FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

1575 HURONTARIO STREET

CITY OF MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

DREAM MAKER DEVELOPMENTS INC.

PREPARED BY:

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OCTOBER 2019

CFCA FILE NO. 1110-4677

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	September 14, 2017	Issued for OPA & ZBA (Not Submitted)
Rev.1	December 6, 2017	Issued for OPA & ZBA
Rev.2	October 9, 2019	Issued for OPA & ZBA

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) has been retained by Dream Maker Developments Inc. (Dream Maker) to prepare a Functional Servicing and Preliminary Stormwater Management Report to support the Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) for the property known as 1575 Hurontario Street in the City of Mississauga in the Region of Peel.

The purpose of this report is to demonstrate that the proposed site can be developed in accordance with the City of Mississauga and Region of Peel guidelines from a functional servicing and preliminary stormwater management perspective.

2.0 Site Description

The subject property covers an area of approximately 0.36 ha and is located in a mixed residential and commercial area in the City of Mississauga. The site currently consists of a vacant asphalt parking lot, a concrete building foundation, and landscaped areas. The property is bound by commercial properties to the north and south, residential properties and Glenview Drive to the east, and Hurontario Street to the west. The proposed development consists of two stacked townhouse blocks with 21 units each, 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.

3.0 Water Servicing

3.1 Existing Water Servicing

A review of the approved Site Grading and Servicing Plan prepared by Charlton Engineering Limited, dated April 2003, indicates that 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. An overview of the existing water services is shown in **Drawing C02**.

3.2 Design Water Demand

The Region of Peel Watermain Design Criteria was referenced to estimate the proposed water demands for domestic purposes. An average daily water demand of 280 L/capita/day was used with a population density of 3.5 people per unit (ppu) as designated by the Region of Peel. A summary of the results is presented in **Table 1**, with detailed calculations provided in **Appendix A**.

Table 1: Estimated Design Water Demand

Standard	Average Daily Demand (L/s)			Maximum Daily Demand (L/s)	Peak Hourly Demand (L/s)
	Existing	Proposed	Increase		
Region of Peel	0.0	0.48	0.48	0.95	1.43

Using the Region of Peel Design Criteria for domestic water demand, the estimated daily demand and peak hour demand for the development will be 0.48 L/s and 1.43 L/s, respectively.

3.3 Fire Flow Demand

The Fire Underwriters Survey method was used to estimate the fire flow requirements for the proposed development. This calculation estimates the preliminary watermain size required to service the development and is based on a gross floor area (GFA) of 3,898 m^2 as provided by Kirkor Architects. The proposed townhouse development is assumed to be of combustible construction and have no sprinkler system. **Table 2** summarizes the required fire flow and duration to meet fire protection for the proposed development.

Table 2: Estimated Fire Demand Flows

Method	Demand Flow (L/s)	Duration (h)
Fire Underwriters Survey (1999)	283.3	4.0

The proposed fire service is required to accommodate a fire flow of 283.3 L/s for a duration of 4 hours. **Appendix A** contains the Fire Underwriters Survey calculations. The building architect and the mechanical engineer will confirm the estimated fire flow demand.

Please note that the Fire Underwriters Survey value is a conservative estimate for comparison purposes only. The Mechanical Engineer for this development will complete the required analyses 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.

3.4 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

A review of the approved Site Grading and Servicing Plan prepared by Charlton Engineering Limited, dated April 2003, indicates that 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 Design Sanitary Flow

The Region of Peel Sanitary Sewer Design Criteria was referenced to estimate the sanitary design flows generated by the proposed development. A unit sewage flow of 302.8 L/capita/day was used with a population density of 3.5 people per unit (ppu) for the 42-unit development. 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 3**, with detailed sanitary design flow calculations provided in **Appendix B**.

Table 3: Estimated Sanitary Design Flows

Standard	Average Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Flow		
					Existing (L/s)	Proposed (L/s)	Difference (L/s)
Region of Peel	0.52	4.19	2.16	0.07	0.00	2.23	2.23

The proposed sanitary service was sized to convey a peak sanitary flow of 2.24 L/s for the development, as determined by the Region of Peel Sanitary Sewer 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 150 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 Drainage Conditions

5.1 Existing Drainage

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 and landscaped areas. 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 drains to the existing 750 mm diameter storm sewer on Maplewood Road. Further, 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 the 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. The 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**). A portion of

the site flows overland directly to Hurontario Street. This condition will be maintained following the development of the site. Based on the existing drainage plan, the site encompasses 0.34 ha (Catchment 101) of an existing 2.76 ha drainage area (Catchment 102), with a total pre-development runoff coefficient of 0.42. In the existing condition, the 0.34 ha site area drains through the existing double catch basin to the 750 mm diameter storm sewer on Maplewood Road.

A summary of the pre-development catchment area characteristics is shown in **Table 4**, with detailed calculations provided in **Appendix C**.

Table 4: 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)	0.20	0.15	0.34	0.53	2	30.4
					5	40.9
					10	50.3
					25	57.8
					50	64.5
					100	71.4
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	0.42	2	192.4
					5	258.6
					10	318.5
					25	365.8
					50	408.3
					100	451.9

5.2 Proposed Drainage

Under post-development conditions, the site is divided into two drainage catchment areas. The drainage catchments are described below in detail and summarized in **Table 6**, with detailed calculations provided in **Appendix C**.

It should be noted that the site area increased in the post development condition from 0.34 ha to 0.36 ha in order to include drainage from the drive aisle up to the property line along Hurontario Street.

Catchment 201:

The site (0.36 ha) will drain to three proposed catchbasins within the proposed paved and landscaped areas. These catchbasins will outlet to the proposed Triton S-29 underground storage chamber. 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 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 through a proposed municipal easement located across the eastern end of the property.

The City of Mississauga requires adjustment factors be applied to the site's runoff coefficient for each storm event above the 10-year storm event. This is to account for the increase in runoff due to the saturation of the ground that occurs during larger storm events. The City of Mississauga adjustment factors and the associated pre- and post-development runoff coefficients for the site are shown in **Table 5**.

Table 5: Adjusted Runoff Coefficients

Storm	Adjustment Factor	Adjusted Pre-Development Runoff Coefficient	Adjusted Post-Development Runoff Coefficient
2-year	1.0	0.4	0.72
5-year	1.0	0.4	0.72
10-year	1.0	0.4	0.72
25-year	1.1	0.44	0.79
50-year	1.2	0.48	0.86
100-year	1.25	0.50	0.89

6.0 Stormwater Management

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

Retain runoff from a small rainfall event of 5 mm across the entire site.

MTO

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 Road), surface storage is not feasible.

Additionally, stormwater from this site drains away from MTO lands in the pre-development and post-development condition towards an existing 750 mm trunk sewer on Maplewood Road. As such, MTO drainage remains unaffected by this development.

6.1 Stormwater Quantity Control

Water quantity objectives will be achieved by reducing post-development peak flow rates to target rates through a 125 mm diameter orifice tube, which will be installed downstream of a proposed underground storage chamber.

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 site runoff entering the storm sewer on Maplewood Road must be controlled from the 10-year post-development design storm event (71.9 L/s) to the 2-year pre-development design storm event (30.4 L/s).

To control the 10-year flow from Catchment 201 to the above target, an 82.9 m^3 underground stormwater storage chamber (Triton S-29 or approved equivalent) will be installed upstream of a 125 mm diameter orifice tube. The stormwater chamber will gravity drain to the existing 750 mm diameter storm sewer on Maplewood Road.

Although the site area discharging to Maplewood Road increases from 0.34 ha to 0.36 ha following development, the 10-year post development peak flow rate is controlled to the 2-year pre-development flow rate with the pre-development area. As such, there is a decrease in flow to this sewer following development and it is assumed that there is adequate capacity in the existing 750 mm diameter storm sewer on Maplewood Road.

Refer to **Table 6** for a summary of the 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: 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)	0.10	0.26	0.37	0.72	2	43.4
					5	58.4
					10	71.9
					25	82.6
					50	92.2
					100	102.0
202 (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	1.98	0.82	2.81	0.44	2	205.4
					5	276.1
					10	340.0
					25	390.5
					50	435.9
					100	482.4

6.2 Stormwater Quality Control

An oil and grit separator (OGS) located downstream of the underground stormwater storage chamber will be used to provide stormwater quality control for the site. As shown in **Appendix C**, preliminary sizing calculations have found a Stormceptor Model 750 or approved equal will provide 85% removal of suspended solids from the site, as required by the MOECC and the City of Mississauga.

6.3 Water Balance

A storage volume of 20.0 m^3 will be provided below the outlet elevation of the proposed storage chamber. This storage volume is necessary to comply with the water balance criteria of retaining the first 5 mm of runoff from the site. The associated required volume is 17.9 m^3 (3573 m^2 x 0.005 m), and as such, the provided 20.0 m^3 dead storage volume within the chamber is adequate to meet the City's water balance criteria.

7.0 Erosion and Sediment Controls During Construction

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

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

Heavy Duty Silt Fencing

Silt fencing will be installed along the perimeter of the site to intercept sheet flow. Additional silt fence 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 to prevent mud tracking from the site onto surrounding lands and the perimeter roadway network. All construction traffic will be restricted to this access only.

