
Total equivalent population to be serviced [1]		675	
Total lands to be serviced		1.33 ha	
Hydrant flow test			
	Hydrant flow test location	Argyle Road	
	Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure	579.16	55.67	N/A
Maximum water pressure	586.05	66.54	

No.	Water demands – Phase 1		
	Demand type	**Demand**	**Units**
1	Average day flow	2.19	l/s
2	Maximum day flow	4.38	l/s
3	Peak hour flow	6.56	l/s
4	Fire flow [2]	100	l/s
Analysis			
5	Maximum day plus fire flow	104.38	l/s

WASTEWATER CONNECTION

Phase 2

Connection point [4]		
Total equivalent population to be serviced		675 persons
Total lands to be serviced		1.33 ha
6	Wastewater sewer effluent (in l/s)	9.50

[1] Please refer to design criteria for population equivocates
[2] Please reference the Fire Underwriters Survey Document
[3] Please specify the connection point ID
[4] Please specify the connection point (wastewater line or manhole ID)
Also, the “total equivalent population to be serviced” and the “total lands to be serviced” should reference the connection point. (the FSR should contain one copy of Site Servicing Plan)

Please include the graphs associated with the hydrant flow test information table
Please provide Professional Engineer's signature and stamp on the demand table
All required calculations must be submitted with the demand table submission.

CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Existing Population Estimate

Total Site Area

2.15 ha

	Residential (# of units)
Building A	126
Building B	127
TOTAL	253

Residential Population:

Apartment:	2.7	persons/unit
Residential Population:	**683**	persons
EXISTING POPULATION	**683**	persons

Source: Peel Region Public Works Design Criteria Manual - Sanitary Sewer, March 2017.

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CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Proposed Population Estimate

Total Site Area

2.15 ha

	Residential (# of units)
Proposed Buildings	
Building C	250
TOTAL	250

Residential Population:

Apartment:	2.7	persons/unit
Residential Population:	**675**	persons
PROPOSED POPULATION:	**675**	persons
SITE TOTAL POPULATION:	**1358**	persons

Source: Peel Region Public Works Design Criteria Manual - Sanitary Sewer, March 2017.

I:\1700\1788 - Ranee Management\5378 - 1840 - 1850 Bloor St\Design\Civil_Water\[5378_ Ex_Prop Wtr_San Demand.xlsx]Population Estimates

CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Existing Water Demand

Population Estimate:

Residential:	683 persons
TOTAL POPULATION:	683 persons

Design Criteria:

Average Consumption Rate:	0.280	m^3/cap.day
Maximum Daily Demand Peaking Factor:	2.00	
Peak Hourly Demand Peaking Factor:	3.00	

Source: Peel Region Public Works Watermain Design Criteria, June 2010.

Residential Demand:

Average Daily Demand:	191.27	m^3/day
	2.21	L/s
Maximum Daily Demand:	382.54	m^3/day
	4.43	L/s
Peak Hourly Demand:	573.80	m^3/day
	6.64	L/s

Existing Average Day Demand:	**2.21**	L/s
Existing Maximum Day Demand:	**4.43**	L/s
Existing Peak Hourly Demand:	**6.64**	L/s

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CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Proposed Water Demand

Population Estimate:

Residential:	675 persons
TOTAL POPULATION:	675 persons

Design Criteria:

Average Consumption Rate:	0.280 m^3/cap.day
Maximum Daily Demand Peaking Factor:	2.00
Peak Hourly Demand Peaking Factor:	3.00

Source: Peel Region Public Works Watermain Design Criteria, June 2010.

Residential Demand:

Average Daily Demand:	189.00 m^3/day
	2.19 L/s
Maximum Daily Demand:	378.00 m^3/day
	4.38 L/s
Peak Hourly Demand:	567.00 m^3/day
	6.56 L/s

Proposed Average Daily Demand:	**2.19** L/s
Proposed Maximum Daily Demand:	**4.38** L/s
Proposed Peak Hourly Demand:	**6.56** L/s

Site Total Average Daily Demand:	4.40 L/s
Site Total Maximum Daily Demand:	8.80 L/s
Site Total Peak Hourly Demand:	13.20 L/s

Includes existing residential water demand.

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CROZIER & ASSOCIATES Consulting Engineers

Project: 2570-2590 Argyle Road
Project NO.: 1788-5379

Date: 2020.06.08
Designed By: DD
Checked By: NS

Building C - Fire Flow Calculations - Fire Underwriters Survey Method

Water Supply for Public Fire Protection (1999)
Fire Underwriters Survey
Notes:

1.) The development will use ordinary construction (C-value = 1.0).

Part II - Guide for Determination of Required Fire Flow

1. An estimate of fire flow required for a given area may be determined by the formula:

$$F = 220 * C * \sqrt{A}$$

Where:

F = the required fire flow in litres per minute
C = coefficient related to the type of construction
= 1.5 for wood frame construction (structure essentially all combustible)
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior)
= 0.8 for non-combustible construction (unprotected metal structural components)
= 0.6 for fire-resistive construction (fully protected frame, floors, roof)
A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building considered.

Proposed Development

0.8	C-Value	Largest Floor	1642.49 sq.m	Note: Level 08 of Tower
		(Plus 25% of Adjoining Floors)	821.245 sq.m	
			2463.7 sq.m	

Therefore F = 8,700 L/min

Fire flow determined above shall not exceed:
30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No change)		

-15% Reduction(%)
-1,305 L/min reduction

Subtotal = 7,395 L/min

Note: Flow determined shall not be less than 2,000 L/min

3. Sprinklers - The value obtained in No. 2 above may be reduced by up to 50% for complete automatic sprinkler protection.

☑ **Assume complete automatic sprinkler protection (50% reduction)**
-3,698 L/min reduction

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

4. Exposure - To the value obtained in No. 2, a percentage should be added for structures exposed within 45 metres by the fire area under consideration. The percentage shall depend upon the height, area, and construction of the building(s) being exposed, the separation, openings in the exposed building(s), the length and height of exposure, the provision of automatic sprinklers and/or outside sprinklers in the building(s) exposed, the occupancy of the exposed building(s) and the effect of hillside locations on the possible spread of fire.

Separation	Charge	Separation	Charge
0 to 3 m	25%	20.1 to 30 m	10%
3.1 to 10 m	20%	30.1 to 45 m	5%
10.1 to 20 m	15%	>45 m	0%

Exposed buildings

Name	Distance (m)	Charge	Surcharge (L/min)
North	16.5	15%	1,109
East	42	5%	370
South	n/a	0%	0
West	37	5%	370
		Total Surcharge	**1,849**

Determine Required Fire Flow

No.1	8,700		
No. 2	-1,305	reduction	
No. 3	-3,698	reduction	
No. 4	1,849	surcharge	
Required Flow:	**5,546**	**L/min**	
Rounded to nearest 1000 L/min:	**6,000**	**L/min**	or **100.0 L/s**
			1,584.0 USGPM

Note: USGPM = 0.264*(L/min)

Required Duration of Fire Flow

Flow Required (L/min)	Duration (hours)
2,000 or less	1.00
3,000	1.25
4,000	1.50
5,000	1.75
6,000	2.00
8,000	2.00
10,000	2.00
12,000	2.50
14,000	3.00
16,000	3.50
18,000	4.00
20,000	4.50
22,000	5.00
24,000	5.50
26,000	6.00
28,000	6.50
30,000	7.00
32,000	7.50
34,000	8.00
36,000	8.50
38,000	9.00
40,000 and over	9.50

CROZIER CONSULTING ENGINEERS

PROJECT: 2570-2590 Argyle Road
PROJECT No.: 1788-5379
DATE: 2020.06.08

DESIGN: DD
CHECK: NRS

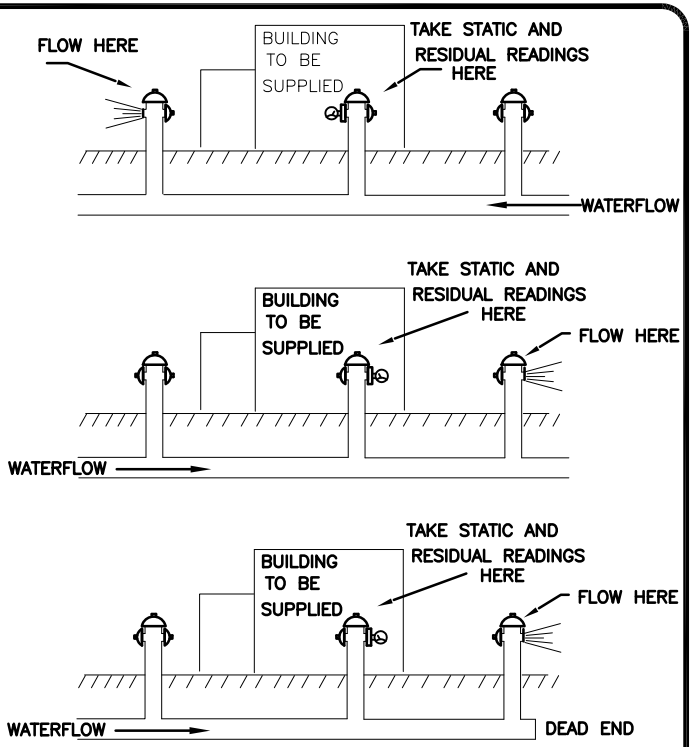
Projected Fire Flows - Hydrant Flow Test dated October 16, 2019

