FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

1575 HURONTARIO STREET

CITY OF MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

DREAM MAKER

PREPARED BY:

C.F. CROZIER & ASSOCIATES INC.
8 MARKET STREET, SUITE 600
TORONTO, ON M5E 1M6

DECEMBER 2017

CFCA FILE NO. 1110-4677

CROZIER & ASSOCIATES
Consulting Engineers

Revision Number	Date	Comments
Rev.0	September 14, 2017	Issued for OPA & ZBA (Not Submitted)
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1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) has been retained by Dream Maker for civil engineering design of the proposed residential development at 1575 Hurontario Street in the City of Mississauga. Crozier has prepared this report in support of an Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) to outline the water and sanitary servicing, grading, and stormwater management.

The purpose of this report is to demonstrate to the City of Mississauga that the proposed development is constructible from a site servicing and stormwater management perspective.

2.0 GENERAL SITE DESCRIPTION

The subject lands cover an area of approximately 0.38 ha and currently consists of a vacant asphalt parking lot, a concrete building foundation and landscaped areas. The property is bounded by commercial properties to the north and south, residential properties and Glenview Drive to the east, and Hurontario Street to the west. An existing swale conveys drainage from the northern neighbouring property through the site to an existing double catch basin in an existing stormwater easement adjacent to the south property line. Based on correspondence with City of Mississauga staff, the existing drainage condition, which allows surface drainage to be conveyed from the northern adjacent property to the existing stormwater easement on the south property line, will be maintained in the proposed drainage condition.

The proposed development consists of two stacked back-to-back townhouse blocks with 32 and 28 units respectively, built above an underground parking garage. A main access road extends east from Hurontario Road through the site and provides access to the proposed underground parking garage. The site slopes downgrade from Hurontario Street towards Glenview Drive at an average rate of 4.0%, with sanitary and stormwater servicing connections being proposed at the south-east corner of the site, into existing municipal service lines on Glenview Drive. A water connection is proposed on the west property line into the municipal service line on Hurontario Street.

3.0 WATER SERVICING

3.1 Existing Water Servicing

According to the approved Site Grading and Servicing Plan prepared by Charlton Engineering Limited, dated April 2003, there is an existing 450 mm diameter concrete watermain on Hurontario Street and a 150 mm diameter watermain on Maplewood Road. There is an existing fire hydrant on the east side of Hurontario Street, approximately 7 m south of the south-west corner of the site.

3.2 Water Design Demand

The Region of Peel Public Works Watermain Design Criteria was used to estimate the proposed water demands for domestic purposes. A density of 2.54 people per unit (ppu) was applied for the stacked townhouse units, as designated by Peel Region. The proposed water service was sized to convey a peak hour flow rate of 1.48 L/s for this development, as determined by Region of Peel criteria. A summary of the results is presented in **Table 1**, with detailed calculations provided in **Appendix A**.

Table 1: Estimated Proposed Domestic Water Demand

Method	**Average Daily Demand** (L/s)	**Maximum Daily Demand** (L/s)	**Peak Hourly Demand** (L/s)
Region of Peel	0.49	0.99	1.48

The Fire Underwriters Survey (FUS) method was used to complete the fire flow demand analysis for the proposed development, with the water service sized to service the full build-out of the development. The proposed fire line water service will be required to accommodate a fire flow of 183.3 L/s for a duration of 2.5 hours per the FUS calculations, which are provided in **Appendix A**.
Note that the Fire Underwriter's Survey value is a conservative estimate for comparison purposes only. The Mechanical Engineer for this development will complete the required analysis for fire protection, and the Architect will design fire separation methods per the determined fire flow rate in order to meet municipally available flows and pressures. The exact location of the existing watermain will need to be verified by the contractor in the field. If required, in order to determine the available fire flow and pressure within the existing municipal system, a hydrant flow test can be completed.

3.3 Proposed Water Servicing

The proposed development will be serviced through a water service connection to the existing 450 mm diameter watermain on the east side of Hurontario Street. The proposed 150 mm diameter watermain will split at the property line into a 150 mm diameter fire connection, and a 100 mm diameter domestic water service (refer to **Drawing C02**). The proposed water service and fire line will be equipped with a property line valve and box and connect inside the mechanical room of the building, per mechanical design and specifications. A water meter with backflow preventer will be installed inside the mechanical room located in the underground parking garage structure, per mechanical design and specifications. The connection will adhere to Region of Peel standards.

4.0 SANITARY SERVICING

4.1 Existing Sanitary Servicing

According to the approved Site Grading and Servicing Plan prepared by Charlton Engineering Limited, dated April 2003, there is an existing 250 mm diameter sanitary sewer on Hurontario Street and an existing 250 mm diameter sanitary sewer on Glenview Drive.

4.2 Sanitary Design Flow

The Region of Peel Public Works Sanitary Sewer Design Criteria was consulted to estimate the sanitary design flows generated by the proposed development. A summary of the results is presented in **Table 2**, with detailed sanitary design flow calculations provided in **Appendix B**.

Table 2: Estimated Sanitary Design Flow

Method	**Average Daily Flow** (L/s)	**Peak Flow** (L/s)	**Infiltration Flow** (L/s)	**Total Peak Flow** (L/s)
Region of Peel	0.53	2.24	0.08	2.31

For this application, the proposed sanitary service was sized to convey a peak hourly flow rate of 2.31 L/s, as determined by the Region of Peel design criteria.

4.3 Proposed Sanitary Servicing

The proposed development will be serviced through a sanitary service connection to an existing manhole on the existing 250 mm diameter sanitary sewer on Glenview Drive (refer to **Drawing C02**). A 250 mm diameter PVC sanitary sewer at 2.0% will connect from the existing manhole to a proposed property line manhole. The sanitary sewer will enter through the wall of the underground parking garage structure and the internal sanitary system of the buildings will be designed by the Mechanical Engineer to ensure the required connection for each townhouse block.

5.0 STORMWATER DRAINAGE CONDITIONS

5.1 Pre-Development Drainage Conditions

Based on a review of the existing topographic survey prepared by Tom A. Senkus, dated June 8th, 2015, the development area currently consists of a vacant asphalt parking lot on the west half of the site and landscaped areas on the east half of the site. The site generally slopes downgrade eastward from Hurontario Street to the south-east corner of the property at Maplewood Road and Glenview Drive. An existing catch basin is located at the south-east corner of the asphalt area and is assumed to connect to the existing double catch basin at the south property line, which is located within an existing stormwater easement and connects to the existing 750 mm diameter storm sewer on Maplewood Road. An existing swale conveys drainage from the adjacent northern property through the site to the existing stormwater easement and eventually to the storm sewer on Maplewood Road.

Based on a discussion with City of Mississauga staff, the existing drainage condition which allows surface drainage to be conveyed from the northern adjacent property to the existing stormwater easement at the south property line, will be maintained in the proposed drainage condition. City of Mississauga staff also provided an existing drainage plan for the area, which is included in **Appendix D** and was used to complete the Pre-Development Drainage Plan (**Figure 1**). Based on the existing drainage plan, the site encompasses 0.34 ha of an existing 2.76 ha drainage area, with a pre-development runoff coefficient of 0.40. The pre-development drainage plan outlines a portion of the site which fronts onto Hurontario Street draining to Hurontario Street, with the remainder of the site draining to the existing double catch basin and the 750 mm diameter storm sewer on Maplewood Road.

Based on the existing topographic information and the existing drainage plan provided by City of Mississauga staff, the portion of the site included within the existing drainage plan is considered the pre-development catchment area (Catchment 101), with the outlet being the existing 750 mm diameter storm sewer on Maplewood Road. The remainder of the existing external drainage catchment is considered Catchment 102. A summary of the pre-development catchment area characteristics is shown in **Table 3**, with detailed calculations provided in **Appendix C**.

Table 3: Pre-Development Land Areas, Runoff Coefficients, and Peak Flow Rates

Catchment Area	Pervious Area (ha) (RC = 0.25)	Impervious Area (ha) (RC = 0.90)	Total Area (ha)	Weighted Runoff Coefficient (RC)	Design Storm Event	Peak Flow Rate (L/s)
101 (Site)	0.26	0.08	0.34	0.40	2	23.0
					5	30.9
					10	38.1
					25	43.7
					50	48.8
					100	54.0
102 (External)	1.86	0.56	2.41	0.40	2	162.0
					5	217.7
					10	268.1
					25	308.0
					50	343.8
					100	380.5
Entire Catchment	2.12	0.64	2.76	0.40	2	185.0
					5	248.6
					10	306.2
					25	351.7
					50	392.6
					100	434.5

5.2 Post-Development Drainage Conditions

Under post-development conditions, the site is divided into two drainage catchment areas, which along with the existing external drainage catchment, are shown in **Figure 2**. The drainage catchments are described below in detail and summarized in **Table 4**, with detailed calculations provided in **Appendix C**.

Catchment 201:

The majority of the site (0.38 ha) will drain through an internal system of area drains and catch basins. The area drains are located within the footprint of the underground parking garage and the catch basins are located adjacent to the underground parking garage. All area drains and catch basins will be connected to the underground parking garage structure's internal conveyance system, which will be designed by the mechanical engineer. The rooftop leaders from the townhouse blocks will splash to grade and drain to the internal storm sewer system. The internal storm sewer system will convey runoff into the proposed underground stormwater cistern, which is located in the underground parking garage structure, and the Triton S-22 underground stormwater chamber, which is located outside of the underground parking garage structure. The runoff will be controlled to below the allowable release rate and then released by gravity flow into the storm sewer system on Maplewood Road as described in Section 6.0.

Catchment 202:

Catchment 202 comprises a small landscaped area (0.01 ha) along the south property line, which is adjacent to the existing double catch basin and stormwater easement. Based on the existing drainage conditions, this area will drain uncontrolled to the storm sewer system on Maplewood Road.

Catchment 203:

Catchment 203 comprises the existing external drainage catchment with a runoff coefficient of 0.40, as indicated by the existing drainage plan. As previously indicated, the existing drainage condition which allows surface drainage to be conveyed from the northern adjacent property to the existing stormwater easement at the south property line, will be maintained in the post-development drainage plan.

Table 4: Post-Development Land Areas, Runoff Coefficients, and Peak Flow Rates

Catchment Area	**Pervious Area (ha) (RC = 0.25)**	**Impervious Area (ha) (RC = 0.90)**	**Total Area** (ha)	**Weighted RC**	**Design Storm Event**	**Peak Flow Rate** (L/s)
201 (Site – controlled)	0.09	0.29	0.38	0.74	2	47.1
					5	63.3
					10	77.9
					25	89.5
					50	99.9
					100	110.6
202 (Site – uncontrolled)	0.01	0	0.01	0.25	2	0.2
					5	0.2
					10	0.3
					25	0.3
					50	0.4
					100	0.4
203 (External)	1.86	0.56	2.41	0.40	2	162.0
					5	217.7
					10	268.1
					25	308.0
					50	343.8
					100	380.5
Entire Catchment	1.95	0.84	2.80*	0.45	2	209.2
					5	281.2
					10	346.4
					25	397.8
					50	444.1
					100	491.4

*The pre-development total drainage area is equal to 2.76 hectares. The post-development total drainage area is equal to 2.80 hectares. This difference is due to the existing drainage plan, which identifies a portion of the site draining towards Hurontario Street in the pre-development condition, while the post-development condition considers the entire site area (3829 m^2) draining towards the 750 mm diameter storm sewer on Maplewood Road.

6.0 STORMWATER MANAGEMENT

Implementation of the proposed development will result in changes to the quantity and quality of the stormwater runoff leaving the site, as well as to the existing water balance patterns. The proposed stormwater management (SWM) plan will mitigate the impact of the proposed development on the existing drainage conditions by implementing best management practices (BMP) designed to provide quantity, quality, and balance controls. The proposed control measures will be implemented in a comprehensive treatment train and in accordance with City of Mississauga SWM criteria.

A qualitative summary of the proposed SWM treatment train is summarized in **Table 5** below:

Table 5: Summary of Treatment Train Control Measures

Objective	Control Measures by Level		
	Lot	Conveyance	End-of-pipe
Water Quantity	Enhanced Initial Abstraction	Grassed Swales	Underground Storage
Water Quality	Clean Runoff Separation	Grassed Swales	Oil and Grit Separator
Water Balance	Enhanced Initial Abstraction	Grassed Swales	Infiltration Gallery

The proposed SWM treatment train includes lot, conveyance and end-of-pipe measures designed to meet the water quantity, quality and balance design objectives. Quantitative descriptions of the SWM treatment train components for each design objective are provided in Sections 6.2, 6.3, and 6.4 of this report. The treatment train will be complemented by erosion and sediment control measures at all stages of construction, with details provided in Section 7.

6.1 Stormwater Criteria

The stormwater management for the site includes controlling the stormwater from the subject property in accordance with the standards set out by the 'Development Requirements Manual' (City of Mississauga Transportation and Works, September 2016) and the 'Stormwater Management Criteria' (Credit Valley Conservation (CVC), August 2012). As the site is located within the Mary Fix Creek subwatershed and the ultimate storm sewer outlet is the existing 750 mm diameter storm sewer on Maplewood Road, the SWM objectives for the proposed SWM Plan were based on CVC and Ministry of Environment and Climate Change (MOECC) criteria as follows:

- Quantity Control: Control 10-yr post-development peak flows to 2-yr pre-development peak flow levels.
- Quality Control: Enhanced Levels of Protection per MOECC Standards (80% TSS Removal).
- Water Balance: 5 mm retention of stormwater across the entire site.
- Erosion and Sediment Control: Controls to be provided during construction.

The site is located within a Ministry of Transportation (MTO) regulated area. The MTO criteria for quantity control states that post-development peak flow rates for all storms up to and including the 100-year event must be controlled to pre-development levels using only surface storage (rooftop and subsurface systems are not considered in the calculations). Based on the existing site conditions (site grade slopes at an average 4% from Hurontario Street to Maplewood Drive), surface storage is not feasible.

