FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

200 SOUTH SERVICE ROAD & 201 RADLEY ROAD

CITY OF MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

DREAM MAKER INC.

PREPARED BY:

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CFCA FILE NO. 1110-4749

CROZIER &ASSOCIATES
Consulting Engineers

Revision Number	Date	Comments
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1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) has been retained by Dream Maker for civil engineering design of the proposed residential development at 200 South Service Road & 201 Radley Road (henceforth referred to as the 'site') in the City of Mississauga. Crozier has prepared this report in support of a Zoning By-Law Amendment (ZBA) to outline the water and sanitary servicing, grading, and stormwater management.

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

2.0 GENERAL SITE DESCRIPTION

The 0.28 ha property, located in a residential neighbourhood, currently consists of two detached residential dwellings. The property has landscaped and impervious areas, including two asphalt driveways, paths, and patio areas. The property is bounded by South Service Road to the north, Crestview Avenue to the west, Radley Road to the south, and residential properties to the east. The portion of the site currently located at 200 South Service Road has existing driveway access to South Service Road and Crestview Avenue and the portion of the site located at 201 Radley Road has existing driveway access to Radley Road.

The existing water service for 200 South Service Road connects to the 300 mm diameter watermain located on South Service Road. The existing water service for 201 Radley Road connects to the 150 mm diameter watermain on Radley Road. An existing 150 mm diameter watermain is located on Crestview Avenue and extends from the watermain on South Service Road to the watermain on Radley Road.

The existing sanitary service for 200 South Service Road discharges to the 250 mm diameter sewer located on South Service Road. The existing sanitary service for 201 Radley Road discharges to the 250 mm diameter sewer located on Radley Road. There is no existing sanitary sewer located on Crestview Avenue.

South Service Road currently has an urban cross-section with drainage conveyed east in a 675 mm diameter storm sewer pipe towards Cooksville Creek. Radley Road currently has a rural cross-section with roadside ditches conveying drainage east to the 900 mm diameter storm sewer system on Radley Street, which flows east towards Cooksville Creek. Crestview Avenue currently has a rural cross-section, with roadside ditches conveying drainage to a catch basin manhole located in the east boulevard of Crestview Avenue, which discharges through an existing corrugated steel pipe (CSP) to the 900 mm diameter storm sewer system on Radley Street. Under existing conditions, the site generally slopes downgrade from South Service Road to Radley Road at an average slope of 0.5% with the site's drainage directed towards the east boulevard of Crestview Avenue.

The proposed development consists of five single detached residential dwellings with individual driveway accesses to Crestview Avenue. A road widening area has been

applied to the site's frontage along South Service Road, with a 14 m Ministry of Transportation of Ontario (MTO) setback, both of which are proposed to be landscaped.

3.0 WATER SERVICING

3.1 Existing Water Servicing

According to Region of Peel as-built for South Service Road (Plan No. 21402-D), dated Aug.20, 1998, and Region of Peel as-built for Radley Road (Plan No. 10561-D), dated September, 1990, the following existing watermains are in close proximity to the site:

- A 300 mm diameter watermain on South Service Road;
- A 150 mm diameter watermain on Crestview Road;
- A 150 mm diameter watermain on Radley Road.

Existing fire hydrants are located at the north-east and north-west corners of Radley Road & Crestview Road and at the north-west corner of Crestview Road & South Service Road. The location of the existing watermains are shown on **Drawing C02**.

3.2 Water Design Demand

The Region of Peel Public Works Watermain Design Criteria was used to estimate the existing and proposed water demands for domestic purposes. A density of 4.15 people per unit (ppu) was applied for the detached dwellings, as designated by Peel Region. A summary of the results is presented in **Table 1**, with detailed calculations provided in **Appendix A**.

Table 1: Estimated Domestic Water Demand

	Average Daily Demand (L/s)	**Maximum Daily Demand** (L/s)	**Peak Hourly Demand** (L/s)
Existing	0.03	0.05	0.08
Proposed	0.07	0.14	0.20

The Fire Underwriters Survey (FUS) method was used to complete the fire flow demand analysis for the proposed development. The existing 150 mm diameter watermain on Crestview Avenue will be required to accommodate a fire flow of 100 L/s for a duration of 2.0 hours per the FUS calculations, which are provided in **Appendix A**.

Note that the Fire Underwriter's Survey value is a conservative estimate for comparison purposes only. The Mechanical Engineer for this development will complete the required analysis for fire protection, and the Architect will design fire separation methods per the determined fire flow rate in order to meet municipally available flows and pressures. The exact location of the existing watermain will need to be verified by the contractor in the field. If required, in order to determine the available fire flow and pressure within the existing municipal system, a hydrant flow test can be completed.

3.3 Proposed Water Servicing

The proposed development consists of five single detached residential dwellings. Individual 19 mm domestic water service connections will be provided from the existing 150 mm diameter watermain on Crestview Avenue to each detached dwelling as shown in **Drawing C02**. Each proposed water service will be equipped with a property line curb stop. A water meter will be installed within each dwelling per mechanical design and specifications. Each water service connection will adhere to Region of Peel standards.

4.0 SANITARY SERVICING

4.1 Existing Sanitary Servicing

According to Region of Peel as-built for South Service Road (Plan No. 21402-D), dated Aug.20, 1998, and Region of Peel as-built for Radley Road (Plan No. 10561-D), dated September, 1990, the following existing sanitary sewers are in close proximity to the site:

- A 250 mm diameter sanitary sewer on South Service Road, with wastewater flowing east;
- A 250 mm diameter sanitary sewer on Radley Road, with wastewater flowing east.

The location of the existing sanitary sewers is shown on **Drawing C02**.

4.2 Sanitary Design Flow

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

Table 2: Estimated Sanitary Design Flow

	Average Daily Flow (L/s)	**Peak Flow** (L/s)	**Infiltration Flow** (L/s)	**Total Peak Flow** (L/s)
Existing	0.03	0.14	0.06	0.20
Proposed	0.07	0.32	0.06	0.37

4.3 Proposed Sanitary Servicing

The existing sanitary service connection for 200 South Service Road discharges to the 250 mm diameter sewer located on South Service Road. The existing sanitary service connection for 201 Radley Road discharges to the 250 mm diameter sewer located on Radley Road. As there is no existing sanitary sewer located on Crestview Avenue, it is proposed to extend a new 200 mm diameter sanitary sewer north on Crestview Avenue from the existing sanitary manhole at the corner of Crestview Avenue & Radley Road. The proposed sanitary sewer will extend approximately 70 m north on Crestview Avenue, with single or double sewer service connections made to each detached dwelling per Region of Peel standards. **Drawing C02** provides further detail regarding the proposed sanitary servicing of the site.

5.0 STORMWATER DRAINAGE CONDITIONS

5.1 Pre-Development Drainage Conditions

Based on a review of the existing topographic survey prepared by Tom A. Senkus, dated September 27th, 2017, the 0.28 ha development area currently consists of two detached residential dwellings with associated landscaped and driveway areas. Based on the existing impervious area, the pre-development weighted runoff coefficient is 0.42. The site generally slopes downgrade from South Service Road to Radley Road at an average slope of 0.5%, with the site's drainage directed towards the roadside ditch in the east boulevard of Crestview Avenue. The site's drainage is collected in a catch basin manhole and conveyed through an existing CSP located within the property limits of 201 Radley Road to the existing 900 mm diameter storm sewer system on Radley Road.