Test	Hydrant Location / ID	Static Pressure	Residual Pressure during Test	Flow from Hydrant Test	Desired Residual Pressure	Projected Fire Flow Available at 20 psi	
		Ps	Pt	Qt	Pr	Qr	
		(psi)	(psi)	(USGPM)	(psi)	(USGPM)	(L/s)
	Argyle Road	86	At Static Pressure		20		
1			85	882.4		9,779	617
2			84	1054.6		6,968	439.6
						EX. PRESSURE IS OKAY	

$Q_r = Q_t \times ((P_s - P_r)/(P_s - P_t))^{0.54}$ Formula to determine available flow as per AWWA M17 (1989)

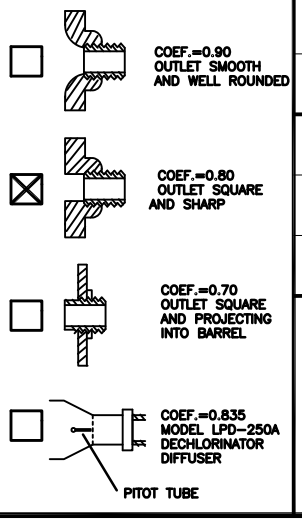
Qr= Qr/15.85 Formula to convert flows at 20 psi from USGPM to L/s

NOTE: Projected fire flows are calculated on the basis of hydrant tests carried out by Classic Fire Protection Inc. dated October 16, 2019



TEST:	PLAY PIPE	C=	STATIC(PSI)	RESIDUAL(PSI)	PITOT(PSI)	FLOW(USGPM)
	1x1 1/8					
	2x1 1/8					
	3x1 1/8					
	4x1 1/8					
	1x1 3/4					
	2x1 3/4					
	3x1 3/4					
	4x1 3/4					
	HYDRANT BUTT					
1	1x2 1/2	.8	86	85	35	882.4
2	2x2 1/2	.8	86	84	12.5	1054.6
	3x2 1/2					
	4x2 1/2					
	FM NOZZLE					
	1x2 1/4	.88				
	2x2 1/4	.88				
	3x2 1/4	.88				
	4x2 1/4	.88				

OUTLET TYPE



Client:

RANEE MANAGEMENT

Location:

2570-2590 ARGYLE RD

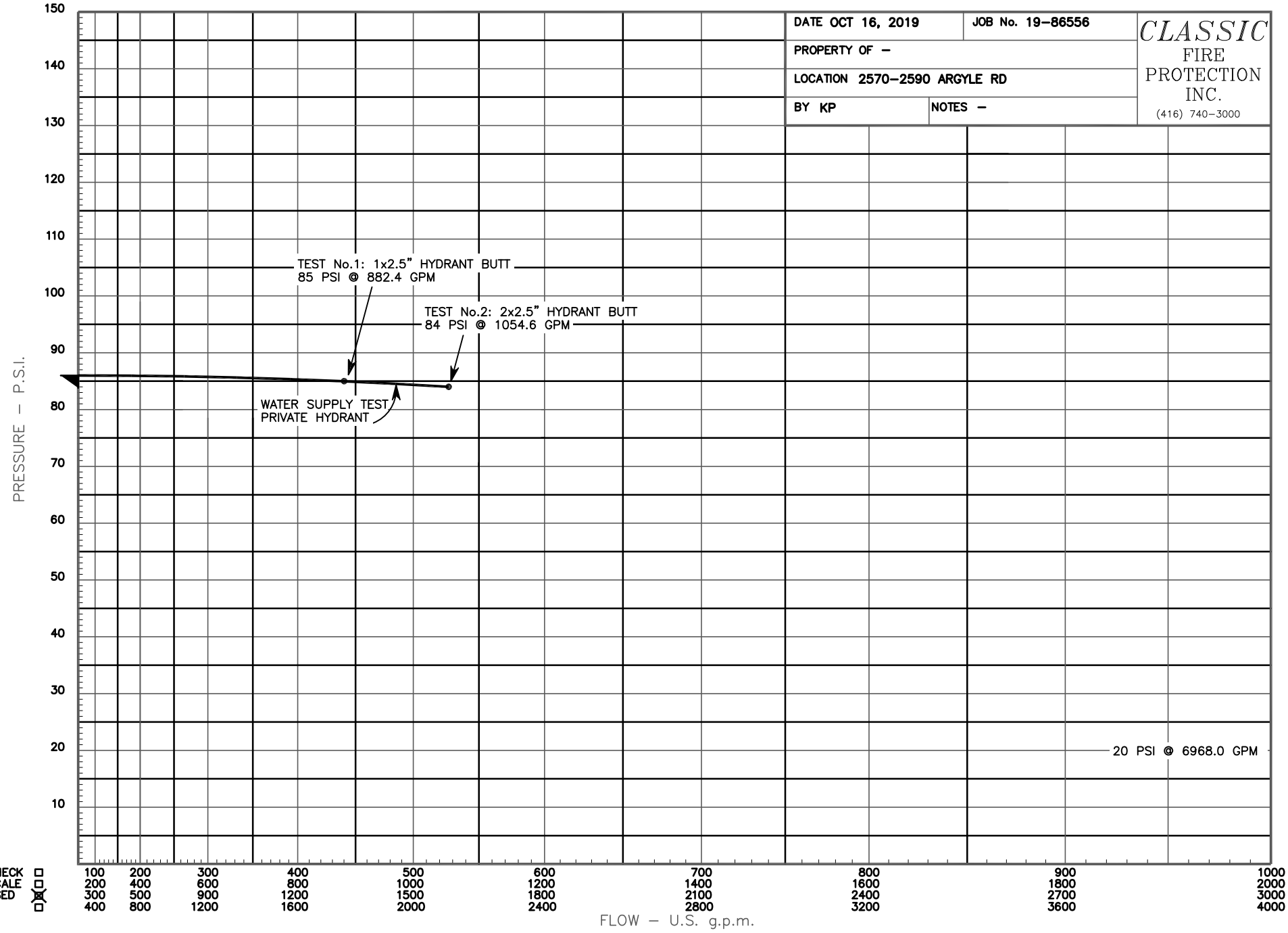
MISSISSAUGA, ON

DEDICATED SERVICE SINCE 1988
CLASSIC FIRE PROTECTION INC.
645 GARYRAY DR.
North York, ON
M9L 1P9
(416) 740-3000
Web: www.classicfire.com

WATER SUPPLY GRAPH

DATE OCT 16, 2019	JOB No. 19-86556
PROPERTY OF –	
LOCATION 2570-2590 ARGYLE RD	
BY KP	NOTES –

CLASSIC FIRE PROTECTION INC.
(416) 740-3000



APPENDIX B

Sanitary Flow Calculations

CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Existing Population Estimate

Total Site Area

2.15 ha

	Residential (# of units)
Building A	126
Building B	127
TOTAL	253

Residential Population:

Apartment:	2.7	persons/unit
Residential Population:	**683**	persons
EXISTING POPULATION	**683**	persons

Source: Peel Region Public Works Design Criteria Manual - Sanitary Sewer, March 2017.

I:\1700\1788 - Ranee Management\5379 - 2570 - 2590 Argyle Rd\Design\Civil_Water\[5379_ Ex_Prop Wtr_San Demand.xlsx]Population Estimates

CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Proposed Population Estimate

Total Site Area

2.15 ha

	Residential (# of units)
Proposed Buildings	
Building C	250
TOTAL	250

Residential Population:

Apartment:	2.7	persons/unit
Residential Population:	**675**	persons
PROPOSED POPULATION:	**675**	persons
SITE TOTAL POPULATION:	**1358**	persons

Source: Peel Region Public Works Design Criteria Manual - Sanitary Sewer, March 2017.