Sediment Control Devices

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 and Recommendations

Based on the information offered in this report, we offer the following conclusions:

- Water servicing is proposed via a 150 mm service tying into the existing 450 mm diameter watermain on Hurontario Street, which will split into a 150 mm diameter fire connection and a 100 mm diameter domestic water service
- The 100 mm diameter domestic water service will provide an average daily flow of 0.48 L/s, and peak hourly flow of 1.43 L/s
- A fire flow demand of 283.3 L/s for a duration of 4 hours will be provided by the proposed hydrant on site
- The site will be serviced by a proposed 150 mm diameter sanitary service which connects to the existing 250 mm diameter sanitary sewer on Maplewood Road
- Stormwater management will control the runoff from the post-development site to below the allowable release rate of 30.4 L/s through a gravity-fed minor system including a 89.2 m^3 detention basin to the receiving storm sewer on Maplewood Road

- Peak flow matching 10-year post-development to 2-year pre-development was achieved through a 125 mm diameter orifice and approximately 62.9 m^3 of active storage
- Approximately 20.0 m^3 of "dead storage" is provided within the underground detention basin to account for the water balance requirement of 5 mm
- Water quality requirements of 80% TSS removal were achieved through the use of a Stormceptor STC 750 oil and grit separator

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

Respectfully submitted,

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Land Development EIT

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/as

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APPENDIX A

Water Demand Calculations

Project: 1575 Hurontario Street **Created By:** KW **Date:** 2019-09-26
Project No.: 1110-4677 **Checked By:** AS **Updated:** 2019-10-08

Domestic Water Demand

Site Area:	0.3573	ha
Population Density:	3.5	persons/unit
Number of Units:	42	
Population:	147	

Design Parameters

Average Demand (L/capita/d)
280

Water Demand:

Average Daily Demand =	41160	L/day
	0.48	**L/s**
Peaking Factors		
Max Day =	2.0	
Peak Hour =	3.0	
Average Day =	0.48	L/s
Max Day =	**0.95**	L/s
Peak Hour =	**1.43**	L/s

Notes & References

Note 1: Stacked townhome population density of 2.54 ppu and back-to-back townhome population density of 3.5 as recommended by Regional correspondence, dated March 13, 2017 and 3.5 has been used for conservative.

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.

Max Day = Average Day Demand * Max Day

Peak Hour = Average Day Demand * Peak Hour

Municipality	Average Daily Water Demand (L/s)	Max Day Demand (L/s)	Peak Hourly Demand (L/s)
Region of Peel	0.48	0.95	1.43

CROZIER CONSULTING ENGINEERS

9980 Derry Road
Fire Protection Volume Calculation
CFCA File: 1588-5193

Date: 2019-10-08
Design: KW
Check: AS

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:

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

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 = 3,898 sq.m

C = 1.0 Assume combustable construction

Therefore F = 14,000 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)		

Limited Combustible	-15% reduction

-2,100 L/min reduction
11,900 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% reduction),

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	10	20%	2380.0
South	Adjacent Dwelling	15	15%	1785.0
East	Adjacent Dwelling	31	5%	595.0
West		>45	0%	0.0
				4,760 L/min Surcharge

Determine Required Fire Flow

No.1	14,000		
No. 2	-2,100	reduction	
No. 3	0	reduction	
No. 4	4,760	surcharge	
Required Flow:	**16,660 L/min**		
Rounded to nearest 1000 L/min:	**17,000 L/min**	or	283.3 L/s
			4,491 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

CROZIER CONSULTING ENGINEERS

Project: 1575 Hurontario Street **Created By:** KW **Date:** 2019-09-26
Project No.: 1110-4677 **Checked By:** AS **Updated:** 2019-10-08

Domestic Sanitary Design Flow

Site Area:	0.3573	ha
Population Density:	3.5	persons/unit
Number of Units:	42	
Population:	147	persons

Design Parameters

Average Flow (L/capita/d)
302.8

Sanitary Design Flow:

	Average Daily Flow =	302.8	L/floor ha/d
	Average Daily Flow =	**0.52**	L/s
Harmon Peak Factor:	M =	**4.19**	
	Peak Flow =	**2.16**	L/s
Infiltration Flow:	Infiltration =	0.20	L/ha/s
	Total Infiltration =	**0.07**	L/s
	Total Peak Flow =	**2.23**	L/s

Summary Table

Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)
0.52	4.19	2.16	0.07	2.23

Notes & References

Note 1: Stacked townhome population density of 2.54 ppu and back-to-back townhome population density of 3.5 as recommended by Regional correspondence, dated March 13, 2017 and 3.5 has been used for conservative.

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

Average Daily Flow = Average Daily Flow (L/floor ha/day) * Gross Floor Area / 86400

Note 3: Peaking Factor = Harmon Formula

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

Total Peak Flow = Peak Flow + Total Infiltration

APPENDIX C

Stormwater Management Calculations

Project: 1575 Hurontario Street
Project No.: 1110-4677
Created By: KW
Checked By: AS
Date: 2019-09-27
Updated: 2019-10-08

Modified Rational Calculations - Input Parameters

Storm Data: City of Mississauga

Time of Concentration: T_c = **15** **min**

Return Period	A	B	C	I (mm/hr)
2 yr	610	4.6	0.7800	59.89
5 yr	820	4.6	0.7800	80.51
10 yr	1010	4.6	0.7800	99.17
25 yr	1160	4.6	0.7800	113.89
50 yr	1300	4.7	0.7800	127.13
100 yr	1450	4.9	0.7800	140.69

Pre - Development Conditions

Catchment	Land Use	Area (ha)	Area (m^2)	C	Weighted Average C
101 (Site)	*Pervious*	0.20	1956	0.25	**0.14**
	Impervious	0.15	1471	0.9	**0.39**
	Total	0.34	3427	-	**0.53**
102 (External)	*Pervious*	1.86	18563	0.25	**0.19**
	Impervious	0.56	5574	0.9	**0.21**
	Total	2.41	24137	-	**0.40**
Total Site		**2.76**	**27564**	**-**	**0.42**

Post - Development Conditions

Catchment	Land Use	Area (ha)	Area (m^2)	C	Weighted Average C
201 (Site)	*Pervious*	0.10	964	0.25	**0.07**
	Impervious	0.26	2609	0.9	**0.66**
	Total	0.36	3573	-	**0.72**
203 (External)	*Pervious*	1.86	18563	0.25	**0.19**
	Impervious	0.56	5574	0.9	**0.21**
	Total	2.41	24137	-	**0.40**
Total Site		**2.77**	**27710**	**-**	**0.44**

Equations:

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

Intensity
$i(T_d) = A / (T + B)^{\wedge}C$

Project: 1575 Hurontario Street
Project No.: 1110-4677
Created By: KW
Checked By: AS
Date: 2019-09-27
Updated: 2019-10-08

Modified Rational Calculations - Peak Flows Summary

Peak Flows (m^3/s)				
Return Period	$C_{pre(adjusted)}$	$C_{post(adjusted)}$	Q_{pre}	Q_{post}
2 yr	0.42	0.72	0.030	0.043
5 yr	0.42	0.44	0.041	0.058
10 yr	0.42	0.44	0.050	0.072
25 yr	0.46	0.49	0.058	0.083
50 yr	0.50	0.53	0.065	0.092
100 yr	0.52	0.55	0.071	0.102

Equations:

Peak Flow
$Q_{post} = 0.0028 \bullet C_{post} \bullet$

Project: 1575 Hurontario Street
Project No.: 1110-4677
Created By: KW
Checked By: AS
Date: 2019-09-27
Updated: 2019-10-08

Modified Rational Calculations - 10-Year to 2-Year Storm Event

Control Criteria

10 yr: Control Post-Development Peak Flows to 2 yr: Pre-Development Peak Flow

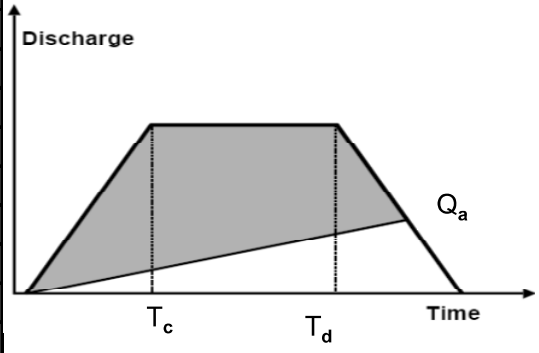
10 yr: Uncontrolled Post-Development Flow:

Q_{post}= 0.072 m^3/s

2 yr: Post-Development Orifice Tube Flowrate:

Q_{pre} = 0.025 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	173.04	300	0.125	22.6
10	124.77	600	0.090	35.5
15	99.17	900	0.072	42.2
20	83.06	1200	0.060	46.0
25	71.90	1500	0.052	48.2
30	63.66	1800	0.046	49.3
35	57.30	2100	0.042	49.7
40	52.22	2400	0.038	49.6
45	48.07	2700	0.035	49.1
50	44.60	3000	0.032	48.2
55	41.65	3300	0.030	47.1
60	39.11	3600	0.028	45.8
65	36.91	3900	0.027	44.3
70	34.96	4200	0.025	42.7
75	33.24	4500	0.024	40.9
80	31.69	4800	0.023	39.0
85	30.31	5100	0.022	37.0
Required Storage Volume:				**49.7**