6.2 Stormwater Quantity Control

Water quantity objectives will be achieved by reducing post-development peak flow rates to target rates through a combination of lot, conveyance and end of pipe measures. At the lot level, enhanced initial abstraction values will be provided by a thicker layer of topsoil (minimum of 0.2 m) in landscape areas that will result in greater local runoff volumes infiltrated as well as greater volumes of runoff from adjacent impervious surfaces intercepted; this will in turn result in lower overall runoff volumes leaving the site. The proposed grassed swales will also contribute to peak flow reduction by lengthening the path of flows and encouraging infiltration. Ultimate control of the flows leaving the site will be provided by the orifice control, which will be installed downstream of the proposed underground storage chamber and cistern.

The Modified Rational Method was used to determine the pre-development and post-development peak flow rates for the site using Mississauga rainfall intensities, individual catchment areas, and calculated runoff coefficients. The peak flow rates were then used to determine the maximum allowable discharge rate based on the 2 year pre-development design storm event.

The site runoff entering the storm sewer on Maplewood Road must be controlled from the 10 year post-development design storm event (78.2 L/s) to the 2 year pre-development design storm event (23.0 L/s). Since the 10-year design flows from Catchment 202 (0.3 L/s) will be released uncontrolled, the maximum allowable release rate for the quantity controls in Catchment 201 will be reduced to 22.7 L/s (23.0 L/s – 0.3 L/s).

To control the 10-year flow from Catchment 201 to the above target, a 35.2 m^3 underground stormwater storage chamber (Triton S-22 or approved equivalent) and 65.0 m^3 underground stormwater storage cistern will be installed upstream of a 75 mm orifice tube. The stormwater chamber and cistern will gravity drain to the existing 750 mm diameter storm sewer on Maplewood Road.

Refer to **Table 6** for a summary of the pre-development and post-development design storm event peak flows. Detailed calculations of the Modified Rational Method, storage requirements and orifice tube sizing are provided in **Appendix C**.

Table 6: Summary of Peak Flow Rates

Storm Event	**Total Area** (ha)	**Pre-Development Peak Flow** (L/s)	**Post-Development Peak Flow** (L/s)	**Catchment 201 10-Yr Post-Development Peak Flow Rate** (Controlled*) (L/s)	**Catchment 202 10-Yr Post-Development Peak Flow Rate** (Uncontrolled) (L/s)	**Entire site 10-Yr Post-Development Peak Flow Rate** (L/s)
2	0.38	23.0	47.3	18.9	0.3	19.2
5		30.9	63.5			
10		38.1	78.2			
25		43.7	89.8			
50		48.8	100.3			
100		54.0	111.0			

*Refer to Orifice Tube Design Summary in Appendix C

6.3 Stormwater Quality Control

Water quality objectives will be achieved by reducing, intercepting and removing suspended solids from runoff through the implementation of lot, conveyance and end-of-pipe measures. At the lot level, clean and dirty runoff will be separated from roof and ground surfaces when possible to simplify the treatment of the "dirty" runoff. At the conveyance level, grassed swales upstream of the storm sewer system will slow down runoff and encourage the interception and settling of suspended solids. The final stage of the water quality treatment train will be an oil and grit separator (OGS) located downstream of the underground stormwater storage chamber and cistern. As shown in **Appendix C,** preliminary sizing calculations have found a Stormceptor Model 300 or approved equal will provide 84% removal of suspended solids for 99% of the runoff volume, as required by the MOECC and the City of Mississauga.

6.4 Water Balance

Water balance objectives will be met by a combination of lot, conveyance and end-of-pipe measures designed to retain and/or infiltrate on site the first millimeters of all precipitation events. At the lot level, the initial abstraction of pervious surfaces will be enhanced to increase their potential for the retention and

interception of runoff. At the conveyance level, it is expected that the proposed grassed swales will retain and infiltrate a portion of the runoff that they convey. To complete the required objective, an infiltration gallery will receive runoff from the landscaped areas and a portion of the townhouse rooftops.

The infiltration gallery is provided in the form of a gravel sump located beneath the stormwater storage chamber (Triton S-22 or approved equivalent). The gravel sump has been sized to infiltrate the 5 mm water balance requirement for the site over a drawdown period of 48 hours. For a total site area of 0.38 ha, the required water balance volume is 19.15 m^3. The drawdown calculations for the infiltration facilities were completed using parameters and assumptions from the 'Low Impact Development SWM Planning and Design Guide' (CVC, 2010). **Table 7** includes a summary of the required infiltration system parameters with detailed drawdown calculations provided in **Appendix C**.

Table 7: Summary of Infiltration Gallery Parameters

	Infiltration Gallery
Footprint Area (m^2)	45.36
Gravel Sump Depth (m)	1.06
Length (m)	12.76
Width (m)	3.56
5mm Design Storm Event Runoff Volume Storage (m^3)	19.23

The gravel sump will be filled with 50 mm diameter clear stone and wrapped in a geotextile to prevent the migration of fine material. The exact location of the proposed infiltration gallery is shown in **Drawing C02**.

7.0 Erosion and Sediment Control During Construction

Erosion and sediment controls will be installed prior to the commencement of any construction activities and will be maintained until the site is stabilized or as directed by the Site Engineer and/or the City of Mississauga. The Erosion & Sediment Control Plan (**Drawing C01**) identifies the location of the recommended control features. Controls will be inspected after each significant rainfall event and maintained in proper working condition.

The following sediment and erosion controls will be included during construction on the site:

Heavy Duty Silt Fencing

A Heavy Duty Silt fence will be installed on the perimeter of the site to intercept sheet flow. Additional silt fences may be added based on field decisions by the Site Engineer and Owner, prior to, during and following construction.

Rock Mud Mat

A rock mud mat will be installed at the entrance to the construction zone in order to prevent mud tracking from the site onto the surrounding lands and perimeter roadway network. All construction traffic will be restricted to this access only.

Silt Sacks in Catch Basins

A silt sack shall be installed on the top of existing storm sewer catch basins located on Hurontario Street, Glenview Drive, and Maplewood Road during construction and on the top of new catch basins and area drains until the finished surfaces are stabilized.

8.0 CONCLUSIONS & RECOMMENDATIONS

Based on the information contained within this summary report, we offer the following conclusions:

- The proposed development can be serviced by the existing 450 mm ø watermain located on Hurontario Street, the existing 250 mm ø sanitary sewer on Maplewood Road, and the existing 750 mm ø storm sewer on Maplewood Road.
- A new water service connection to Hurontario Street will be provided for water services (domestic and fire). A new sanitary service connection for the Building 'A' and 'B' townhouse units will be made into the existing municipal service line on Maplewood Road. A new storm connection for the site will be made into the existing storm sewer line on Maplewood Road.
- Stormwater management will control the runoff from the post-development site to below the allowable release flow rate of 23.0 L/s through a gravity-fed 75 mm orifice tube to the receiving storm sewer on Maplewood Road.
- Stormwater quality control will be met using a treatment train approach, including lot, conveyance, and end of pipe measures to achieve the required 80% TSS removal for 100% of the runoff volume prior to discharging to the receiving storm sewer.
- Stormwater water balance objectives will be met using a stormwater chamber gravel sump to retain and infiltrate the 5 mm storm event over a drawdown period of 48 hours.
- All site drainage will be self-contained with the exception of a small area along the south property line, which will drain uncontrolled to Maplewood Road. An emergency overland flow route is provided to Maplewood Road along the access road for stormwater volumes exceeding the storage capacity of the minor system.

Based on these conclusions, we recommend approval of the Official Plan Amendment and Zoning By-Law Amendment from the perspective of functional servicing and stormwater management.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

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Civil

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APPENDIX A

Water Demand Calculations

CROZIER & ASSOCIATES Consulting Engineers

Project: Kirkor Architects & Planners | Date: 9/6/2017
Project No: 1110-4677 | Design BY: TL
Address: 1575 Hurontario St. | Checked By: BP

DOMESTIC WATER DEMAND TABLE

PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

Proposed Site Conditions

A. **Proposed Units**

Stacked Back to Back Townhouse	60
TOTAL	**60**

B. **Area's** (m^2)

Total Residential Units GFA	5,584
Site Area	3,829

C. **Design Criteria**

Population per Hectare[1] = $\frac{2.54 \text{ ppu} * (\#\text{ units})}{\text{area}}$

Population per Hectare = 398 p/ha
Total Population = 152

Note 1: Stacked townhome population density of 2.54 ppu as recommended by Regional correspondence, dated March 13, 2017

Residential Average Consumption Rate[2] = 280.0 L/cap/d
Apartments — Max Day Factor[2] = 2.0
Apartments — Peak Hour Factor[2] = 3.0

Average day flow	280	x	152	=			42,672	L/day	=	0.49	L/s
Maximum day flow	280	x	152	x	2.0	=	85,344	L/day	=	0.99	L/s
Peak hour flow	280	x	152	x	3.0	=	128,016	L/day	=	1.48	L/s

Note 2: Average Consumption Rate, Max day Factor andPeak Hour Factor each determined from Table #1 - Typical Water Demand Criteria, Region of Peel Public Works Watermain Design Criteria.

F. **Total Domestic Demand**

Average day flow	**0.49**	**L/s**
Maximum day flow	**0.99**	**L/s**
Peak hour flow	**1.48**	**L/s**

Note:
Average consumption rate, max day factor and peak hour factor per Region of Peel Public Works Watermain Design Criteria

CROZIER & ASSOCIATES Consulting Engineers

1575 Hurontario Street - Building A
Fire Protection Volume Calculation
CFCA File: 1110-4677

Date: 9/6/2017
Design: TL
Check: BP

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

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 Buildings

Building Area = 676.0 sq.m
Total Floor Area (+ 50% of floor above) = 996.0 sq.m

C = 1.0 Assume ordinary construction

Therefore F = 6,943 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)		

Combustible	0% reduction

0 L/min reduction
6,943 L/min

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

3. Sprinklers - The value obtained in No. 2 above maybe reduced by up to 50% for complete automatic sprinkler protection. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.

As part of this analysis, building is assumed to have no sprinkler protection,

0 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%		

Exposed buildings

Name		**Distance (m)**	**Charge (%)**	**Surcharge (L/s)**
North	Adjacent Dwelling	8	20%	1388.6
South	Adjacent Dwelling	15	15%	1041.5
East	Adjacent Dwelling	8.5	20%	1388.6
West	Adjacent Dwelling	31	5%	347.2
				4,166 L/min Surcharge

Determine Required Fire Flow

No.1	6,943		
No. 2	0	reduction	
No. 3	0	reduction	
No. 4	4,166	surcharge	
Required Flow:	**11,109 L/min**		
Rounded to nearest 1000 L/min:	**11,000 L/min**	or	183.3 L/s
			2,906 USGPM

Required Duration of Fire Flow

Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	**2.0**
12,000	**2.5**
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

CROZIER & ASSOCIATES Consulting Engineers

1575 Hurontario Street - Building B
Fire Protection Volume Calculation
CFCA File: 1110-4677

Date: 9/6/2017
Design: TL
Check: BP

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

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 Buildings

Building Area = 594.0 sq.m
Total Floor Area (+ 50% of floor above) = 874.0 sq.m

C = 1.0 Assume ordinary construction

Therefore F = 6,504 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)		

Combustible	0% reduction

0 L/min reduction
6,504 L/min

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

3. Sprinklers - The value obtained in No. 2 above maybe reduced by up to 50% for complete automatic sprinkler protection. The credit for the system will be a maximum of 30% for an adequately designed system conforming to NFPA 13 and other NFPA sprinkler standards.

As part of this analysis, building is assumed to have no sprinkler protection,

0 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%		

Exposed buildings

Name		**Distance (m)**	**Charge (%)**	**Surcharge (L/s)**
North	Adjacent Dwelling	8	20%	1300.8
South	Adjacent Dwelling	27	10%	650.4
East	Adjacent Dwelling	27	10%	650.4
West	Adjacent Dwelling	8.5	20%	1300.8

3,902 L/min Surcharge

Determine Required Fire Flow

No.1	6,504		
No. 2	0	reduction	
No. 3	0	reduction	
No. 4	3,902	surcharge	
Required Flow:	**10,406 L/min**		
Rounded to nearest 1000 L/min:	**10,000 L/min**	or	166.7 L/s
			2,642 USGPM

Required Duration of Fire Flow

Flow Required L/min	Duration (hours)
2,000 or less	1.0
3,000	1.25
4,000	1.5
5,000	1.75
6,000	2.0
8,000	2.0
10,000	**2.0**
12,000	2.5
14,000	3.0
16,000	3.5
18,000	4.0
20,000	4.5
22,000	5.0
24,000	5.5
26,000	6.0
28,000	6.5
30,000	7.0
32,000	7.5
34,000	8.0
36,000	8.5
38,000	9.0
40,000 and over	9.5

APPENDIX B

Sanitary Flow Calculations

Project:	Kirkor Architects & Planners	Date:	9/6/2017
Project No:	1110-4677	Design By:	TL
Address:	1575 Hurontario St.	Checked By:	BP

SANITARY SEWAGE FLOWS

PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

A. Proposed Development

Residential Unit Type	Total Res. Units
Roll Dewllings	60
Totals	**60**

Site area = **0.3829** **ha**

Population per Hectare = $\frac{\text{2.54 ppu * (\# units)}}{\text{area}}$

Population per Hectare = 398 p/ha

Total Population 152 capita

Note 1: Stacked townhome population density of 2.54 ppu as recommended by Regional correspondence, dated March 13, 2017.