I:\1700\1788 - Ranee Management\5378 - 1840 - 1850 Bloor St\Design\Civil_Water\[5378_ Ex_Prop Wtr_San Demand.xlsx]Population Estimates

CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Existing Sanitary Flow

Total Site Area:

2.15 ha

Infiltration Area:

0.84 ha Note: Sum of drainage Catchment 101 and 102 Areas

Population Estimates:

Residential:	683	persons
TOTAL POPULATION:	683	persons

Design Criteria:

Unit Sewage Flow:	0.3028	m^3/cap.day
Infiltration:	0.200	L/s/ha
Peaking Factor (Commercial Land Use):		

Modified Harmon Formula

$$M = 1+\frac{14}{4+\sqrt{Pe}}$$

Source: Peel Region Sanitary Sewer Design Criteria, March 2017. Standard Drawing 2-9-2

Residential Sanitary Flow:

Average Dry Weather Flow:	206.84	m^3/day
	2.39	L/s

Existing Dry Weather Sanitary Flow:	2.39	L/s
Peaking Factor:	3.90	
Existing Peak Sanitary Flow:	9.34	L/s
Inflow/Infiltration Allowance:	0.17	L/s
Existing Design Sanitary Flow:	9.51	L/s

I:\1700\1788 - Ranee Management\5379 - 2570 - 2590 Argyle Rd\Design\Civil_Water\[5379_Projected Fire Flows.xlsx]Building C

CROZIER & ASSOCIATES Consulting Engineers

Project: 2570 - 2590 Argyle Road
Address: 2570 - 2590 Argyle Road
Project No.: 1788-5379

Date: 2020.06.08
Revised: -
Design: DD
Check: NS

Proposed Sanitary Flow

Site Area:

2.15 ha

Infiltration Area:

1.33 ha Note: Drainage Catchment 203 (Post-Development) Area

Population Estimates:

Residential:	675	persons
TOTAL POPULATION:	675	persons

Design Criteria:

Unit Sewage Flow:	0.3028	m^3/cap.day
Infiltration:	0.200	L/s/ha
Peaking Factor (Commercial Land Use):		

Source: Peel Region Sanitary Sewer Design Criteria, March 2017. Standard Drawing 2-9-2

Modified Harmon Formula

$$M = 1+\frac{14}{4+\sqrt{Pe}}$$

Residential Sanitary Flow:

Average Dry Weather Flow:	204.39	m^3/day
	2.37	L/s

Proposed Dry Weather Sanitary Flow:	2.37	L/s
Peaking Factor:	3.90	
Proposed Peak Sanitary Flow:	9.23	L/s
Inflow/Infiltration Allowance:	0.27	L/s
Proposed Design Sanitary Flow:	9.50	L/s

Site Total Dry Weather Sanitary Flow:	4.76	L/s
Site Total Peak Sanitary Flow:	18.57	L/s
Site Total Design Sanitary Flow:	19.01	L/s

Includes existing residential sanitary design flows.

I:\1700\1788 - Ranee Management\5379 - 2570 - 2590 Argyle Rd\Design\Civil_Water\[5379_Projected Fire Flows.xlsx]Building C

APPENDIX C

Stormwater Management Calculations

CROZIER CONSULTING ENGINEERS

Project: 2570-2590 Argyle Road
Project No.: 1788-5379
Created By: DD
Checked By: NRS
Date: 2020.06.08
Updated:

Modified Rational Calculations - Input Parameters

Storm Data: Mississauga

Time of Concentration: T_c = 15 **min** (per city of Mississauga standards)

Return Period	A	B	C	I (mm/hr)
2 yr	610.0	4.6	0.78	59.89
5 yr	820	4.6	0.78	80.51
10 yr	1010	4.6	0.78	99.17
25 yr	1160	4.6	0.78	113.89
50 yr	1300	4.7	0.78	127.13
100 yr	1450	4.9	0.78	140.69

Pre - Development Conditions				
Catchment 103 Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
Pervious	0.20	1990	**0.5**	**0.07**
Impervious	1.13	11335	**0.5**	**0.43**
Total Site	**1.33**	**13325**	**-**	**0.50**

Post - Development Conditions				
Catchment	**Area** (ha)	**Area** (m^2)	**C**	**100-Year Adjusted RC**
203	0.93	9296	**0.83**	**1.00**
UC01	0.40	4029	**0.69**	**0.86**

Equations:

Peak Flow
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$

Intensity
$i(T_d) = A / (T + B)^C$

Note: City of Mississauga Correction Factors applied to RC for below design storms.

10-year	1.00
25-year	1.10
50-year	1.20
100-year	1.25

CROZIER CONSULTING ENGINEERS

Project: 2570-2590 Argyle Road
Project No.: 1788-5379
Created By: DD
Checked By: NRS
Date: 2020.06.08
Updated:

Modified Rational Calculations - Peak Flows Summary

Peak Flows (m^3/s)				
Return Period	**Q_{pre}**	**Q_{203}**	**Q_{UC01}**	**Q_{Target}***
100 yr	0.328	0.304	0.094	0.234

City of Mississauga Conversion Factor applied to runoff coefficient

* $QT_{arget} = Q_{pre} - Q_{UC01}$ is the control rate required for catchment Q203 to ensure post-development flows are equal or less than pre-development flows

Equations:

Peak Flow

$$\mathbf{Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A}$$

CROZIER CONSULTING ENGINEERS

Project: 2570-2590 Argyle Road
Project No.: 1788-5379
Created By: DD
Checked By: NRS
Date: 2020.06.08
Updated:

Modified Rational Calculations - 100-Year Storm Event

Control Criteria

100 yr: Control Post-Development Peak Flows to Pre-Development Peak Flow

100 yr: Uncontrolled Post-Development Flow:

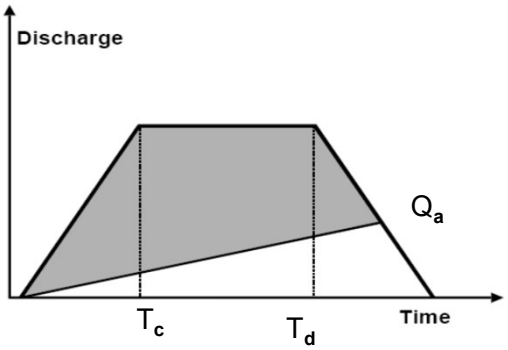
Q_{post} = 0.304 m^3/s

100 yr: Pre-Development Flow:

Q_{Target} = 0.234 m^3/s

$Q_{orifice}$ = 0.137 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	242.53	300	0.655	114.3
10	176.31	600	0.476	183.0
15	140.69	900	0.380	218.7
20	118.12	1200	0.319	239.0
25	102.41	1500	0.277	250.5
30	90.77	1800	0.245	256.4
35	81.77	2100	0.221	258.3
40	74.58	2400	0.201	257.4
45	68.68	2700	0.185	254.3
50	63.75	3000	0.172	249.5
55	59.56	3300	0.161	243.3
60	55.95	3600	0.151	235.9
65	52.81	3900	0.143	227.5
70	50.03	4200	0.135	218.3
Required Storage Volume:				**258.3**



Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet i(T_d) \bullet A$

Storage
$S_d = Q_{post} \bullet T_d - Q_{target} (T_d + T_c) / 2$

CROZIER & ASSOCIATES
Consulting Engineers

PROJECT: 2570-2590 Argyle Road
PROJECT No.: 1788-5379
DATE: 2020.06.08
UPDATE:
DESIGN: DD
CHECK: NRS

Orifice Design Summary - Catchment 203

Orifice Type =	Tube	
Invert Elevation =	110.39	m
Diameter of Orifice =	200	mm
Area of Orifice (A) =	0.0314	sq.m
Orifice Coefficient (Cd) =	0.820	

Calculation of Head

Centroid Elevation =	110.49	m
Water Elevation =	111.93	m
Upstream Head*, (h) =	1.44	m

Qa = **(Cd)(A)(2gh)^0.5**

Actual Controlled Discharge, Qa =	0.13693	cms
Qa =	**136.93**	**L/s**

*Head is based upon orifice area @ orifice face not Vena Contracta

I:\1700\1788 - Ranee Management\5379 - 2570 - 2590 Argyle Rd\Design\Civil_Water\[5379_Rational Method with IDF Lookup.xlsx]Orifice

CROZIER CONSULTING ENGINEERS

2570-2590 Argyle Road
1788-5379

Date: 2020.06.08
Created By: DD
Checked By: NS

Water Balance Volume Requirement

Site Area 2.15 ha

Water Balance criteria is 5mm across site impervious area

Impervious Area:	1.10	ha
Volume Required:	55.00	m^3

Daniel Doherty

From: Nathan McFadden <Nathan.McFadden@mississauga.ca>
Sent: Wednesday, March 11, 2020 7:32 AM
To: Nicole Segal
Cc: Basic, Ranka; ddoherty@cfrozier.ca; DiBerto, Dorothy
Subject: RE: 2570 Argyle Road, Mississauga - SWM Terms of Reference (CFCA File No.: 1788-5379)

Hi Nicole,

After reviewing Dorothy's email I agree with the request for more stringent storm water quantity control due to the spill/flooding occurring downstream.