Peak Flow	Storage
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$	$S_d = Q_{post} \cdot T_d - Q_{target} (T_d + T_c) / 2$

Project: 1575 Hurontario Street
Project No.: 1110-4677

Created By: KW
Checked By: AS

Date: 2019-09-27
Updated: 2019-10-08

Modified Rational Calculations - Summary

Storm Event (yr)	Peak Flow Rate			Required Storage (m^3)
	2-Year Pre-Development (L/s)	Post-Development[1] (L/s)		
		Uncontrolled	Controlled	
10	0.030	0.072	0.025	49.7

CROZIER
CONSULTING ENGINEERS

Project: 1575 Hurontario Street
Project No: 1588-5193
Created By: KW
Checked By: AS
Date: 2019-07-20
Updated: 2019-10-08

ORIFICE RATING CURVE

Orifice Parameters

Diameter Ø (m) = 0.125
Area (A) (m^2) = 0.0123
Coefficient (C) = 0.82
Orifice Invert= 199.24
Centroid (h)= 199.30

Orifice Tube

Discharge, Q = CA x sqrt(2gh)

A. Rating Table

Elevation	Discharge	Active Storage Volume	
m	m^3/s	m^3	
199.24	0.000	0	ORIFICE INVERT
199.41	0.015	23.22	2 yr
199.48	0.019	32.33	5 yr
199.61	0.025	49.72	10 yr
199.60	0.024	49.50	25 yr
199.66	0.027	56.72	50 yr
199.70	0.028	63.09	100 yr
200.15	0.041	92.4	TOP OF STORAGE TANK

Triton Storage Calculator
Rectangular Footprint, Including Perimeter Stone

Units: Metric (user can change units in the "Reference" tab, below)

User Input:

Triton Chamber Model	S-29	
Number of Rows	1	
Number of Chambers/Row	75	
Base of Stone Elevation	92.56	m
Depth of Stone Above Chambers	152.0	mm
Depth of Stone Below Chambers	152.0	mm
End Stone	305.0	mm
Side Stone	305.0	mm
Distance Between Legs of Chambers	190.0	mm
Voids in Stone (porosity)	40%	

System minimums are automatically populated by default. The defaults can be overwritten if desired. Red cells indicate that the minimums have not been met and must be revised, while green cells indicate values larger than the minimums.

Calculated Values:

Number of Chambers	75	
Number of End Caps	2	
System Width	2.11	m
System Length	64.42	m
System Depth	1.218	m
System Footprint	135.9	m^2
Volume of Stone Required	107.4	m^3
System Storage Volume	101.1	m^3

Constants:

Chamber Width at Legs	1499	mm
Chamber Height	914.0	mm
Chamber Length at Overlap	847.00	mm
End Cap Length at Overlap	142.00	mm
Min. Depth of Stone Above Chambers	152	mm
Min. Depth of Stone Below Chambers	152	mm
Min. End Stone	305	mm
Min. Side Stone	305	mm
Min. Distance Between Legs of Chambers	190.0	mm
Layup Chamber Volume	0.774	m^3
Layup End Cap Volume	0.029	m^3

Incremental Storage Output:

Height of System	Cumulative Chamber & End Cap Volume	Cumulative Stone Void Volume	Cumulative System Volume	Elevation
(mm)	(m^3)	(m^3)	(m^3)	(m)

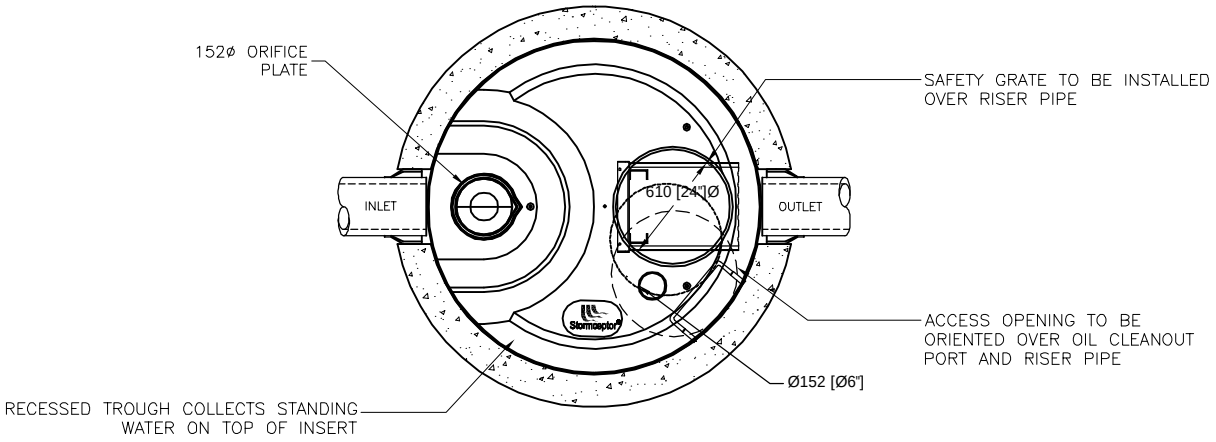
Incremental Storage Output:

Height of System	Cumulative Chamber & End Cap Volume	Cumulative Stone Void Volume	Cumulative System Volume	Elevation
(mm)	(m^3)	(m^3)	(m^3)	(m)
0.0	0.0	0.0	0.0	92.56
25.0	0.0	1.4	1.4	92.59
50.0	0.0	2.7	2.7	92.61
75.0	0.0	4.1	4.1	92.64
100.0	0.0	5.4	5.4	92.66
125.0	0.0	6.8	6.8	92.69
150.0	0.0	8.2	8.2	92.71
152.0	0.0	8.3	8.3	92.71
177.0	2.1	8.8	10.9	92.74
202.0	2.1	10.1	12.2	92.76
227.0	4.1	10.7	14.8	92.79
252.0	6.2	11.2	17.4	92.81
277.0	8.3	11.8	20.0	92.84
302.0	10.3	12.3	22.6	92.86
327.0	12.3	12.8	25.2	92.89
352.0	14.3	13.4	27.7	92.91
377.0	16.3	14.0	30.3	92.94
402.0	18.3	14.5	32.8	92.96
427.0	20.3	15.1	35.4	92.99
452.0	22.3	15.6	37.9	93.01
477.0	24.2	16.2	40.5	93.04
502.0	26.2	16.8	43.0	93.06
527.0	28.1	17.4	45.5	93.09
552.0	30.0	18.0	48.0	93.11
577.0	31.9	18.6	50.5	93.14
602.0	34.6	18.9	53.5	93.16
627.0	35.5	19.9	55.4	93.19
652.0	37.3	20.5	57.8	93.21
677.0	39.1	21.2	60.3	93.24
702.0	40.8	21.8	62.6	93.26
727.0	42.5	22.5	65.0	93.29
752.0	44.2	23.2	67.4	93.31
777.0	45.8	23.9	69.7	93.34
802.0	47.4	24.6	72.0	93.36
827.0	48.9	25.4	74.3	93.39
852.0	50.4	26.2	76.5	93.41
877.0	51.7	27.0	78.7	93.44
902.0	53.0	27.8	80.8	93.46
927.0	54.2	28.7	82.9	93.49
952.0	55.3	29.6	84.9	93.51
977.0	56.3	30.6	86.9	93.54

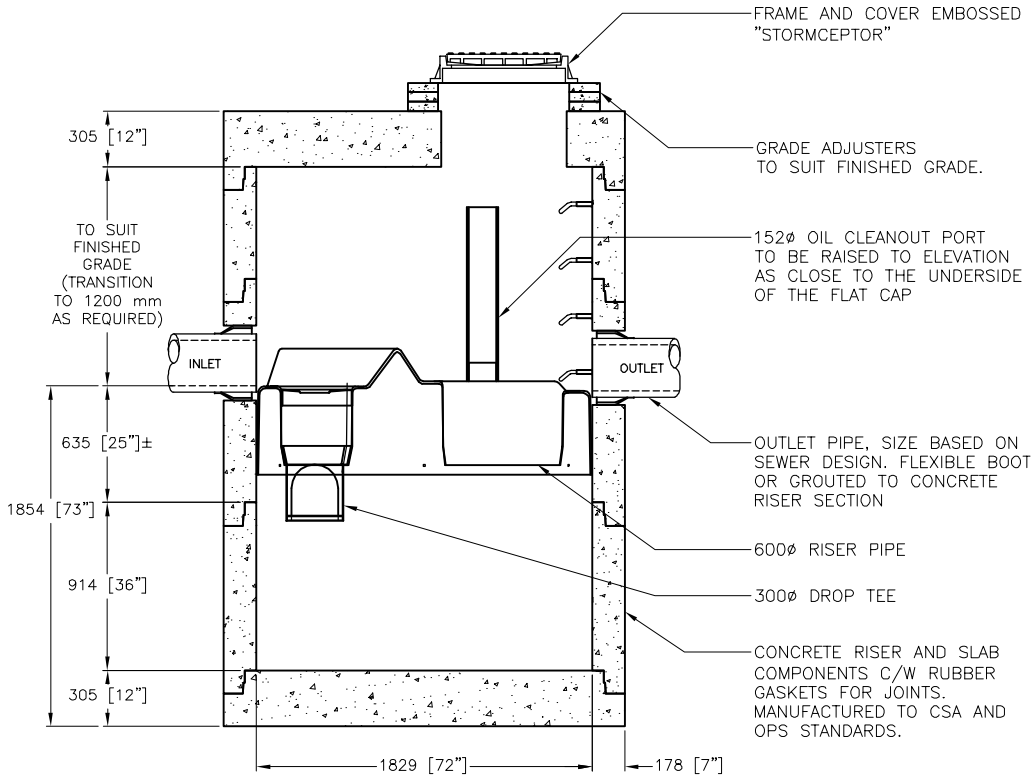
Incremental Storage Output:

Height of System	Cumulative Chamber & End Cap Volume	Cumulative Stone Void Volume	Cumulative System Volume	Elevation
(mm)	(m^3)	(m^3)	(m^3)	(m)
1002.0	57.1	31.6	88.7	93.56
1027.0	57.7	32.7	90.4	93.59
1052.0	58.0	34.0	92.0	93.61
1066.0	58.1	34.7	92.8	93.63
1091.0	0.0	36.0	94.2	93.65
1116.0	0.0	37.4	95.5	93.68
1141.0	0.0	38.7	96.9	93.70
1166.0	0.0	40.1	98.3	93.73
1191.0	0.0	41.5	99.6	93.75
1216.0	0.0	42.8	101.0	93.78
1218.0	0.0	42.9	101.1	93.78

DRAWING NOT TO BE USED FOR CONSTRUCTION



PLAN VIEW



SECTION VIEW

Stormceptor®

imbrium®
WWW.IMBRIUMSYSTEMS.COM
407 FAIRVIEW DRIVE, WHITBY, ON L1N 3A9
TF 800-565-4801 CA 416-960-9900 INTL +1-416-960-9900

STC 750
STANDARD MODEL

####

REV #	DATE	REVISION DESCRIPTION	BY

SHEET NUMBER 1 OF 1

DATE:######## | SCALE: 40 | PROJECT No.: ##### | DRAWN: ### | CHECKED: ###

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Detailed Stormceptor Sizing Report – 1575 Hurontario

Project Information & Location			
Project Name	1575 Hurontario	**Project Number**	20057
City	Mississauga	**State/ Province**	Ontario
Country	Canada	**Date**	10/9/2019
Designer Information		**EOR Information (optional)**	
Name	Katrina Weel	**Name**	
Company	CF Crozier & Associates	**Company**	
Phone #	416-477-3392	**Phone #**	
Email	kweel@cfcrozier.ca	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	
Recommended Stormceptor Model	STC 750
Target TSS Removal (%)	80.0
TSS Removal (%) Provided	85
PSD	Fine Distribution
Rainfall Station	TORONTO CENTRAL

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

Stormceptor Sizing Summary	
Stormceptor Model	**% TSS Removal Provided**
STC 300	76
STC 750	85
STC 1000	86
STC 1500	87
STC 2000	89
STC 3000	90
STC 4000	92
STC 5000	93
STC 6000	94
STC 9000	96
STC 10000	96
STC 14000	97
StormceptorMAX	Custom

Stormceptor
The Stormceptor oil and sediment separator is sized to treat stormwater runoff by removing pollutants through gravity separation and flotation. Stormceptor's patented design generates positive TSS removal for each rainfall event, including large storms. Significant levels of pollutants such as heavy metals, free oils and nutrients are prevented from entering natural water resources and the re-suspension of previously captured sediment (scour) does not occur.
Stormceptor provides a high level of TSS removal for small frequent storm events that represent the majority of annual rainfall volume and pollutant load. Positive treatment continues for large infrequent events, however, such events have little impact on the average annual TSS removal as they represent a small percentage of the total runoff volume and pollutant load.

Design Methodology
Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:
- Site parameters
- Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
- Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
- TSS load
- Detention time of the system

Hydrology Analysis
PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour). Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station			
State/Province	Ontario	**Total Number of Rainfall Events**	2719
Rainfall Station Name	TORONTO CENTRAL	**Total Rainfall (mm)**	13185.4
Station ID #	0100	**Average Annual Rainfall (mm)**	732.5
Coordinates	43°37'N, 79°23'W	**Total Evaporation (mm)**	923.8
Elevation (ft)	328	**Total Infiltration (mm)**	3673.9
Years of Rainfall Data	18	**Total Rainfall that is Runoff (mm)**	8587.7

Notes
• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules. • Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed. • For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

Drainage Area	
Total Area (ha)	0.36
Imperviousness %	72.00

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Design Details	
Stormceptor Inlet Invert Elev (m)	
Stormceptor Outlet Invert Elev (m)	
Stormceptor Rim Elev (m)	
Normal Water Level Elevation (m)	
Pipe Diameter (mm)	
Pipe Material	
Multiple Inlets (Y/N)	No
Grate Inlet (Y/N)	No

Particle Size Distribution (PSD)

Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design.

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Site Name	

Site Details

Drainage Area

Total Area (ha)	0.36
Imperviousness %	72.00

Surface Characteristics

Width (m)	120.00
Slope %	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Maintenance Frequency

Maintenance Frequency (months) >	12

Infiltration Parameters

Horton's equation is used to estimate infiltration

Max. Infiltration Rate (mm/hr)	61.98
Min. Infiltration Rate (mm/hr)	10.16
Decay Rate (1/sec)	0.00055
Regeneration Rate (1/sec)	0.01

Evaporation

Daily Evaporation Rate (mm/day)	2.54

Dry Weather Flow

Dry Weather Flow (lps)	0

Winter Months

Winter Infiltration	0

TSS Loading Parameters

TSS Loading Function	

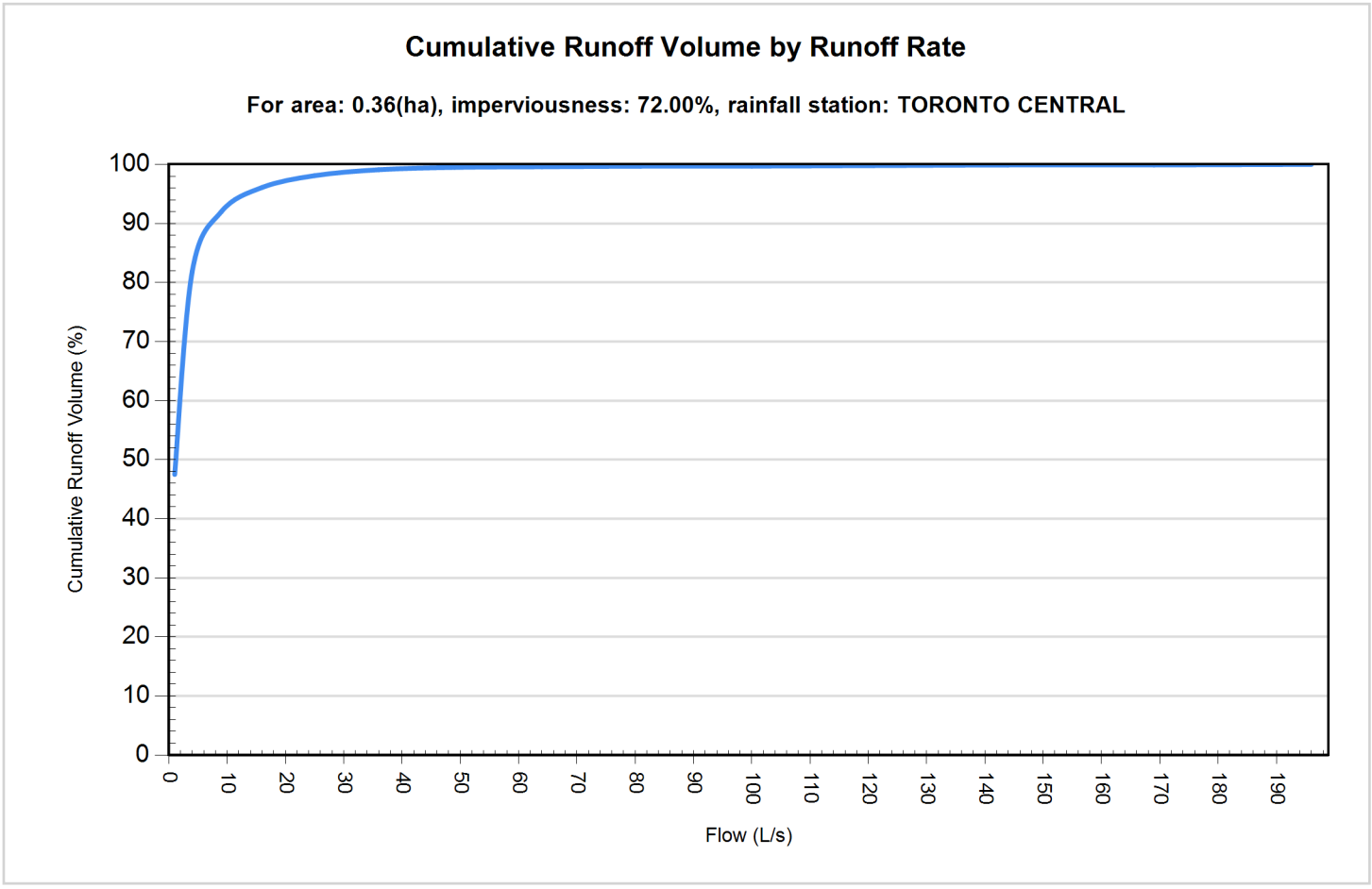
Buildup/Wash-off Parameters

Target Event Mean Conc. (EMC) mg/L	
Exponential Buildup Power	
Exponential Washoff Exponent	

