FUNCTIONAL SERVICING & PRELIMINARY STORMWATER MANAGEMENT REPORT

80 THOMAS STREET

CITY MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

DUNPAR HOMES

PREPARED BY:

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

OCTOBER 2016

CFCA FILE NO. 1240 - 4376

CROZIER & ASSOCIATES
Consulting Engineers

Revision Number	Date	Comments
Rev. 0	October, 2016	Issued for Zoning By-Law Amendment (ZBA)

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1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) was retained by Dunpar Homes to prepare a Functional Servicing and Preliminary Stormwater Management Report. This report supports the Zoning By-law Amendment (ZBA) to permit the proposed re-development at 80 Thomas Street in the City of Mississauga. The proposed re-development consists of an 18-block, 219-unit townhouse complex based on the Site Plan prepared by OP Design Inc. dated April 25, 2016, revised October 14, 2016. The existing industrial building and parking areas will be removed.

The purpose of this report is to demonstrate that the proposed re-development is feasible from a servicing and stormwater management perspective. We acknowledge that the proposed re-development design may be impacted due to the Mullet Creek regulatory flood line. Crozier is currently investigating the regulatory flood line limits on the subject property.

2.0 GENERAL SITE DESCRIPTION

The subject property is approximately 2.47 ha and is located in a mixed residential and commercial area in Mississauga. An industrial building with associated parking and landscaped areas currently exist on the subject property.

The property is bounded by:

- Thomas Street to the south
- Joymar Drive to the east
- Residential areas to the north and west

The project will consist of the re-development of the industrial site into an 18-block, 219-unit townhouse complex with an internal private roadway and two private laneways connecting to Joymar Drive, associated surface and covered parking areas, and landscaped areas. The proposed residential buildings will have a combined gross floor area of 123,832 square feet.

3.0 WATER SERVICING

3.1 Existing Water Servicing

A 300 mm diameter watermain is located east of the subject property within the Joymar Drive right-of-way (Joymar Drive Prop 300mm Watermain, Sta.0+000 to Sta. 0+180, Region of Peel Public Works, 1995). A 300 mm diameter watermain is also located south of the subject property within the Thomas Street right-of-way, (Thomas Street Prop 300mm Watermain, Joymar Dr. to Gafney Dr., Region of Peel Public Works, 1995).

The proposed water supply for the development is through a connection to the existing 300 mm diameter watermain on Joymar Drive.

3.2 Design Water Demand

Region of Peel Watermain Design Criteria were referenced to calculate water demands for the proposed development. An average daily water demand of 0.28 m^3/person/day was used in conjunction with an occupancy density of 2.7 persons/unit for the 219 units in the proposed development. **Table 1** summarizes the water demands. **Appendix A** contains detailed water demand calculations.

Table 1: Estimated Domestic Water Demand

Criteria	Average Day (L/s)	Peak Flow (L/s)	Standard
Region of Peel	1.92	5.75	Region of Peel Public Works Design, Specifications & Procedures Manual, Linear Infrastructure, Watermain Design Criteria (June 2010)

Using the Region of Peel design criteria for domestic water demand, the estimated average day water demand and peak flows for the site will be 1.92 L/s and 5.75 L/s, respectively.

The Fire Underwriters Survey method was used to calculate the fire flow requirements for the proposed development. The design fire flow and water demand calculations, included in **Appendix A**, are considered approximate at this time. The final sizing of the water connection will be verified during detailed design. In order to determine the available fire flow and pressure within the existing watermain system, a hydrant flow test may be required. The estimated fire flow requirements, summarized in **Table 2,** were calculated based on the gross-floor area of the largest building within the development and basic building construction.

Table 2: Estimated Fire Demand Flow

Method	Demand Flow (L/s)	Demand Flow (USGPM)	Duration (h)
Fire Underwriters Survey	167	2,642	2.0

The proposed fire service is required to accommodate a design fire flow of 167 L/s for duration of 2.0 hours. **Appendix A** contains the Fire Underwriters Survey calculation.

3.3 Proposed Water Servicing

A 250 mm diameter looped watermain with an extension to the southern condominium blocks is proposed to service the development. The looped watermain is located within the private road right-of-way and will connect to the 300 mm diameter watermain within the Joymar Drive right-of-way, east of the subject property. Each condominium block of units will be serviced with a separate diameter water connection to the looped watermain. The mechanical engineer will design the internal unit water connections within each block of units.

A hydrant flow test was completed at 9:05 am on October 4, 2016 along Joymar Drive adjacent to the subject site. The minimum and maximum water pressures were 407 kPa and 462 kPa, respectively. With these known pressures we expect there should be sufficient capacity to service the site for water from the

Joymar Drive watermain. The Region of Peel will confirm this through their regional water model. The Region of Peel Connection Demand Table (**Appendix A**) highlights the hydrant flow test results and water demands for the site.

Internal fire hydrants are proposed to connect to the looped watermain. The Preliminary Site Servicing Plan (**Drawing C702)** illustrates the locations of the watermain, the southern extension, hydrants, and proposed connections. Additional details will be provided at detailed design.

4.0 SANITARY SERVICING

4.1 Existing Sanitary Servicing

Existing 300 mm and 375 mm diameter gravity sanitary sewers are located within the Thomas Street right-of-way, south of the subject property (Thomas Street Prop 300mm Watermain, Joymar Dr. to Gafney Dr., Region of Peel Public Works, 1995). There is no existing sanitary sewer on Joymar Drive adjacent to the subject property.

The proposed sanitary servicing for the development includes a connection to the existing 375 mm diameter sanitary sewer on Thomas Street.

4.2 Design Sanitary Demand

Region of Peel Sanitary Sewer Design Criteria were referenced to calculate sanitary design flows for the proposed development. A unit sewage flow rate of 302.8 L/person/day was used with an occupancy density of 2.7 persons/unit for the 219 units in the proposed development. Infiltration flow and a peaking factor were applied to the average daily sewage flow to obtain the total estimated peak design sewage flow. A summary of the results are presented in **Table 3**, with detailed calculations provided in **Appendix B**.

Table 3: Estimated Sanitary Design Flows

Criteria	Average Day Flow (L/s)	Peak Hour Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)	Standard
Region of Peel	2.07	3.94	8.16	0.49	8.65	Region of Peel, Linear Infrastructure, Sanitary Sewer Design Criteria (July 2009)

The proposed sanitary service was sized to convey a peak sanitary flow of 8.65 L/s, as determined by the Region of Peel Sanitary Sewer Design Criteria.

4.3 Proposed Sanitary Servicing

An internal 200 mm diameter sanitary sewer network on the site is proposed to service the development. This 200 mm diameter sanitary sewer connects to the 375 mm diameter sanitary sewer on Thomas Street, south of the subject property. The internal sanitary sewer network drains south along the private road right-of-way before connecting to the Thomas Street sewer. Each condominium block will be serviced with a separate connection to the 200 mm diameter sanitary sewer.

The Preliminary Site Servicing Plan (**Drawing 702)** illustrates the locations of the sanitary sewer and all of the proposed sanitary service connections. Details will be provided at detailed design.

5.0 DRAINAGE CONDITIONS

5.1 Existing Drainage

Most of the stormwater runoff generated within the 2.47 ha subject property currently drains overland to the south and east where it is collected in the municipal storm sewer systems on Thomas Street and Joymar Drive. Stormwater collected in these systems is conveyed east east on Thomas Street where it outlets to Mullet Creek. A small portion of runoff from the site drains overland to the west where it is collected in an existing ditch inlet catchbasin. The ditch inlet catchbasin drains to the west through a storm sewer within a municipal easement that ultimately connects to the municipal storm sewer on Callisto Court. A similar ditch inlet catchbasin collects a small portion of runoff along the north edge of the property. This ditch inlet catchbasin drains to the east where it connects to the Joymar Drive storm sewer. No external drainage enters the site under existing conditions. There does not appear to be any existing stormwater controls on site.

5.2 Proposed Drainage

The proposed re-development consists of an 18-block, 219-unit townhouse complex with an internal private roadway, associated surface and covered parking areas, and landscaped areas. The majority of the site's runoff will be collected by catchbasins located within the private road right-of-way and will be conveyed through a proposed internal storm sewer network. The proposed internal storm sewer network connects to the existing municipal storm sewer on Joymar Drive at a proposed manhole to the east of the property. In addition to the main internal storm sewer network, runoff from both laneways along the north and south portions of the site will drain east into on-site catchbasins. These proposed catchbasins connect to the Joymar Drive storm sewer at separate locations. The existing ditch inlet catchbasin, which connects to the municipal storm sewer on Callisto Court, will no longer be required with the re-development of these lands. As a result, the existing municipal easement over Part 1, Plan 43R-29999 can ultimately be released.

The Preliminary Site Servicing and Site Grading Plans (**Drawing C702 and C703**) illustrate the internal storm sewer network and all of the connections, as well as, the proposed drainage of the site.

5.3 Runoff Coefficients

As mentioned in the Development Application Review Committee (DARC) Comments from the City of Mississauga, a maximum pre-development runoff coefficient of 0.75 will be used for the entire site to establish the target discharge rate. For post-development conditions, a runoff coefficient of 0.90 was selected for the site because of the high level of imperviousness. In order to account for the increase in runoff because of the saturation of the catchment surface, runoff coefficient adjustment factors were used for the lower frequency design storms (25-,50-,100-year and regional storms) according to the updated City of Mississauga criteria. **Table 4** summarizes the adjustment factors and the adjusted runoff coefficients. Refer to **Appendix C** for the calculations.