Please let me know if you have any questions.

Thank you,

Nathan McFadden C.E.T.
Storm Drainage Technologist
Environmental Services
T 905-615-3200 ext.3192
nathan.mcfadden@mississauga.ca

City of Mississauga | Transportation & Works Department
Infrastructure Planning & Engineering Services

Follow us on Instagram **@saugastormwater**

From: DiBerto, Dorothy [mailto:Dorothy.DiBerto@cvc.ca]
Sent: Tuesday, March 10, 2020 2:54 PM
To: nsegal@cfcrozier.ca
Cc: Nathan McFadden; Basic, Ranka; ddoherty@cfrozier.ca
Subject: RE: 2570 Argyle Road, Mississauga - SWM Terms of Reference (CFCA File No.: 1788-5379)

Hi Nicole,

Maricris is currently on leave so I will take this on for the moment.

To answer your questions, see my comments in red below:

We can further discuss if necessary,

Thanks

Dorothy Di Berto, RPP
Senior Manager, Planning | Planning and Development Services | Credit Valley Conservation
905.670.1615 ext 232 | C: 416.558.2053 | 1.800.668.5557
dorothy.diberto@cvc.ca | cvc.ca

From: Nicole Segal <nsegal@cfcrozier.ca>
Sent: Monday, March 2, 2020 5:03 PM
To: Nathan McFadden <Nathan.McFadden@mississauga.ca>; Marinas, Maricris <Maricris.Marinas@cvc.ca>
Cc: Daniel Doherty <ddoherty@cfcrozier.ca>
Subject: 2570 Argyle Road, Mississauga - SWM Terms of Reference (CFCA File No.: 1788-5379)

Hi Maricris and Nathan,

Hope you're both doing well. We are initiating the civil design of the infill project located at 2570 Argyle Road in Mississauga – see attached Site Plan. Prior to starting the design we would like to confirm the Terms of Reference for the stormwater management design. Can you please review the following criteria and advise if they are suitable for the site?:

Stormwater Quality: Achieve 80% TSS Removal – **Yes**

Stormwater Quantity: No controls required in accordance with the CVC Stormwater Management Criteria (August 2012) – refer to attached PDF named 2570 Argyle SWM Quantity Control **Based on City's Criteria (see link below), Mary Fix Creek requirement is 10 yr post-2 yr pre.**

http://www7.mississauga.ca/Departments/Marketing/documents/tw/FINAL-Section-8-Storm-Drainage-Design-Requirements-Jan2020.pdf

However, there is spill/flooding occurring downstream of the property and as such we recommend 100 yr post-100 yr pre development flow, if possible. Recognizing that this is more stringent than the current City criteria, but also acknowledging downstream hazard, we suggest this if City staff are in agreement.

Water Balance: Retain 5mm onsite **Yes**

We also note the Erosion Criteria: " ***At a minimum retain 5 mm on site where conditions do not warrant the detailed analyses described in Section 4.3.***

If a site drains to a sensitive creek, or a subwatershed study or EIR is required, then the proponent must complete a geomorphologic assessment study to determine the site appropriate erosion threshold (refer to Figure 4-1)".

Maricris, can you please also do a high level review of the plotted floodplain elevation and advise if you see any glaring issues?

In terms of the flood hazard please provide the topographic elevation and geodetically delineate the R.F.Elevation along the property.

Also, please provide a Geotechnical Study in order to delineate the slope stability based on CVC's guide.

Thanks,
Nicole

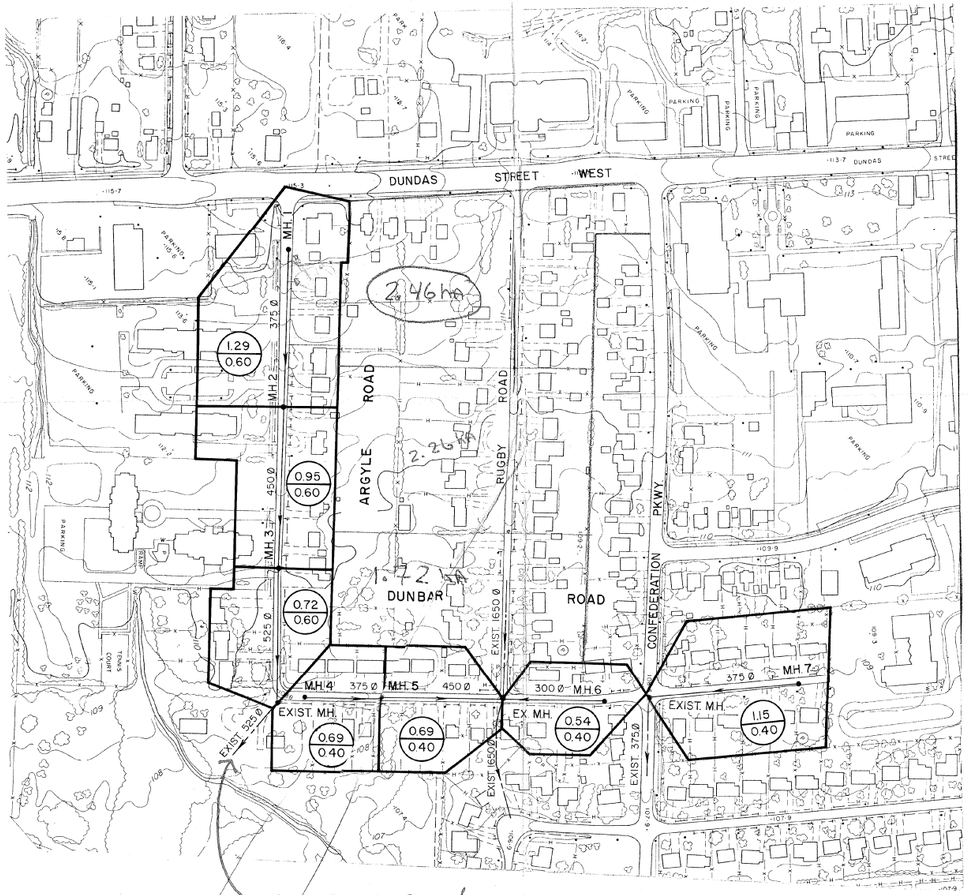
Nicole Segal M.M.Sc., EIT | Engineering Intern
C.F. Crozier & Associates Consulting Engineers
2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4

cfcrozier.ca | nsegal@cfcrozier.ca
tel: 905.875.0026 ext: 329

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

REVISIONS		
DATE	DETAILS	INIT.

177.6
15-56



THIS EXIST. 525 Ø - IS NOT 525mm Ø
BUT 450 mm Ø
* UNDER DESIGNED FOR THIS AREA

177.6

15.36
15.43
16.09

0.69 / 0.40 AREA - HECTARES / RUNOFF COEFFICIENT

GENERAL NOTES

- ALL DRIVEWAYS ASPHALT UNLESS OTHERWISE NOTED.
- ALL SERVICE LOCATIONS ARE APPROXIMATE AND MUST BE LOCATED ACCURATELY IN FIELD.
- DENOTES BUILDING - NOT LOCATED.
- DENOTES BUILDING - LOCATED.
- T.T.B.M. No. ELEV.
- TEMP. BENCH MARK ELEV. DESCRIPTION.

DESIGNED BY | CHKD | APPROVED BY

271.2

MISSISSAUGA
Public Works Department

ARGYLE RD. — DUNBAR RD.

STORM DRAINAGE AREAS

STN. TO STN.