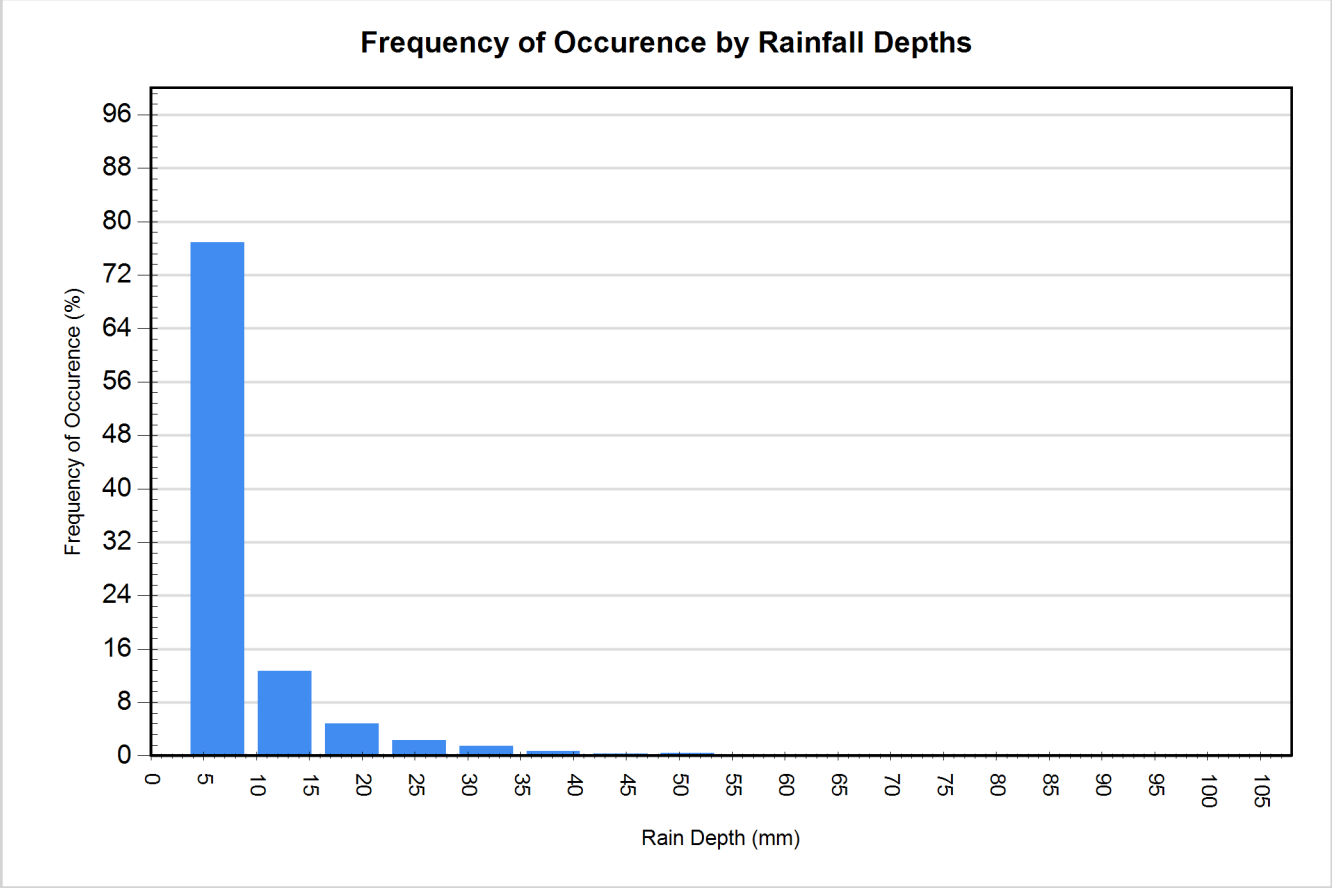
TSS Availability Parameters

Availability Constant A	
Availability Factor B	
Availability Exponent C	
Min. Particle Size Affected by Availability (micron)	

Cumulative Runoff Volume by Runoff Rate			
Runoff Rate (L/s)	**Runoff Volume (m^3)**	**Volume Over (m^3)**	**Cumulative Runoff Volume (%)**
1	14818	16381	47.5
4	25525	5673	81.8
9	28696	2502	92.0
16	29994	1204	96.1
25	30610	588	98.1
36	30906	292	99.1
49	31027	171	99.5
64	31068	130	99.6
81	31097	101	99.7
100	31118	80	99.7
121	31137	61	99.8
144	31158	40	99.9
169	31180	18	99.9
196	31196	2	100.0



Rainfall Event Analysis				
Rainfall Depth (mm)	**No. of Events**	**Percentage of Total Events (%)**	**Total Volume (mm)**	**Percentage of Annual Volume (%)**
6.35	2091	76.9	3344	25.4
12.70	345	12.7	3201	24.3
19.05	131	4.8	2062	15.6
25.40	63	2.3	1358	10.3
31.75	42	1.5	1185	9.0
38.10	20	0.7	678	5.1
44.45	9	0.3	377	2.9
50.80	11	0.4	521	4.0
57.15	3	0.1	159	1.2
63.50	1	0.0	61	0.5
69.85	0	0.0	0	0.0
76.20	1	0.0	73	0.6
82.55	1	0.0	80	0.6
88.90	1	0.0	85	0.6
95.25	0	0.0	0	0.0
101.60	0	0.0	0	0.0



For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications

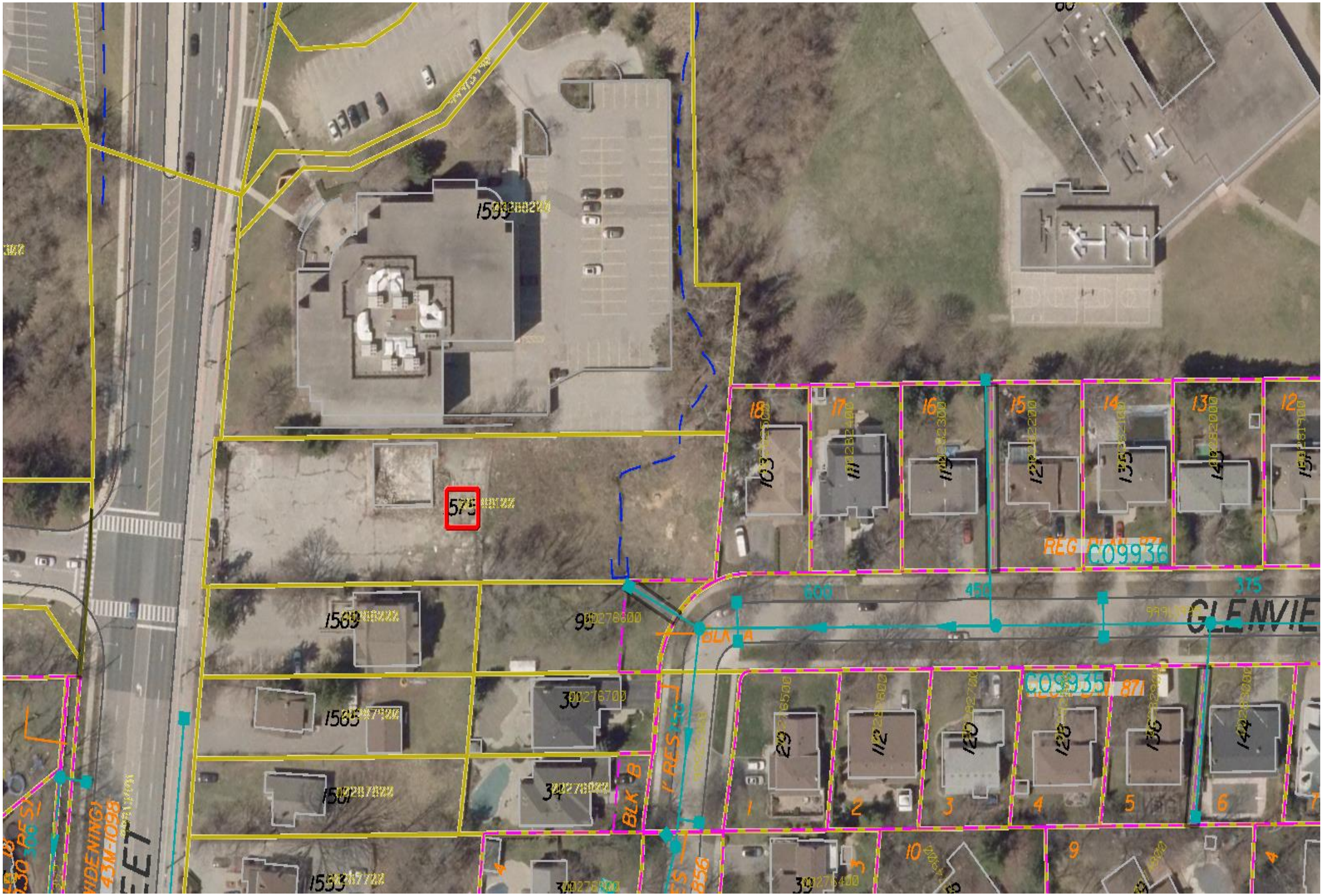
APPENDIX D

Existing Reports

STORM DRAINAGE AREA

AREA in ACRES
RUN-OFF COEFF.