B. Proposed Flow

Unit Type	Gross Floor Area (m^2)	Site Area (ha)	Population	Average Sanitary Flow (302.8L/cap/d)		Harmon Peaking Factor	Total Peak Flow (L/s)
				(L/s)	(m^3/day)		
Stacked Townhouse	5,584	0.383	152	0.53	46.15	4.19	2.24
						Total	**2.24**

Note 2: Average Sanitary Flow - 302.8 L/cap/d Region of Peel Public Works Criteria Manual - Std. Dwg. 2-9-2

Note 3: Peaking Factor = Harmon Formula

C. Infiltration

Site Area (ha)	Infiltration Rate (L/ha/s)	Total Infiltration (L/s)
0.383	0.20	0.08

Note 3: Infiltration = 0.2 L/ha/s Section 2.3 Region of Peel Public Works Criteria Manual - Sanitary Sewer

D. Total Proposed Site Flow

	Peak Flow (L/s)
Proposed Flow	2.237
Infiltration	0.077
Total	**2.314**

Proposed Design Flow

The sewage design flow from the proposed development is: **2.31 L/s**

APPENDIX C

Stormwater Management Calculations

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 6-Sep-17

PRE-DEVELOPMENT CONDITIONS

Storm Data: City of Mississauga IDF Parameters

Time of Concentration: T_c= 15 min

Return Period	a	b	c	i mm/hr
2 yr	610	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

Equations:

Intensity

$$i_{(Td)} = a / (T_c + b)^c$$

Peak Flow

$$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$$

ENTIRE CATCHMENT:

Existing Weighted Runoff Coefficient

	C	Area (ha)	Weighted RC
Catchment 101 (Site)			
Pervious	0.25	0.2636	0.19
Impervious	0.90	0.0791	0.21
Total:	-	0.3427	0.40
Catchment 102 (External)			
Pervious	0.25	1.8563	0.19
Impervious	0.90	0.5574	0.21
Total:	-	2.4137	0.40
TOTAL:		*2.7564*	*0.40*

Note: According to e-mail correspondence with the City of Mississauga, dated August 14, 2017, a 2.41 ha external drainage catchment must be conveyed to the same stormwater outlet as the Site. Refer to Figure 1.

Pre-Development Peak Flows (Site):

2 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	0.343	ha	(Drainage area)
T_c	15	min	
i	59.89	mm/hr	City of Mississauga
Q_{pre}	0.0230	m^3/s	(Peak Flow)

5 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	0.343	ha	(Drainage area)
T_c	15	min	
i	80.51	mm/hr	City of Mississauga
Q_{pre}	0.0309	m^3/s	(Peak Flow)

10 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	0.343	ha	(Drainage area)
T_c	15	min	
i	99.17	mm/hr	City of Mississauga
Q_{pre}	0.0381	m^3/s	(Peak Flow)

25 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	0.343	ha	(Drainage area)
T_c	15	min	
i	113.89	mm/hr	City of Mississauga
Q_{pre}	0.0437	m^3/s	(Peak Flow)

50 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	0.343	ha	(Drainage area)
T_c	15	min	
i	127.13	mm/hr	City of Mississauga
Q_{pre}	0.0488	m^3/s	(Peak Flow)

100 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	0.343	ha	(Drainage area)
T_c	15	min	
i	140.69	mm/hr	City of Mississauga
Q_{pre}	0.0540	m^3/s	(Peak Flow)

Pre-Development Peak Flows (Entire Catchment):

2 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	2.756	ha	(Drainage area)
T_c	15	min	
i	59.89	mm/hr	City of Mississauga
Q_{pre}	0.1850	m^3/s	(Peak Flow)

5 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	2.756	ha	(Drainage area)
T_c	15	min	
i	80.51	mm/hr	City of Mississauga
Q_{pre}	0.2486	m^3/s	(Peak Flow)

10 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	2.756	ha	(Drainage area)
T_c	15	min	
i	99.17	mm/hr	City of Mississauga
Q_{pre}	0.3062	m^3/s	(Peak Flow)

25 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	2.756	ha	(Drainage area)
T_c	15	min	
i	113.89	mm/hr	City of Mississauga
Q_{pre}	0.3517	m^3/s	(Peak Flow)

50 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	2.756	ha	(Drainage area)
T_c	15	min	
i	127.13	mm/hr	City of Mississauga
Q_{pre}	0.3926	m^3/s	(Peak Flow)

100 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.40	-	(Runoff coefficient)
$Area_{Pre}$	2.756	ha	(Drainage area)
T_c	15	min	
i	140.69	mm/hr	City of Mississauga
Q_{pre}	0.4345	m^3/s	(Peak Flow)

PROJECT: 1575 Hurontario Street **DESIGN:** BP **DATE:**
PROJECT No.: 1110-4677 **CHECK:** AS **UPDATED:**

POST-DEVELOPMENT CONDITIONS

Storm Data: City of Mississauga IDF Parameters

Time of Concentration: Tc= 15 min

Return Period	a	b	c	i mm/hr
2 yr	610	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

Equations:

Intensity

$$i_{(Td)} = a / (T_c + b)^c$$

Peak Flow

$$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$$

ENTIRE CATCHMENT:

Post-Dev Weighted Runoff Coefficient

	C	Area (ha)	Weighted RC
Site Area			
Catchment 201:			
Pervious	0.25	0.0927	0.06
Impervious	0.90	0.2861	0.68
Total:	-	0.3788	0.74
Catchment 202 (Uncontrolled):			
Pervious	0.25	0.0041	0.25
Impervious	0.90	0.0000	0.00
Total:	-	0.0041	0.25
TOTAL:	-	0.3829	0.74
Catchment Area 203 (External)			
Pervious	0.25	1.85627	0.19
Impervious	0.90	0.55743	0.21
Total:	-	2.4137	0.40
TOTAL:		*2.7966*	0.45

Note: According to e-mail correspondence with the City of Mississauga, a 2.41 ha external drainage catchment must be conveyed to the same stormwater outlet as the Site. Refer to Figure 2.

Post-Development Peak Flows (Site):

2 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.74 -	(Runoff coefficient)
$Area_{Post}$	0.383 ha	(Drainage area)
T_c	15 min	
i	59.89 mm/hr	From City of Mississauga
Q_{post}	0.0472 m^3/s	(Peak Flow)

5 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.74 -	(Runoff coefficient)
$Area_{Post}$	0.383 ha	(Drainage area)
T_c	15 min	
i	80.51 mm/hr	From City of Mississauga
Q_{post}	0.0635 m^3/s	(Peak Flow)

10 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.74 -	(Runoff coefficient)
$Area_{Post}$	0.383 ha	(Drainage area)
T_c	15 min	
i	99.17 mm/hr	From City of Mississauga
Q_{post}	0.0782 m^3/s	(Peak Flow)

25 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.74 -	(Runoff coefficient)
$Area_{Post}$	0.383 ha	(Drainage area)
T_c	15 min	
i	113.89 mm/hr	From City of Mississauga
Q_{post}	0.0898 m^3/s	(Peak Flow)

50 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.74 -	(Runoff coefficient)
$Area_{Post}$	0.383 ha	(Drainage area)
T_c	15 min	
i	127.13 mm/hr	From City of Mississauga
Q_{post}	0.1003 m^3/s	(Peak Flow)

100 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.74 -	(Runoff coefficient)
$Area_{Post}$	0.383 ha	(Drainage area)
T_c	15 min	
i	140.69 mm/hr	From City of Mississauga
Q_{post}	0.1110 m^3/s	(Peak Flow)

Post-Development Peak Flows (Entire Catchment):

2 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.45 -	(Runoff coefficient)
$Area_{Post}$	2.797 ha	(Drainage area)
T_c	15 min	
i	59.89 mm/hr	From City of Mississauga
Q_{post}	0.2092 m^3/s	(Peak Flow)

5 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.45 -	(Runoff coefficient)
$Area_{Post}$	2.797 ha	(Drainage area)
T_c	15 min	
i	80.51 mm/hr	From City of Mississauga
Q_{post}	0.2812 m^3/s	(Peak Flow)

10 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.45 -	(Runoff coefficient)
$Area_{Post}$	2.797 ha	(Drainage area)
T_c	15 min	
i	99.17 mm/hr	From City of Mississauga
Q_{post}	0.3464 m^3/s	(Peak Flow)

25 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.45 -	(Runoff coefficient)
$Area_{Post}$	2.797 ha	(Drainage area)
T_c	15 min	
i	113.89 mm/hr	From City of Mississauga
Q_{post}	0.3978 m^3/s	(Peak Flow)

50 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.45 -	(Runoff coefficient)
$Area_{Post}$	2.797 ha	(Drainage area)
T_c	15 min	
i	127.13 mm/hr	From City of Mississauga
Q_{post}	0.4441 m^3/s	(Peak Flow)

100 Year Storm

-	0.0028 factor	(Metric conversion in equation)
C_{post}	0.45 -	(Runoff coefficient)
$Area_{Post}$	2.797 ha	(Drainage area)
T_c	15 min	
i	140.69 mm/hr	From City of Mississauga
Q_{post}	0.4914 m^3/s	(Peak Flow)

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 29-Aug-17

MODIFIED RATIONAL CALCULATIONS

POST-DEVELOPMENT

MTO Criteria:

Control 2 yr Post-Development peak flow to the 2 yr Pre-Development peak flow

2 yr Post-Development Flow:

Q_{post} = 0.047 m^3/s

Allowable Release Rate (2 yr Pre-Development Flow):

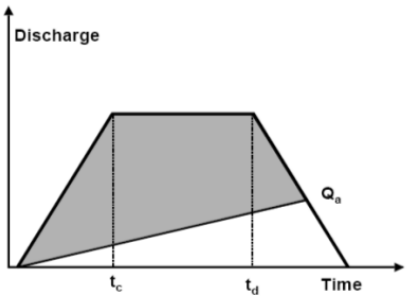
Q_{pre} = 0.0230 m^3/s

2 yr Post-Development Release Rate:

Catchment 201:	0.0189	m^3/s	Refer to orifice control
Catchment 202:	0.0002	m^3/s	Uncontrolled
Total:	0.0191	m^3/s	

Storage Volume Determination (Detailed)

T_d min	i mm/hr	T_d sec	Q m^3/s	S_d m^3
10	75.36	600	0.059	24.3
15	59.89	900	0.047	28.3
20	50.16	1200	0.040	30.4
25	43.42	1500	0.034	31.5
30	38.45	1800	0.030	31.9
35	34.60	2100	0.027	31.8
40	31.54	2400	0.025	31.3
45	29.03	2700	0.023	30.6
50	26.94	3000	0.021	29.7
55	25.16	3300	0.020	28.6



REQUIRED STORAGE VOLUME: **31.9** m^3

Equations:

Peak Flow

$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$

Intensity

i(Td) = A/(Td+B)^C

Storage

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

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 29-Aug-17

MODIFIED RATIONAL CALCULATIONS

POST-DEVELOPMENT

MTO Criteria:

Control 5 yr Post-Development peak flow to the 5 yr Pre-Development peak flow

5 yr Post-Development Flow:

Q_{post} = 0.064 m^3/s

Allowable Release Rate (5 yr Pre-Development Flow):

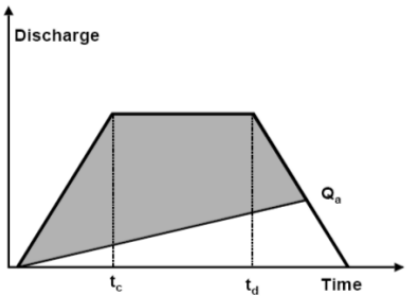
Q_{pre} = 0.031 m^3/s

5 yr Post-Development Release Rate:

Catchment 201:	0.0189	m^3/s	Refer to orifice control
Catchment 202:	0.0002	m^3/s	Uncontrolled
Total:	0.0192	m^3/s	

Storage Volume Determination (Detailed)

T_d min	i mm/hr	T_d sec	Q m^3/s	S_d m^3
10	101.30	600	0.080	36.6
15	80.51	900	0.064	42.9
20	67.43	1200	0.053	46.8
25	58.37	1500	0.046	49.2
30	51.68	1800	0.041	50.7
35	46.52	2100	0.037	51.5
40	42.40	2400	0.033	51.9
45	39.02	2700	0.031	51.9
50	36.21	3000	0.029	51.6
55	33.82	3300	0.027	51.1



REQUIRED STORAGE VOLUME:	**51.9**	m^3

Equations:

Peak Flow

$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$

Intensity

i(Td) = A/(Td+B)^C

Storage

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

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 29-Aug-17

MODIFIED RATIONAL CALCULATIONS

POST-DEVELOPMENT

MTO Criteria:

Control 10 yr Post-Development peak flow to the 10 yr Pre-Development peak flow

10 yr Post-Development Flow:

Q_{post} = 0.078 m^3/s

Allowable Release Rate (10 yr Pre-Development Flow):

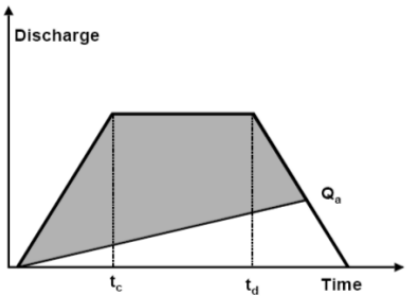
Q_{pre} = 0.038 m^3/s

10 yr Post-Development Release Rate:

Catchment 201:	0.0189	m^3/s	Refer to orifice control
Catchment 202:	0.0003	m^3/s	Uncontrolled
Total:	0.0192	m^3/s	

Storage Volume Determination (Detailed)

T_d min	i mm/hr	T_d sec	Q m^3/s	S_d m^3
10	124.77	600	0.098	47.7
15	99.17	900	0.078	56.2
20	83.06	1200	0.066	61.6
25	71.90	1500	0.057	65.2
30	63.66	1800	0.050	67.7
35	57.30	2100	0.045	69.3
40	52.22	2400	0.041	70.4
45	48.07	2700	0.038	71.1
50	44.60	3000	0.035	71.4
55	41.65	3300	0.033	71.5
60	39.11	3600	0.031	71.3
65	36.91	3900	0.029	70.9
70	34.96	4200	0.028	70.4