SCALE 1:2000	AREA Z-15	PROJECT No. 90-124
DRAWN BY T.J.	CHECKED BY	PLAN No. C-
DATE 1991 05 08	SHEET 1 OF 1	

Stormceptor®

FORTERRA

Stormceptor® EF Sizing Report

ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION STORMCEPTOR®

03/27/2020

Province:	Ontario
City:	Mississauga
Nearest Rainfall Station:	TORONTO LESTER B. PEARSON INT'L AP
NCDC Rainfall Station Id:	8733
Years of Rainfall Data:	44
Site Name:	
Drainage Area (ha):	1.45
Runoff Coefficient 'c':	0.74
Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0
Require Hydrocarbon Spill Capture?	No
Upstream Flow Control?	No
Required Water Quality Runoff Volume Capture (%):	
Estimated Water Quality Flow Rate (L/s):	
Peak Conveyance (maximum) Flow Rate (L/s):	
Site Sediment Transport Rate (kg/ha/yr):	

Project Name:	2570-2590 Argyle Road
Project Number:	1788-5379
Designer Name:	Daniel Doherty
Designer Company:	Crozier & Associates
Designer Email/Phone:	ddoherty@cfcrozier.ca
EOR Name:	
EOR Company:	
EOR Email/Phone:	

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EF4	50
EF6	58
EF8	62
EF10	64
EF12	66

Recommended Stormceptor EF Model: EF8

Estimated Net Annual Sediment (TSS) Load Reduction (%): 62

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)

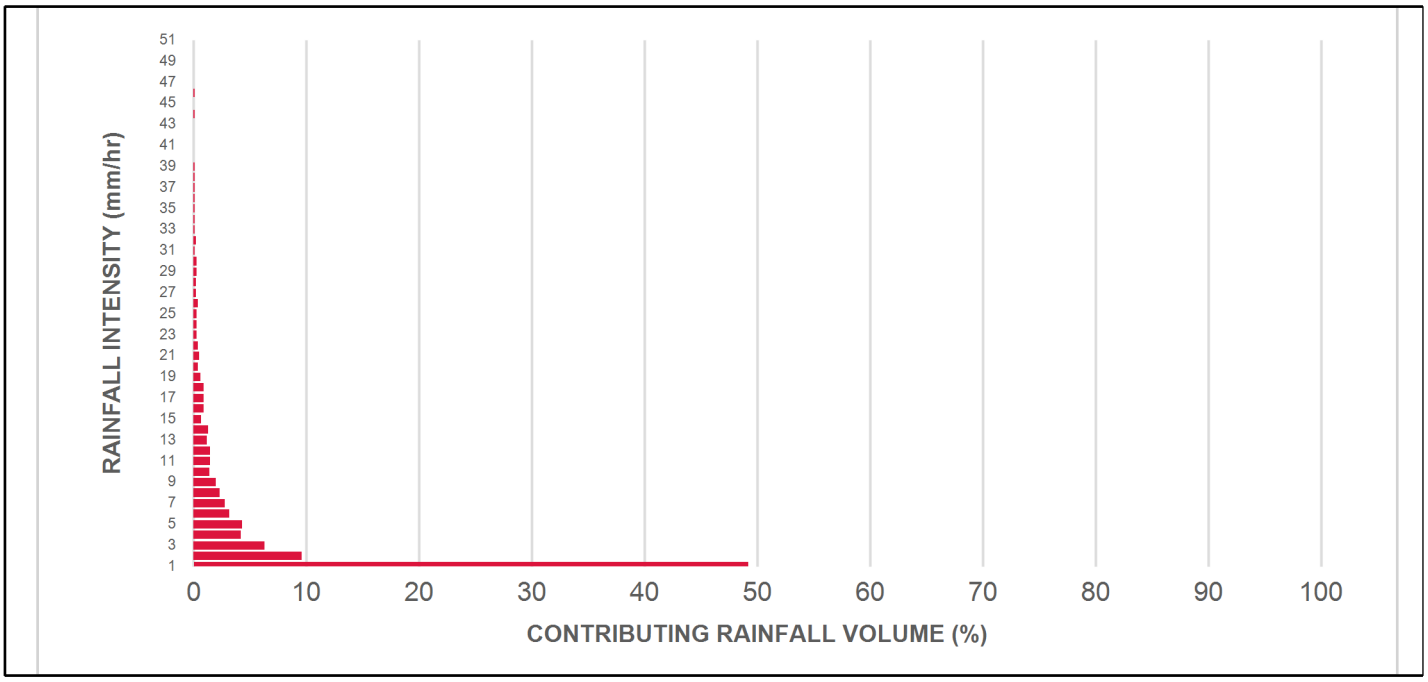
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a 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

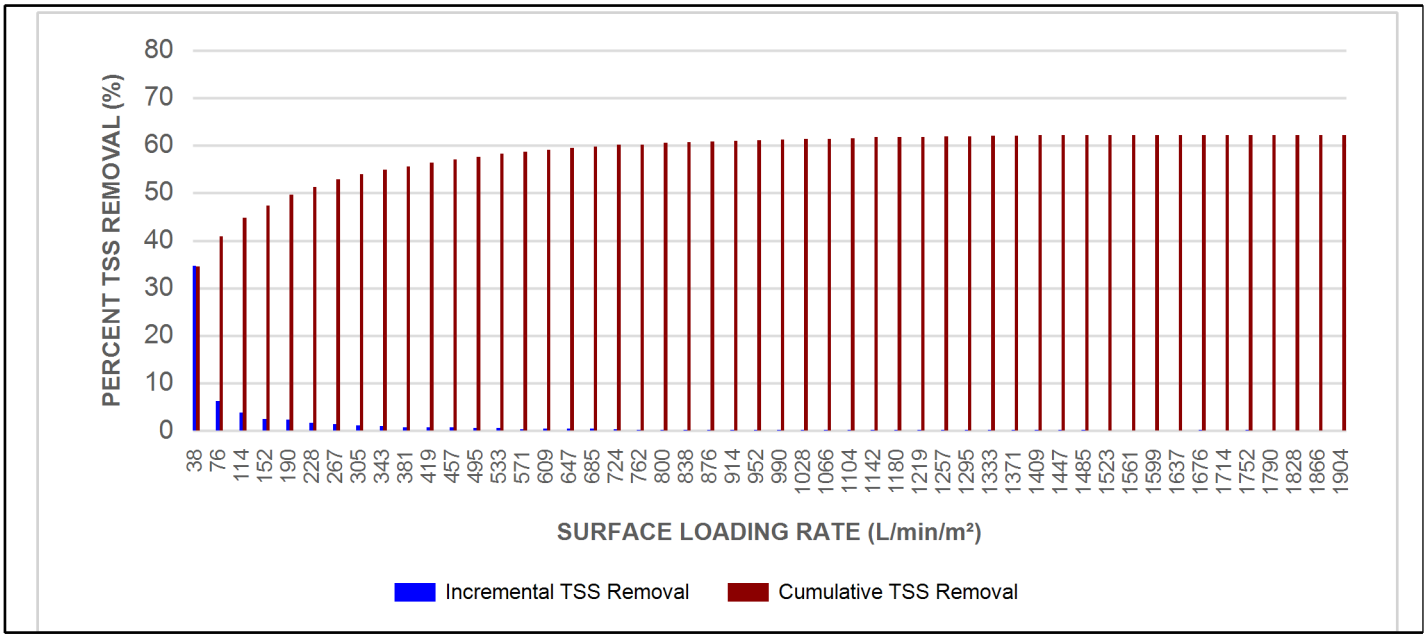
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
1	49.2	49.2	2.98	179.0	38.0	70	34.6	34.6
2	9.6	58.8	5.97	358.0	76.0	66	6.3	40.9
3	6.3	65.1	8.95	537.0	114.0	62	3.9	44.8
4	4.2	69.3	11.93	716.0	152.0	58	2.4	47.3
5	4.3	73.6	14.91	895.0	190.0	55	2.4	49.6
6	3.2	76.8	17.90	1074.0	228.0	53	1.7	51.3
7	2.8	79.6	20.88	1253.0	267.0	52	1.5	52.8
8	2.3	81.9	23.86	1432.0	305.0	51	1.2	54.0
9	2.0	83.9	26.85	1611.0	343.0	50	1.0	54.9
10	1.4	85.3	29.83	1790.0	381.0	49	0.7	55.6
11	1.5	86.8	32.81	1969.0	419.0	48	0.7	56.3
12	1.5	88.3	35.80	2148.0	457.0	48	0.7	57.1
13	1.2	89.5	38.78	2327.0	495.0	47	0.6	57.6
14	1.3	90.8	41.76	2506.0	533.0	47	0.6	58.2
15	0.7	91.5	44.74	2685.0	571.0	46	0.3	58.6
16	0.9	92.4	47.73	2864.0	609.0	46	0.4	59.0
17	0.9	93.3	50.71	3043.0	647.0	46	0.4	59.4
18	0.9	94.2	53.69	3222.0	685.0	46	0.4	59.8
19	0.6	94.8	56.68	3401.0	724.0	45	0.3	60.1
20	0.4	95.2	59.66	3580.0	762.0	45	0.2	60.2
21	0.5	95.7	62.64	3759.0	800.0	45	0.2	60.5
22	0.4	96.1	65.62	3937.0	838.0	45	0.2	60.7
23	0.3	96.4	68.61	4116.0	876.0	45	0.1	60.8
24	0.3	96.7	71.59	4295.0	914.0	44	0.1	60.9
25	0.3	97.0	74.57	4474.0	952.0	44	0.1	61.1