Table 4: Adjusted Runoff Coefficients

Storm	Adjustment Factor	Adjusted Pre-Development Runoff Coefficient	Adjusted Post-Development Runoff Coefficient
2-year	1.00	0.75	0.90
5-year	1.00	0.75	0.90
10-year	1.00	0.75	0.90
25-year	1.10	0.83	0.99
50-year	1.20	0.90	1.00
100-year	1.25	0.94	1.00
Regional	1.25	0.94	1.00

6.0 STORMWATER MANAGEMENT

Stormwater management design criteria were established through the DARC comments, a phone conversation with the City of Mississauga and a review of the current City of Mississauga Development Requirements Manual. The stormwater management criteria include:

Quantity Control

Provide post to pre stormwater management control for all design storms (2-, 5-, 10-, 25-, 50-, and 100-year design storms) and the regional storm using a pre-development runoff coefficient of 0.75.

Quality Control

An enhanced level of water quality control is required (80% Total Suspended Solids removal).

Water Balance

Retain first 5 mm of rainfall on site by way of infiltration, evapotranspiration, or re-use.

6.1 Stormwater Quantity Control

Stormwater quantity control requirements for the site include providing post-development to pre-development control for all storms including the 2-, 5-, 10-, 25-, 50- and 100-year and regional storm events. The Modified Rational Method was used to calculate both the runoff rates from the site and the storage requirements necessary for the post-development peak flows to meet their pre-development levels using City of Mississauga Intensity-Duration-Frequency (IDF) Parameters. SWMHYMO was used to model the Regional storm event for the site under pre and post-development conditions.

The proposed stormwater quantity controls will consist of oversized storm sewer pipes and an underground stormwater chamber with an outlet orifice tube. Rooftop controls are not proposed at this time. The proposed chamber and the oversized stormwater pipes will be designed to contain an active storage volume of 145 m^3. This storage volume is required to control the 100-year post-development peak stormwater flow from catchment 202 helping to match the pre-development peak flows for the entire site. A 450 mm diameter storm sewer, acting as an orifice tube, will control the flows out of the underground storage chamber to a maximum flow rate of 599 L/s during the 100-year design storm. The Preliminary Servicing Plan (**Drawing C702**) illustrates the location of the underground storage system. **Appendix C** contains the complete stormwater calculations.

A summary of preliminary stormwater runoff flows and the required storage volumes are provided in **Table 5**.

Table 5: Pre and Post-Development Flow Rates and Required Storage Volumes

Storm	Pre-Development Flow Rate (L/s)	Post-Development Flow Rate (L/s)		Active Storage Volume Required (m^3)	Active Storage Volume Provided (m^3)
		Uncontrolled	Controlled		
2-year	311	373	311	56	145
5-year	418	502	418	75	
10-year	515	618	515	93	
25-year	651	781	651	117	
50-year	793	881	793	79	
100-year	914	975	811	145	
Regional	308	361	308	108	

6.2 Stormwater Quality Control

An in-line oil/grit separator (OGS) will provide water quality control (Enhanced Level of Protection, or 80% TSS removal) for the proposed development. The OGS (Stormceptor STC 9000) will be installed just upstream of the proposed underground storage chamber. It will provide quality control for runoff generated during the design rainfall events up to and including the 100-year and regional design storms. We acknowledge that some of the runoff generated on the site to the north and south will not be treated for water quality; however, the majority of the site runoff will be treated.

6.3 Water Balance

A storage volume of 123 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 rainfall on-site. The stored stormwater will be used for site irrigation.

7.0 EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

Erosion and sediment controls will be installed before construction begins. They will be maintained until the site is stabilized or as directed by the Site Engineer or City of Mississauga. The Preliminary Erosion and Sediment Control Plan (**Drawing 701**) identifies the location of the recommended controls.

The following erosion and sediment controls may include heavy duty silt fencing, rock mud mat, and silt sacks in catchbasins.

8.0 CONCEPTUAL SERVICING OF ADJACENT PROPERTY (86 THOMAS STREET)

Eighty-six Thomas Street is a small portion of developable land located to the southwest of the subject property. The proposed re-development of the subject property, 80 Thomas Street, does not impact the potential future development of 86 Thomas Street. The appropriate easement would need to be established over the southern laneway of the 80 Thomas Street re-development to ensure pedestrian and vehicular access for 86 Thomas Street is protected. Servicing of 86 Thomas Street can be accommodated directly from Thomas Street.

9.0 CONCLUSIONS & RECOMMENDATIONS

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

- The proposed re-development of the site includes the re-development of the industrial building and parking areas into an 18 block, 219 unit townhouse complex with an internal private roadway and two private laneways connecting to Joymar Drive, associated surface and covered parking areas, and landscaped areas.
- Domestic peak water demand for the proposed condominium townhouse complex is 5.75 L/s. A design fire flow of 167 L/s for 2.0 hours is required.
- Water demand for the proposed development will be provided through an internal watermain that connects to the existing 300 mm diameter watermain on Joymar Drive.
- Peak sanitary flow for the proposed condominium townhouse complex is 8.65 L/s.
- Sanitary flows from the proposed development will be conveyed using a private internal sanitary sewer network that connects to the existing 375 mm diameter sanitary sewer on Thomas Street, south of the subject property.

- Stormwater management for the proposed development will include controlling the post-development peak flows to the pre-development peak flows for the 2-year though to and including the 100-year and the regional design storms.
- Internal stormwater runoff will be safely conveyed through the subject property by the internal storm sewer network for rainfall events up to and including the 100-year and regional design storms.
- Stormwater quantity controls for the site will be provided through the combination of oversized storm sewer pipes, an underground storage chamber and an outlet orifice tube.
- Stormwater quality controls for the site will be provided through an in-line oil/grit separator (OGS) unit.
- The first 5 mm of rainfall on the site will be retained within an underground storage chamber and re-used for irrigation purposes.
- Erosion and sediment controls will be provided during construction.
- The proposed re-development does not impact the potential future development of 86 Thomas Street.

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

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

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Senior Project Manager

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Associate

LP/ce

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APPENDIX A

Water Demand Calculations

Domestic Water Demand

Notes & References

Site Area: 2.47 ha
Population Density: 2.7 persons/unit
Number of units: 219
Population: 591

Section 2.1, Region of Peel Public Works Design Criteria Manual - Sanitary Sewer.

Population Equivalent Densities:

Building Use	People / ha	Area (ha)	Equivalent Population	
Residential	239.39	2.473	592	0.592
Total		**2.473**	**592**	**0.592**

Building Use	Building Area (m^2)	Average Daily Flow Rate (L/capita/day)	Average Flow (L/day)
Residential	11,504	280	165564
Total	**11,504**	**280**	**165564**

Water Demand:

Average Daily Flow Rate = 280 L/day/capita

Table #1 - Typical Water Demand Criteria, Region of Peel Public Works Watermain Design Criteria.

Average Daily Demand = 165,564 L/day
1.92 **L/s**

Peaking Factors
Max Day = 2.0
Peak Hour = 3.0

Table #1 - Typical Water Demand Criteria, Region of Peel Public Works Watermain Design Criteria.

Average Day = 1.92 L/s
Max Day = **3.83** L/s
Peak Hour = **5.75** L/s

Max Day = Average Day Demand * Max Day
Peak Hour = Average Day Demand * Peak Hour

Municipality	Average Daily Water Demand (L/s)	Peak Daily Demand (L/s)	Peak Hourly Demand (L/s)
Region of Peel	1.92	3.83	5.75

CROZIER & ASSOCIATES Consulting Engineers

80 Thomas Street
Fire Protection Volume Calculation
CFCA File: 1240-4376

Date: 10/24/2016
Designed By: LP
Checked By: 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:

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

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

A = 826.0 sq.m. Gross floor area (G.F.A) of Block Q per Site Plan from OP Design Inc., dated Apr 25, 2016

C = 1.0

Therefore F = 6,323 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
6,323 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 considered to not have any sprinkler system

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	11	15%	948.4
South	Adjacent Dwelling	11	15%	948.4
East	Adjacent Dwelling	15	15%	948.4
West	Adjacent Dwelling	15	15%	948.4
				3,794 L/min Surcharge

Determine Required Fire Flow

No.1	6,323		
No. 2	0 reduction		
No. 3	0 reduction		
No. 4	3,794 surcharge		
Required Flow:	**10,117 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

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SITE NAME: Crozier & Associates Consulting Engineers DATE: Oct. 4/16.

LOCATION: 80 Thomas St, Mississauga.