The pre-development drainage plan is shown in **Figure 1**. **Table 3** provides a summary of pre-development site areas, associated runoff coefficients, and calculated peak flow rates, with detailed calculations provided in **Appendix C**.

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

Catchment Area	**Pervious Area** (ha) (RC = 0.25)	**Impervious Area** (ha) (RC = 0.90)	**Total Area** (ha)	**Weighted Runoff Coefficient** (RC)	**Design Storm Event**	**Peak Flow Rate** (L/s)
101	0.21	0.07	0.28	0.42	2	19.6
					5	26.4
					10	32.5
					25	37.4
					50	41.7
					100	46.1

5.2 Post-Development Drainage Conditions

Under post-development conditions, the existing catch basin manhole and catch basin located within the east boulevard of Crestview Avenue are proposed to be removed, along with the existing 600 mm diameter and 900 mm diameter storm sewers located within the limits of the site. A new storm sewer is proposed to be extended west on Radley Road from the existing storm manhole and connect to a new storm catch basin manhole (CBMH) located in the east boulevard of Crestview Avenue (refer to **Drawing C02**). The existing ditch in the east boulevard of Crestview Avenue will be re-graded and completed with headwalls and culverts to convey drainage beneath the proposed driveways to the new storm CBMH.

The site is proposed to be divided into two drainage catchment areas, which are shown in **Figure 2**. The drainage catchments are described below in detail and summarized in **Table 4**, with detailed calculations provided in **Appendix C**.

Catchment 201:

The proposed grading for the development includes split lot drainage. Catchment 201 comprises the driveways, and various landscaped areas which will drain uncontrolled to the existing re-graded ditch within the east boulevard of Crestview Avenue.

Catchment 202:

Catchment 202 comprises the rooftop, side yards, and rear yards of the proposed detached residential dwellings. Rooftop drainage will splash to grade via roof leaders and be directed via side yard swales to the proposed rear yard catch basins. Surface drainage will be conveyed by side yard swales and overland flow to the rear yard catch basins. The rear yard catch basins will discharge the runoff to proposed subsurface infiltration galleries which are sized to infiltrate the 100-year storm event. For larger storm events exceeding the storage capacity of the minor system, an overland flow route will convey the stormwater to Radley Road.

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

Catchment Area	**Pervious Area** (ha) (RC = 0.25)	**Impervious Area** (ha) (RC = 0.90)	**Total Area** (ha)	**Weighted Runoff Coefficient** (RC)	**Design Storm Event**	**Peak Flow Rate** (L/s)
201	0.08	0.02	0.11	0.39	2	7.1
					5	9.5
					10	11.7
					25	13.5
					50	15.1
					100	16.7
202	0.09	0.09	0.17	0.58	2	17.0
					5	22.9
					10	28.2
					25	32.3
					50	36.1
					100	39.9
Entire Site	0.17	0.11	0.28	0.51	2	24.1
					5	32.4
					10	39.9
					25	45.8
					50	51.2
					100	56.6

6.0 STORMWATER MANAGEMENT

The stormwater management for the site includes controlling the stormwater from the subject property in accordance with standards set by the 'Development Requirements Manual' (City of Mississauga Transportation and Works, September 2016) and the 'Stormwater Management Criteria' (Credit Valley Conservation (CVC), August 2012).

6.1 Stormwater Criteria

As the site is located in the Cooksville Creek subwatershed and the ultimate storm sewer outlet is the existing 900 mm diameter storm sewer on Radley 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 100-yr post-development peak flows to 2-yr pre-development peak flow levels.

- Quality Control: Enhanced Levels of Protection per MOECC Standards (80% TSS Removal).
- Water Balance: 5 mm retention of stormwater across the entire site.
- Erosion and Sediment Control: Controls to be provided during construction.

A portion of the site is located within a MTO regulated area with an associated 14 metre development setback. 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). As the proposed development is not located within the MTO setback, subsurface storage is proposed to meet the quantity control criteria.

6.2 Stormwater Quantity Control

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

Based on the quantity control criteria stated in Section 6.1, the post-development peak flow from the site for the 100-year design storm event (56.5 L/s) must not exceed the pre-development peak flow from the site for the 2-year design storm event (19.6 L/s). This objective is achieved by reducing the site area draining uncontrolled to the existing ditch on Crestview Avenue, and ultimately, to the storm sewer system on Radley Road.

While Catchment 201 is proposed to drain uncontrolled to the existing ditch on Crestview Road, Catchment 202 is proposed to drain to a subsurface storage chamber (Triton M-6 or approved equivalent), sized to hold the runoff generated from the 100-year storm event (based on a 4-hour hydrograph) and dissipate the runoff into the native soil over a drawdown period of 47 hours, as recommended by the LID SWM Design Guide (CVC, 2011).

Refer to **Table 5** for a summary of the pre-development and post-development design storm event peak flows. Detailed calculations of the Modified Rational Method, storage requirements and drawdown period are provided in **Appendix C**.

Table 5: Summary of Peak Flow Rates

Storm Event	Total Area (ha)	Pre-Development Peak Flow (L/s)	Post-Development Peak Flow (L/s)		
		Catchment 101	Catchment 201	Catchment 202	Entire Site:
2	0.28	19.6	7.1	0	7.1
5		26.4	9.5	0	9.5
10		32.5	11.7	0	11.7
25		37.4	13.5	0	13.5
50		41.7	15.1	0	15.1
100		46.1	16.7	0	16.7

As noted in **Table 5**, the peak flow rate for the 100-year design storm event in the post-development condition (16.7 L/s) does not exceed the peak flow rate for the 2-year design storm event in the pre-development condition (19.6 L/s), therefore the stormwater quantity control criteria is satisfied.

6.3 Stormwater Quality Control

As outlined in the Development Requirements Manual (2016), the City criteria for stormwater quality refers to the MOECC stormwater quality Enhanced Level of Protection of 80% TSS removal from 100% of the runoff volume for the proposed development. Within the proposed development, stormwater runoff encounters three surface types, each with differing characteristics related to water quality. The majority of the runoff will be collected on landscaped surfaces and will therefore have an associated TSS removal of 80%. A portion of the runoff will be collected on roof surfaces, which is not likely to accumulate sediment and may be considered clean for the purposes of water quality control. The remainder of the runoff will be collected on driveway surfaces and be directed towards the existing roadside ditch on Crestview Avenue, mimicking the pre-development drainage pattern.

As noted in **Table 6**, the combination of clean roof water and landscaped areas within the site will achieve 80% removal of TSS, therefore the water quality target of the long-term removal of 80% of TSS on an annual loading basis from all runoff leaving the Site is achieved.

Table 6: Water Quality Controls

Land Use	Area (ha)	% of Total Development Area	TSS Removal Efficiency	TSS Removal
Proposed Driveways	0.022	7.86%	0.0%	0.0%
Proposed Landscaped Area	0.171	60.68%	80.0%	48.54%
Proposed Dwellings	0.089	31.45%	100.0%	31.45%
Total Site	**0.282**	**100.0%**	**-**	**80.0%**

6.4 Water Balance

Water balance objectives will be met by a combination of lot, conveyance and end-of-pipe measures designed to retain and/or infiltrate on site the first millimeters of all precipitation events. At the lot level, the proposed landscaped surfaces will increase the potential for the retention and interception of runoff. At the conveyance level, it is expected that the proposed grassed swales will retain and infiltrate a portion of the runoff that they convey. To complete the required objective, a gravel sump in the storage chamber will receive runoff from the landscaped areas and the rooftop areas.