REQUIRED STORAGE VOLUME: **71.5** m^3

Equations:

Peak Flow

$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$

Intensity

i(Td) = A/(Td+B)^C

Storage

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

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 29-Aug-17

MODIFIED RATIONAL CALCULATIONS

POST-DEVELOPMENT

MTO Criteria:

Control 25 yr Post-Development peak flow to the 25 yr Pre-Development peak flow

25 yr Post-Development Flow:

Q_{post} = 0.090 m^3/s

Allowable Release Rate (25 yr Pre-Development Flow):

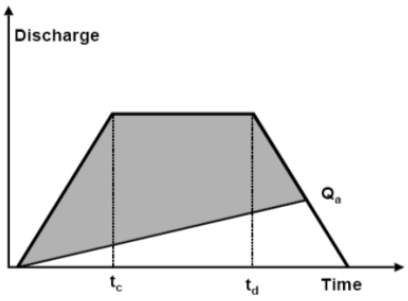
Q_{pre} = 0.044 m^3/s

25 yr Post-Development Release Rate:

Catchment 201:	0.0189	m^3/s	Refer to orifice control
Catchment 202:	0.0003	m^3/s	Uncontrolled
Total:	0.0193	m^3/s	

Storage Volume Determination (Detailed)

T_d min	i mm/hr	T_d sec	Q m^3/s	S_d m^3
15	113.89	900	0.090	66.6
20	95.40	1200	0.075	73.2
25	82.58	1500	0.065	77.8
30	73.11	1800	0.058	81.1
35	65.80	2100	0.052	83.4
40	59.98	2400	0.047	85.1
45	55.21	2700	0.044	86.3
50	51.22	3000	0.040	87.1
55	47.84	3300	0.038	87.6
60	44.92	3600	0.035	87.8
65	42.39	3900	0.033	87.8
70	40.15	4200	0.032	87.6



REQUIRED STORAGE VOLUME: **87.8** m^3

Equations:

Peak Flow

$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$

Intensity

$i(Td) = A/(Td+B)^{C}$

Storage

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

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 29-Aug-17

MODIFIED RATIONAL CALCULATIONS

POST-DEVELOPMENT

MTO Criteria:

Control 50 yr Post-Development peak flow to the 50 yr Pre-Development peak flow

50 yr Post-Development Flow:

Q_{post} = 0.100 m^3/s

Allowable Release Rate (50 yr Pre-Development Flow):

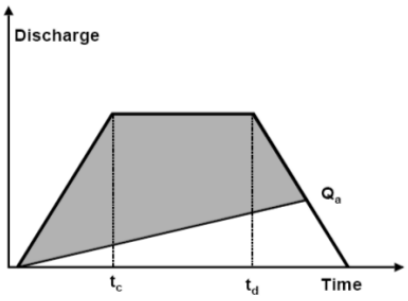
Q_{pre} = 0.049 m^3/s

50 yr Post-Development Release Rate:

Catchment 201:	0.0189	m^3/s	Refer to orifice control
Catchment 202:	0.0004	m^3/s	Uncontrolled
Total:	0.0193	m^3/s	

Storage Volume Determination (Detailed)

T_d min	i mm/hr	T_d sec	Q m^3/s	S_d m^3
25	92.30	1500	0.073	89.3
30	81.75	1800	0.064	93.3
35	73.60	2100	0.058	96.3
40	67.10	2400	0.053	98.6
45	61.77	2700	0.049	100.3
50	57.32	3000	0.045	101.5
55	53.54	3300	0.042	102.4
60	50.28	3600	0.040	103.0
65	47.45	3900	0.037	103.3
70	44.95	4200	0.035	103.5
75	42.74	4500	0.034	103.4
80	40.76	4800	0.032	103.2
85	38.97	5100	0.031	102.8



REQUIRED STORAGE VOLUME: **103.5** m^3

Equations:

Peak Flow

$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$

Intensity

$i(Td) = A/(Td+B)^{C}$

Storage

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

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 29-Aug-17

MODIFIED RATIONAL CALCULATIONS

POST-DEVELOPMENT

MTO Criteria:

Control 100 yr Post-Development peak flow to the 100 yr Pre-Development peak flow

100 yr Post-Development Flow:

Q_{post} = 0.111 m^3/s

Allowable Release Rate (100 yr Pre-Development Flow):

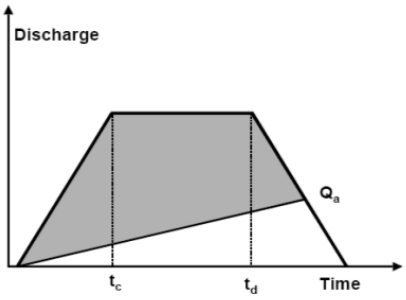
Q_{pre} = 0.054 m^3/s

100 yr Post-Development Release Rate:

Catchment 201:	0.0189	m^3/s	Refer to orifice control
Catchment 202:	0.0004	m^3/s	Uncontrolled
Total:	0.0193	m^3/s	

Storage Volume Determination (Detailed)

T_d min	i mm/hr	T_d sec	Q m^3/s	S_d m^3
35	81.77	2100	0.064	109.9
40	74.58	2400	0.059	112.8
45	68.68	2700	0.054	115.0
50	63.75	3000	0.050	116.8
55	59.56	3300	0.047	118.1
60	55.95	3600	0.044	119.1
65	52.81	3900	0.042	119.8
70	50.03	4200	0.039	120.3
75	47.58	4500	0.038	120.6
80	45.38	4800	0.036	120.7
85	43.39	5100	0.034	120.6
90	41.60	5400	0.033	120.4



REQUIRED STORAGE VOLUME: **120.7** m^3

Equations:

Peak Flow

$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$

Intensity

i(Td) = A/(Td+B)^C

Storage

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

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 11-Aug-17
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 29-Aug-17

MODIFIED RATIONAL CALCULATIONS

POST-DEVELOPMENT

City of Mississauga Criteria (Mary Fix Creek Subwatershed):

Control 10 yr Post-Development peak flow to the 2 yr Pre-Development peak flow

10 yr Post-Development Flow:

Q_{post} = 0.078 m^3/s

Allowable Release Rate (2 yr Pre-Development Flow):

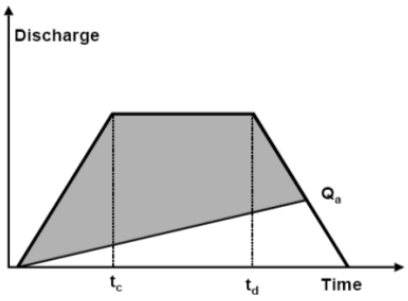
Q_{pre} = 0.023 m^3/s

10 yr Post-Development Release Rate:

Catchment 201:	0.0189	m^3/s	Refer to orifice control
Catchment 202:	0.0003	m^3/s	Uncontrolled
Total:	0.0192	m^3/s	

Storage Volume Determination (Detailed)

T_d min	i mm/hr	T_d sec	Q m^3/s	S_d m^3
10	124.77	600	0.098	47.7
15	99.17	900	0.078	56.2
20	83.06	1200	0.066	61.6
25	71.90	1500	0.057	65.2
30	63.66	1800	0.050	67.7
35	57.30	2100	0.045	69.3
40	52.22	2400	0.041	70.4
45	48.07	2700	0.038	71.1
50	44.60	3000	0.035	71.4
55	41.65	3300	0.033	71.5
60	39.11	3600	0.031	71.3



REQUIRED STORAGE VOLUME: **71.5** m^3

Equations:

Peak Flow

$Q_{post} = 0.0028 \bullet C_{post} \bullet i_{(Td)} \bullet A$

Intensity

$i(Td) = A/(Td+B)^C$

Storage

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

CROZIER & ASSOCIATES
Consulting Engineers

PROJECT: 1575 Hurontario Street
PROJECT No.: 1110-4677
DESIGN: BP
CHECK: AS
DATE: 11- Aug-2017
UPDATE: 29- Aug-2017

ORIFICE TUBE DESIGN SUMMARY

Outlet: Glenview Drive

Orifice Type =	Orifice Tube	
Invert Elevation =	92.62	m
Diameter of Orifice =	75	mm
Area of Orifice (A) =	0.0044	sq.m
Orifice Coefficient (Cd) =	0.820	

Calculation of Head

Centroid Elevation =	92.66	m
Water Elevation =	94.05	m
Upstream Head*, (h) =	1.39	m

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

Actual Controlled Discharge, Qa = 0.01894 cms

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 1575 Hurontario Street | **DESIGN:** BP | **DATE:** 8/26/2017
PROJECT No.: 1110-4677 | **CHECK:** AS | **UPDATED:** 9/12/2017

STORMWATER STORAGE VOLUMES

Address: 1575 Hurontario Street

Underground Storage:

Type:	Triton S-22	
Required Bed Size:	45.36	m^2
Required Length:	12.76	m
Required Width:	3.56	m
Active Storage Volume:	**35.20**	**m^3**
Sump Storage Volume:	**19.23**	**m^3**

Type:	Cistern (located in underground parking garage)	
Required Cistern Size:	60	m^2
Required Length:	15	m
Required Width:	4	m
Active Storage Volume:	**65.00**	**m^3**
Sump Storage Volume:	**0**	**m^3**

Triton S-22 Profile

Top Water Elevation:	94.05	m asl
Top Elevation of Embedment Stone:	93.87	m asl
Top Elevation - Storage Chamber:	93.72	m asl
Bottom Elevation - Storage Chamber:	92.83	m asl
Invert Elevation:	92.68	m asl
Top Elevation - Sump Storage:	92.68	m asl
Bottom Elevation - Sump Storage:	91.62	m asl

Cistern (Stepped Profile)

	Area 1[1]:	*Area 2[2]:*	
Area:	44	16	m^2
Length:	11	4	m
Width:	4	4	m
Top Elevation of Cistern:	94.10	93.50	m asl
Top Water Elevation:	94.05	93.50	m asl
Bottom Elevation (Invert) of Cistern:	92.82	92.82	m asl
Active Storage Volume:	54.12	10.88	m^3

Note 1: Area 1 is 11 m length x 4 m width of the stepped stormwater cistern located in the underground parking garage structure (as shown on Dwg. C02) with the top of the Area 1 portion of the cistern located at 94.10 m asl.

Note 2: Area 2 is 4 m length x 4 m width of the stepped stormwater cistern located in the underground parking garage structure (as shown on Dwg. C02) with the top of the Area 2 portion of the cistern located at 93.50 m asl.

TOTAL REQUIRED ACTIVE STORAGE:	**71.5**	**m^3**
TOTAL PROVIDED ACTIVE STORAGE:	**100.2**	**m^3**
TOTAL REQUIRED SUMP STORAGE:	**19.2**	**m^3**
TOTAL PROVIDED SUMP STORAGE:	**19.2**	**m^3**

Project:	1575 Hurontario St.	Design:	BP	Date:	08/29/2017
Project No.:	1110-4677	Check:	AS	Updated:	09/06/2017

INFILTRATION GALLERY CALCULATIONS

PARAMETERS

Assumed Infiltration Rate = 22 mm/hr — Based on MOE well records adjacent to site, which identify silty sand as the predominant native soil type

Drawdown Time = 48 hours

DESIGN CALCULATIONS

5mm Storm Event Runoff Volume

$$RV_{5mm} = SiteArea \times 5mm = 3829m^2 \times 0.005m = 19.15m^3$$

Required Soakaway Pit Footprint

Source: Low Impact Development Stormwater Management Planning and Design Guide, Credit Valley Conservation, 2010

$$SoakawayPitArea = A_{SP} = \frac{1000 \times RunoffVolume}{InfiltrationRate \times VoidRatio \times DrawdownTime}$$

$$= \frac{1000 \times 19.15m^3}{22\,mm/hr \times 0.4 \times 48hr} = 45.336 \approx 45m^2$$

RECOMMENDED INFILTRATION SYSTEM DIMENSIONS (refer to DWG C02)

	Infiltration Trench (in Triton S-22 underground cistern)
Footprint Area (m^2)	45.36
Trench Length (m)	12.76
Trench Width (m)	3.56
Stone Storage Reservoir Depth (m)	1.06
Required 5mm Runoff Volume Storage (m^3)	19.15
Provided 5mm Runoff Volume Storage (m^3)	19.23

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	9/13/2017
Project Name	Dream Maker
Project Number	1110-4677
Location	1575 Hurontario Street

Designer Information

Company	CF Crozier & Associates
Contact	Benjamin Peachman

Notes

N/A

Drainage Area

Total Area (ha)	0.3788
Imperviousness (%)	75.53

The Stormceptor System model STC 300 achieves the water quality objective removing 84% TSS for a City of Toronto (clay, silt and sand) particle size distribution and 99% runoff volume.

Rainfall

Name	TORONTO CENTRAL
State	ON
ID	100
Years of Records	1982 to 1999
Latitude	45°30'N
Longitude	90°30'W

Water Quality Objective

TSS Removal (%)	80
Runoff Volume (%)	90

Upstream Storage

Storage (ha-m)	Discharge (L/s)
0.000	00.000
0.010	18.940

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %	Runoff Volume %
STC 300	**84**	**99**
STC 750	89	100
STC 1000	89	100
STC 1500	89	100
STC 2000	91	100
STC 3000	92	100
STC 4000	94	100
STC 5000	94	100
STC 6000	95	100
STC 9000	97	100
STC 10000	96	100
STC 14000	97	100

Particle Size Distribution

Removing silt particles from runoff ensures that the majority of the pollutants, such as hydrocarbons and heavy metals that adhere to fine particles, are not discharged into our natural water courses. The table below lists the particle size distribution used to define the annual TSS removal.