TEST DATA TIME OF TEST: 9:05am

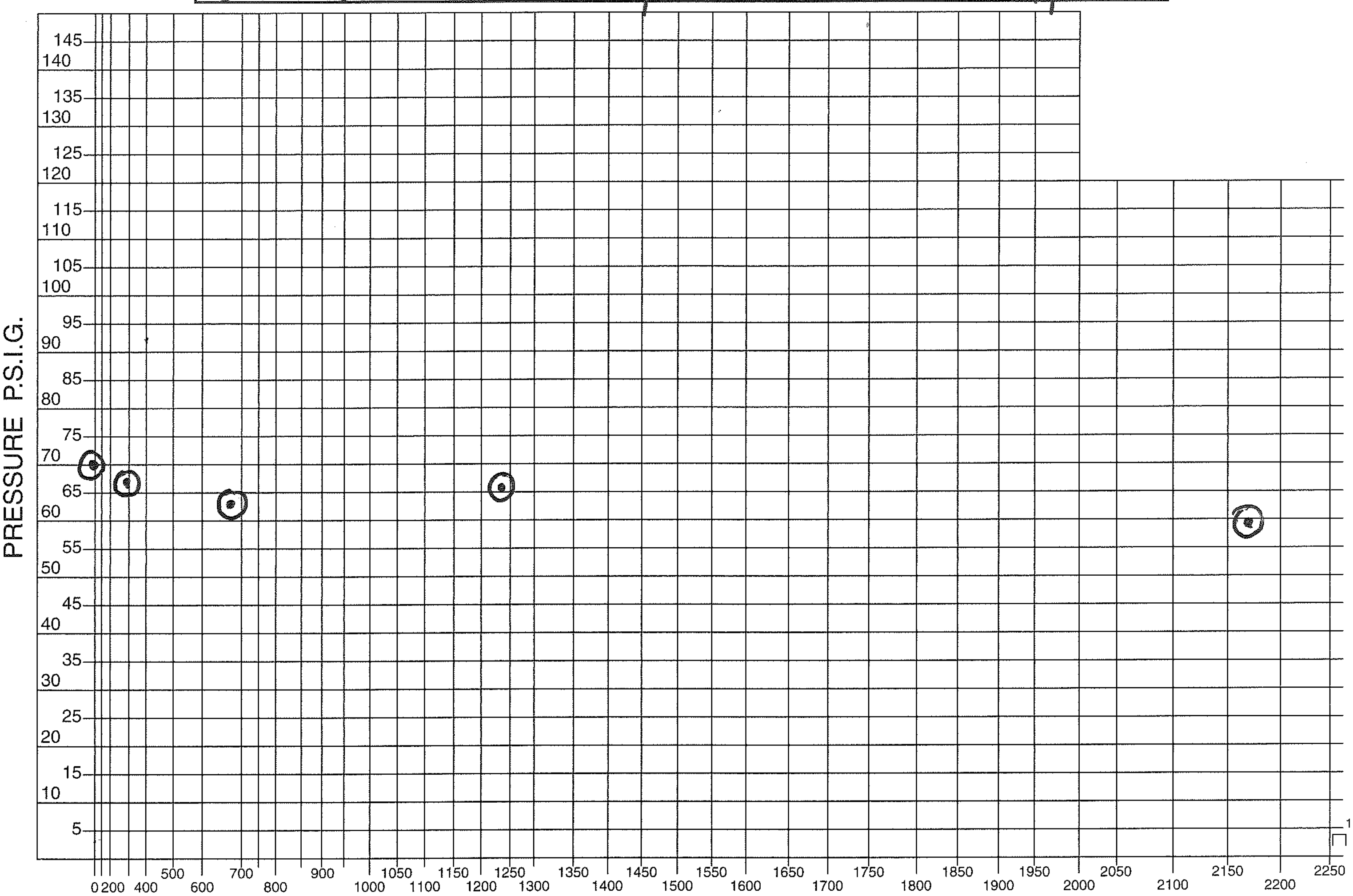
LOCATION OF TEST: (FLOW) Across from 86 Joymar Dr - M67 3P

(RESIDUAL) West of 66 Thomas St - M67-3P

MAIN SIZE: N.A.

STATIC PRESSURE: 70psi

	NUMBER OF OUTLETS & ORIFICE SIZE	PITOT PRESSURE	FLOW (U.S. G.P.M.)	RESIDUAL PRESSURE
# 1	1 x 1 1/8"	62psi	295	67psi
# 2	1 x 1 3/4"	56psi	680	63psi
# 3	1 x 2 1/2"	54psi	1230	66psi
# 4	2 x 2 1/2"	42psi	2170	59psi



FLOW U.S. G.P.M.

COMMENTS: Performed one complete NFPA 291 flow test. Pressure seemed to rise while flowing the 2 1/2" ports.

Authorized Signature__________ Corix Water Services Signature [signature]

CROZIER & ASSOCIATES
Consulting Engineers

Project: 80 Thomas St.
Project No.: 1240-4376
Created By: LP
Checked By: NC
Date: 2016.10.24
Revised: 2016.10.24

80 THOMAS STREET - WATER DEMAND

Connection Point

300 mm diameter watermain along Joymar Drive
Reference: Jormar Drive Prop 300mm Watermain, Sta. 0+000 to Sta. 0+180, Region of Peel Public Works, 1995

Pressure zone of connection point	3
Total equivalent population to be serviced	592
Total lands to be serviced	2.47 ha
Hydrant flow test	October 4, 2016
Hydrant flow test location	86 Joymar Drive

	Pressure (KPa)	Time
Minimum Water Pressure	407	9:05 AM
Maximum Water Pressure	462	9:05 AM

No.	Water Demands		
	Demand Type	**Demand**	**Units**
1	Average Day Flow	1.92	L/s
2	Maximum Day Flow	3.83	L/s
3	Peak Hour Flow	5.75	L/s
4	Fire Flow	167	L/s
Analysis			
5	Maximum Day plus Fire Flow	170.83	L/s

WASTEWATER CONNECTION

Connection Point

375 mm diameter sanitary sewer along Thomas Street
Reference: Thomas Street Prop 300mm Watermain, Joymar Dr. to Gafney Dr., Region of Peel Public Works, 1995

Total equivalent population to be serviced		592
Total lands to be serviced		2.47
6	Wastewater sewer effluent (L/s)	8.65

LICENSED PROFESSIONAL ENGINEER
D. O. MORITA
100012817
Oct. 24/16
PROVINCE OF ONTARIO

APPENDIX B

Sanitary Flow Calculations

Domestic Sanitary Design Flow

Notes & References

Site Area:	2.47	ha	
Population Density:	2.7	persons/unit	Section 2.1, Region of Peel Public Works Design Criteria Manual - Sanitary Sewer.
Number of units:	219		
Population:	591		

Population Equivalent Densities:

Design Parameters

Average Flow (L/capita/d)
302.8

Region of Peel Public Works Criteria Manual Std. Dwg. 2-5-2

Building Use	People / ha	Area (ha)	Equivalent Population	
Residential	239.4	2.470	591	0.591
Total		**2.47**	**591**	**0.591**

Sanitary Design Flow:

	Average Daily Flow =	302.8	L/capita/d	Average Daily Flow = Average Daily Flow (L/cap./day) * population / 86400
	Average Daily Flow =	**2.07**	L/s	
Harmon Peak Factor:	M =	**3.94**		M = 1 + 14 / (4 + (p/1000)^.5)
	Peak Flow =	**8.16**	L/s	Peak Flow = Average Daily Flow * M
Infiltration Flow:	Infiltration =	0.20	L/ha/s	Section 2.3 Region of Peel Public Works Criteria Manual - Sanitary Sewer
	Total Infiltration =	**0.49**	L/s	
	Total Peak Flow =	**8.65**	L/s	Total Peak Flow = Peak Flow + Total Infiltration

Summary Table

Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)
2.07	3.94	8.16	0.49	8.65

APPENDIX C

Stormwater Management Calculations

Modified Rational Calculations - Input Parameters

Storm Data: City of Mississauga

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

Return Period	A	B	C	I (mm/hr)
2 yr	610.0	4.60	0.78	59.89
5 yr	820.0	4.60	0.78	80.51
10 yr	1010.0	4.60	0.78	99.17
25 yr	1160.0	4.60	0.78	113.89
50 yr	1300.0	4.70	0.78	127.13
100 yr	1450.0	4.90	0.78	140.69

Pre - Development Conditions				
Catchment Area	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**[1]
101	2.47	24740	**0.75**	**0.75**
Total Site	**2.47**	**24740**		

1. Pre-Development Runoff Coefficient of 0.75 to be used for entire pre-development area (as per DARC comments and correspondence with the City of Mississauga)

Post - Development Conditions				
Catchment Area	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**
201	0.35	3500	0.90	0.90
202	1.93	19330	0.90	0.90
203	0.19	1870	0.90	0.90
Total Site	**2.47**	**24700**	**-**	**0.90**

Pre- and Post-Development Adjsuted Runoff Coefficients			
Return Period	**Adjsutment Factor**	**Pre-Development Adjusted RC**	**Post-Development Adjusted RC**
2	1.00	0.75	0.90
5	1.00	0.75	0.90
10	1.00	0.75	0.90
25	1.10	0.83	0.99
50	1.20	0.90	1.00
100	1.25	0.94	1.00

Equations:

Peak Flow

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

Intensity

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

Modified Rational Calculations - Peak Flows Summary

Peak Flows (m^3/s)						
Return Period	Q_{pre}	$Q_{post-site}$ [1]	$Q_{post-201}$	$Q_{post-202}$	$Q_{post-203}$	$Q_{target-202}$ [2]
2 yr	0.311	0.373	0.053	0.291	0.028	0.230
5 yr	0.418	0.502	0.071	0.392	0.038	0.309
10 yr	0.515	0.618	0.087	0.482	0.047	0.381
25 yr	0.651	0.781	0.110	0.609	0.059	0.481
50 yr	0.793	0.881	0.125	0.687	0.067	0.601
100 yr	0.914	0.975	0.138	0.760	0.074	0.702