The gravel sump will be located beneath the stormwater storage chamber. As noted in **Section 6.2**, drawdown calculations for the stormwater storage chamber were completed and the gravel sump has been sized to infiltrate the 5 mm water balance requirement for the site over a drawdown period of 47 hours. For a total site area of 0.28 ha, the required

water balance volume is 14.11 m^3. **Table 7** includes a summary of the required gravel sump parameters.

Table 7: Summary of Gravel Sump Parameters

	Gravel Sump
Footprint Area (m^2)	102.78 m^2 x 2 galleries = 205.56 m^2
Gravel Sump Depth (m)	0.17
Length (m)	28.87 m x 2 galleries = 57.74 m
Width (m)	3.56 m
5mm Design Storm Event Runoff Volume Storage (m^3)	14.11

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

7.0 Erosion and Sediment Control During Construction

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

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

Heavy Duty Silt Fencing

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

Rock Mud Mat

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

Silt Sacks in Catch Basins

A silt sack shall be installed on the top of existing storm sewer catch basins located on South Service Road and Radley Road during construction and on the top of new catch basins and area drains until the finished surfaces are stabilized.

8.0 CONCLUSIONS & RECOMMENDATIONS

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

- Water servicing for the proposed development will be provided by the existing 150 mm ø watermain located on Crestview Avenue, with individual service connections provided for each detached dwelling per Region of Peel standards.
- Sanitary servicing for the proposed development will be provided by an extension of the existing sanitary sewer north on Crestview Avenue. Single or double sewer service connections will be made to each detached dwelling per Region of Peel standards.
- Stormwater management quantity controls for the development include detention of the 100-year design storm to the 2-year pre-development peak flow rate through the use of two 40.7 m^3 underground storage chambers, sized to dissipate the 100-year design storm event volume into the native soil over a drawdown period of 47 hours.
- The stormwater quality objective of 80% TSS removal from 100% of the runoff volume for the proposed development is achieved through a combination of clean rooftop water and landscaped areas.
- Stormwater water balance objectives will be met using a stormwater chamber gravel sump to retain and infiltrate the 5 mm storm event over a drawdown period of 47 hours.

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

Respectfully submitted,

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APPENDIX A

Water Demand Calculations

Project: 200 South Service Rd & 201 Radley Rd
Project No: 1110-4749

Date: 1/2/2018
Design BY: TL
Checked By: BP

EXISTING WATER DEMAND

PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

A. **Existing Units**

Detached Dwelling	2
TOTAL	**2**

B. **Area's** (m2)

Total Residential Units GFA	386
Site Area	2,821

C. **Design Criteria**

Total Population = **8**

Note 1: Detached dwelling population density of 4.15 ppu as recommended by Regional correspondence, dated September 2, 2016

Residential Average Consumption Rate= 280.0 L/cap/d
Residential Max Day Factor = 2.0
Residential Peak Hour Factor = 3.0

Average day flow	280	x	8	=			2,324	L/day	=	0.03	L/s
Maximum day flow	280	x	8	x	2.0	=	4,648	L/day	=	0.05	L/s
Peak hour flow	280	x	8	x	3.0	=	6,972	L/day	=	0.08	L/s

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

D. **Total Domestic Demand**

Average day flow	**0.03**	**L/s**
Maximum day flow	**0.05**	**L/s**
Peak hour flow	**0.08**	**L/s**

Project: 200 South Service Rd & 201 Radley Rd
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Design BY: TL
Checked By: BP

PROPOSED WATER DEMAND

PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

A. **Proposed Units**

Detached Dwelling	5
TOTAL	**5**

B. **Area's** (m2)

Total Residential Units GFA	1,780
Site Area	2,821

C. **Design Criteria**

Total Population = **21**

Note 1: Detached dwelling population density of 4.15 ppu as recommended by Regional correspondence, dated September 2, 2016

Residential Average Consumption Rate= 280.0 L/cap/d
Residential Max Day Factor = 2.0
Residential Peak Hour Factor = 3.0

Average day flow	280	x	21	=			5,810	L/day	=	0.07	L/s
Maximum day flow	280	x	21	x	2.0	=	11,620	L/day	=	0.13	L/s
Peak hour flow	280	x	21	x	3.0	=	17,430	L/day	=	0.20	L/s

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

D. **Total Domestic Demand**

Average day flow	**0.07**	**L/s**
Maximum day flow	**0.13**	**L/s**
Peak hour flow	**0.20**	**L/s**

CROZIER & ASSOCIATES Consulting Engineers

200 South Service Road & 201 Radley Road
Fire Protection Calculation
CFCA File: 1110-4749

Date: 1/2/2018
Design: TL
Check: BP

Water Supply for Public Fire Protection - 1999
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

=	1.5	for wood frame construction (structure essentially all combustible)
=	1.0	for ordinary construction (brick or other masonry walls, combustible floor and interior)
=	0.8	for non-combustible construction (unprotected metal structural components)
=	0.6	for fire-resistive construction (fully protected frame, floors, roof)

A = The total floor area in square metres (including all storeys, but excluding basements at least 50 percent below grade) in the building considered.

Proposed Building:

Note: Single detached dwelling with largest footprint area and smallest horizontal separation from adjacent proposed dwelling used as conservative estimate for fire flow calculation.

Building Area = 187.3 sq.m
Total Floor Area (+ 50% of floor above) = 280.9 sq.m

C = 1.0 Assume ordinary construction

Therefore F = 3,687 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
3,687 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	2.76	25%	921.9
South	Adjacent Dwelling	2.76	25%	921.9
East	Adjacent Dwelling	12.3	15%	553.1
West	Adjacent Dwelling	>45	0%	0.0
				2,397 L/min Surcharge

Determine Required Fire Flow

No.1	3,687		
No. 2	0	reduction	
No. 3	0	reduction	
No. 4	2,397	surcharge	
Required Flow:	**6,084 L/min**		
Rounded to nearest 1000 L/min:	**6,000 L/min**	or	100.0 L/s
			1,585 USGPM

Required Duration of Fire Flow

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

APPENDIX B

Sanitary Flow Calculations

Project: 200 South Service Road & 201 Radley Road
Project No: 1110-4749

Date: 1/2/2018
Design: TL
Check: BP

EXISTING SANITARY FLOWS

PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

A. Existing Site Conditions

Residential Unit Type	Total Res. Units
Detached Dwelling	2
Totals	**2**

Site area = **0.2821** **ha**

Total Population **9** capita

Note 1: Detached dwelling population density of 4.15 ppu as recommended by Regional correspondence, dated September 2, 2016

B. Existing Flow

Unit Type	Gross Floor Area (m2)	Site Area (ha)	Population	Average Sanitary Flow (302.8L/cap/d) (L/s)	Harmon Peaking Factor	Total Peak Flow (L/s)
Detached Dwellings	386	0.282	9	0.03	4.42	0.14