City of Toronto (clay, silt and sand)

Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s		Particle Size µm	Distribution %	Specific Gravity	Settling Velocity m/s
10	20	2.65	0.0004					
30	10	2.65	0.0008					
50	10	2.65	0.0022					
95	20	2.65	0.0063					
265	20	2.65	0.0366					
1000	20	2.65	0.1691					

Stormceptor Design Notes

- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor version 1.0
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 300 is adaptable to function with a catch basin inlet and/or inline pipes.
- Only the Stormceptor models STC 750 to STC 6000 may accommodate multiple inlet pipes.
- Inlet and outlet invert elevation differences are as follows:

Inlet and Outlet Pipe Invert Elevations Differences

Inlet Pipe Configuration	STC 300	STC 750 to STC 6000	STC 9000 to STC 14000
Single inlet pipe	75 mm	25 mm	75 mm
Multiple inlet pipes	75 mm	75 mm	Only one inlet pipe.

- Design estimates are based on stable site conditions only, after construction is completed.
- Design estimates assume that the storm drain is not submerged during zero flows. For submerged applications, please contact your local Stormceptor representative.
- Design estimates may be modified for specific spills controls. Please contact your local Stormceptor representative for further assistance.
- For pricing inquiries or assistance, please contact Imbrium Systems Inc., 1-800-565-4801.

Site Calculator

- System Builder
- Field Diagram
- Summary

Parameters

Units: Metric ▾
Storage Volume: 35 Cu. M
Chamber Selection: S-22 ▾ [+]
Header Row Position: Left ▾
Fill Over Embedment Stone: 30 cm
Embedment Stone:

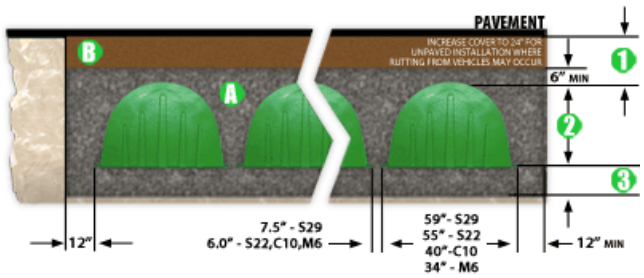
Over:
15
Under:
15
Porosity: 0.4
Controlled By (in M):
Width
5
Accessories:
Dumpsters: 0
Bins: 0
Floors:
Double Stacked
Double Stacked?:
Lower Chamber: S-29
Stone Between: 15

Note: After making an input change you must hit recalculate to update the Field Diagram and Project Results. RECALCULATE

SAVE

NOTICE: This calculator works best in when used with Firefox browser. If using Internet Explorer, please be sure to disable Protected Mode. This calculator has shown issues when used in Chrome with AdBlock enabled. If using Chrome, please disable AdBlock.
This calculator is provided for your convenience only and is not meant for final quotation and/or engineering purposes. Please contact Triton for more information. HydroCAD Stormwater Modeling Need to model out a full system, or need engineering ready calculations? Triton chambers are available for modeling in HydroCAD by clicking on the HydroCAD banner to the left.

Project Results

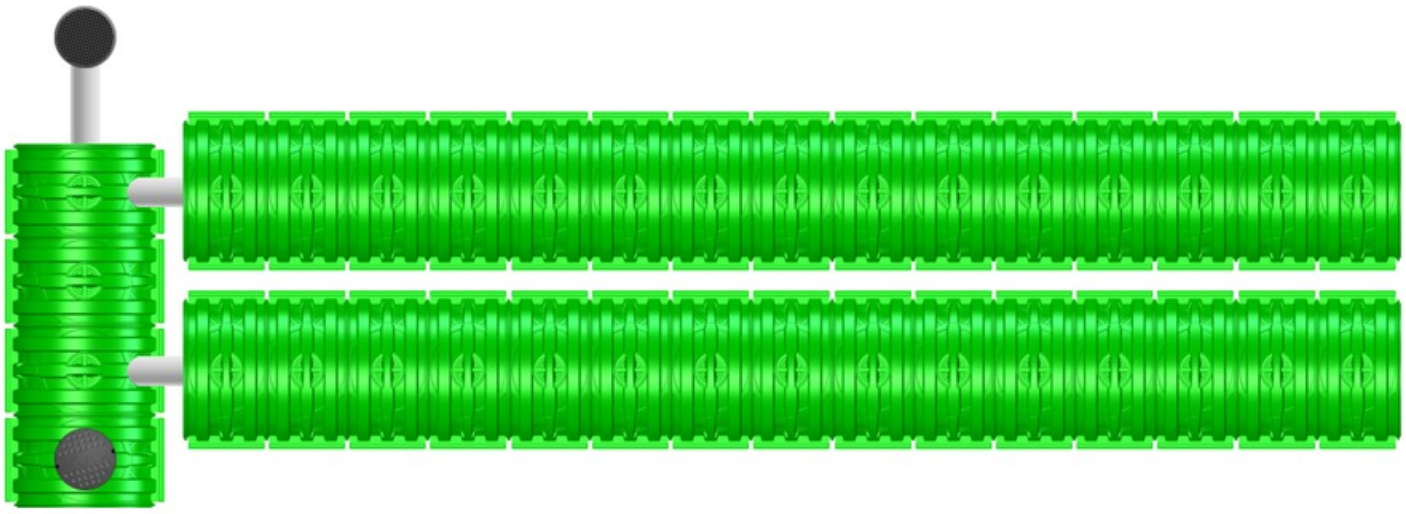


- 1 Total Cover Over Chambers: 45.72 cm
- 2 Height of Chamber: 88.7476 cm
- 3 Embedment Stone Under Chambers: 15.24 cm
- A Volume of Embedment Stone Required: 31 Cu. M
- B Volume of Fill Material Required: 13 Cu. M

Total Storage Provided:	35.2 Cu. M
Type of Distribution Chambers:	S-22
# of Distribution Chambers Required:	30
# of end caps required:	6
Type of header row chambers required:	S-22 Header
# of header row chambers required:	4
Floors:	0
Bins:	0
Dumpsters:	0
Required Bed Size:	45.36 Sq. M
Volume of Embedment Stone Required:	31.53 Cu. M
Volume of Fill Material Required:	13.83 Cu. M
Volume of Excavation:	67.91 Cu. M
Area of Filter Fabric:	84.26 Sq. M

# of Chambers long:	15
# of rows:	2
Actual Trench Length:	12.757 M
Actual Trench Width:	3.556 M

Field Diagram

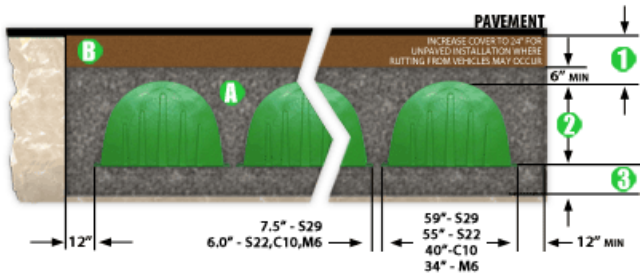


WIRE DIAGRAM

Chamber Type

Dimensions 55" x 35" x 30" (WxHxL)
1397mm x 889mm x 762mm
Weight 28 lbs / 12.7 kg
Bare Chamber Storage 23.2 ft³ / 0.66 m³

Project Results



- ❶ Total Cover Over Chambers: 45.72 cm
- ❷ Height of Chamber: 88.7476 cm
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- Ⓐ Volume of Embedment Stone Required: 31 Cu. M

- Volume of Fill Material Required: 13 Cu. M

Total Storage Provided:	35.2 Cu. M
Type of Distribution Chambers:	S-22
# of Distribution Chambers Required:	30
# of end caps required:	6
Type of header row chambers required:	S-22 Header
# of header row chambers required:	4
Floors:	0
Bins:	0
Dumpsters:	0
Required Bed Size:	45.36 Sq. M
Volume of Embedment Stone Required:	31.53 Cu. M
Volume of Fill Material Required:	13.83 Cu. M
Volume of Excavation:	67.91 Cu. M
Area of Filter Fabric:	84.26 Sq. M
# of Chambers long:	15
# of rows:	2
Actual Trench Length:	12.757 M
Actual Trench Width:	3.556 M

Triton Stormwater Solutions, LLC
7600 Grand River Rd, Suite 195
Brighton, Michigan 48114
Phone: (810) 222-7652 - Fax: (810) 222-1769

DOWNLOADS

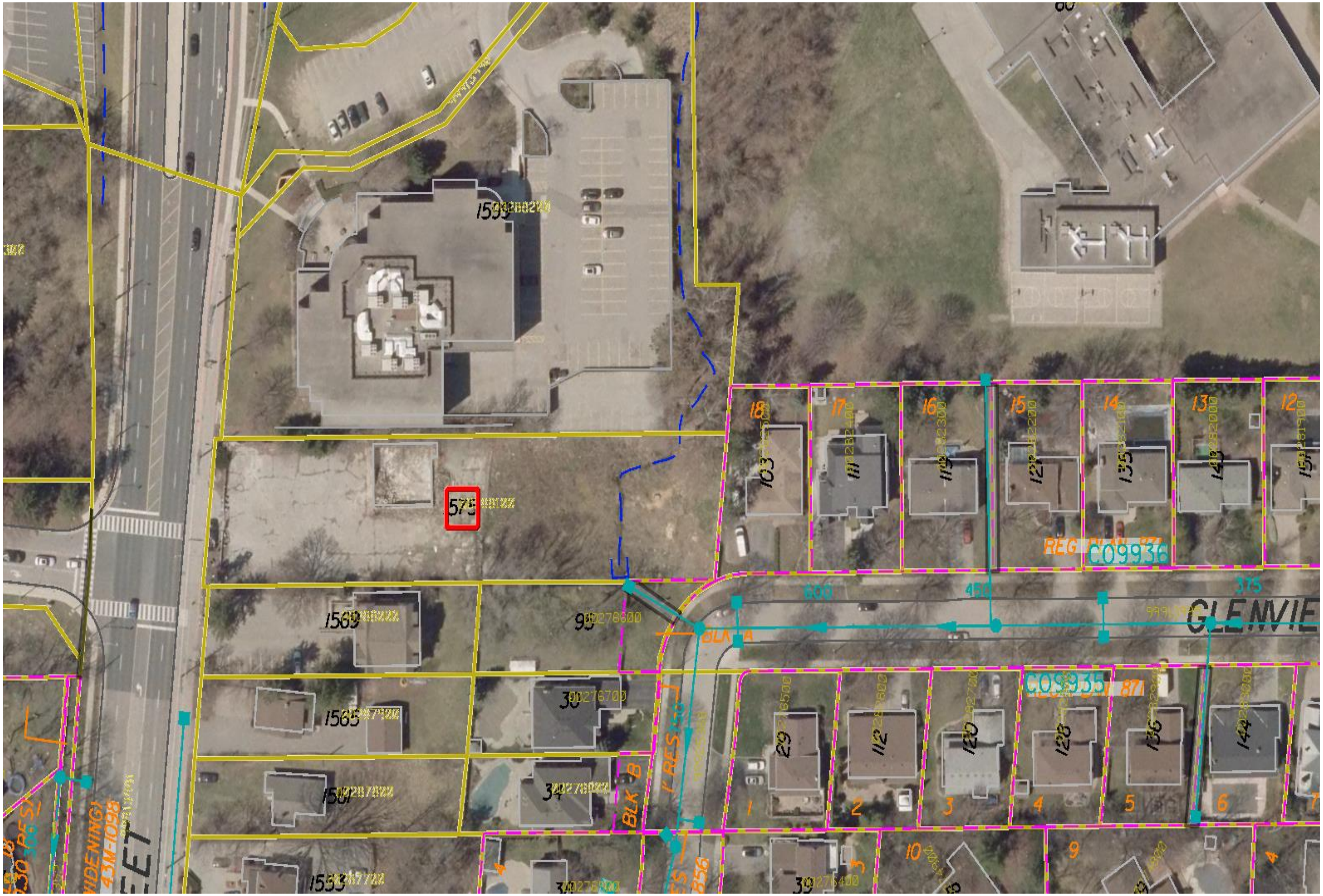
APPENDIX D

External Reports

STORM DRAINAGE AREA

AREA in ACRES
RUN-OFF COEFF.

(.67 Acres) 1/10


1595
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120
128
136
144
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17
16
15
14
13
12
C09936
C09935
GLENVIE
BLK B
43M-1098

DRAWINGS

LEGEND

- PROPERTY LINE
- EXISTING DITCH
- HP EXISTING HYDRO POLE
- EXISTING FENCE
- 215.00 EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- MUD-MAT; SEE DETAIL
- SF SILT FENCE; SEE DETAIL
- EXISTING FIRE HYDRANT

No.	ISSUE / REVISION	YYYY/MMM/DD
1	ISSUED FOR FSR	2017/DEC/06
0	ISSUED FOR FSR (NOT SUBMITTED)	2017/SEP/14

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 709.

ELEVATION = 98.279m

LOCAL BENCHMARK:

NAIL LOCATED IN MOST WESTERN CORNER OF PARKING LOT, APPROX. 0.0m SOUTH OF THE EDGE OF ASPHALT.

ELEVATION = 000.000m

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENKUS ONTARIO LAND SURVEYOR. (2015/JUNE/08)
REFERENCE No.: ##-##-###-##

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
UTM ZONE 17, NAD83 (GSRS) (2010.0)

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996781

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY KIRKOR ARCHITECTS + PLANNERS.
DRAWING No.: XXX, REV.X (2017/MAY/08)
PROJECT No.: SP 01

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.