1. $Q_{post-site}$ is the post-development uncontrolled peak flow for the entire site ($Q_{post-site} = Q_{post-201}+Q_{post-202}+Q_{post-203}$)
2. $Q_{target-202} = Q_{pre}-(Q_{post-201}+Q_{post-203})$ as post-development catchments 201 and 203 are uncontrolled

Equations:

Peak Flow

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

Modified Rational Calculations - 100-Year Storm Event

Control Criteria

100 yr: Control Post-Development Peak Flows from Catchment 202 to Required Target Peak Flow

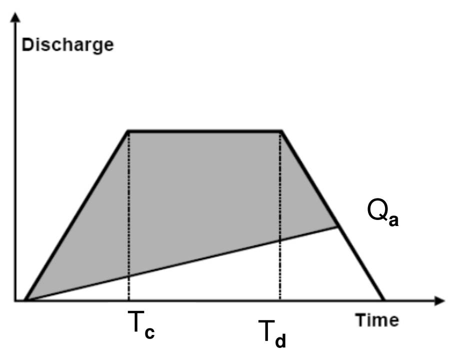
100 yr: Uncontrolled Post-Development Catchment 202 Flow:

$Q_{post-202}$ = 0.760 m^3/s

Catchment 202 Target Flow:

$Q_{target-202}$ = 0.599 m^3/s *(Max. orifice outlet flow for 100-year storm)*

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	242.53	300	1.311	33.8
10	176.31	600	0.953	122.4
15	140.69	900	0.760	145.2
20	118.12	1200	0.638	137.1
25	102.41	1500	0.553	111.3
30	90.77	1800	0.491	74.3
35	81.77	2100	0.442	29.5
40	74.58	2400	0.403	-21.1
45	68.68	2700	0.371	-76.1
50	63.75	3000	0.345	-134.5
55	59.56	3300	0.322	-195.7
60	55.95	3600	0.302	-259.2
65	52.81	3900	0.285	-324.7
70	50.03	4200	0.270	-391.8
75	47.58	4500	0.257	-460.4
80	45.38	4800	0.245	-530.1
85	43.39	5100	0.235	-601.0
Required Storage Volume:				**145.2**



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

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

Modified Rational Calculations - 50-Year Storm Event

Control Criteria

50 yr: Control Post-Development Peak Flows from Catchment 202 to Required Target Peak Flow

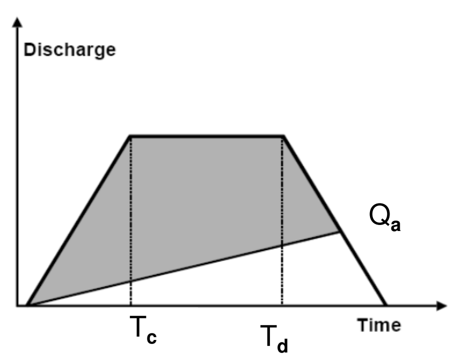
50 yr: Uncontrolled Post-Development Catchment 202 Flow:

$Q_{post\text{-}202}$ = 0.687 m^3/s

Target Flow:

$Q_{target\text{-}202}$ = 0.601 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	220.93	300	1.194	-2.7
10	159.75	600	0.863	66.9
15	127.13	900	0.687	77.0
20	106.57	1200	0.576	59.6
25	92.30	1500	0.499	26.4
30	81.75	1800	0.442	-16.8
35	73.60	2100	0.398	-66.9
40	67.10	2400	0.363	-122.2
45	61.77	2700	0.334	-181.3
50	57.32	3000	0.310	-243.5
55	53.54	3300	0.289	-308.3
60	50.28	3600	0.272	-375.0
65	47.45	3900	0.256	-443.5
70	44.95	4200	0.243	-513.4
75	42.74	4500	0.231	-584.6
80	40.76	4800	0.220	-657.0
85	38.97	5100	0.211	-730.2
Required Storage Volume:				**77.0**



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

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

Modified Rational Calculations - 25-Year Storm Event

Control Criteria

25 yr: Control Post-Development Peak Flows from Catchment 202 to Required Target Peak Flow

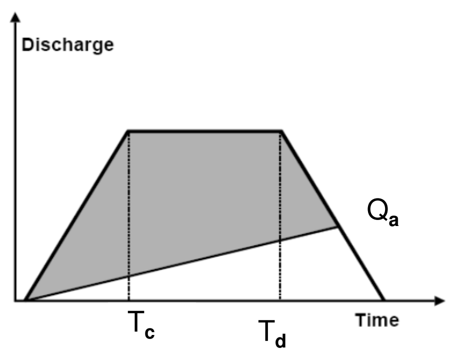
25 yr: Uncontrolled Post-Development Catchment 202 Flow:

$Q_{post\text{-}202}$ = 0.609 m^3/s

Target Flow:

$Q_{target\text{-}202}$ = 0.481 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	198.74	300	1.063	30.2
10	143.31	600	0.767	99.0
15	113.89	900	0.609	115.2
20	95.40	1200	0.510	107.0
25	82.58	1500	0.442	85.0
30	73.11	1800	0.391	54.2
35	65.80	2100	0.352	17.3
40	59.98	2400	0.321	-24.2
45	55.21	2700	0.295	-69.0
50	51.22	3000	0.274	-116.6
55	47.84	3300	0.256	-166.3
60	44.92	3600	0.240	-217.8
65	42.39	3900	0.227	-270.9
70	40.15	4200	0.215	-325.2
75	38.17	4500	0.204	-380.7
80	36.40	4800	0.195	-437.1
85	34.81	5100	0.186	-494.4
Required Storage Volume:				**115.2**



Peak Flow

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

Storage

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

Modified Rational Calculations - 10-Year Storm Event

Control Criteria

10 yr: Control Post-Development Peak Flows from Catchment 202 to Required Target Peak Flow

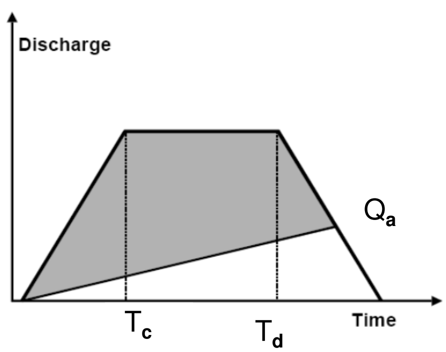
10 yr: Uncontrolled Post-Development Catchment 202 Flow:

$Q_{post\text{-}202}$ = 0.482 m^3/s

Target Flow:

$Q_{target\text{-}202}$ = 0.381 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	0.842	23.9
10	124.77	600	0.607	78.4
15	99.17	900	0.482	91.2
20	83.06	1200	0.404	84.7
25	71.90	1500	0.350	67.3
30	63.66	1800	0.310	42.9
35	57.30	2100	0.279	13.7
40	52.22	2400	0.254	-19.1
45	48.07	2700	0.234	-54.6
50	44.60	3000	0.217	-92.3
55	41.65	3300	0.203	-131.6
60	39.11	3600	0.190	-172.4
65	36.91	3900	0.179	-214.4
70	34.96	4200	0.170	-257.4
75	33.24	4500	0.162	-301.3
80	31.69	4800	0.154	-346.0
85	30.31	5100	0.147	-391.3
Required Storage Volume:				**91.2**



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

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

Modified Rational Calculations - 5-Year Storm Event

Control Criteria

5 yr: Control Post-Development Peak Flows from Catchment 202 to Required Target Peak Flow

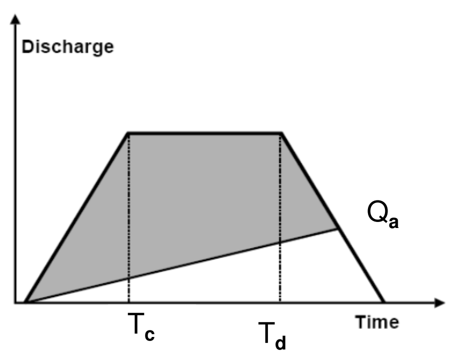
5 yr: Uncontrolled Post-Development Catchment 202 Flow:

$Q_{post\text{-}202}$ = 0.392 m^3/s

Target Flow:

$Q_{target\text{-}202}$ = 0.309 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	140.49	300	0.683	19.4
10	101.30	600	0.493	63.6
15	80.51	900	0.392	74.0
20	67.43	1200	0.328	68.8
25	58.37	1500	0.284	54.6
30	51.68	1800	0.251	34.8
35	46.52	2100	0.226	11.1
40	42.40	2400	0.206	-15.5
45	39.02	2700	0.190	-44.3
50	36.21	3000	0.176	-74.9
55	33.82	3300	0.164	-106.9
60	31.76	3600	0.154	-140.0
65	29.96	3900	0.146	-174.1
70	28.38	4200	0.138	-209.0
75	26.98	4500	0.131	-244.6
80	25.73	4800	0.125	-280.9
85	24.60	5100	0.120	-317.7
Required Storage Volume:				**74.0**



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

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

Modified Rational Calculations - 2-Year Storm Event

Control Criteria

2 yr: Control Post-Development Peak Flows from Catchment 202 to Required Target Peak Flow