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 (%)
26	0.4	97.4	77.56	4653.0	990.0	44	0.2	61.2
27	0.2	97.6	80.54	4832.0	1028.0	44	0.1	61.3
28	0.2	97.8	83.52	5011.0	1066.0	45	0.1	61.4
29	0.3	98.1	86.51	5190.0	1104.0	45	0.1	61.5
30	0.3	98.4	89.49	5369.0	1142.0	46	0.1	61.7
31	0.1	98.5	92.47	5548.0	1180.0	46	0.0	61.7
32	0.2	98.7	95.45	5727.0	1219.0	47	0.1	61.8
33	0.1	98.8	98.44	5906.0	1257.0	47	0.0	61.9
34	0.1	98.9	101.42	6085.0	1295.0	48	0.0	61.9
35	0.1	99.0	104.40	6264.0	1333.0	48	0.0	62.0
36	0.1	99.1	107.39	6443.0	1371.0	49	0.0	62.0
37	0.1	99.2	110.37	6622.0	1409.0	49	0.0	62.1
38	0.1	99.3	113.35	6801.0	1447.0	48	0.0	62.1
39	0.1	99.4	116.33	6980.0	1485.0	46	0.0	62.2
40	0.0	99.4	119.32	7159.0	1523.0	45	0.0	62.2
41	0.0	99.4	122.30	7338.0	1561.0	44	0.0	62.2
42	0.0	99.4	125.28	7517.0	1599.0	43	0.0	62.2
43	0.0	99.4	128.27	7696.0	1637.0	42	0.0	62.2
44	0.1	99.5	131.25	7875.0	1676.0	41	0.0	62.2
45	0.0	99.5	134.23	8054.0	1714.0	40	0.0	62.2
46	0.1	99.6	137.22	8233.0	1752.0	39	0.0	62.2
47	0.0	99.6	140.20	8412.0	1790.0	38	0.0	62.2
48	0.0	99.6	143.18	8591.0	1828.0	38	0.0	62.2
49	0.0	99.6	146.16	8770.0	1866.0	37	0.0	62.2
50	0.0	99.6	149.15	8949.0	1904.0	36	0.0	62.2
Estimated Net Annual Sediment (TSS) Load Reduction =								**62 %**

RAINFALL DATA FROM TORONTO LESTER B. PEARSON INT'L 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

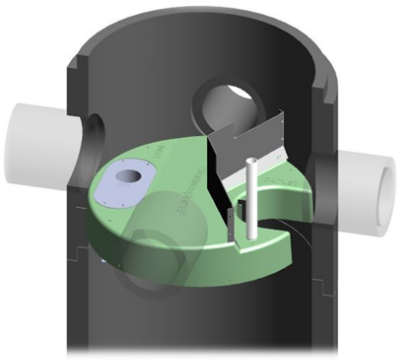
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

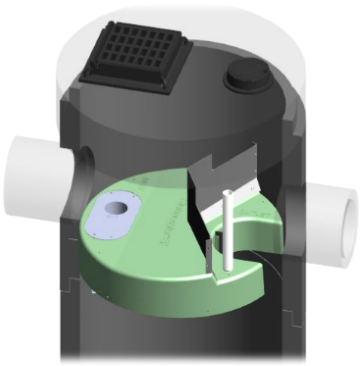
DESIGN FLEXIBILITY

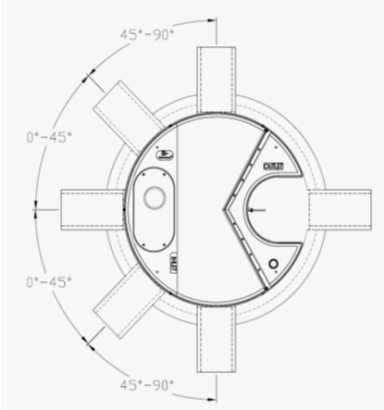
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend 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	197	52	203	8	1190	42	1904	5250
EF6 / EFO6	1.8	6	1.93	6.3	348	92	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	545	144	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	874	231	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	1219	322	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® EF

SLR ($L/min/m^2$)	TSS % REMOVAL	SLR ($L/min/m^2$)	TSS % REMOVAL	SLR ($L/min/m^2$)	TSS % REMOVAL	SLR ($L/min/m^2$)	TSS % REMOVAL
1	70	660	46	1320	48	1980	35
30	70	690	46	1350	48	2010	34

imbrium

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

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 shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. 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.

TECHNICAL BULLETIN

Sizing Stormceptor® EF/EFO for Removal of Canadian ETV and Stormceptor Fine Particle Size Distributions

(Issued April 23, 2018)

The Canadian ETV Particle Size Distribution ("ETV PSD", shown in Table 1 below) is reasonably representative of the PSD of particulates found in typical urban stormwater runoff, and was used in sediment removal and scour performance testing of Stormceptor® EF/EFO in compliance with the provisions of the Canadian ETV protocol titled *Procedure for Laboratory Testing of Oil-Grit Separators*. Municipalities across Canada are increasingly adopting the sediment removal target of 60% removal of the ETV PSD when sizing an oil-grit separator for pretreatment of stormwater runoff, replacing former sediment removal targets that were based on removal of coarser particle size distributions.

Imbrium Systems supports and recommends adoption of 60% removal of the ETV PSD as a Canada-wide standard for sizing of Stormceptor® EF/EFO. However, it is recognized that in some areas there may continue to be sediment removal targets that are based on removal of coarser particle size distributions. Imbrium engineers have performed extensive sizing analyses to determine the estimated removal efficiency of various coarser PSDs as compared to 60% removal of the ETV PSD. Removal efficiencies were calculated for a wide range of influent flow rates, utilizing Stokes' Law for particle settling and the dimensions and hydraulic capacities of each Stormceptor model size.

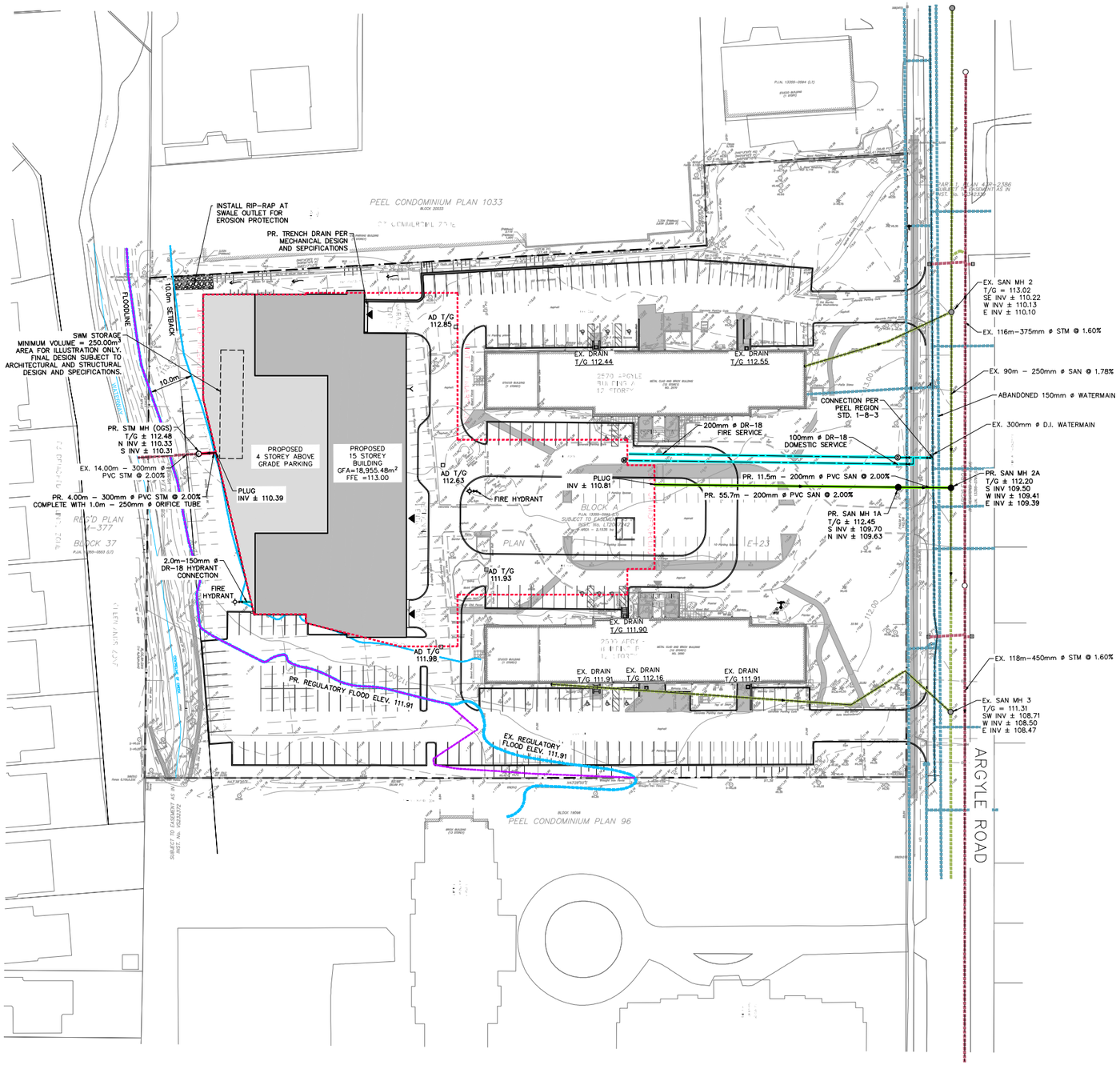
Based on these analyses, sizing Stormceptor® EF/EFO for 60% removal of the ETV PSD is comparable to sizing for 80% removal of the Stormceptor Fine PSD.