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

Note 3: Peaking Factor = Harmon Formula

C. Infiltration

Site Area (ha)	Infiltration Rate (L/ha/s)	Total Infiltration (L/s)
0.282	0.20	0.06

Note 4: Infiltration = 0.2 L/ha/s Section 2.3 Region of Peel Public Works Criteria Manual - Sanitary Sewer

D. Total Existing Peak Flow Rate

	Peak Flow (L/s)	
Peak Flow	0.14	L/s
Infiltration	0.06	L/s
Total	**0.20**	**L/s**

Project: 200 South Service Road & 201 Radley Road
Project No: 1110-4749

Date: 1/2/2018
Design: TL
Check: BP

PROPOSED SANITARY FLOWS

PRELIMINARY ESTIMATES FOR CONFIRMATION OF CAPACITY STATEMENT

A. Proposed Site Conditions

Residential Unit Type	Total Res. Units
Detached Dwelling	5
Totals	**5**

Site area = **0.2821** **ha**

Total Population **21** capita

Note 1: Detached dwelling population density of 4.15 ppu as recommended by Regional correspondence, dated September 2, 2016

B. Proposed Flow

Unit Type	Gross Floor Area (m2)	Site Area (ha)	Population	Average Sanitary Flow (302.8L/cap/d) (L/s)	Harmon Peaking Factor	Total Peak Flow (L/s)
Detached Dwellings	1,780	0.282	21	0.07	4.38	0.32

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

Note 3: Peaking Factor = Harmon Formula

C. Infiltration

Site Area (ha)	Infiltration Rate (L/ha/s)	Total Infiltration (L/s)
0.282	0.20	0.06

Note 4: Infiltration = 0.2 L/ha/s Section 2.3 Region of Peel Public Works Criteria Manual - Sanitary Sewer

D. Total Proposed Peak Flow Rate

	Peak Flow (L/s)	
Peak Flow	0.32	L/s
Infiltration	0.06	L/s
Total	**0.37**	**L/s**

APPENDIX C

Stormwater Management Calculations

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 200 South Service Rd. & 201 Radley Rd.
PROJECT No.: 1110-4749
DESIGN: TL
CHECK: BP
DATE: 12/19/2017
UPDATED: 1/5/2018

PRE-DEVELOPMENT CONDITIONS

Address: 200 South Service Road & 201 Radley Road, Mississauga

Storm Data: City of Mississauga IDF Parameters

Time of Concentration: T_c= 15 min

Return Period	a	b	c	i mm/hr
2 yr	610	4.6	0.78	59.89
5 yr	820	4.6	0.78	80.51
10 yr	1010	4.6	0.78	99.17
25 yr	1160	4.6	0.78	113.89
50 yr	1300	4.7	0.78	127.13
100 yr	1450	4.9	0.78	140.69

Equations:

Intensity

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

Peak Flow

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

Catchment 101 (Entire Site):

Existing Weighted Runoff Coefficient

	C	Area (ha)	Weighted RC
Pervious	0.25	0.2104	0.19
Impervious	0.90	0.0717	0.23
Total Surface		0.2821	0.42

2 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.42	-	(Runoff coefficient)
$Area_{Pre}$	0.282	ha	(Drainage area)
T_c	15	min	
i	59.89	mm/hr	Town of Oakville
Q_{pre}	0.0196	m^3/s	(Peak Flow)

25 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.42	-	(Runoff coefficient)
$Area_{Pre}$	0.282	ha	(Drainage area)
T_c	15	min	
i	113.89	mm/hr	Town of Oakville
Q_{pre}	0.0374	m^3/s	(Peak Flow)

5 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.42	-	(Runoff coefficient)
$Area_{Pre}$	0.282	ha	(Drainage area)
T_c	15	min	
i	80.51	mm/hr	Town of Oakville
Q_{pre}	0.0264	m^3/s	(Peak Flow)

50 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.42	-	(Runoff coefficient)
$Area_{Pre}$	0.282	ha	(Drainage area)
T_c	15	min	
i	127.13	mm/hr	Town of Oakville
Q_{pre}	0.0417	m^3/s	(Peak Flow)

10 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.42	-	(Runoff coefficient)
$Area_{Pre}$	0.282	ha	(Drainage area)
T_c	15	min	
i	99.17	mm/hr	Town of Oakville
Q_{pre}	0.0325	m^3/s	(Peak Flow)

100 Year Storm

-	0.0028	factor	(Metric conversion)
C_{pre}	0.42	-	(Runoff coefficient)
$Area_{Pre}$	0.282	ha	(Drainage area)
T_c	15	min	
i	140.69	mm/hr	Town of Oakville
Q_{pre}	0.0461	m^3/s	(Peak Flow)

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 200 South Service Rd. & 201 Radley Rd.
PROJECT No.: 1110-4749
DESIGN: TL
CHECK: BP
DATE: 12/19/2017
UPDATED: 1/5/2018

POST-DEVELOPMENT CONDITIONS

Address: 200 South Service Road & 201 Radley Road, Mississauga

Storm Data: City of Mississauga IDF Parameters

Time of Concentration: T_c= 15 min

Return Period	a	b	c	i (mm/hr)
2 yr	610	4.6	0.78	59.89
5 yr	820	4.6	0.78	80.51
10 yr	1010	4.6	0.78	99.17
25 yr	1160	4.6	0.78	113.89
50 yr	1300	4.7	0.78	127.13
100 yr	1450	4.9	0.78	140.69

Equations:

Intensity

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

Peak Flow

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

Catchment 201 (Uncontrolled):

Proposed Weighted Runoff Coefficient

	C	Area (ha)	Weighted RC
Pervious	0.25	0.0842	0.20
Impervious	0.90	0.0236	0.20
Total Surface		0.1078	0.39

2 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.39 -	(Runoff coefficient)
$Area_{Post}$	0.108 ha	(Drainage area)
T_c	15 min	
i	59.89 mm/hr	Town of Oakville
Q_{post}	0.0071 m^3/s	(Peak Flow)

5 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.39 -	(Runoff coefficient)
$Area_{Post}$	0.108 ha	(Drainage area)
T_c	15 min	
i	80.51 mm/hr	Town of Oakville
Q_{post}	0.0095 m^3/s	(Peak Flow)

10 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.39 -	(Runoff coefficient)
$Area_{Post}$	0.108 ha	(Drainage area)
T_c	15 min	
i	99.17 mm/hr	Town of Oakville
Q_{post}	0.0117 m^3/s	(Peak Flow)

25 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.39 -	(Runoff coefficient)
$Area_{Post}$	0.108 ha	(Drainage area)
T_c	15 min	
i	113.89 mm/hr	Town of Oakville
Q_{post}	0.0135 m^3/s	(Peak Flow)

50 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.39 -	(Runoff coefficient)
$Area_{Post}$	0.108 ha	(Drainage area)
T_c	15 min	
i	127.13 mm/hr	Town of Oakville
Q_{post}	0.0151 m^3/s	(Peak Flow)

100 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.39 -	(Runoff coefficient)
$Area_{Post}$	0.108 ha	(Drainage area)
T_c	15 min	
i	140.69 mm/hr	Town of Oakville
Q_{post}	0.0167 m^3/s	(Peak Flow)