Project

1575 HURONTARIO STREET
CITY OF MISSISSAUGA

Drawing

REMOVALS PLAN
EROSION & SEDIMENT CONTROL PLAN

NOT FOR CONSTRUCTION

Stamp

FOR REVIEW

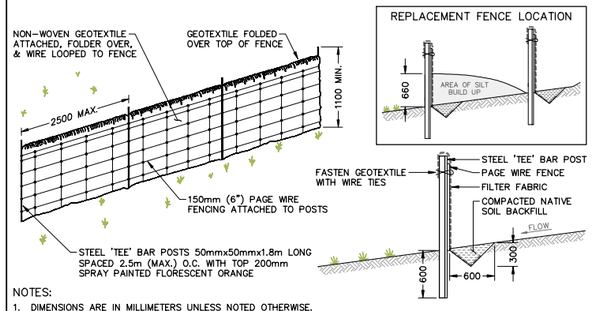
CROZIER & ASSOCIATES Consulting Engineers
8 MARKET STREET
SUITE 600
TORONTO ON M5E 1M6
416 477-3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
S.T.T.	B.M.P.	1110-4677	
Check	Check	Scale	Dwg.
S.C.S	A.S.	1:250	C 01

SCALE: 1:250

TYPICAL HEAVY DUTY SILT FENCE

SCALE: N.T.S.

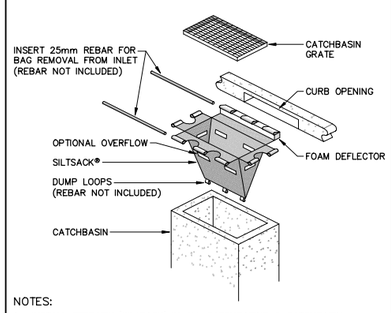


NOTES:

1. DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
2. SILT CONTROL FENCE SHOULD BE ALIGNED WITH CONTOURS FOR SHEET OVERLAND FLOW.
3. SILT CONTROL FENCE IS TO BE LOCATED IN AREAS OF LOW SEDIMENT YIELD ON SLOPES THAT CONFORM TO MTO DRAINAGE MANUAL VOLUME 2 "CHART F4-3C TOPOGRAPHIC FACTOR IS BASED ON SLOPE LENGTH AND GRADIENT."
4. SILT CONTROL FENCE TO BE INSTALLED WITH FILTER MEDIA FABRIC TOED INTO THE SOIL A MIN. OF 300mm BY EITHER STATIC SLICING OR TRENCH METHODS WITH COMPACTION OF TRENCH MATERIAL MEETING 95% INSITU SOIL STRENGTH.
5. STEEL 'TEE' BAR POSTS ARE TO BE SPACED MAX. 2.5m ON CENTER WITH A MIN. HEIGHT OF 1.1m.
6. FROZEN GROUND CONDITIONS REQUIRE FILTER FABRIC TO BE BACKFILLED IN TRENCH WITH CLEAR STONE
7. GEOTEXTILE FABRIC TO BE COMPRISED OF NON-WOVEN U.V. STABILIZED MATERIAL. FABRIC TO BE FOLDED OVER TOP OF FENCE MIN. 300mm AND WIRE FASTENED.

'SILTSACK' DETAIL

SCALE: N.T.S.

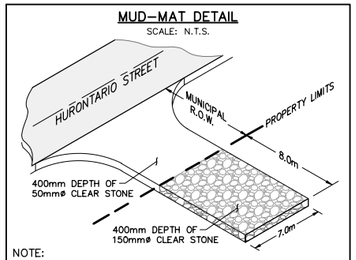


NOTES:

1. INSTALL TERRAFIX 'SILTSACK' IN ALL CATCHBASINS & CATCHBASIN MANHOLES AFFECTED BY CONSTRUCTION.
2. INSTALL TERRAFIX 'SILTSACK' IN ALL NEW CATCHBASINS & CATCHBASIN MANHOLES.

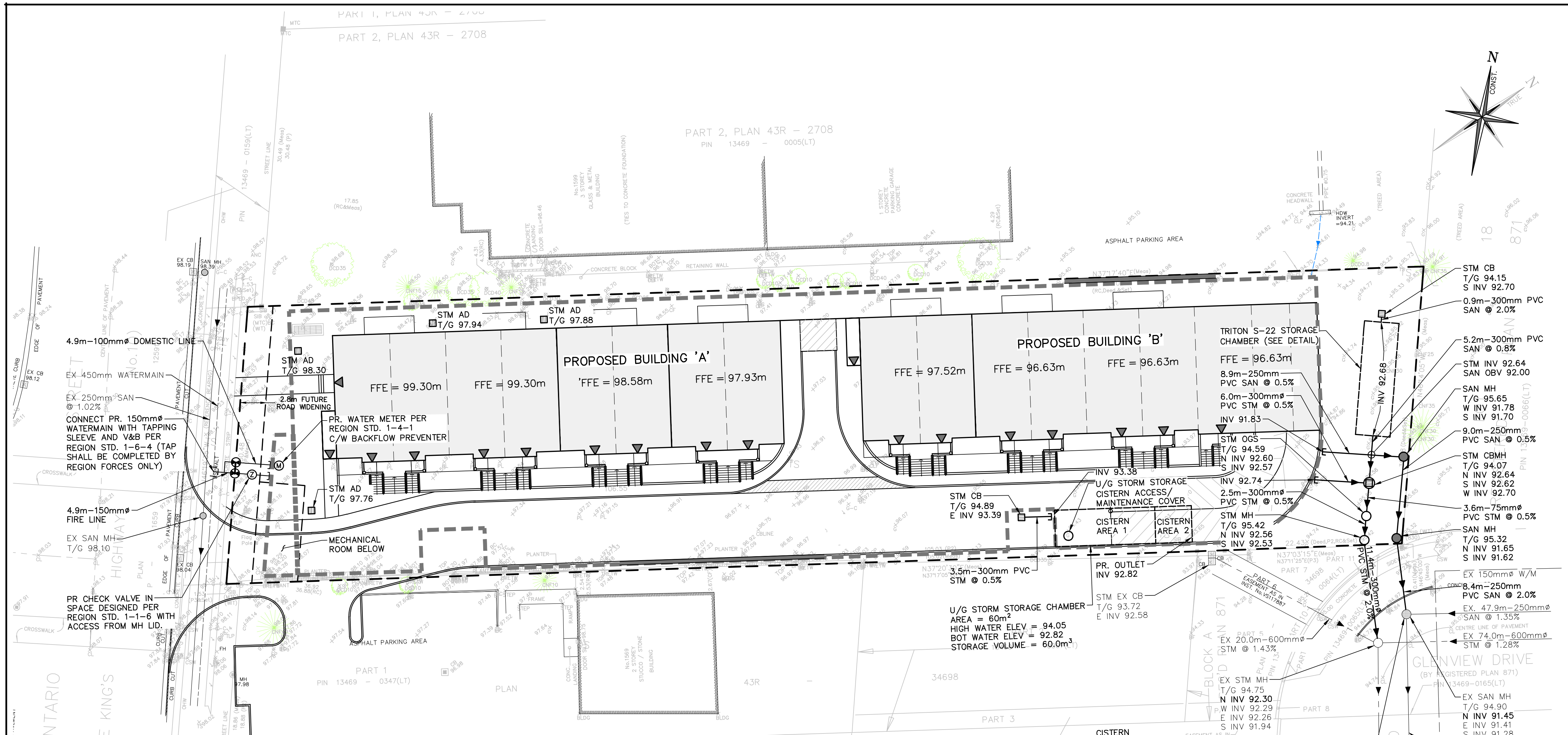
MUD-MAT DETAIL

SCALE: N.T.S.



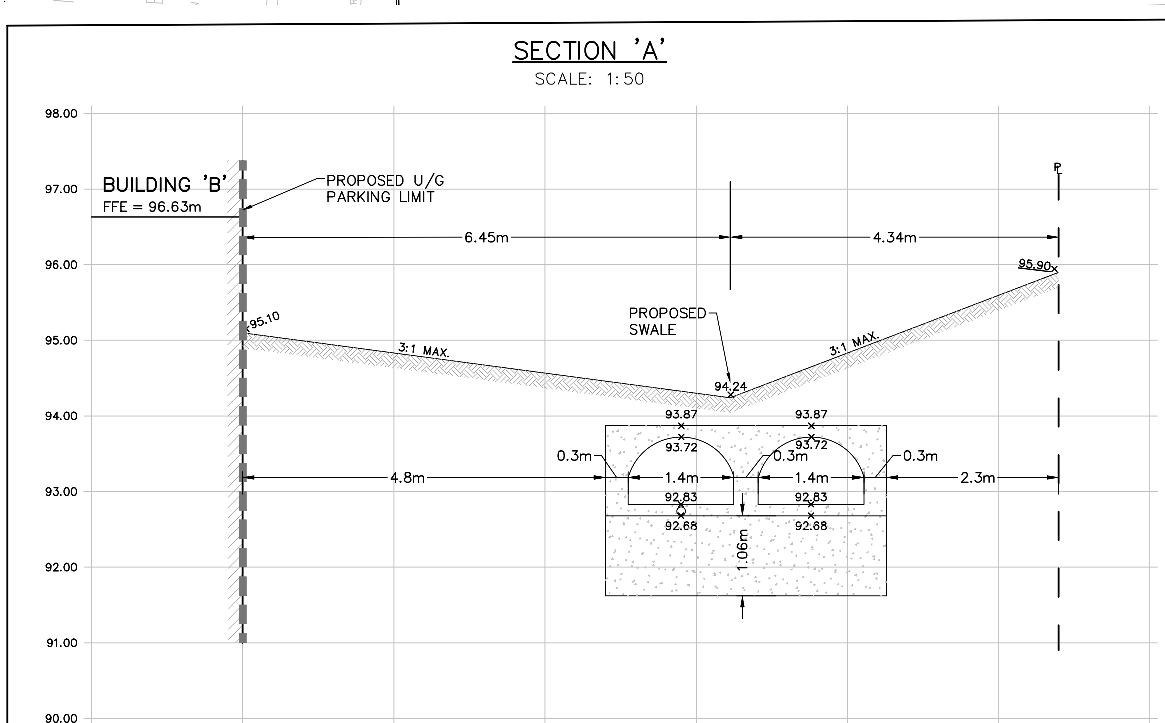
NOTE:

GEOTEXTILE (TERRAFIX 270R OR APPROVED EQUAL) TO BE PLACED AS SEPARATION BARRIER BETWEEN EXISTING GROUND AND CLEAR STONE.



LEGEND

	PROPERTY LINE
	EXISTING WATERMAIN & GATE VALVE
	EXISTING STORM SEWER & MANHOLE
	EXISTING SINGLE / DOUBLE CATCHBASIN
	EXISTING SANITARY SEWER & MANHOLE
	PROPOSED WATERMAIN & GATE VALVE
	PROPOSED WATER SERVICE LATERAL (XXmmø)
	PROPOSED FIRE HYDRANT & GATE VALVE
	PROPOSED WATER METER
	PROPOSED CHECK VALVE
	PROPOSED STORM SEWER & MANHOLE
	PROPOSED SINGLE / DOUBLE CATCHBASIN
	PROPOSED SANITARY SEWER & MANHOLE
	LIMIT OF UNDERGROUND PARKING
	PROPOSED VALVE & BOX
	EXISTING DITCH



SCALE: 1:250

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ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 709.
ELEVATION = 98.279m

LOCAL BENCHMARK:

NAIL LOCATED IN MOST WESTERN CORNER OF PARKING LOT, APPROX. 0.0m SOUTH OF THE EDGE OF ASPHALT.
ELEVATION = 000.000m

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENKUS ONTARIO LAND SURVEYOR. (2015/JUNE/08) REFERENCE No.: ##-##-###-##

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS UTM ZONE 17, NAD83 (GSRS) (2010.0)

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996781

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY KIRKOR ARCHITECTS + PLANNERS.
DRAWING No.: XXX, REV.X (2017/MAY/08)
PROJECT No.: SP 01

DRAWING NOTES:

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

Project

1575 HURONTARIO STREET
CITY OF MISSISSAUGA

Drawing

SITE SERVICING PLAN

NOT FOR CONSTRUCTION

Stamp | Stamp

FOR REVIEW

CROZIER & ASSOCIATES
Consulting Engineers

8 MARKET STREET
SUITE 600
TORONTO, ON M5E 1M6
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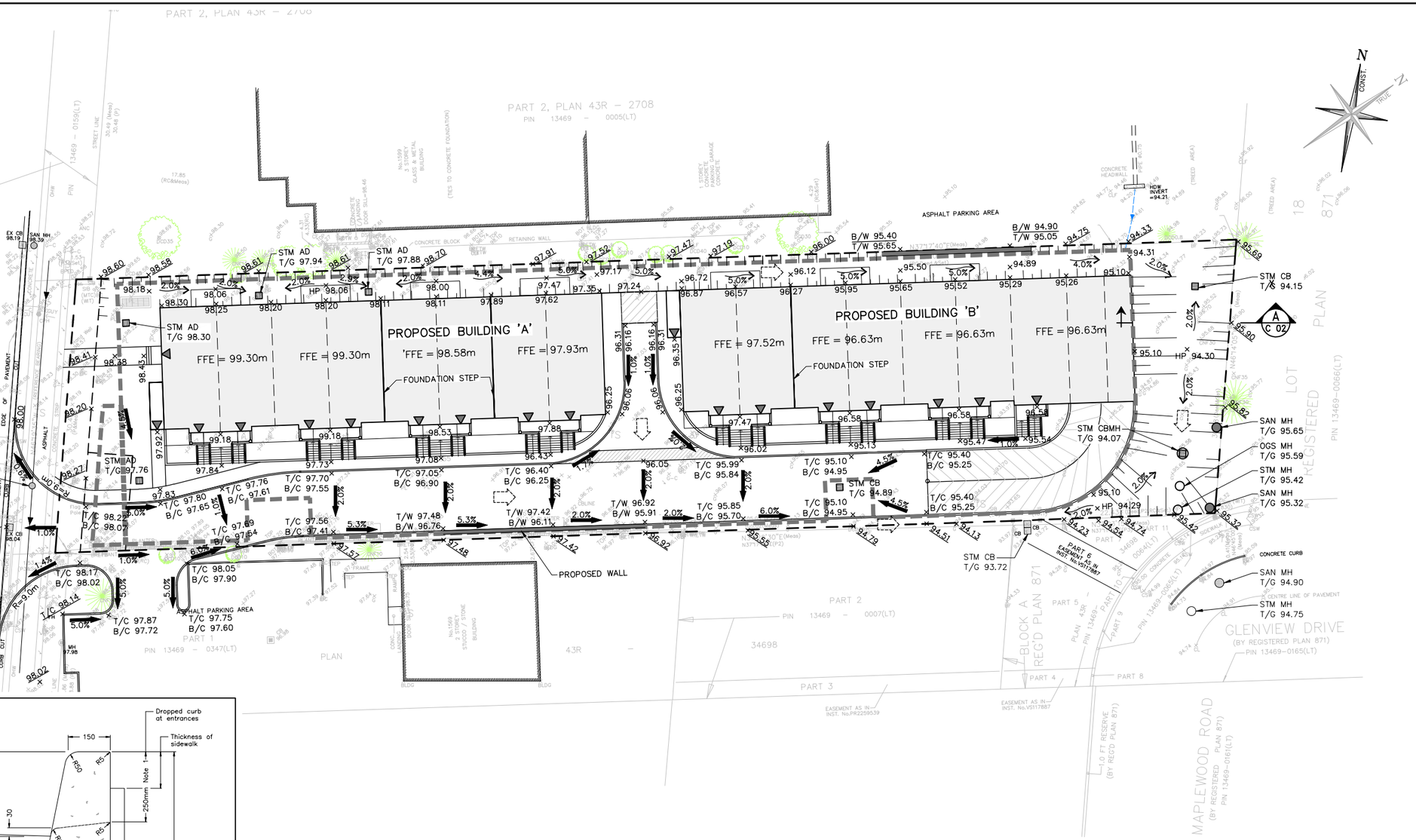
Drawn	S.T.T.	Design	B.M.P.	Project No.	1110-4677
Check	S.C.S	Check	A.S.	Scale 1:250	Dwg. C 02

SPA#0000-000



NOTES:
1 Where sidewalk is continuously adjacent, reduce the dropped curb at entrances to 75mm.
2 For slipforming procedure, a 5% batter is acceptable.

A Treatment at entrances shall be according to OPSD 351.010.
B Outlet treatment shall be according to the OPSD 610 Series.
C The transition from one curb type to another shall be a minimum length of 3.0m, except in conjunction with guide rail where it shall be according to the OPSD 900 Series.
D All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2006	Rev 1
300mm HEIGHT CONCRETE BARRIER CURB	MODIFIED BY CFCA	
	OPSD 600.110	

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING FENCE
- 215.00 EXISTING GRADE
- 215.00 PROPOSED GRADE
- 215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- 2.0% PROPOSED GRASSED SWALE
- PROPOSED RETAINING WALL
- PROPOSED SLOPE (3:1 MAX.)
- BUILDING ENTRANCE (PERSONNEL DOOR)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- LIMIT OF UNDERGROUND

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Project

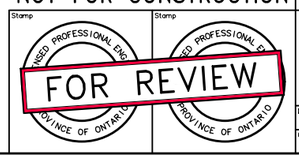
1575 HURONTARIO STREET
CITY OF MISSISSAUGA

Drawing

SITE GRADING PLAN

NOT FOR CONSTRUCTION

Stamp



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				Dwg.	C 03

CONSTRUCTION NOTES (CITY OF MISSISSAUGA)

1.0 GENERAL – CONSTRUCTION

1.1 ALL WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH CURRENT CITY OF MISSISSAUGA STANDARDS, REGION OF PEEL STANDARDS, OPSD & OPSS. WHERE CONFLICT OCCURS, CITY OF MISSISSAUGA STANDARDS TO GOVERN FOR STORMWATER, ROADWORKS & INTERNAL GRADING; REGION OF PEEL STANDARDS TO GOVERN FOR SANITARY & WATERMAIN INSTALLATION.
1.2 ALL TOPSOIL & EARTH EXCAVATION TO BE REMOVED AND RELOCATED TO AN APPROVED SITE.
1.3 THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DETAILED LAYOUT OF THE WORK. THE ENGINEER WILL CONFIRM ALL BENCHMARK ELEVATIONS AND HORIZONTAL ALIGNMENT.
1.4 ALL PROPERTY BARS TO BE PRESERVED AND REPLACED BY O.L.S. AT CONTRACTOR'S EXPENSE IF REMOVED DURING CONSTRUCTION.
1.5 THE CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENTS FOR THE SUPPLY OF TEMPORARY WATER & POWER.
1.6 IF REQUIRED, DEWATERING TO BE CARRIED OUT IN ACCORDANCE WITH OPSS–517 & 518 TO MAINTAIN ALL TRENCHES IN A DRY CONDITION. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING M.O.E. PERMIT IF REQUIRED.
1.7 ALL ENGINE DRIVEN PUMPS TO BE ADEQUATELY SILENCED, SUITABLE FOR OPERATION IN A RESIDENTIAL DISTRICT.
1.8 THE UTILITIES SHOWN ON PLANS ARE APPROXIMATE ONLY & CONTRACTOR TO CONFIRM LOCATIONS IN ADVANCE OF CONSTRUCTION.
1.9 THE CONTRACTOR IS RESPONSIBLE TO NOTIFY ALL UTILITY COMPANIES PRIOR TO COMMENCING WORK & CO–ORDINATE CONSTRUCTION ACCORDINGLY.
1.10 THE LOCATION AND ELEVATION OF ALL EXISTING SERVICES AND UTILITIES ARE TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE RESTORATION AND/OR REPAIR OF EXISTING UTILITIES DISTURBED DURING CONSTRUCTION.
1.11 ALL AREAS BEYOND THE SITE PLAN WHICH ARE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE AUTHORITY HAVING JURISDICTION AT THE EXPENSE OF THE CONTRACTOR.
1.12 ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "OCCUPATIONAL HEALTH AND SAFETY ACT". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
1.13 ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
1.14 ROAD AND BOULEVARD RESTORATION AS PER CITY OF MISSISSAUGA ROAD CUT PERMIT.
1.15 THE GEOTECHNICAL SUITABILITY OF ALL THE FILL MATERIAL WILL BE ASSESSED BY THE GEOTECHNICAL ENGINEER.
1.16 GEOTECHNICAL ENGINEER TO CONFIRM SUITABILITY OF ROAD MATERIAL DEPTHS BASED ON SUB–BASE MATERIAL.
1.17 MONITORING WELLS TO BE DECOMMISSIONED OR ADJUSTED TO SUIT GRADE AS PER GEOTECHNICAL ENGINEER.

2.0 OPEN CUT INSTALLATION & RESTORATION

2.1 BACKFILL MATERIALS SHALL BE OPSS GRANULAR 'A', GRANULAR 'B' & UNSHRINKABLE FILL PLACED AT THE SPECIFIED DEPTHS AS PER STANDARD 2220.030. ALL GRANULAR MATERIAL SHALL CONFORM WITH OPSS 1010 & THE UNSHRINKABLE FILL SHALL CONFORM TO OPSS 1359. ALL GRANULAR MATERIAL SHALL BE PLACED IN 150mm LIFTS AND COMPACTED TO 100% STANDARD PROCTOR DENSITY.
2.2 AFTER BACKFILLING THE UTILITY TRENCH, A MIN. 300mm TOTAL ASPHALT REMOVAL SHALL BE CUT ON ALL SIDES OF THE TRENCH INTO THE EXISTING PAVEMENT STRUCTURE. THE PAVEMENT STRUCTURE MATERIALS SHALL MATCH THE EXISTING PAVEMENT MATERIAL.
2.3 ASPHALT RESTORATION SHALL BE A MINIMUM OF 40mm HL–3 & 50mm HL–8 & SHALL MATCH THE EXISTING PAVEMENT STRUCTURE. ALL ASPHALT RESTORATION SHALL BE IN COMPLIANCE WITH OPSS 310. ALL HOT–MIX MATERIAL SHALL CONFORM TO OPSS 1149, 1150 AND/OR 1154. EXPOSED ASPHALT AND CONCRETE FACES SHALL BE CLEANED AND COATED WITH AN RS–1 (OR EQUIVALENT) ASPHALT EMULSION & ALLOW TO 'BREAK' PRIOR TO COMMENCING ASPHALT PLACEMENT.
2.4 WHEN THE REMAINING ASPHALT, FROM THE EDGE OF PAVEMENT TO THE SAWCUT IS 1.3m OR LESS, THE EXISTING ASPHALT WILL BE REMOVED FULL DEPTH & REPAVED AS PER NOTE 3. WHEN TWO OR MORE ROAD CUTS ARE REQUIRED AT A GIVEN SITE AND THE CUTS ARE LESS THAN 2.5m APART THE ENTIRE AREA MUST HAVE FULL DEPTH ASPHALT RESTORATION FROM THE OUTER LIMITS OF ALL REPAIRS.
2.5 SIDEWALK RESTORATION SHALL BE A MINIMUM OF 1 FULL BAY INCLUDING EXPANSION JOINT MATERIAL. ALL CONCRETE SHALL BE AS PER OPSS 351. ALL SIDEWALKS SHALL BE 130mm THICK.
2.6 SUB–DRAINS UNDER THE CURB SHALL BE RESTORED TO ENSURE THEIR OPERATION AND SHALL BE PLACED AS PER CITY OF MISSISSAUGA STANDARD DRAWING NUMBER 2220.040
2.7 WHERE THE CURB HAS BEEN UNDERMINED TO FACILITATE WATERMAIN INSTALLATION THE CURB SHALL BE REMOVED AND REPLACED. CURB RESTORATION SHALL BE MINIMUM OF 2.0m OR SHALL EXTEND 0.5m BEYOND THE OUTER TRENCH EDGES WHICH EVER IS GREATER, ALL CONCRETE SHALL BE AS PER OPSS 353.
2.8 ALL GRASSED BOULEVARDS SHALL BE RE–INSTATED WITH NUMBER 1 NURSERY SOD PLACED ON TOP OF 100mm OF TOPSOIL. ALL SOD SHALL BE PLACED WITH STAGGERED JOINTS, BE ROLLED, AND WHERE APPLICABLE, STAKED INTO THE GROUND.

3.0 DRIVEWAYS

3.1 GRANULAR 'A' & 'B' BASE TO BE COMPACTED TO 98% OF THE MATERIAL'S RESPECTIVE SPMDD OR AS APPROVED BY GEOTECHNICAL ENGINEER.
3.2 THE TOP 1.0m OF THE SUB–BASE SHALL BE COMPACTED TO A MINIMUM OF 98% OF STANDARD PROCTOR DENSITY WITHIN 2% OF OPTIMUM MOISTURE CONTENT.
3.3 SUBGRADE TO BE PROOF ROLLED & CERTIFIED BY GEOTECHNICAL ENGINEER PRIOR TO PLACING GRANULAR MATERIAL.
3.4 DRIVEWAYS & PARKING LOT TO BE CONSTRUCTED AS PER RECOMMENDATIONS OF GEOTECHNICAL ENGINEER.
3.5 ALL GRANULAR AND ASPHALT MATERIAL PLACEMENT TO BE IN ACCORDANCE WITH OPSS 314 & OPSS 310.
3.6 ALL GRANULAR CONNECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARD 2220.050.
3.7 ALL CONCRETE SIDEWALKS TO BE CONSTRUCTED IN ACCORDANCE WITH CITY OF MISSISSAUGA STANDARD 2240.010.
3.8 ALL PEDESTRIAN SIDEWALK ENTRANCES AT INTERSECTIONS TO BE CONSTRUCTED IN ACCORDANCE WITH OPSD 350.010.

4.0 SANITARY SERVICES

4.1 BEDDING & EMBEDMENT TO OPSD – 802.010, GRANULAR 'A' BEDDING.
4.2 TRENCH BACKFILL TO SELECT NATIVE MATERIAL AS APPROVED BY ENGINEER OR IMPORTED GRANULAR MATERIAL.
4.3 SERVICING FOR COMMERCIAL BUILDINGS TO REGION OF PEEL STANDARD 2–4–2 AND 1–8–4.
4.4 BEDDING & EMBEDMENT MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S STANDARD PROCTOR MAXIMUM DRY DENSITY (SPMDD).
4.5 CLEAR STONE WRAPPED WITH FILTER FABRIC CAN BE SUBSTITUTED FOR EMBEDMENT MATERIAL IF APPROVED BY THE GEOTECHNICAL ENGINEER.
4.6 SANITARY SEWER – SDR 35 PVC WITH MINIMUM PIPE STIFFNESS OF 320kPa – MANUFACTURED TO C.S.A. STANDARD B182.2 (A.S.T.M. SPECIFICATION D 3034) WITH RUBBER GASKETTED BELL AND SPIGOT JOINTS.
4.7 SANITARY SEWER BEDDING SHALL BE CLASS 'B' BEDDING AS PER REGION OF PEEL STD. 2–3–1, UNLESS OTHERWISE NOTED.
4.8 ALL SEWERS CONSTRUCTED WITH GRADES 0.5% OR LESS, SHALL BE INSTALLED USING A LASER AND CHECKED PRIOR TO BACKFILL AT THE CONTRACTORS EXPENSE.