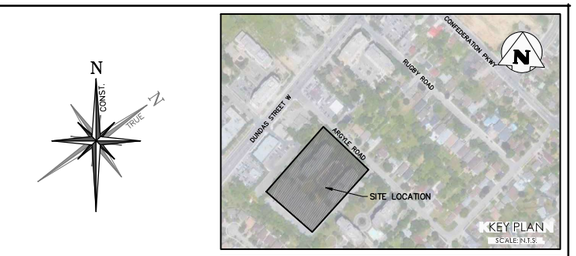
Table 1: Particle Size Distribution of Test Sediment

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

The particle size distribution shown in Table 1 above is the Canadian ETV Particle Size Distribution ("ETV PSD") specified in the Canadian ETV protocol titled *Procedure for Laboratory Testing of Oil-Grit Separators*.

FIGURES





LEGEND

- PROPERTY LINE
- FLOODLINE ELEV. 111.91
- 10.0m FLOODLINE SETBACK
- POST-DEVELOPMENT FLOODLINE ELEV. 111.91
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING AREA DRAIN
- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE CONNECTION (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED WATER METER (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED DETECTOR CHECK VALVE IN CHAMBER (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED AREA DRAIN (PER MECHANICAL DESIGN AND SPECIFICATIONS)
- PROPOSED SANITARY SEWER & MANHOLE
- UNDERGROUND PARKING LIMIT

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR 1st SUBMISSION	2020/JUN/08

BENCHMARK NOTE:

ELEVATIONS ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK No. 1059., SET HORIZONTALLY AT THE BASE OF A 750MM DIAMETER CONCRETE TRAFFIC POLE AT THE NORTH-WEST CORNER OF DUNDAS STREET WEST AND PARKHILL ROAD. HAVING A PUBLISHED ELEVATION OF 115.617M

SURVEY NOTES:

SURVEY COMPLETED BY SPEIGHT, VAN NOSTRAND & GIBSON LIMITED. (2019/MAY/21) REFERENCE No.: 1-E23-PEEL

BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF ARGYLE ROAD AS SHOWN ON PLAN E-23 HAVING A BEARING OF N46°19'00"W

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY IBI GROUP.
DRAWING No.: A-003 (2020/JUN/03)
PROJECT No.: 120325

DRAWING NOTES:

THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.

THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT. DO NOT SCALE THIS DRAWING.

ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

MISSISSAUGA

Project

2570 – 2590 ARGYLE ROAD
CITY OF MISSISSAUGA
PEEL REGION

Drawing

PRELIMINARY SITE SERVICING PLAN

NOT FOR CONSTRUCTION

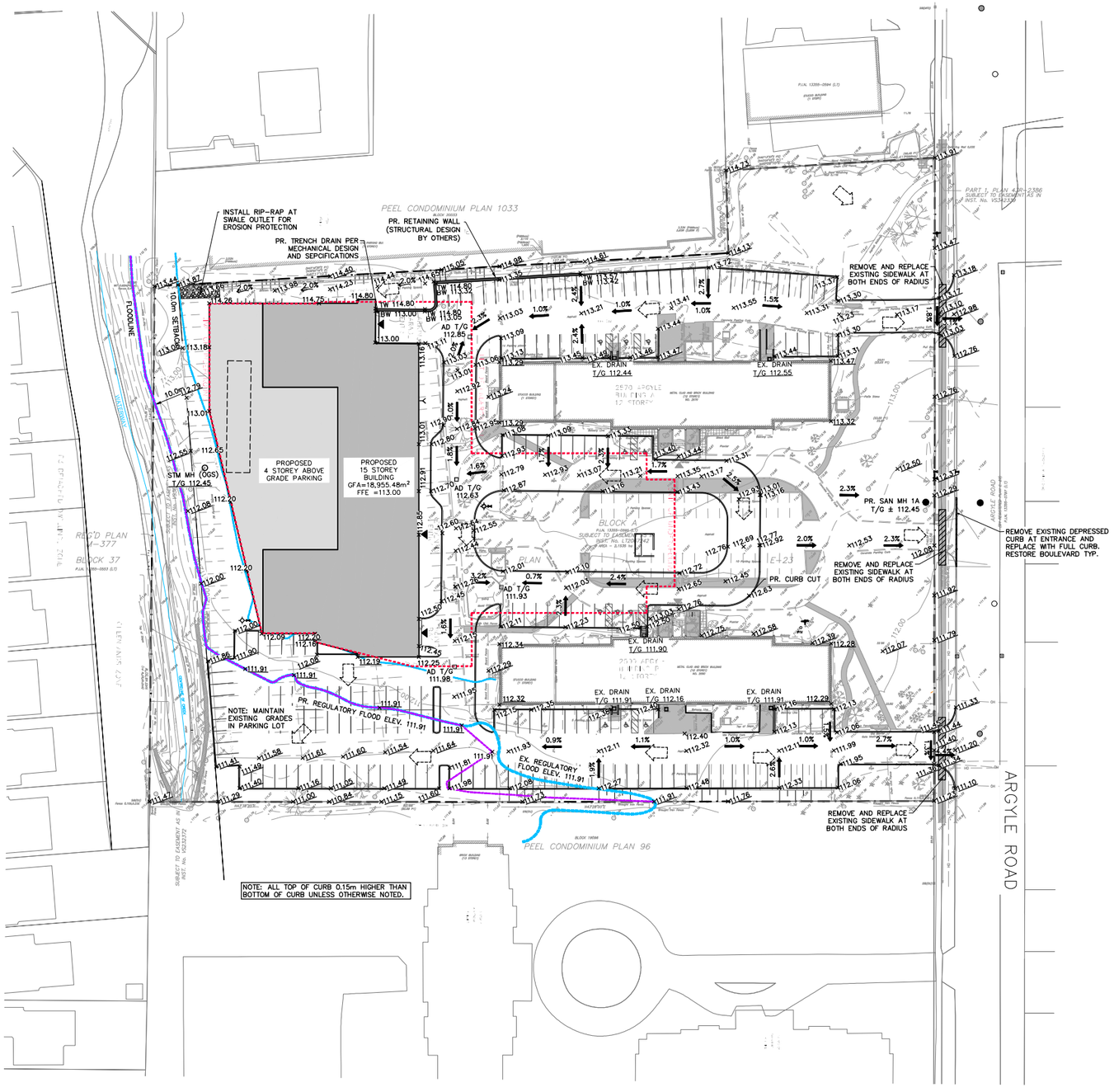
Stamp

FOR REVIEW

Stamp

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
D.D.	D.D.	1788-5379	
Check	Check	Scale	Dwg.
N.R.S.	N.C.	1:500	FIG 1



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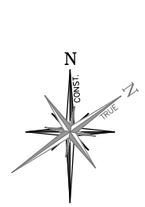

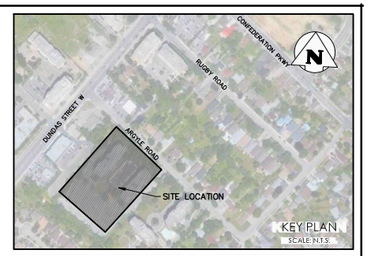

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- FLOODLINE ELEV. 111.91
- 10.0m FLOODLINE SETBACK
- POST-DEVELOPMENT FLOODLINE ELEV. 111.91
- ×153.00 EXISTING GRADE
- ×153.00 PROPOSED GRADE
- ×153.00 PROPOSED GRADE (TO MATCH EXISTING)
- PROPOSED RETAINING WALL
- 2.0% PROPOSED MINOR FLOW DIRECTION
- MAJOR OVERLAND FLOW DIRECTION
- PROPOSED SLOPE (MAX 3:1)
- LIMIT OF UNDERGROUND GARAGE