Catchment 202 (Controlled):

Proposed Weighted Runoff Coefficient

	C	Area (ha)	Weighted RC
Pervious	0.25	0.0853	0.12
Impervious	0.90	0.0890	0.46
Total		0.1743	0.58

2 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.58 -	(Runoff coefficient)
$Area_{Post}$	0.174 ha	(Drainage area)
T_c	15 min	
i	59.89 mm/hr	Town of Oakville
Q_{post}	0.0170 m^3/s	(Peak Flow)

5 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.58 -	(Runoff coefficient)
$Area_{Post}$	0.174 ha	(Drainage area)
T_c	15 min	
i	80.51 mm/hr	Town of Oakville
Q_{post}	0.0229 m^3/s	(Peak Flow)

10 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.58 -	(Runoff coefficient)
$Area_{Post}$	0.174 ha	(Drainage area)
T_c	15 min	
i	99.17 mm/hr	Town of Oakville
Q_{post}	0.0282 m^3/s	(Peak Flow)

25 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.58 -	(Runoff coefficient)
$Area_{Post}$	0.174 ha	(Drainage area)
T_c	15 min	
i	113.89 mm/hr	Town of Oakville
Q_{post}	0.0323 m^3/s	(Peak Flow)

50 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.58 -	(Runoff coefficient)
$Area_{Post}$	0.174 ha	(Drainage area)
T_c	15 min	
i	127.13 mm/hr	Town of Oakville
Q_{post}	0.0361 m^3/s	(Peak Flow)

100 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.58 -	(Runoff coefficient)
$Area_{Post}$	0.174 ha	(Drainage area)
T_c	15 min	
i	140.69 mm/hr	Town of Oakville
Q_{post}	0.0399 m^3/s	(Peak Flow)

Entire Site:

Proposed Weighted Runoff Coefficient

	C	Area (ha)	Weighted RC
Pervious	0.25	0.1695	0.15
Impervious	0.90	0.1126	0.36
Total		0.2821	0.51

2 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.51 -	(Runoff coefficient)
$Area_{Post}$	0.282 ha	(Drainage area)
T_c	15 min	
i	59.89 mm/hr	Town of Oakville
Q_{post}	0.0241 m^3/s	(Peak Flow)

5 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.51 -	(Runoff coefficient)
$Area_{Post}$	0.282 ha	(Drainage area)
T_c	15 min	
i	80.51 mm/hr	Town of Oakville
Q_{post}	0.0324 m^3/s	(Peak Flow)

10 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.51 -	(Runoff coefficient)
$Area_{Post}$	0.282 ha	(Drainage area)
T_c	15 min	
i	99.17 mm/hr	Town of Oakville
Q_{post}	0.0399 m^3/s	(Peak Flow)

25 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.51 -	(Runoff coefficient)
$Area_{Post}$	0.282 ha	(Drainage area)
T_c	15 min	
i	113.89 mm/hr	Town of Oakville
Q_{post}	0.0458 m^3/s	(Peak Flow)

50 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.51 -	(Runoff coefficient)
$Area_{Post}$	0.282 ha	(Drainage area)
T_c	15 min	
i	127.13 mm/hr	Town of Oakville
Q_{post}	0.0512 m^3/s	(Peak Flow)

100 Year Storm

-	0.0028 factor	(Metric conversion)
C_{post}	0.51 -	(Runoff coefficient)
$Area_{Post}$	0.282 ha	(Drainage area)
T_c	15 min	
i	140.69 mm/hr	Town of Oakville
Q_{post}	0.0566 m^3/s	(Peak Flow)

CROZIER & ASSOCIATES Consulting Engineers

PROJECT: 200 South Service Rd. & 201 Radley Rd.
PROJECT No.: 1110-4749
DESIGN: TL **DATE:** 12/19/2017
CHECK: BP **UPDATED:** 1/5/2018

DRAWDOWN CALCULATION

Address: 200 South Service Road & 201 Radley Road, Mississauga

IDF Data per City of Mississauga Standard Drawing 2111.010

100-YR EVENT			
100-Yr Intensity (i)		19.86	mm/hr
Storm Duration (T_d)		4	hr
Catchment	Area (m^2)	Runoff Volume (m^3) = (1/2)*2T_d*(0.0028*$RC_{Weighted}$*i*Area)	
202	1743	81.20	

Soakaway Pit		
Parameter	Value	Unit
Assumed Minimum Infiltration (Percolation) Rate	15	mm/hr
Runoff Volume	81.2	m^3
Recommended Maximum Pit Depth[1]	1.50	m
Trench Porosity[2]	0.56	-
Maximum Drawdown Time	48	hr

[1]CVC/TRCA SWM Design Guideline Manual

[2]Porosity of storage media based on composite void ratio between chamber and stone layer

Proposed Soakaway Pit Dimensions	
Footprint Surface Area (m^2)	**207.55**
Width (m)	**3.56**
Length (m)	**58.30**
Depth (m)	**0.75**
100-year Drawdown Time (hr)	**47**

Note: Refer to Appendix C for dimensions of Triton subsurface stormwater chambers

Equations:

Peak Flow

$Q_{100\text{-year}} = 0.0028 * C_{post} * i * A$

Runoff Volume

$RV_{100\text{-year}} = 1/2 * 2t_c * Q_{100\text{-year}}$

Drawdown Time

Drawdown Time (hr) = (1000 * Runoff Volume (m^3)) /(Infiltration Rate (mm/hr) * Void Ratio * Infiltration Area (m^2))

Site Calculator

- System Builder
- Field Diagram
- Summary

Parameters

Units: Metric ▼
Storage Volume: 40 Cu. M
Chamber Selection: M-6 ▼ [+]
Header Row Position: Left ▼
Fill Over Embedment Stone: 30 cm
Embedment Stone:

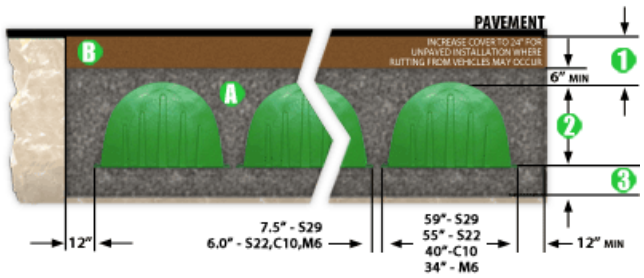
Over:
15
Under:
15
Porosity: 0.4
Controlled By (in M):
Width
4
Accessories:
Dumpsters: 0
Bins: 0
Floors:
Double Stacked
Double Stacked?:
Lower Chamber: S-29
Stone Between: 15

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

SAVE

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

Project Results



- 1 Total Cover Over Chambers: 45.72 cm
- 2 Height of Chamber: 44.6532 cm
- 3 Embedment Stone Under Chambers: 15.24 cm
- A Volume of Embedment Stone Required: 60 Cu. M
- B Volume of Fill Material Required: 31 Cu. M

Total Storage Provided:	40.7 Cu. M
Type of Distribution Chambers:	M-6
# of Distribution Chambers Required:	106
# of end caps required:	8
Type of header row chambers required:	M-6
# of header row chambers required:	4
Floors:	0
Bins:	0
Dumpsters:	0
Required Bed Size:	102.78 Sq. M
Volume of Embedment Stone Required:	60.85 Cu. M
Volume of Fill Material Required:	31.33 Cu. M
Volume of Excavation:	108.54 Cu. M
Area of Filter Fabric:	151.5 Sq. M