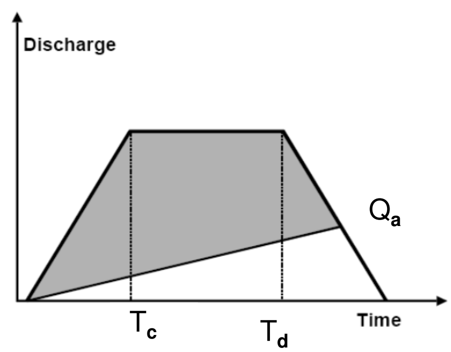
2 yr: Uncontrolled Post-Development Catchment 202 Flow:

$Q_{post\text{-}202}$ = 0.291 m^3/s

Target Flow:

$Q_{target\text{-}202}$ = 0.230 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	104.51	300	0.508	14.4
10	75.36	600	0.367	47.3
15	59.89	900	0.291	55.1
20	50.16	1200	0.244	51.2
25	43.42	1500	0.211	40.7
30	38.45	1800	0.187	25.9
35	34.60	2100	0.168	8.3
40	31.54	2400	0.153	-11.5
45	29.03	2700	0.141	-33.0
50	26.94	3000	0.131	-55.7
55	25.16	3300	0.122	-79.5
60	23.62	3600	0.115	-104.1
65	22.29	3900	0.108	-129.5
70	21.12	4200	0.103	-155.5
75	20.07	4500	0.098	-182.0
80	19.14	4800	0.093	-209.0
85	18.30	5100	0.089	-236.3
Required Storage Volume:				**55.1**



Peak Flow

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

Storage

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

Modified Rational Calculations - Summary

Storm Event (yr)	Peak Flow Rate			Required Storage (m^3)
	Pre-Development (L/s)	Post-Development[1] (L/s)		
		Uncontrolled	Controlled	
2	0.311	0.373	0.311	55.1
5	0.418	0.502	0.418	74.0
10	0.515	0.618	0.515	91.2
25	0.651	0.781	0.651	115.2
50	0.793	0.881	0.793	77.0
100	0.914	0.975	0.811	145.2