5.0 WATERMAIN

5.1 BEDDING & EMBEDMENT TO REGION OF PEEL STANDARD 1–5–1. WATERMAIN SUPPORT BRIDGING DISTURBED GROUND TO REGION OF PEEL STANDARD 1–5–2.
5.2 TRENCH BACKFILL TO BE SELECT NATIVE MATERIAL AS APPROVED BY ENGINEER OR IMPORTED GRANULAR MATERIAL.
5.3 SERVICE CONNECTIONS TO REGION OF PEEL STANDARD 1–8–4. FIRE LINE AND DOMESTIC CONNECTION TO REGION OF PEEL STANDARD 1–6–4.
5.4 BEDDING & EMBEDMENT MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMDD.
5.5 MINIMUM COVER ON WATERMAIN AND SERVICES TO BE 1.7m BELOW FINISHED GRADE.
5.6 CLEARANCE BETWEEN WATERMAIN AND SEWERS TO BE A MINIMUM OF 0.5m VERTICAL WHERE WATER MAIN IS ABOVE SEWER OR 2.5m MINIMUM HORIZONTAL SEPARATION.
5.7 SERVICES TO BE LIVE TAPPED TO MAIN.
5.8 FOLLOWING TESTING, CONTRACTOR SHALL OPERATE EACH WATER SERVICE TO VERIFY FULL FLOW AND PRESSURE AT THE CURB STOP TO THE SATISFACTION OF THE ENGINEER.
5.9 VALVE & BOX – MUELLER A769 WITH GUIDE PLATE; CLOW–BIBBY VB 1100/RB645.
5.10 MECHANICAL JOINT FITTINGS – ANSI A21.53 (A.W.W.A C153) SPECIFICATIONS; HYPROTEC FITTING SHALL BE USED WITH HYPROTEC PIPE INSTALLATION.
5.11 BACKFLOW PREVENTORS – WATTS SERIES 900 OR 9D; CLAYTON VALVE MODEL 3 OR R.P.; FEBCO 825Y.
5.12 ALL PVC WATERMAIN SHALL BE EQUAL TO AWWA C–900 CLASS 150, DR 18,
5.13 ALL PVC WATERMAIN SHALL BE INSTALLED WITH A 12 GAUGE STRANDED COPPER TWU TRACER WIRE IN ACCORDANCE WITH REGION OF PEEL STANDARDS.
5.14 VALVE IN BOXES SHALL BE INSTALLED AS PER REGION OF PEEL STD. 1–3–8. MAINLINE VALVES TO BE RESTRAINED AS PER REGION OF PEEL STD. 1–3–3A.
5.15 CATHODIC PROTECTION IS REQUIRED ON ALL METALLIC FITTINGS AS PER REGION OF PEEL STANDARDS.
5.16 THE OPERATION OF EXISTING WATERMAIN VALVES SHALL BE CONDUCTED AS REQUIRED BY THE REGION OF PEEL.

6.0 STORM SEWERS

6.1 BEDDING & EMBEDMENT MATERIAL TO BE COMPACTED TO A DRY DENSITY OF AT LEAST 95% OF THE MATERIAL'S SPMDD.
6.2 BEDDING & EMBEDMENT TO OPSD 802.010 (FLEXIBLE PIPE) GRANULAR 'A' EMBEDMENT.
6.3 MAIN SEWERS SHALL BE PVC PIPE (OPSS 410), MIN. PIPE STIFFNESS SHALL BE 320kPa. ALL PIPE TO BE JOINED WITH A GASKETTED BELL AND SPIGOT SYSTEM.
6.4 WHERE COVER OVER THE SPRING LINE OF THE SEWER IS LESS THAN 1.50m, REFER TO INSULATION DETAIL ON DRAWING 102.
6.5 ALL CATCH BASINS FRAMES AND GRATES AS PER OPSD 400.020.

7.0 EROSION & SEDIMENT CONTROLS

7.1 NO MAINTENANCE OR REPAIR WORK ON CONSTRUCTION EQUIPMENT IS ALLOWED WITHIN 30m OF AN EXISTING WATERCOURSE OR DITCH.
7.2 ALL SEDIMENT AND EROSION CONTROL FACILITIES AND WORKS ARE TO BE CONSTRUCTED AND IN PLACE TO THE APPROVAL OF THE SITE ENGINEER PRIOR TO ANY GRADING OPERATIONS COMMENCING. TYPICAL WORKS INCLUDE SILT FENCES AND INTERCEPTOR SWALES.
7.3 ALL TEMPORARY SOIL OR DIRT STOCKPILES ARE TO BE PROVIDED WITH THE NECESSARY SEDIMENT AND EROSION CONTROL FEATURES. IF STOCKPILES ARE TO REMAIN FOR A PERIOD LONGER THAN 180 DAYS, STOCKPILES SHALL BE HYROSEEDED AND SURROUNDED WITH SILT FENCE.
7.4 ALL AREA DRAINS TO HAVE FILTER FABRIC PLACED AND MAINTAINED UNDER GRATES PER STD. 2930.040 UNTIL LANDSCAPING IS COMPLETE AND STABILIZED IN DEVELOPMENT OR AS DIRECTED BY SITE ENGINEER.
7.5 ADDITIONAL EROSION AND SEDIMENT CONTROL MEASURES (I.E. SILT FENCE, STRAW BALES, CLEARSTONE, ETC.) ARE TO BE KEPT ON SITE FOR EMERGENCIES AND REPAIRS.
7.6 EROSION AND SEDIMENT CONTROL METHODS ARE TO BE CONTINUOUSLY EVALUATED AND, WHERE NECESSARY, UPGRADES ARE TO BE IMPLEMENTED.
7.7 AN AFTER HOURS CONTACT NUMBER IS TO BE VISIBLY POSTED ON–SITE FOR EMERGENCIES.
7.8 ALL SEDIMENT CONTROL FENCING IS TO BE ERECTED PRIOR TO THE COMMENCEMENT OF ANY SITE GRADING OPERATIONS, AS PER CITY OF MISSISSAUGA STANDARD 2940.01.
7.9 ALL CATCHBASINS WITHIN LANDSCAPED AREAS TO HAVE SEDIMENT BARRIER (CITY OF MISSISSAUGA STANDARD 2930.02 OR 2930.03) ERECTED IMMEDIATELY AFTER CATCHBASIN INSTALLATION. SEDIMENT PROTECTION BARRIER TO BE MAINTAINED ON A REGULAR BASIS OR TO THE SATISFACTION OF THE CITY OF MISSISSAUGA.
7.10 ALL ROADSIDE CATCHBASINS TO HAVE SEDIMENT PROTECTION AS PER CITY OF MISSISSAUGA STANDARD 2930.04 INSTALLED IMMEDIATELY AFTER CATCHBASIN INSTALLATION. SEDIMENT PROTECTION BARRIER TO BE MAINTAINED ON A REGULAR BASIS OR TO THE SATISFACTION OF THE CITY OF MISSISSAUGA.
7.11 IF SITE CONSTRUCTION ACTIVITIES ARE INTERRUPTED AND/OR INACTIVITY EXCEEDS 30 DAYS, ALL STRIPPED AND/OR BARE SOIL AREAS ARE TO BE STABILIZED BY SODDING/SEEDING/MULCHING OR OTHER APPROVED METHOD, TO THE SATISFACTION OF THE CITY OF MISSISSAUGA.
7.12 THIS CONTROL PLAN IS PREPARED FOR SUBMISSION TO THE CITY OF MISSISSAUGA IN CONJUNCTION WITH AN APPLICATION FOR EROSION & SEDIMENT CONTROL PERMIT NO. 08–006 UNDER THE EROSION & SEDIMENT CONTROL BY–LAW NO. 512.91, AS AMENDED.
7.13 ALL EROSION AND SEDIMENT CONTROL MEASURE ARE TO BE REGULARLY INSPECTED AND MAINTAINED, AS REQUIRED, TO THE SATISFACTION OF THE CITY OF MISSISSAUGA.
7.14 DURING ALL CONSTRUCTION PHASES, MUD TRACKING CONTROL, CONSISTING OF FLUSHING AND SWEEPING ROADS, IS TO BE PROVIDED FOR ALL ROADS, AS WARRANTED, IN ACCORDANCE WITH THE CITY OF MISSISSAUGA MUD TRACKING CONTROL POLICY.
7.15 SILT FENCE MUST BE INSPECTED WEEKLY FOR RIPS OR TEARS, BROKEN STAKES, BLOW–OUTSAND ACCUMULATION OF SEDIMENT.
7.16 SILT FENCE MUST BE INSPECTED IMMEDIATELY AFTER EVERY RAIN STORM EVENT OR AS DIRECTED BY SITE ENGINEER.
7.17 SEDIMENT MUST BE REMOVED FROM SILT FENCE WHEN ACCUMULATION REACHES 50% OF THE HEIGHT OF THE FENCE.
7.18 ALL SILT FENCES MUST BE REMOVED ONLY WHEN THE ENTIRE SITE IS STABILIZED AND AS DIRECTED BY THE SITE ENGINEER.
7.19 ALL SILT FENCES INSTALLED AT THE LIMIT OF THE DEVELOPMENT ARE TO BE PLACED DIRECTLY ON THE PROPERTY LINE OR AS DIRECTED BY SITE ENGINEER.

CONSTRUCTION NOTES (REGION OF PEEL)

1. ALL MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
2. WATERMAIN AND/OR WATER SERVICE MATERIALS 100mm (4") AND LARGER MUST BE A.W.W.A. C900; SIZE 50mm (2") AND SMALLER TO BE COPPER TYPE 'K' B88–49.
3. WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7m (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2m (4') FROM THEMSELVES AND ALL OTHER UTILITIES.
4. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC., MUST BE PROVIDED WITH AT LEAST A 50mm (2") OUTLET ON 100mm (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE HOSED OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100mm (4") DIAMETER MINIMUM ON A HYDRANT.
5. ALL CURB STOPS TO BE 3.0m (10') OF THE FACE OF THE BUILDING UNLESS OTHERWISE NOTED.
6. HYDRANT AND VALVE SET TO REGION STANDARD 1–6–1 DIMENSIONS A AND B, 0.7m (2") AND 0.9m(3") AND HAVE PUMPER NOZZLE.
7. WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEETS MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
8. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARANCE OF 0.3m (12") OVER/0.5m (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
9. ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
10. ALL LIVE TAPPING AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED THROUGH THE REGIONAL INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.
11. LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE CONTRACTOR.
12. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF THEIR WORK. WHETHER SHOWN ON THE PLANS OR NOT AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
13. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO THE UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COSTS ARISING FROM SUCH INSPECTION.
14. ALL PROPOSED WATER PIPING MUST BE ISOLATED THROUGH A TEMPORARY CONNECTION THAT SHALL INCLUDE AN APPROPRIATE CROSS–CONNECTION CONTROL DEVICE, CONSISTENT WITH THE DEGREE OF HAZARD, FOR BACKFLOW PREVENTION OF THE ACTIVE DISTRIBUTION SYSTEM, CONFORMING TO REGION OF PEEL STANDARDS 1–7–7 OR 1–7–8.

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ELEVATION = 000.000m

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENKUS ONTARIO LAND SURVEYOR. (2015/JUNE/08)
REFERENCE No.: ##-##-###-##

BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
UTM ZONE 17, NAD83 (GSRS) (2010.0)

DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.9996781

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY KIRKOR ARCHITECTS + PLANNERS.
DRAWING No.: XXX, REV.X (2017/MAY/08)
PROJECT No.: SP 01

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.

Project

1575 HURONTARIO STREET
CITY OF MISSISSAUGA

Drawing

NOTES

NOT FOR CONSTRUCTION

Stamp — LICENSED PROFESSIONAL ENGINEER, PROVINCE OF ONTARIO

Stamp — LICENSED PROFESSIONAL ENGINEER, PROVINCE OF ONTARIO

FOR REVIEW

CROZIER & ASSOCIATES
Consulting Engineers
8 Market Street
Suite 600
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416 477-3392 T
www.cfcrozier.ca

Drawn	S.T.T.	Design	B.M.P.	Project No.	1110–4677
Check	S.C.S	Check	A.S.	Scale 1:500	Dwg. C 04

FIGURES

LEGEND

Symbol	Description
— — —	PROPERTY LINE
	EXISTING CONTOUR (0.5m)
	EXISTING CONTOUR (1.0m)
	EXISTING DITCH
× 215.00	EXISTING GRADE
	EXISTING OVERLAND FLOW DIRECTION
	STORM DRAINAGE CATCHMENT
ID / A | RC	CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

No.	ISSUE / REVISION	YYYY/MMM/DD
1	ISSUED FOR FSR	2017/DEC/06
0	ISSUED FOR FSR (NOT SUBMITTED)	2017/SEP/14

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE DERIVED FROM THE CITY OF MISSISSAUGA BENCHMARK NO. 709.

ELEVATION = 98.279m

LOCAL BENCHMARK:

NAIL LOCATED IN MOST WESTERN CORNER OF PARKING LOT, APPROX. 0.0m SOUTH OF THE EDGE OF ASPHALT.

ELEVATION = 000.000m

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENKUS ONTARIO LAND SURVEYOR. (2015/JUNE/08)
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1575 HURONTARIO STREET
CITY OF MISSISSAUGA

Drawing

PRE–DEVELOPMENT
DRAINAGE PLAN

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Drawn S.T.T.	Design B.M.P.	Project No. 1110–4677	
Check S.C.S	Check A.S.	Scale 1:500	Dwg. FIG 1

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- x 215.00 EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- STORM DRAINAGE CATCHMENT
- ID / A | RC — CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

No.	ISSUE / REVISION	YYYY/MMM/DD
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Project

1575 HURONTARIO STREET CITY OF MISSISSAUGA

Drawing

POST–DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

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Drawn	S.T.T.	Design	B.M.P.	Project No.	1110–4677
Check	S.C.S	Check	A.S.	Scale	1:500
				Dwg.	FIG 2