(.67 Acres) 1/10


1599
1575
1569
1565
1561
1553
99
30
34
39
103
111
119
127
135
143
129
112
120
128
136
144
18
17
16
15
14
13
12
C09936
C09935
GLENVIE
600
450
375
BLK A
BLK B
43M-1098

FIGURES

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

NOT FOR CONSTRUCTION

No.	ISSUE / REVISION	YYYY/MMM/DD
2	ISSUED FOR OPA/ZBA	2019/OCT/11
1	ISSUED FOR FSR	2017/DEC/06

ELEVATION NOTE:

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

ELEVATION = 98.279m

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENKUS ONTARIO LAND SURVEYOR. (2015/JUNE/08)
REFERENCE No.: 02-39C
BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
UTM ZONE 17, NAD83 (CSRS) (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.: 17-094 (2019/OCT/03)
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

PRE-DEVELOPMENT DRAINAGE PLAN

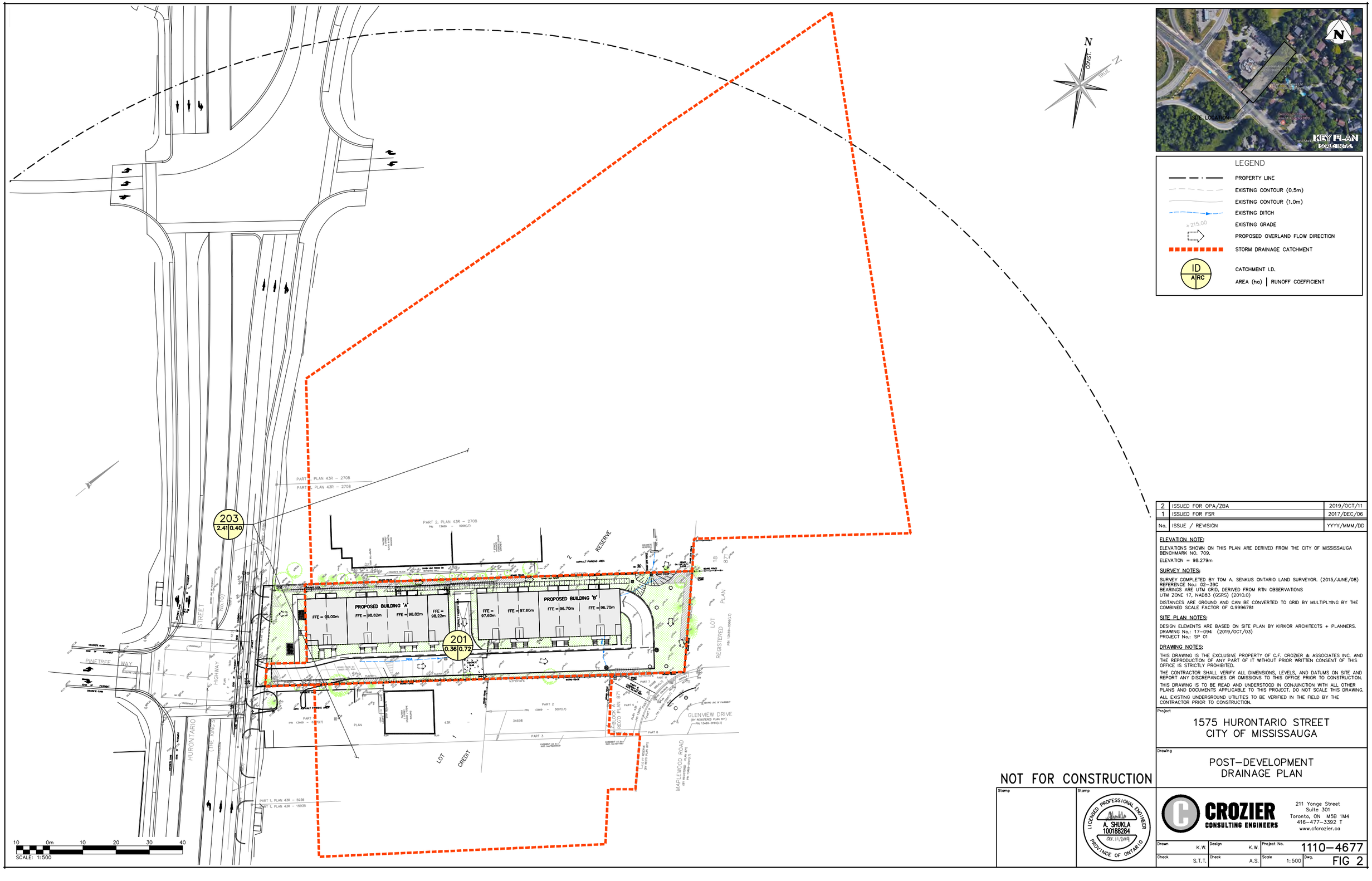
Stamp

Stamp

LICENSED PROFESSIONAL ENGINEER
A. SHUKLA
100188284
OCT. 11, 2019
PROVINCE OF ONTARIO

CROZIER CONSULTING ENGINEERS
211 Yonge Street
Suite 301
Toronto, ON M5B 1M4
416-477-3392 T
www.cfcrozier.ca

Drawn	Design	Project No.	
K.W.	K.W.	1110-4677	
Check	Check	Scale	Dwg.
S.T.T.	A.S.	1:500	FIG 1



NOT FOR CONSTRUCTION

No.	ISSUE / REVISION	YYYY/MMM/DD
2	ISSUED FOR OPA/ZBA	2019/OCT/11
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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