1. Post-development peak flows are for the entire site

```
2     Metric units
*#*****************************************************************************
*#  Project Name: [80 Thomas Street]    Project Number: [1240-4376]
*#  Date        : 10-03-2016
*#  Modeller    : [LP]
*#  Company     : C.F. CROZIER & ASSOCIATES INC.
*#  License #   :  3737016
*#*****************************************************************************
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[0],  NRUN=[0]
*%                    [  ] <--storm filename, one per line for NSTORM time
*#-----------------|-----------------------------------------------------------|
*#-----------------| PRE-DEVELOPMENT CONDITIONS --------------------------------|
*#-----------------|-----------------------------------------------------------|
*#-----------------|-----------------------------------------------------------|
*#-----------------| Regional Storm --------------------------------------------|
*#-----------------|-----------------------------------------------------------|
*#-----------------|-----------------------------------------------------------|

READ STORM           STORM_FILENAME=["Hazel.stm"]

*%-----------------|-----------------------------------------------------------|
*#-----------------| 101 - Entire Area -----------------------------------------|
*%-----------------|-----------------------------------------------------------|
CALIB STANDHYD       ID=[1], NHYD=["101"], DT=[1](min), AREA=[2.47](ha),
                     XIMP=[0.76], TIMP=[0.76], DWF=[0.0](cms), LOSS=[2],
                     SCS curve number CN=[30],
                     Pervious   surfaces: IAper=[5.0](mm), SLPP=[2.0](%),
                                          LGP=[20](m), MNP=[0.035], SCP=[0](min),
                     Impervious surfaces: IAimp=[2.5](mm), SLPI=[2.0](%),
                                          LGI=[50](m), MNI=[0.013], SCI=[0](min),
                     RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1

FINISH
```

```
===========================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO       999   999    =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O     9   9 9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ## 9   9 9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O      9999  9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO          9     9   =========
                                                       9   9 9   9   # 3737016
        StormWater Management HYdrologic Model          999   999    =========

 **************************************************************************
 ***************************** SWMHYMO Ver/4.05 *****************************
 *********  A single event and continuous hydrologic simulation model  *********
 *********     based on the principles of HYMO and its successors      *********
 *********                 OTTHYMO-83 and OTTHYMO-89.                  *********
 **************************************************************************
 ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
 *********                  Ottawa,  Ontario: (613) 836-3884           *********
 *********                  Gatineau, Quebec: (819) 243-6858           *********
 *********                  E-Mail: swmhymo@jfsa.Com                   *********
 **************************************************************************

 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
 +++++++++ Licensed user: C.F. Crozier & Associates Inc.               +++++++++
 +++++++++                Collingwood           SERIAL#:3737016        +++++++++
 ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

 **************************************************************************
 *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
 *********           Maximum value for ID numbers  :     10            *********
 *********           Max. number of rainfall points: 105408            *********
 *********           Max. number of flow points    : 105408            *********
 **************************************************************************


 **********************   D E T A I L E D   O U T P U T   **********************
 **************************************************************************
 *         DATE: 2016-10-03     TIME: 11:40:47     RUN COUNTER: 000583         *
 **************************************************************************
 * Input   filename: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\Pre.dat          *
 * Output  filename: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\Pre.out          *
 * Summary filename: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\Pre.sum          *
 * User comments:                                                              *
 * 1:__________________________________________________________________________*
 * 2:__________________________________________________________________________*
 * 3:__________________________________________________________________________*
 **************************************************************************

---------------------------------------------------------------------------
001:0001-------------------------------------------------------------------
*#*************************************************************************
*#  Project Name: [80 Thomas Street]    Project Number: [1240-4376]
*#  Date        : 10-03-2016
*#  Modeller    : [LP]
*#  Company     : C.F. CROZIER & ASSOCIATES INC.
*#  License #   :  3737016
*#*************************************************************************
--------------------
| START              |  Project  dir.: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\
--------------------  Rainfall dir.: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\
    TZERO =   .00 hrs on        0
    METOUT=   2 (output = METRIC)
    NRUN  = 001
    NSTORM=   0
---------------------------------------------------------------------------
001:0002-------------------------------------------------------------------
*#-----------------|-------------------------------------------------------|
*#-----------------| PRE-DEVELOPMENT CONDITIONS ----------------------------|
*#-----------------|-------------------------------------------------------|
*#-----------------|-------------------------------------------------------|
*#-----------------| Regional Storm ----------------------------------------|
*#-----------------|-------------------------------------------------------|
*#-----------------|-------------------------------------------------------|
--------------------
| READ STORM         |    Filename: Hurricane Hazel
| Ptotal= 212.00 mm|    Comments: Hurricane Hazel
--------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
              1.00   6.000 |   4.00  13.000 |   7.00  23.000 |  10.00  53.000
              2.00   4.000 |   5.00  17.000 |   8.00  13.000 |  11.00  38.000
              3.00   6.000 |   6.00  13.000 |   9.00  13.000 |  12.00  13.000

---------------------------------------------------------------------------
001:0003-------------------------------------------------------------------
*#-----------------| 101 - Entire Area -------------------------------------|
----------------------
| CALIB STANDHYD      |   Area    (ha)=    2.47
| 01:101    DT= 1.00 |   Total Imp(%)=   76.00   Dir. Conn.(%)=   76.00
----------------------
                              IMPERVIOUS    PERVIOUS (i)
     Surface Area     (ha)=       1.88          .59
     Dep. Storage     (mm)=       2.50         5.00
     Average Slope     (%)=       2.00         2.00
     Length            (m)=      50.00        20.00
     Mannings n           =       .013         .035

     Max.eff.Inten.(mm/hr)=      53.00        19.59
               over (min)        2.00         5.00
     Storage Coeff.  (min)=       1.76 (ii)    4.51 (ii)
     Unit Hyd. Tpeak (min)=       2.00         5.00
     Unit Hyd. peak  (cms)=        .60          .24
                                                            *TOTALS*
     PEAK FLOW       (cms)=        .28          .03            .308 (iii)
     TIME TO PEAK    (hrs)=       9.47        10.00          10.000
     RUNOFF VOLUME    (mm)=     209.50        53.58         172.080
     TOTAL RAINFALL   (mm)=     212.00       212.00         212.000
     RUNOFF COEFFICIENT   =        .99          .25            .812

       (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
           CN* =  30.0    Ia = Dep. Storage  (Above)
      (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
           THAN THE STORAGE COEFFICIENT.
     (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

---------------------------------------------------------------------------
001:0004-------------------------------------------------------------------
      FINISH
---------------------------------------------------------------------------
***************************************************************************
     WARNINGS / ERRORS / NOTES
     -------------------------
   Simulation ended on 2016-10-03     at 11:40:47
===========================================================================
```

```
2     Metric units
*#*****************************************************************************
*#  Project Name: [80 Thomas Street]    Project Number: [1240-4376]
*#  Date        : 10-03-2016
*#  Modeller    : [LP]
*#  Company     : C.F. CROZIER & ASSOCIATES INC.
*#  License #   :  3737016
*#*****************************************************************************
START                TZERO=[0.0],  METOUT=[2],  NSTORM=[0],  NRUN=[0]
*%                    [  ] <--storm filename, one per line for NSTORM time
*#-----------------|-----------------------------------------------------------|
*#-----------------| POST-DEVELOPMENT CONDITIONS ------------------------------
*#-----------------|-----------------------------------------------------------|
*#-----------------|-----------------------------------------------------------|
*#-----------------| Regional Storm -------------------------------------------|
*#-----------------|-----------------------------------------------------------|
*#-----------------|-----------------------------------------------------------|

READ STORM           STORM_FILENAME=["Hazel.stm"]

*%-----------------|-----------------------------------------------------------|
*#-----------------| 201 - South Area -----------------------------------------|
*%-----------------|-----------------------------------------------------------|
CALIB STANDHYD       ID=[1], NHYD=["201"], DT=[1](min), AREA=[0.35](ha),
                     XIMP=[0.99], TIMP=[0.99], DWF=[0.0](cms), LOSS=[2],
                     SCS curve number CN=[30],
                     Pervious   surfaces: IAper=[5.0](mm), SLPP=[2.0](%),
                                          LGP=[5](m), MNP=[0.035], SCP=[0](min),
                     Impervious surfaces: IAimp=[2.5](mm), SLPI=[2.0](%),
                                          LGI=[50](m), MNI=[0.013], SCI=[0](min),
                     RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1

*%-----------------|-----------------------------------------------------------|
*#-----------------| 202 - Middle Area ----------------------------------------|
*%-----------------|-----------------------------------------------------------|
CALIB STANDHYD       ID=[2], NHYD=["202"], DT=[1](min), AREA=[1.93](ha),
                     XIMP=[0.99], TIMP=[0.99], DWF=[0.0](cms), LOSS=[2],
                     SCS curve number CN=[30],
                     Pervious   surfaces: IAper=[5.0](mm), SLPP=[2.0](%),
                                          LGP=[5](m), MNP=[0.035], SCP=[0](min),
                     Impervious surfaces: IAimp=[2.5](mm), SLPI=[2.0](%),
                                          LGI=[100](m), MNI=[0.013], SCI=[0](min)
                     RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1

*%-----------------|-----------------------------------------------------------|
*#-----------------| 203 - North Area -----------------------------------------|
*%-----------------|-----------------------------------------------------------|
CALIB STANDHYD       ID=[3], NHYD=["203"], DT=[1](min), AREA=[0.19](ha),
                     XIMP=[0.99], TIMP=[0.99], DWF=[0.0](cms), LOSS=[2],
                     SCS curve number CN=[30],
                     Pervious   surfaces: IAper=[5.0](mm), SLPP=[2.0](%),
                                          LGP=[5](m), MNP=[0.035], SCP=[0](min),
                     Impervious surfaces: IAimp=[2.5](mm), SLPI=[2.0](%),
                                          LGI=[50](m), MNI=[0.013], SCI=[0](min),
                     RAINFALL=[ ,  ,  ,  , ](mm/hr) ,  END=-1

*%-----------------|-----------------------------------------------------------|
*#-----------------| Underground Storage --------------------------------------|
*%-----------------|-----------------------------------------------------------|
ROUTE RESERVOIR      IDout=[4],   NHYD=["STORE"],  IDin=[2],
                     RDT=[1](min),
                           TABLE of ( OUTFLOW-STORAGE ) values
                                       (cms) - (ha-m)
                                     [   0.0 ,  0.0 ]
                                     [   0.0 ,  0.012 ]
                                     [   0.262 , 0.023 ]
                                     [   0.478 ,  0.024 ]
                                     [   0.599 ,  0.027 ]
                                     [   -1  ,  -1  ]  (max twenty pts)
                           IDovf=[5], NHYDovf=["S_OVF"]

FINISH
```

```
 ==============================================================================

   SSSSS  W   W  M   M  H   H  Y   Y  M   M   OOO        999   999   =========
   S      W W W  MM MM  H   H   Y Y   MM MM  O   O      9   9 9   9
   SSSSS  W W W  M M M  HHHHH    Y    M M M  O   O  ## 9   9 9   9   Ver  4.05
       S   W W   M   M  H   H    Y    M   M  O   O       9999  9999   Sept 2011
   SSSSS   W W   M   M  H   H    Y    M   M   OOO           9     9   =========
                                                      9   9 9   9   # 3737016
        StormWater Management HYdrologic Model          999   999    =========

  ******************************************************************************
  ***************************** SWMHYMO Ver/4.05 ******************************
  *********  A single event and continuous hydrologic simulation model  *********
  *********     based on the principles of HYMO and its successors      *********
  *********                OTTHYMO-83 and OTTHYMO-89.                   *********
  ******************************************************************************
  ********* Distributed by:  J.F. Sabourin and Associates Inc.          *********
  *********                  Ottawa,  Ontario: (613) 836-3884          *********
  *********                  Gatineau, Quebec: (819) 243-6858          *********
  *********                  E-Mail: swmhymo@jfsa.Com                  *********
  ******************************************************************************

  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
  +++++++++ Licensed user: C.F. Crozier & Associates Inc.               +++++++++
  +++++++++                 Collingwood          SERIAL#:3737016        +++++++++
  ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++

  ******************************************************************************
  *********           ++++++ PROGRAM ARRAY DIMENSIONS ++++++            *********
  *********           Maximum value for ID numbers  :     10            *********
  *********           Max. number of rainfall points: 105408            *********
  *********           Max. number of flow points    : 105408            *********
  ******************************************************************************


  *********************   D E T A I L E D   O U T P U T   *********************
  ******************************************************************************
  *        DATE: 2016-10-24     TIME: 11:15:12     RUN COUNTER: 000596         *
  ******************************************************************************
  * Input   filename: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\Post.dat        *
  * Output  filename: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\Post.out        *
  * Summary filename: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\Post.sum        *
  * User comments:                                                             *
  * 1:_________________________________________________________________________*
  * 2:_________________________________________________________________________*
  * 3:_________________________________________________________________________*
  ******************************************************************************

 ------------------------------------------------------------------------------
 001:0001----------------------------------------------------------------------
 *#****************************************************************************
 *#  Project Name: [80 Thomas Street]    Project Number: [1240-4376]
 *#  Date         : 10-03-2016
 *#  Modeller     : [LP]
 *#  Company      : C.F. CROZIER & ASSOCIATES INC.
 *#  License #    :  3737016
 *#****************************************************************************
 --------------------
 | START              |  Project  dir.: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\
 --------------------   Rainfall dir.: I:\1200\1240-D~1\4376-8~1\Design\SWMHYMO\
     TZERO =   .00 hrs on       0
     METOUT=   2 (output = METRIC)
     NRUN  = 001
     NSTORM=   0
 ------------------------------------------------------------------------------
 001:0002----------------------------------------------------------------------
 *#-----------------|----------------------------------------------------------|
 *#-----------------| POST-DEVELOPMENT CONDITIONS ------------------------------
 *#-----------------|----------------------------------------------------------|
 *#-----------------|----------------------------------------------------------|
 *#-----------------| Regional Storm ------------------------------------------|
 *#-----------------|----------------------------------------------------------|
 *#-----------------|----------------------------------------------------------|
 --------------------
 | READ STORM         |    Filename: Hurricane Hazel
 | Ptotal= 212.00 mm|    Comments: Hurricane Hazel
 --------------------
              TIME    RAIN |   TIME    RAIN |   TIME    RAIN |   TIME    RAIN
               hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr |    hrs   mm/hr
              1.00   6.000 |   4.00  13.000 |   7.00  23.000 |  10.00  53.000
              2.00   4.000 |   5.00  17.000 |   8.00  13.000 |  11.00  38.000
              3.00   6.000 |   6.00  13.000 |   9.00  13.000 |  12.00  13.000

 ------------------------------------------------------------------------------
 001:0003----------------------------------------------------------------------
 *#-----------------| 201 - South Area ----------------------------------------|
 ----------------------
 | CALIB STANDHYD      |   Area    (ha)=     .35
 | 01:201    DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
 ----------------------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=        .35          .00
      Dep. Storage     (mm)=       2.50         5.00
      Average Slope     (%)=       2.00         2.00
      Length            (m)=      50.00         5.00
      Mannings n          =       .013         .035

      Max.eff.Inten.(mm/hr)=      53.00        19.67
                over (min)       2.00         3.00
      Storage Coeff.  (min)=       1.76 (ii)    2.96 (ii)
      Unit Hyd. Tpeak (min)=       2.00         3.00
      Unit Hyd. peak  (cms)=        .60          .38
                                                           *TOTALS*
      PEAK FLOW       (cms)=        .05          .00          .051 (iii)
      TIME TO PEAK    (hrs)=       9.42        10.00        10.000
      RUNOFF VOLUME    (mm)=     209.50        53.58       207.941
      TOTAL RAINFALL   (mm)=     212.00       212.00       212.000
      RUNOFF COEFFICIENT   =        .99          .25          .981

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  30.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ------------------------------------------------------------------------------
 001:0004----------------------------------------------------------------------
 *#-----------------| 202 - Middle Area ---------------------------------------|
 ----------------------
 | CALIB STANDHYD      |   Area    (ha)=    1.93
 | 02:202    DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
 ----------------------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=       1.91          .02
      Dep. Storage     (mm)=       2.50         5.00
      Average Slope     (%)=       2.00         2.00
      Length            (m)=     100.00         5.00
      Mannings n          =       .013         .035

      Max.eff.Inten.(mm/hr)=      53.00        19.63
                over (min)       3.00         4.00
      Storage Coeff.  (min)=       2.67 (ii)    3.87 (ii)
      Unit Hyd. Tpeak (min)=       3.00         4.00
      Unit Hyd. peak  (cms)=        .40          .29
                                                           *TOTALS*
      PEAK FLOW       (cms)=        .28          .00          .282 (iii)
      TIME TO PEAK    (hrs)=       9.70        10.00        10.000
      RUNOFF VOLUME    (mm)=     209.50        53.58       207.940
      TOTAL RAINFALL   (mm)=     212.00       212.00       212.000
      RUNOFF COEFFICIENT   =        .99          .25          .981

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  30.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ------------------------------------------------------------------------------
 001:0005----------------------------------------------------------------------
 *#-----------------| 203 - North Area ----------------------------------------|
 ----------------------
 | CALIB STANDHYD      |   Area    (ha)=     .19
 | 03:203    DT= 1.00 |   Total Imp(%)=   99.00   Dir. Conn.(%)=   99.00
 ----------------------
                              IMPERVIOUS    PERVIOUS (i)
      Surface Area     (ha)=        .19          .00
      Dep. Storage     (mm)=       2.50         5.00
      Average Slope     (%)=       2.00         2.00
      Length            (m)=      50.00         5.00
      Mannings n          =       .013         .035

      Max.eff.Inten.(mm/hr)=      53.00        19.67
                over (min)       2.00         3.00
      Storage Coeff.  (min)=       1.76 (ii)    2.96 (ii)
      Unit Hyd. Tpeak (min)=       2.00         3.00
      Unit Hyd. peak  (cms)=        .60          .38
                                                           *TOTALS*
      PEAK FLOW       (cms)=        .03          .00          .028 (iii)
      TIME TO PEAK    (hrs)=       9.40        10.00        10.000
      RUNOFF VOLUME    (mm)=     209.50        53.58       207.940
      TOTAL RAINFALL   (mm)=     212.00       212.00       212.000
      RUNOFF COEFFICIENT   =        .99          .25          .981

        (i) CN PROCEDURE SELECTED FOR PERVIOUS LOSSES:
            CN* =  30.0    Ia = Dep. Storage  (Above)
       (ii) TIME STEP (DT) SHOULD BE SMALLER OR EQUAL
            THAN THE STORAGE COEFFICIENT.
      (iii) PEAK FLOW DOES NOT INCLUDE BASEFLOW IF ANY.

 ------------------------------------------------------------------------------
 001:0006----------------------------------------------------------------------
 *#-----------------| Underground Storage -------------------------------------|
 ---------------------
 | ROUTE RESERVOIR    |    Requested routing time step =  1.0 min.
 |  IN>02:(202   )    |
 | OUT<04:(STORE )    |    =========  OUTLFOW STORAGE TABLE  =========
 ---------------------     OUTFLOW    STORAGE  |  OUTFLOW    STORAGE
                             (cms)    (ha.m.)  |    (cms)    (ha.m.)
                              .000  .0000E+00  |     .478  .2400E-01
                              .000  .1200E-01  |     .599  .2700E-01
                              .262  .2300E-01  |     .000  .0000E+00

      ROUTING RESULTS             AREA     QPEAK     TPEAK       R.V.
      --------------------        (ha)     (cms)     (hrs)       (mm)
      INFLOW >02: (202   )        1.93      .282    10.000    207.940
      OUTFLOW<04: (STORE )        1.93      .282    10.000    201.723
    OVERFLOW<05: (S_OVF )         .00      .000      .000       .000

                    TOTAL NUMBER OF SIMULATED OVERFLOWS  =        0
                    CUMULATIVE TIME OF OVERFLOWS  (hours)=      .00
                    PERCENTAGE OF TIME OVERFLOWING    (%)=      .00


                    PEAK   FLOW   REDUCTION [Qout/Qin](%)=   99.999
                    TIME SHIFT OF PEAK FLOW         (min)=      .00
                    MAXIMUM  STORAGE   USED       (ha.m.)=.2309E-01

        *** WARNING: Outflow volume is less than inflow volume.
 ------------------------------------------------------------------------------
 001:0007----------------------------------------------------------------------
       FINISH
 ------------------------------------------------------------------------------
 ******************************************************************************
      WARNINGS / ERRORS / NOTES
      -------------------------
  001:0006 ROUTE RESERVOIR
        *** WARNING: Outflow volume is less than inflow volume.
    Simulation ended on 2016-10-24     at 11:15:12
 ==============================================================================
```