# of Chambers long:	36
# of rows:	3
Actual Trench Length:	28.869 M
Actual Trench Width:	3.56 M

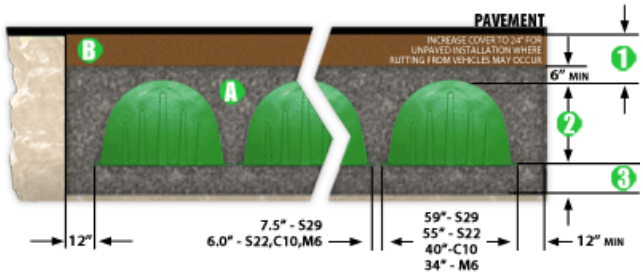
Field Diagram

WIRE DIAGRAM

Chamber Type

Dimensions 34" x 17.5" x 32" (WxHxL)
836.6mm x 44.5mm x 812.8mm
Weight 12 lbs / 5.4 kg
Bare Chamber Storage 5.6 ft³ / 0.16 m³

Project Results



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# of Distribution Chambers Required:	106
# of end caps required:	8
Type of header row chambers required:	M-6
# of header row chambers required:	4
Floors:	0
Bins:	0

Dumpsters:	0
Required Bed Size:	102.78 Sq. M
Volume of Embedment Stone Required:	60.85 Cu. M
Volume of Fill Material Required:	31.33 Cu. M
Volume of Excavation:	108.54 Cu. M
Area of Filter Fabric:	151.5 Sq. M
# of Chambers long:	36
# of rows:	3
Actual Trench Length:	28.869 M
Actual Trench Width:	3.56 M

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

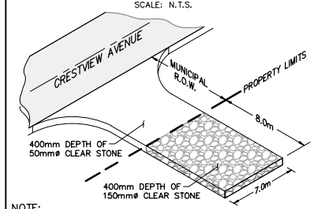
DRAWINGS

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- o HP — EXISTING HYDRO POLE
- x — x — EXISTING FENCE
- 215.00 — EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- MUD-MAT; SEE DETAIL
- SF — SILT FENCE; SEE DETAIL

MUD-MAT DETAIL

SCALE: N.T.S.

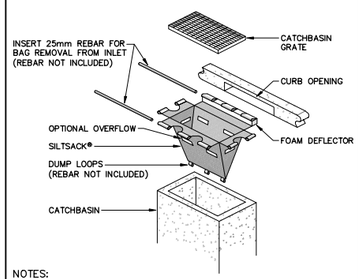


NOTE:

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

'SILTSACK' DETAIL

SCALE: N.T.S.

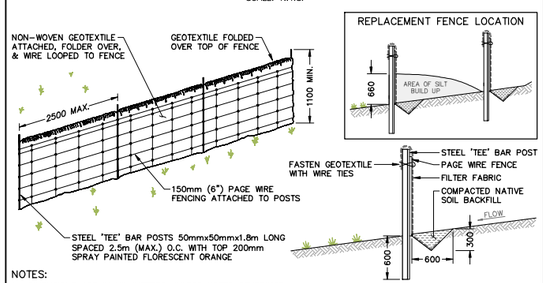


NOTES:

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

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.

No.	ISSUE / REVISION	YYYY/MMM/DD
A	ISSUED FOR REVIEW	2018/JAN/12

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE REFERRED TO CITY OF MISSISSAUGA (CITY DATUM) BENCHMARK No. 709
ELEVATION = 98.279

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENKUS ONTARIO LAND SURVEYOR. (2017/SEP/27)
REFERENCE No.: 17-50
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 COMPANY INC.
DRAWING No.: XXX, REV.X (2000/NOV/20)
PROJECT No.: ####

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

200 SOUTH SERVICE ROAD & 201 RADLEY ROAD CITY OF MISSISSAUGA

Drawing

REMOVALS PLAN
EROSION & SEDIMENT CONTROL PLAN

NOT FOR CONSTRUCTION

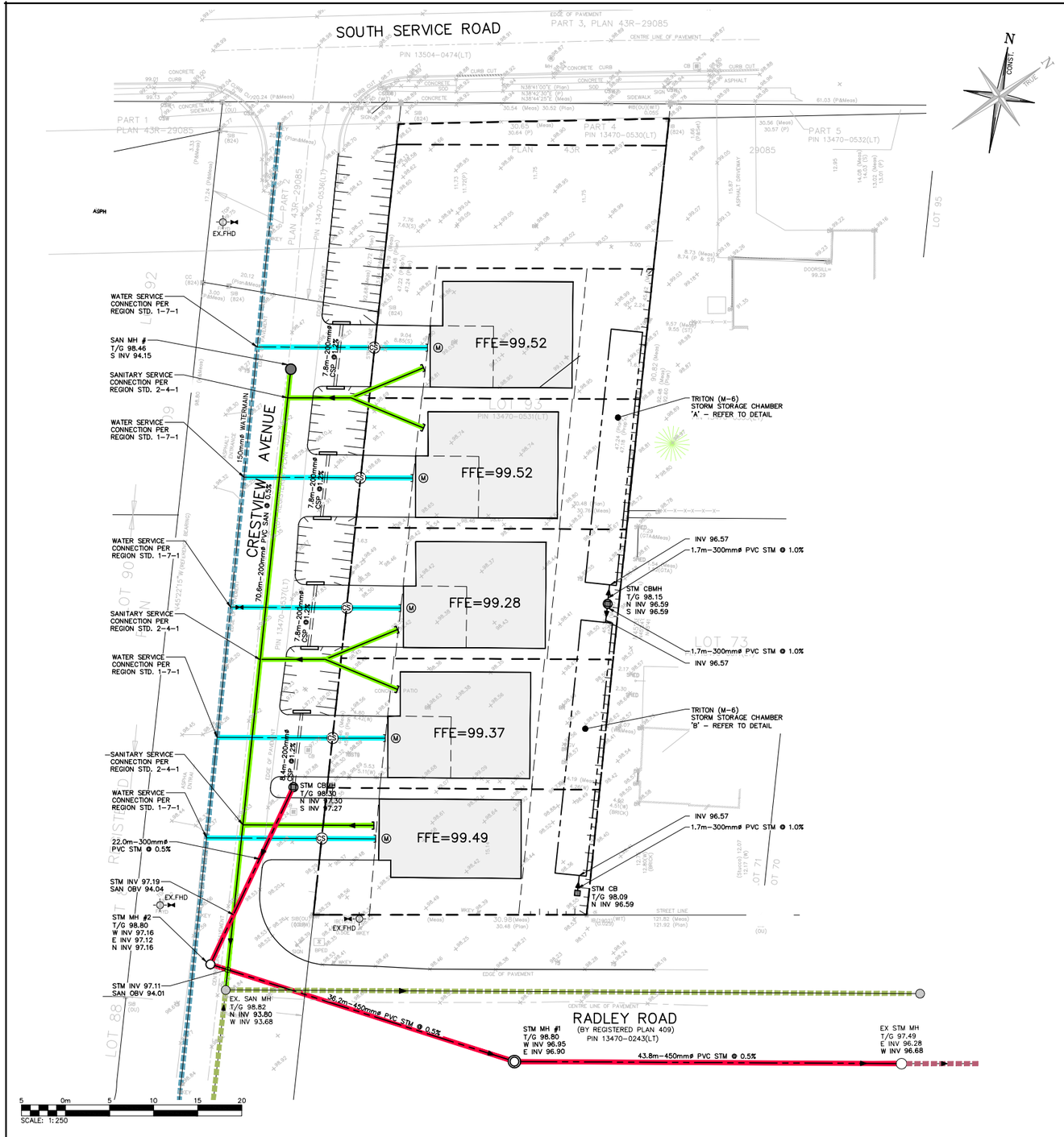
Stamp

PRELIMINARY

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

Drawn	Design	Project No.
D.B./S.T.T.	B.P.	1110-4749
Check	Check	Scale / Dwg.
B.P.	A.S.	1:250 / C 01