POST–DEVELOPMENT DRAINAGE PLAN

Stamp

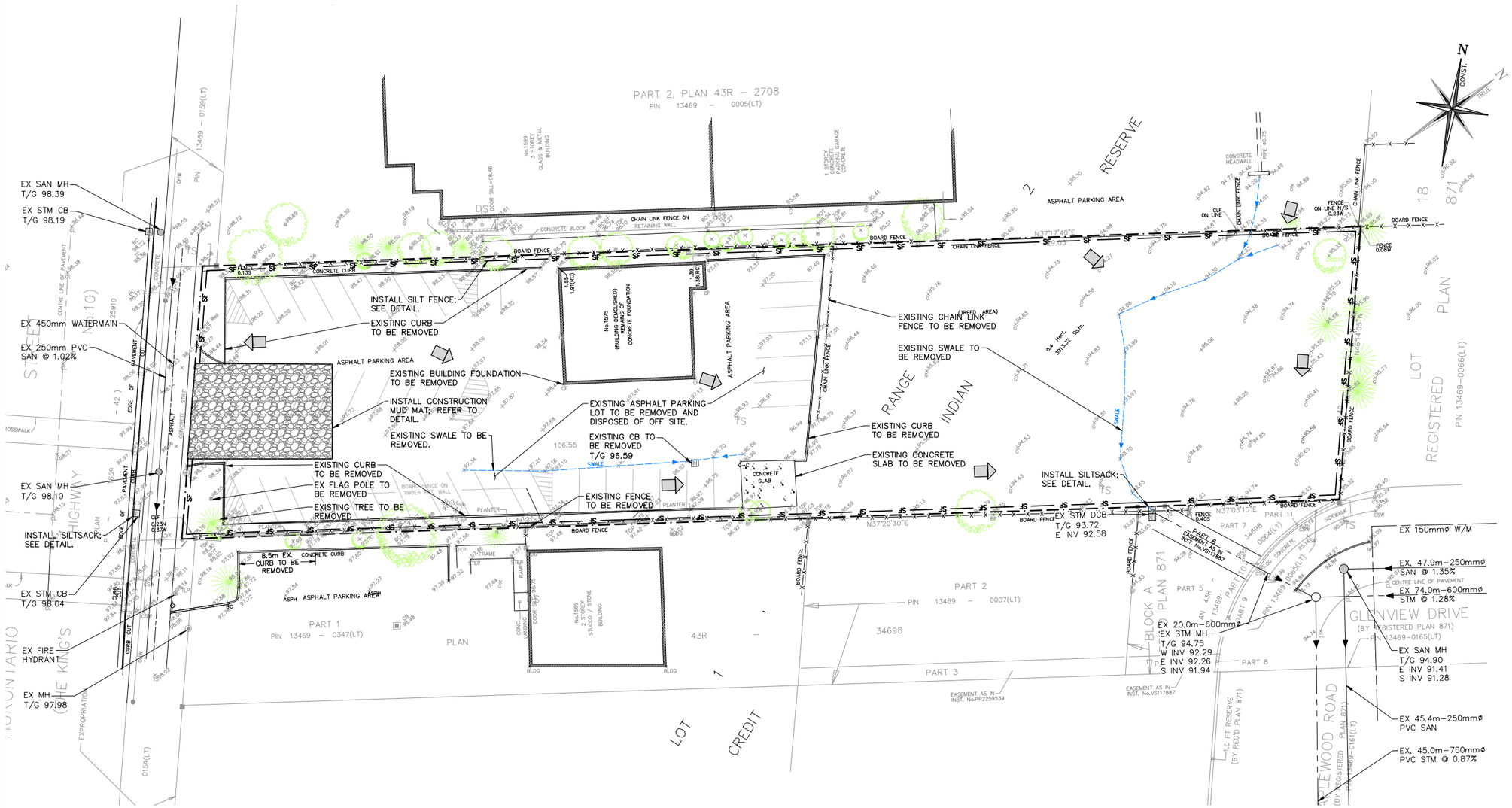
Stamp

LICENSED PROFESSIONAL ENGINEER
A. SHUKLA
100188284
PROVINCE OF ONTARIO
DEC. 11, 2019

CROZIER CONSULTING ENGINEERS
211 Yonge Street
Suite 301
Toronto, ON M5B 1M4
416–477–3392 T
www.cfcrozier.ca

Drawn	Design	Project No.	
K.W.	K.W.		1110–4677
Check	Check	Scale	Dwg.
S.T.T.	A.S.	1:500	FIG 2

DRAWINGS

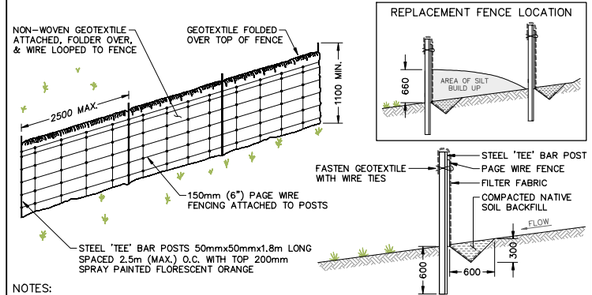


LEGEND

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

TYPICAL HEAVY DUTY SILT FENCE

SCALE: N.T.S.

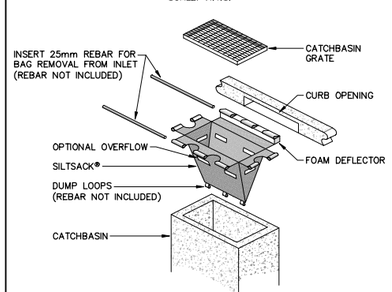


NOTES:

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.

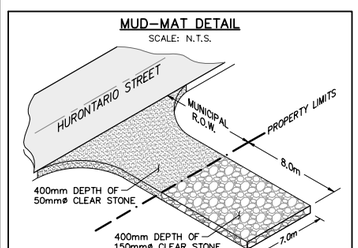


NOTES:

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.

5 0m 5 10 15 20
SCALE: 1:250

NOT FOR CONSTRUCTION

No.	ISSUE / REVISION	YYYY/MMM/DD
2	ISSUED FOR OPA/ZBA	2019/OCT/11
1	ISSUED FOR FSR	2017/DEC/06

ELEVATION NOTE:

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

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENKUS ONTARIO LAND SURVEYOR. (2015/JUNE/08)
REFERENCE No.: 02–39C
BEARINGS ARE UTM GRID, DERIVED FROM RTN OBSERVATIONS
UTM ZONE 17, NAD83 (CSRS) (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.: 17–094 (2019/OCT/03)
PROJECT No.: SP 01

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Project

1575 HURONTARIO STREET
CITY OF MISSISSAUGA

Drawing

REMOVALS PLAN
EROSION & SEDIMENT CONTROL PLAN

Stamp

Stamp: LICENSED PROFESSIONAL ENGINEER — A. SHUKLA — 100188284 — Oct. 11, 2019 — PROVINCE OF ONTARIO

CROZIER CONSULTING ENGINEERS
211 Yonge Street
Suite 301
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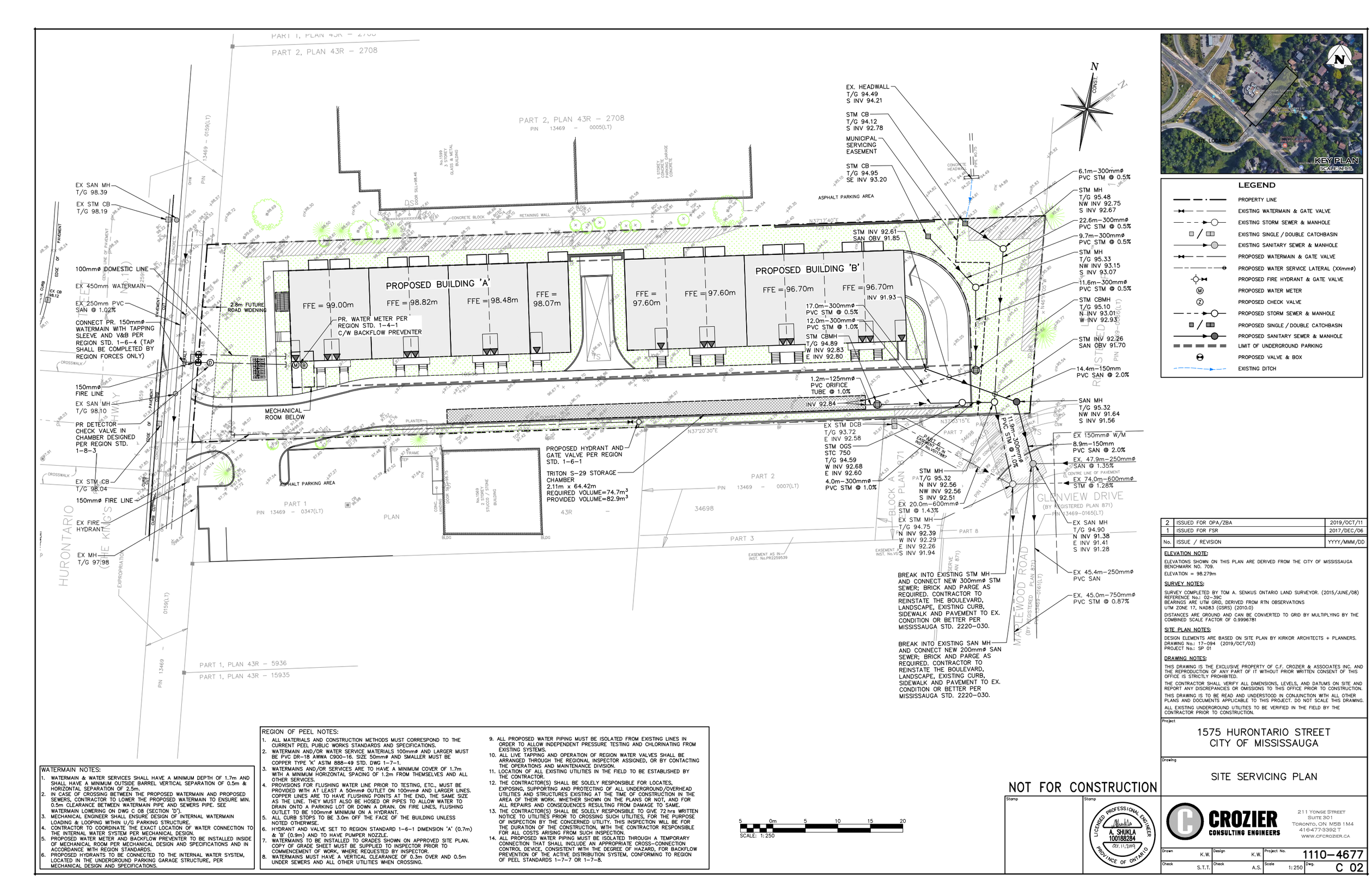
www.cfcrozier.ca

Drawn	Design	Project No.	
K.W.	K.W.		1110–4677
Check	Check	Scale	Dwg.
S.T.T.	A.S.	1:250	C 01



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

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Project

1575 HURONTARIO STREET CITY OF MISSISSAUGA

Drawing

SITE SERVICING PLAN

WATERMAIN NOTES:

1. WATERMAIN & WATER SERVICES SHALL HAVE A MINIMUM DEPTH OF 1.7m AND SHALL HAVE A MINIMUM OUTSIDE BARREL VERTICAL SEPARATION OF 0.5m & HORIZONTAL SEPARATION OF 2.5m.
2. IN CASE OF CROSSING BETWEEN THE PROPOSED WATERMAIN AND PROPOSED SEWERS, CONTRACTOR TO LOWER THE PROPOSED WATERMAIN TO ENSURE MIN. 0.5m CLEARANCE BETWEEN WATERMAIN PIPE AND SEWERS PIPE. SEE WATERMAIN LOWERING ON DWG C 08 (SECTION 'D').
3. MECHANICAL ENGINEER SHALL ENSURE DESIGN OF INTERNAL WATERMAIN LOADING & LOOPING WITHIN U/G PARKING STRUCTURE.
4. CONTRACTOR TO COORDINATE THE EXACT LOCATION OF WATER CONNECTION TO THE INTERNAL WATER SYSTEM PER MECHANICAL DESIGN.
5. PROPOSED WATER METER AND BACKFLOW PREVENTER TO BE INSTALLED INSIDE OF MECHANICAL ROOM PER MECHANICAL DESIGN AND SPECIFICATIONS AND IN ACCORDANCE WITH REGION STANDARDS.
6. PROPOSED HYDRANTS TO BE CONNECTED TO THE INTERNAL WATER SYSTEM, LOCATED IN THE UNDERGROUND PARKING GARAGE STRUCTURE, PER MECHANICAL DESIGN AND SPECIFICATIONS.

REGION OF PEEL NOTES:

1. ALL MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
2. WATERMAIN AND/OR WATER SERVICE MATERIALS 100mmø AND LARGER MUST BE PVC DR–18 AWWA C900–16. SIZE 50mmø AND SMALLER MUST BE COPPER TYPE 'K' ASTM B88–49 STD. DWG 1–7–1.
3. WATERMAINS AND/OR SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7m WITH A MINIMUM HORIZONTAL SPACING OF 1.2m FROM THEMSELVES AND ALL OTHER SERVICES.
4. PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING, ETC., MUST BE PROVIDED WITH AT LEAST A 50mmø OUTLET ON 100mmø 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 PIPES TO ALLOW WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100mmø MINIMUM ON A HYDRANT.
5. ALL CURB STOPS TO BE 3.0m OFF THE FACE OF THE BUILDING UNLESS NOTED OTHERWISE.
6. HYDRANT AND VALVE SET TO REGION STANDARD 1–6–1 DIMENSION 'A' (0.7m) & 'B' (0.9m) AND TO HAVE PUMPER NOZZLE.
7. WATERMAINS TO BE INSTALLED TO GRADES SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
8. WATERMAINS MUST HAVE A VERTICAL CLEARANCE OF 0.3m OVER AND 0.5m 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/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 hrs WRITTEN NOTICE TO 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.

5 0m 5 10 15 20
SCALE: 1:250

NOT FOR CONSTRUCTION

Stamp

Stamp

LICENSED PROFESSIONAL ENGINEER
A. SHUKLA
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PROVINCE OF ONTARIO
2019.11.20

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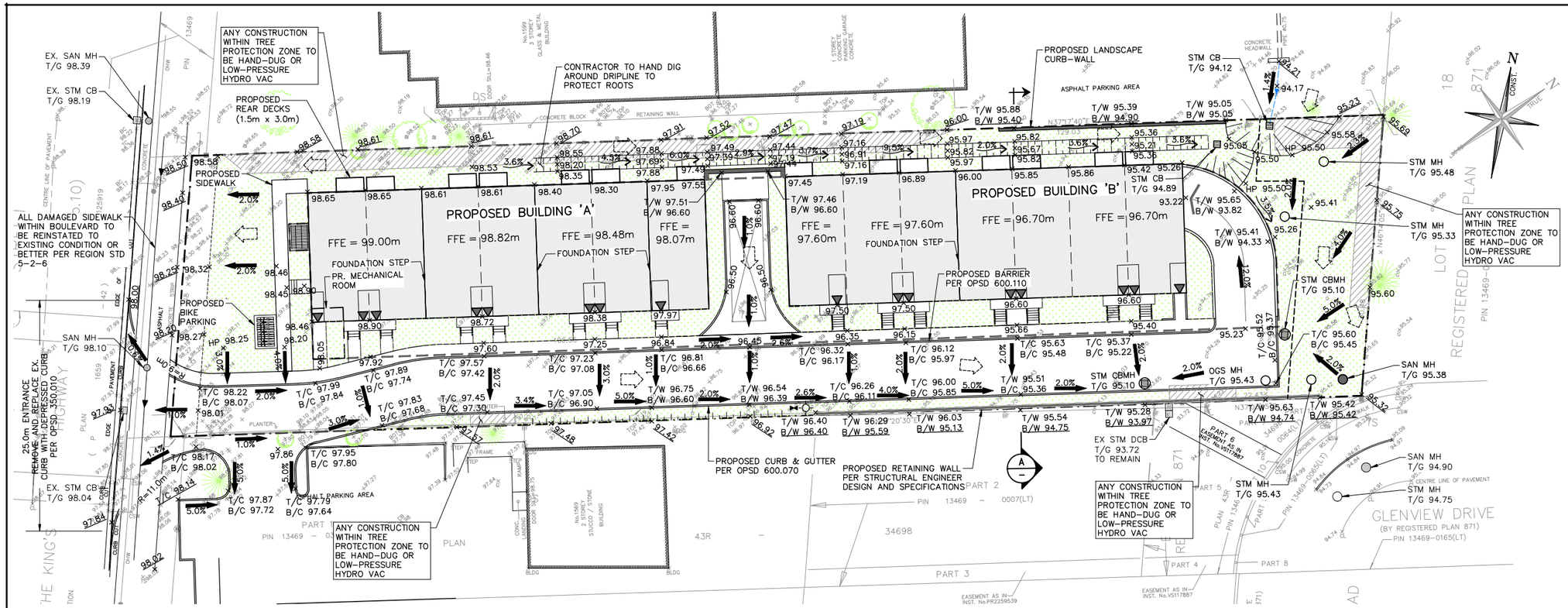
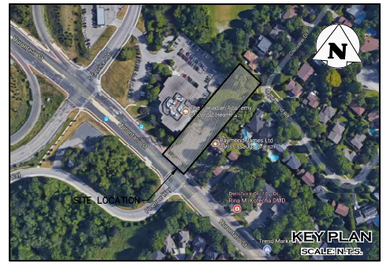
Drawn	K.W.	Design	K.W.	Project No.	1110–4677
Check	S.T.T.	Check	A.S.	Scale	1:250
				Dwg.	C 02



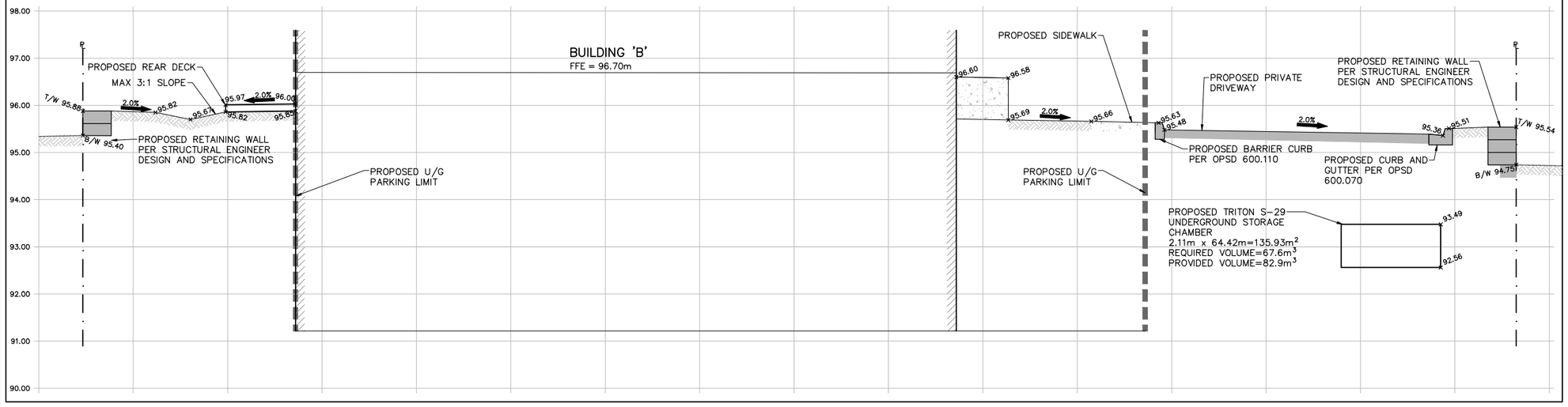


LEGEND

- PROPERTY LINE
- EXISTING DITCH
- ×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
- PROPOSED HYDRANT

SECTION 'A'

SCALE: 1:50



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Project

1575 HURONTARIO STREET
CITY OF MISSISSAUGA

Drawing

SITE GRADING PLAN

Stamp

Stamp

LICENSED PROFESSIONAL ENGINEER
A. SHUKLA
100188284
OCT. 11, 2019
PROVINCE OF ONTARIO

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