Stormceptor®

Stormceptor Design Summary

PCSWMM for Stormceptor

Project Information

Date	9/30/2016
Project Name	80 Thomas Street
Project Number	1240-4376
Location	Mississauga

Designer Information

Company	C.F. Crozier
Contact	Lucas Parsons

Notes

Upstream Storage

Drainage Area

Total Area (ha)	1.94
Imperviousness (%)	95

The Stormceptor System model STC 9000 achieves the water quality objective removing 83% TSS for a City of Toronto (clay, silt and sand) particle size distribution and 96% 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	0

Stormceptor Sizing Summary

Stormceptor Model	TSS Removal %	Runoff Volume %
STC 300	51	54
STC 750	62	75
STC 1000	63	75
STC 1500	64	75
STC 2000	69	85
STC 3000	70	85
STC 4000	75	91
STC 5000	76	91
STC 6000	79	94
STC 9000	**83**	**96**
STC 10000	83	96
STC 14000	86	98

Stormceptor®

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

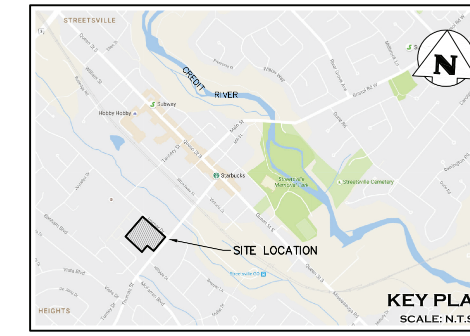
- Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor version 1.0
- Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal.
- Only the STC 300 is adaptable to function with a catch basin inlet 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.

DRAWINGS



LEGEND

— · —	PROPERTY LINE
	EXISTING CONTOUR (0.25m)
	EXISTING DITCH
—x—x—	EXISTING FENCE
x 215.00	EXISTING GRADE
	EXISTING OVERLAND FLOW DIRECTION
	EXISTING WATERMAIN & GATE VALVE
	EXISTING STORM SEWER
	EXISTING STORM CATCHBASIN MANHOLE
	EXISTING SANITARY SEWER
	EXISTING SANITARY MANHOLE
SF	SILT FENCE; CITY STD. 2940.010

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED WITH FUNCTIONAL SERVICING REPORT	2016/OCT/24

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK No. 257, LOCATED ON THE SOUTH FACE, 0.61m WEST OF THE EAST CORNER OF THE RED BRICK BUILDING AT THE NORTHWEST CORNER OF THOMAS STREET AND QUEEN STREET

ELEVATION = 162.08m
(CANADIAN GEODETIC VERTICAL DATUM 1928: PRE 1978 ADJUSTMENT)

SURVEY NOTES:

SURVEY COMPLETED BY DAVID B. SEARLES SURVEYING LTD. (2016/JUN/01)
FILE No.: 95-0-16

BEARINGS SHOWN ARE GRID AND ARE REFERRED TO THE NORTHERLY LIMIT OF THOMAS STREET AS SHOWN ON PLAN 43R-28302, HAVING A BEARING OF N39°41'00"E

DISTANCES SHOWN HEREON ARE GROUND DISTANCES.

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY OP DESIGN INC.
DRAWING No.: A-1, REV.10 (2016/OCT/04)
PROJECT No.: 2016-022

DRAWING NOTES:

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

Project

DUNPAR HOMES
80 THOMAS STREET
CITY OF MISSISSAUGA

Drawing

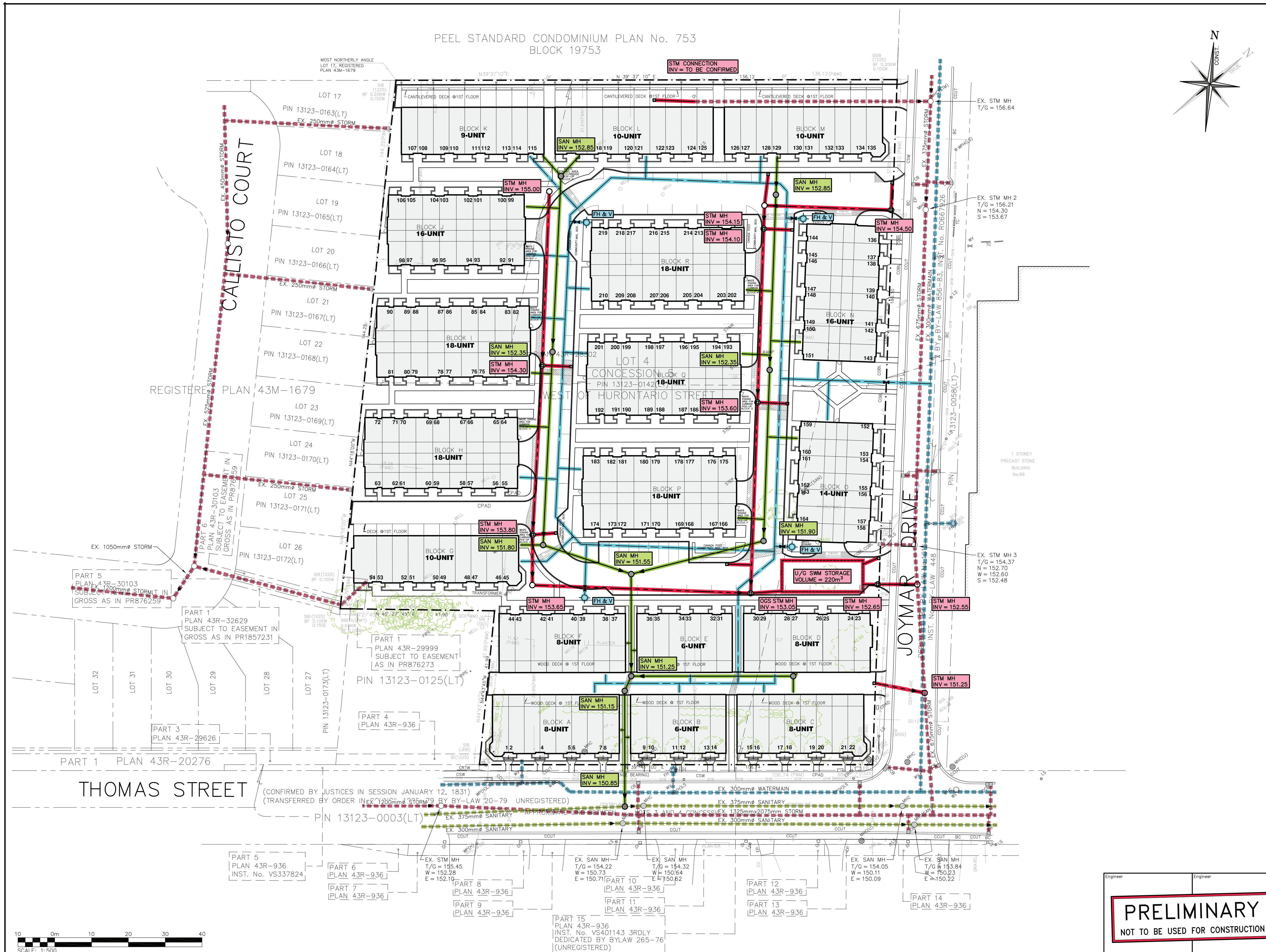
PRELIMINARY REMOVALS PLAN
EROSION & SEDIMENT CONTROL PLAN

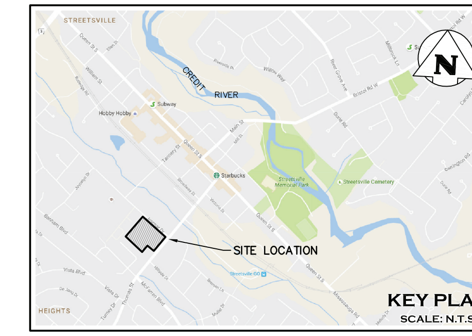
Engineer | Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

CROZIER & ASSOCIATES
Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
J.R.S.	N.A.S./B.M.P.	1240-4376	
Check D.O.M.	Check D.O.M.	Scale 1:500	Dwg. C 701





LEGEND

- PROPERTY LINE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER
- EXISTING STORM CATCHBASIN MANHOLE
- EXISTING SANITARY SEWER
- EXISTING SANITARY MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE CONNECTION
- PROPOSED WATER METER
- PROPOSED BACKFLOW PREVENTOR
- PROPOSED STORM SEWER
- PROPOSED STORM CATCHBASIN MANHOLE
- PROPOSED SANITARY SEWER
- PROPOSED SANITARY MANHOLE

No.	ISSUE / REVISION	YYYY/MMM/DD
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Project

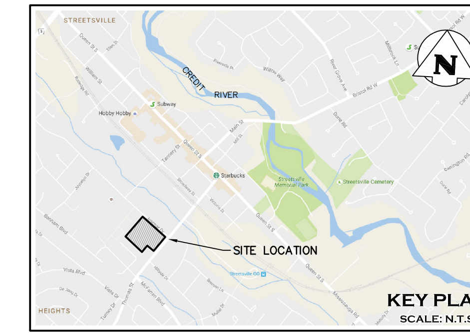
DUNPAR HOMES
80 THOMAS STREET
CITY OF MISSISSAUGA

Drawing

PRELIMINARY SITE SERVICING PLAN

CROZIER & ASSOCIATES
Consulting Engineers
2800 High Point Drive
Suite 100
Milton, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
J.R.S.	N.A.S./B.M.P.	1240-4376	
Check	**Check**	**Scale**	**Dwg.**
D.O.M.	D.O.M.	1:500	C 702



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.25m)
- ×153.00 EXISTING GRADE
- ×153.00 PROPOSED GRADE
- ×153.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- MAJOR OVERLAND FLOW DIRECTION

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED WITH FUNCTIONAL SERVICING REPORT	2016/OCT/24

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PROJECT No.: 2016-022

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Project

DUNPAR HOMES
80 THOMAS STREET
CITY OF MISSISSAUGA

Drawing

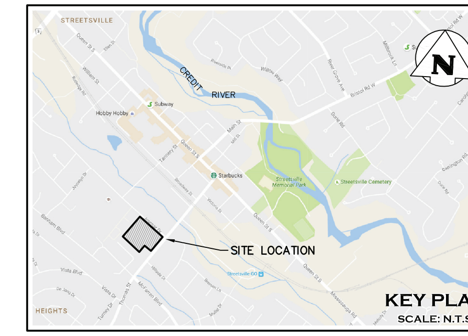
PRELIMINARY
GRADING PLAN

Engineer | Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

CROZIER & ASSOCIATES
Consulting Engineers
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
J.R.S.	N.A.S./B.M.P.	1240-4376	
Check	Check	Scale	Dwg.
D.O.M.	D.O.M.	1:500	C 703



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.25m)
- EXISTING DITCH
- EXISTING FENCE
- EXISTING GRADE
- EXISTING STORM SEWER
- EXISTING STORM CATCHBASIN MANHOLE
- EXISTING OVERLAND FLOW DIRECTION
- STORM DRAINAGE CATCHMENT
- CATCHMENT I.D.
- AREA (ha) | RUNOFF COEFFICIENT

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED WITH FUNCTIONAL SERVICING REPORT	2016/OCT/24

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DRAWING No.: A-1, REV.10 (2016/OCT/04)
PROJECT No.: 2016-022

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Project

DUNPAR HOMES
80 THOMAS STREET
CITY OF MISSISSAUGA

Drawing

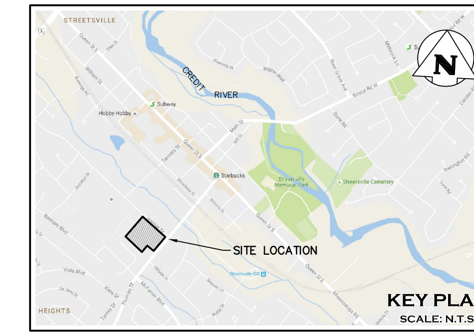
PRELIMINARY PRE-DEVELOPMENT
DRAINAGE PLAN

Engineer | Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

CROZIER & ASSOCIATES Consulting Engineers
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
WWW.CFCROZIER.CA

Drawn J.R.S.	Design N.A.S./B.M.P.	Project No.	1240-4376
Check D.O.M.	Check D.O.M.	Scale 1:500	Dwg. C 704



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.25m)
- EXISTING GRADE
- EXISTING STORM SEWER
- EXISTING STORM CATCHBASIN MANHOLE
- PROPOSED STORM SEWER
- PROPOSED STORM CATCHBASIN MANHOLE
- MAJOR OVERLAND FLOW DIRECTION
- STORM DRAINAGE CATCHMENT
- CATCHMENT I.D.
- AREA (ha) | RUNOFF COEFFICIENT

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED WITH FUNCTIONAL SERVICING REPORT	2016/OCT/24

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK No. 257, LOCATED ON THE SOUTH FACE, 0.61m WEST OF THE EAST CORNER OF THE RED BRICK BUILDING AT THE NORTHWEST CORNER OF THOMAS STREET AND QUEEN STREET

ELEVATION = 162.08m
(CANADIAN GEODETIC VERTICAL DATUM 1928: PRE 1978 ADJUSTMENT)

SURVEY NOTES:

SURVEY COMPLETED BY DAVID B. SEARLES SURVEYING LTD. (2016/JUN/01)
FILE No.: 95-0-16

BEARINGS SHOWN ARE GRID AND ARE REFERRED TO THE NORTHERLY LIMIT OF THOMAS STREET AS SHOWN ON PLAN 43R-28302, HAVING A BEARING OF N39°41'00"E

DISTANCES SHOWN HEREON ARE GROUND DISTANCES.

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY OP DESIGN INC.
DRAWING No.: A-1, REV.10 (2016/OCT/04)
PROJECT No.: 2016-022

DRAWING NOTES:

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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

DUNPAR HOMES
80 THOMAS STREET
CITY OF MISSISSAUGA

Drawing

PRELIMINARY POST-DEVELOPMENT DRAINAGE PLAN

Engineer | Engineer

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

CROZIER & ASSOCIATES Consulting Engineers
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905 875-0026 T
905 875-4915 F
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Drawn	Design	Project No.	
J.R.S.	N.A.S./B.M.P.	1240-4376	
Check D.O.M.	Check D.O.M.	Scale 1:500	Dwg. C 705