I:\1100\1110-Dream Suites\4749-200 S. Service Rd & 201 Radley\CAD\Civil\Sheets\4749_C00.dwg, 1/12/2018 4:23:41 PM, DWG To PDF.pc3



TRITON CHAMBER 'A' & 'B' DETAIL

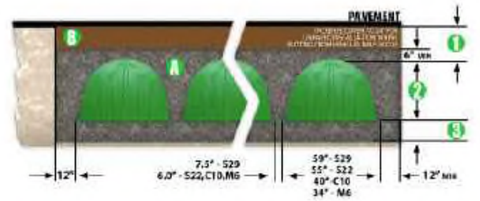
Field Diagram

WIRE DIAGRAM

Chamber Type

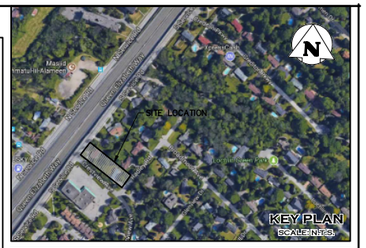
Dimensions 34" x 17.5" x 32" (WxHxL)
836.6mm x 44.5mm x 812.8mm
Weight 12 lbs / 5.4 kg
Bare Chamber Storage 5.6 ft³ / 0.16 m³

Project Results



- 1 Total Cover Over Chambers: 45.72 cm
- 2 Height of Chamber: 44.6532 cm
- 3 Embedment Stone Under Chambers: 15.24 cm
- 4 Volume of Embedment Stone Required: 60 Cu. M
- 5 Volume of Fill Material Required: 31 Cu. M

Total Storage Provided:	40.7 Cu. M
Type of Distribution Chambers:	M-6
# of Distribution Chambers Required:	106
# of end caps required:	8
Type of header row chambers required:	M-6
# of header row chambers required:	4
Floors:	0
Bins:	0
Dumpsters:	0
Required Bed Size:	102.78 Sq. M
Volume of Embedment Stone Required:	60.85 Cu. M
Volume of Fill Material Required:	31.33 Cu. M
Volume of Excavation:	108.54 Cu. M
Area of Filter Fabric:	151.5 Sq. M
# of Chambers long:	36
# of rows:	3
Actual Trench Length:	28.869 M
Actual Trench Width:	3.56 M



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 (19mmø)
- PROPOSED FIRE HYDRANT & GATE VALVE
- EXISTING FIRE HYDRANT & GATE VALVE
- PROPOSED WATER METER
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED SAN. SERVICE LATERAL (125mmø)

No.	ISSUE / REVISION	YYYY/MMM/DD
A	ISSUED FOR REVIEW	2018/JAN/12

ELEVATION NOTE:

ELEVATIONS SHOWN ON THIS PLAN ARE REFERRED TO CITY OF MISSISSAUGA (CITY DATUM) BENCHMARK No. 709
ELEVATION = 98.279

SURVEY NOTES:

SURVEY COMPLETED BY TOM A. SENIKUS ONTARIO LAND SURVEYOR. (2017/SEP/27)
REFERENCE No.: 17-50
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 COMPANY INC.
DRAWING No.: XXX, REV.X (2000/NOV/20)
PROJECT No.: ####

DRAWING NOTES:

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

Project
200 SOUTH SERVICE ROAD & 201 RADLEY ROAD
CITY OF MISSISSAUGA

Drawing
SITE SERVICING PLAN

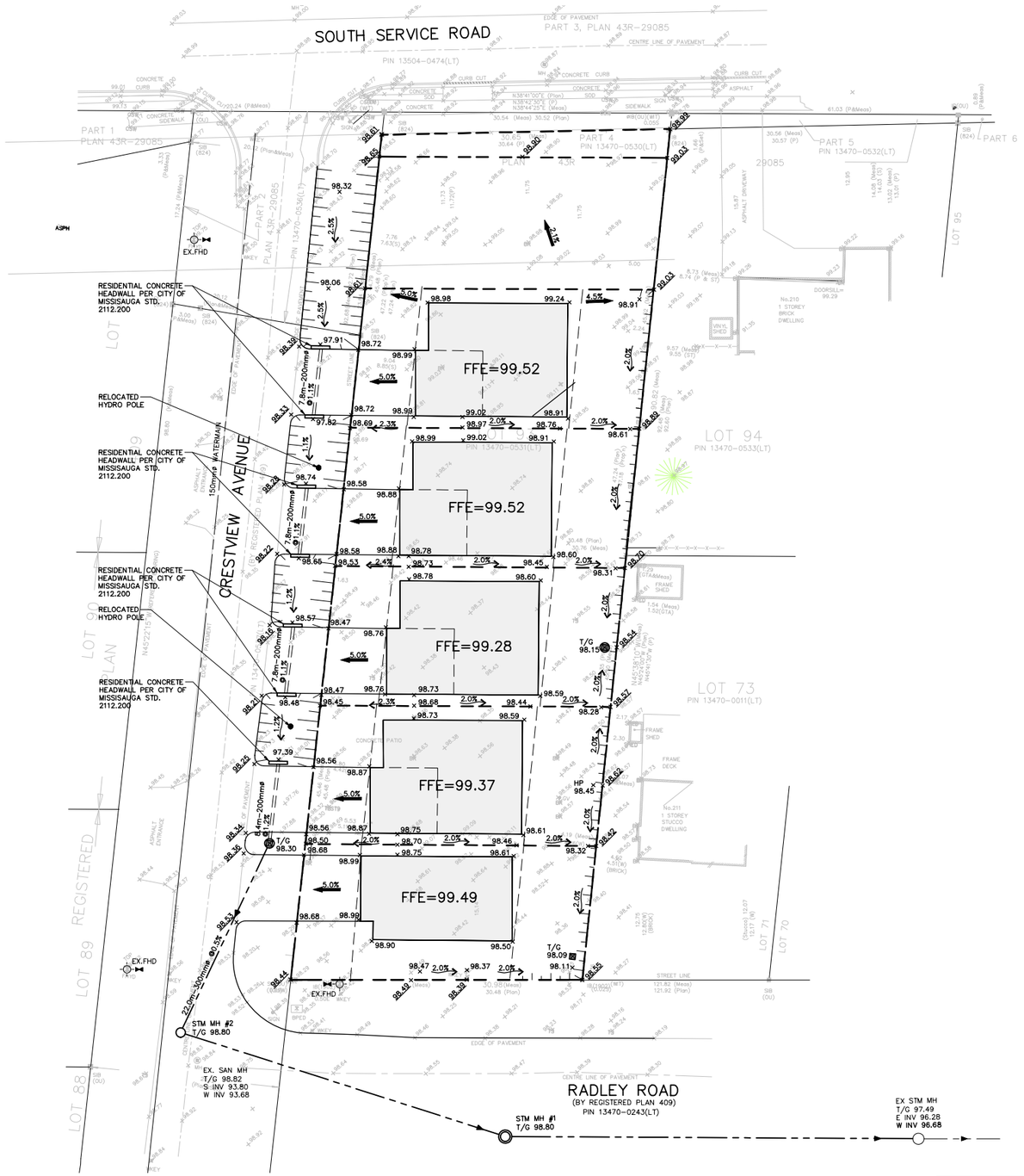
NOT FOR CONSTRUCTION

Stamp

PRELIMINARY

CROZIER & ASSOCIATES Consulting Engineers
8 MARKET STREET
SUITE 600
TORONTO, ON M5E 1M6
416.477.3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
S.T.T.	B.P.	1110-4749	
Check	Check	Scale	Dwg.
B.P.	A.S.	1:250	C 02



LEGEND

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

No.	ISSUE / REVISION	YYYY/MMM/DD
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Project

200 SOUTH SERVICE ROAD & 201 RADLEY ROAD CITY OF MISSISSAUGA

Drawing

SITE GRADING PLAN

NOT FOR CONSTRUCTION

Stamp

PRELIMINARY

Stamp

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

Drawn	S.T.T.	Design	B.P.	Project No.	1110-4749
Check	B.P.	Check	A.S.	Scale	1:250
				Dwg.	C 03

SPA# 0000-000

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

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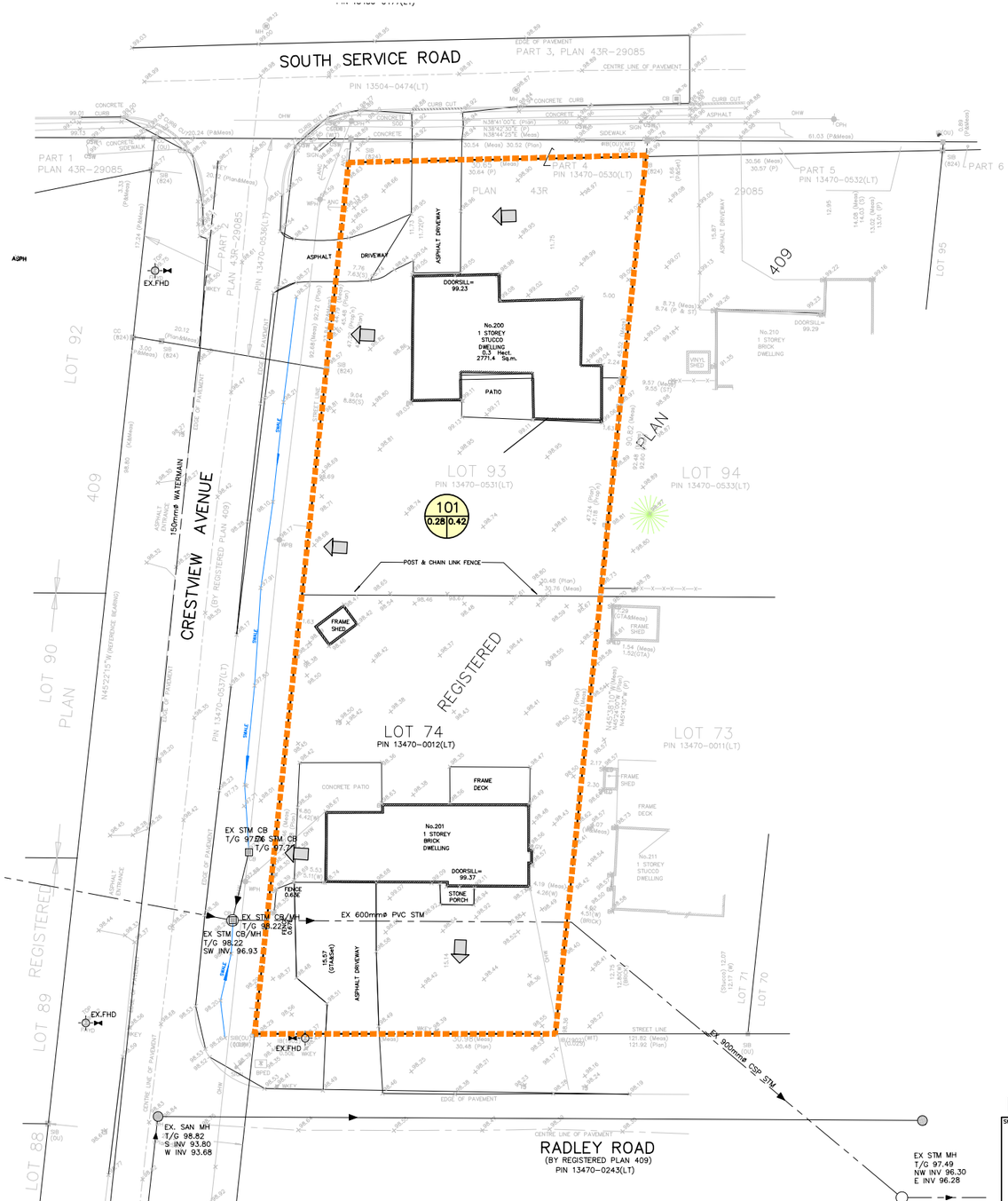
FIGURES



LEGEND

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

No.		
A	ISSUED FOR REVIEW	2018/JAN/12
No.	ISSUE / REVISION	YYYY/MMM/DD

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DRAWING No.: XXX, REV.X (2000/NOV/20)
PROJECT No.: ####

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Project

200 SOUTH SERVICE ROAD & 201 RADLEY ROAD CITY OF MISSISSAUGA

Drawing

PRE-DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

Stamp

PRELIMINARY

Stamp

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

Drawn	Design	Project No.	
S.T.T.	B.P.		1110-4749
Check	Check	Scale	Dwg.
B.P.	A.S.	1: 250	FIG 1

LEGEND

- PROPERTY LINE
- EXISTING DITCH
- EXISTING GRADE
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- STORM DRAINAGE CATCHMENT
- ID / A / RC — CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT

SCALE: 1:250

NOT FOR CONSTRUCTION

PRELIMINARY

SPA# 0000-000

No.	ISSUE / REVISION	YYYY/MMM/DD
A	ISSUED FOR REVIEW	2018/JAN/12

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Project

200 SOUTH SERVICE ROAD & 201 RADLEY ROAD CITY OF MISSISSAUGA

Drawing

POST-DEVELOPMENT DRAINAGE PLAN

CROZIER & ASSOCIATES Consulting Engineers
8 MARKET STREET
SUITE 600
TORONTO, ON M5E 1M6
416 477-3392 T
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Drawn	S.T.T.	Design	B.P.	Project No.	1110-4749
Check	B.P.	Check	A.S.	Scale	1:250
				Dwg.	FIG 2

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