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR 1st SUBMISSION	2020/JUN/08

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SURVEY NOTES:

SURVEY COMPLETED BY SPEIGHT, VAN NOSTRAND & GIBSON LIMITED. (2019/MAY/21) REFERENCE No.: 1-E23-PEEL

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MISSISSAUGA

Project
2570 – 2590 ARGYLE ROAD
CITY OF MISSISSAUGA
PEEL REGION

Drawing
PRELIMINARY SITE GRADING PLAN

NOT FOR CONSTRUCTION

Stamp

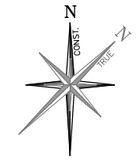
FOR REVIEW

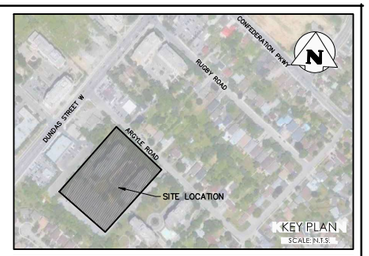
Stamp

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875 0026 T
905 875 4915 F
WWW.CFCROZIER.CA

Drawn	D.D.	Design	N.R.S.	Project No.	1788-5379
Check	N.R.S.	Check	N.C.	Scale	1:500
				Dwg.	FIG 2

10 0m 10 20 30 40
SCALE: 1:500





LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- FLOODLINE
- 10.0m FLOODLINE SETBACK
- x 215.00 EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- EXISTING STORM DRAINAGE CATCHMENT
- EXISTING STORM SEWER & MANHOLE
- EXISTING AREA DRAIN
- ID / A|RC CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

No.	ISSUE / REVISION	YYYY/MMM/DD
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BENCHMARK NOTE:

ELEVATIONS ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK No. 1059., SET HORIZONTALLY AT THE BASE OF A 750MM DIAMETER CONCRETE TRAFFIC POLE AT THE NORTH-WEST CORNER OF DUNDAS STREET WEST AND PARKHILL ROAD. HAVING A PUBLISHED ELEVATION OF 115.617M

SURVEY NOTES:

SURVEY COMPLETED BY SPEIGHT, VAN NOSTRAND & GIBSON LIMITED. (2019/MAY/21) REFERENCE No.: 1-E23-PEEL

BEARINGS SHOWN HEREON ARE ASTRONOMIC AND ARE REFERRED TO THE WESTERLY LIMIT OF ARGYLE ROAD AS SHOWN ON PLAN E-23 HAVING A BEARING OF N46°19'00"W

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY IBI GROUP.
DRAWING No.: A-003 (2020/JUN/03)
PROJECT No.: 120325

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MISSISSAUGA

Project
2570 – 2590 ARGYLE ROAD
CITY OF MISSISSAUGA
PEEL REGION

Drawing
PRE-DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

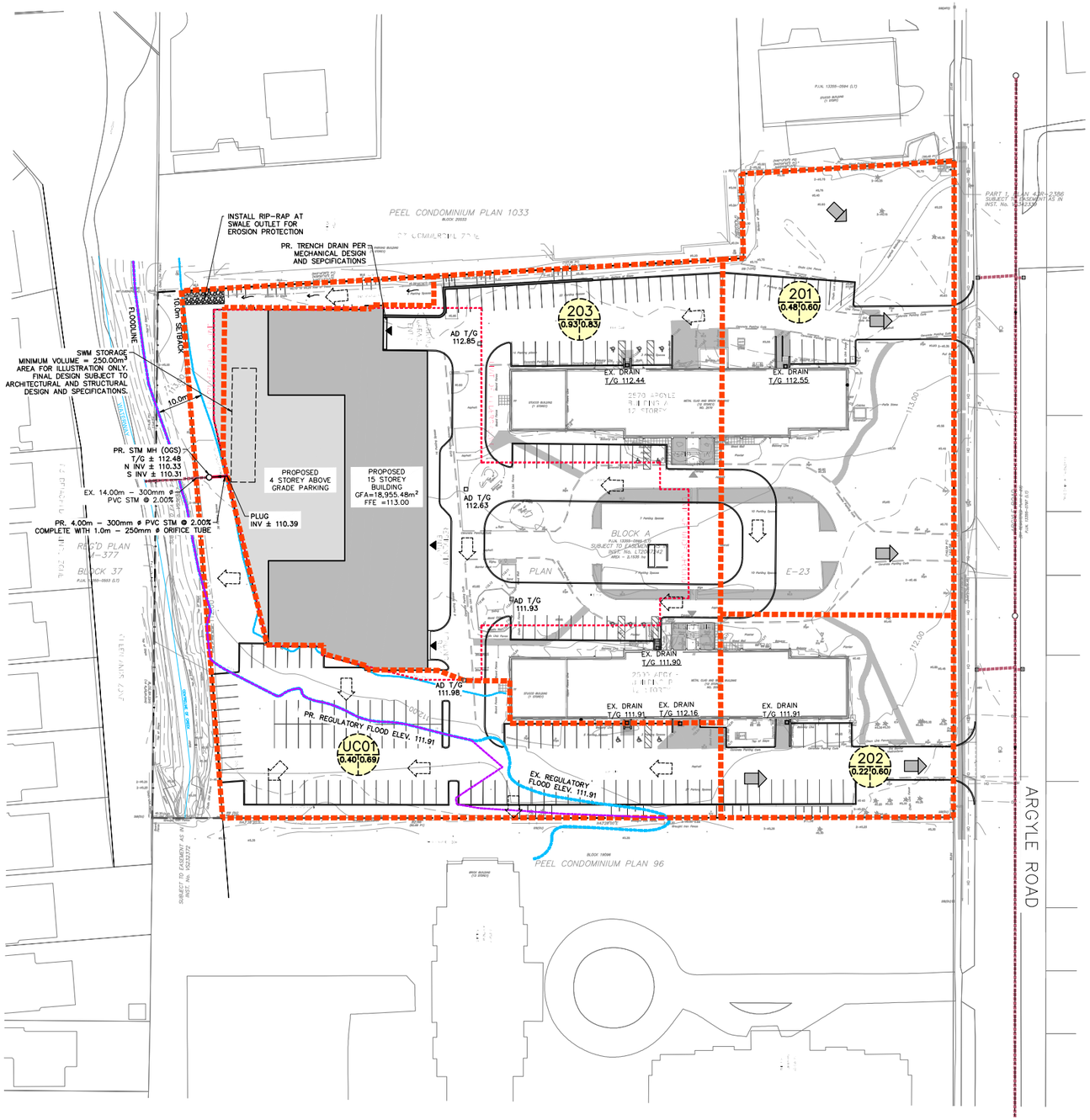
Stamp

FOR REVIEW

Stamp

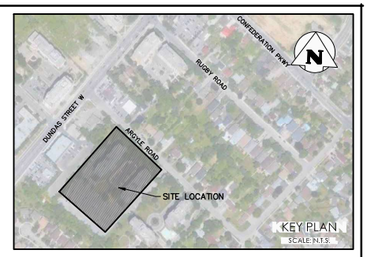
CROZIER CONSULTING ENGINEERS
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875 0026 T
905 875 4915 F
www.cfcrozier.ca

Drawn	Design	Project No.	
D.D.	D.D.	1788-5379	
Check	Check	Scale	Dwg.
N.R.S.	N.C.	1:500	FIG 3



10 0m 10 20 30 40
SCALE: 1:500

N



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- FLOODLINE ELEV. 111.91
- 10.0m FLOODLINE SETBACK
- POST-DEVELOPMENT FLOODLINE ELEV. 111.91
- x 215.00 EXISTING GRADE
- PROPOSED OVERLAND FLOW DIRECTION
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED STORM DRAINAGE CATCHMENT
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING AREA DRAIN
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED AREA DRAIN
- ID / A|RC CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

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MISSISSAUGA

Project
2570 – 2590 ARGYLE ROAD
CITY OF MISSISSAUGA
PEEL REGION

Drawing
POST-DEVELOPMENT DRAINAGE PLAN

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Stamp

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Drawn	Design	Project No.	
D.D.	D.D.	1788-5379	
Check	Check	Scale	Dwg.
N.R.S.	N.C.	1:500	FIG 4