FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

12563 & 12599 HWY 50 & 2 INDUSTRIAL RD

TOWN OF CALEDON
REGION OF PEEL

PREPARED FOR:

12599 HWY 50 LTD.

PREPARED BY:

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

FEBRUARY 2021

CFCA FILE NO. 1986-5779

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	February 12, 2021	Issued for First Submission

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by 12599 Hwy 50 Ltd. (the Owner) to prepare a Functional Servicing and Stormwater Management Report in support of an Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) related to the mixed-use development for the subject lands located at 12563 & 12599 Highway 50 and 2 Industrial Road (Site) in the Town of Caledon.

This report outlines the proposed functional servicing and stormwater management plan for the Site according to the requirements of the Province, Region, Town, and Toronto Region Conservation Authority (TRCA). The following reports, design criteria, and as-constructed drawings were referenced during the preparation of this report:

- Provincial
    - Ministry of Environment, Conservation and Parks Stormwater Management Planning and Design Manual dated March 2003.
- Regional
    - Region of Peel 2020 Water and Wastewater Master Plan for the Lake-based Systems (study completion June 2020).
    - Public Works Design, Specifications, and Procedures Manual. Linear Infrastructure. Watermain Design Criteria revised June 2010.
    - Public Works Design, Specifications, and Procedures Manual. Linear Infrastructure. Sanitary Sewer Design Criteria modified March 2017.
- Conservation Authority
    - Toronto Region Conservation Authority (TRCA) Stormwater Management Criteria dated August 2012.
- Municipal
    - Town of Caledon Development Standards Manual Version 5.0 dated 2019.
- As-constructed drawings:
    - 03631_D: Highway 50 sanitary and water infrastructure dated 1984.
    - 03632_D Highway 50 stormwater management pond dated 1984.
    - 03636_D Industrial Road 300 mm watermain dated 1980.
    - 08187_D Industrial Road sanitary sewer dated 1989.

2.0 Site Description

The Site covers an area of approximately 3.52 ha and currently consist of a commercial plaza, an unpaved contactor yard, a used car dealership, and a dance studio. The subject lands are in the Bolton Highway 50 Commercial Area within the Bolton Urban Boundary and are bound by Highway 50 to the south-west, Industrial Road to the south, and commercial developments to the east and north. Per Town of Caledon's Zoning By-law 2006-50 Schedule A Zone Map 1a, current land use is classified as "Bolton Highway Commercial" (CHB). The proposed development for the Site based on the site plan dated February 4, 2021 (with revised site statistics provided on February 9, 2021) provided by SRN Architects includes five buildings of mixed-use mid-rise and high-rise towers detailed as follows:

- Building 1: 32-storey mixed-use commercial and condominium residential building.
- Building 2: 26-storey mixed-use commercial and condominium residential building.
- Building 3: 22-storey mixed-use commercial and condominium residential building.
- Building 4: 23-storey mixed-use, commercial and condominium residential building.
- Building 5: 18-storey mixed-use commercial and condominium residential building.

In addition to the towers, the development will include one level of underground parking, landscaped areas, and access to Highway 50 and Industrial Road.

3.0 Water Servicing

The Region of Peel is responsible for the operation and maintenance of the public water and treatment system in the Town of Caledon, and any local system will have to connect to this public system. The existing and proposed water servicing is discussed in the following sections.

3.1 Existing Water Servicing

The Site resides in Pressure Zone 6 where existing water infrastructure generally provides adequate water supply and pressures up to a serviceable elevation up to 259.1 meters above sea level (masl). Water is sourced from the Bolton Elevated Tank, which stores water from the Tullamore Reservoir Pumping Station. A review of as-constructed drawings from the City and the Region shows the following watermains near the Site:

- Existing 300 mm diameter watermain on the north side of Industrial Road.
- Existing 300 mm diameter watermain on the west side of Highway 50.

Multiple hydrants are located near the Site for fire protection:

- Existing hydrant on the southwest corner of Highway 50 and Hopcroft Road near 12566 Highway 50 approximately 30 m from the Site.
- Existing hydrant on the northeast corner of Highway 50 and Industrial Road.

- Existing hydrant on the north side of Industrial Road approximately 130 m east of the intersection of Highway 50 and Industrial Road.

3.2 Design Water Demand

The Region of Peel Linear Infrastructure Sanitary Sewer Manual (March 2017) and an email dated December 1, 2020 with people per unit information confirmed by Alexander Sepe (Region Staff) were used to determine the equivalent population estimate for the Site. Table 1 provides a density per unit calculation. The detailed calculations are provided in Appendix A.

Table 1: Summary of Unit Breakdown

Phase (Building) Number	Single	Semi	Row	Apartment 2+	Apartment 1+	Total Units	Amenity Area (ha)
Building 1	0	0	0	284	235	519	1.25
Building 2	0	5	0	217	206	423	
Building 3	0	8	0	218	187	405	
Building 4	0	12	0	305	294	599	
Building 5	0	0	0	134	124	258	
Total	**0**	**25**	**0**	**1,158**	**1,046**	**2,204**	**1.25**

Based on the total number of units and amenity area illustrated in Table 1, Table 2 uses the provided PPU's to determine the equivalent population estimate for the Site.

Table 2: Equivalent Population Estimate

Phase (Building) Number	Single	Semi	Row	Apartment 2+	Apartment 1+	Amenity Equivalent Population	Building Equivalent Population
Building 1	0	0	0	721	395	63	1179
Building 2	0	0	0	551	346		897
Building 3	0	0	0	554	314		868
Building 4	0	0	0	775	494		1269
Building 5	0	0	0	340	208		549
Total	**0**	**0**	**0**	**2,941**	**1,757**	**63**	**4761**

Considering the unit breakdown for each building, the total population for the Site is 4,824 persons, which is the sum of the amenity equivalent and building equivalent populations.

The Region of Peel 2020 Water and Wastewater Master Plan was used to determine the maximum domestic water demand generated by the proposed development based on the equivalent population estimate for the Site. An average daily water demand of 270 L/cap/day, a maximum day factor of 1.8, and a peak hour factor of 3.0 were used.

The Fire Underwriters Survey method was used to estimate the fire flow demand for the proposed development. This calculation is used to estimate the size of incoming fire lines and does not provide a recommendation for fire protection. The buildings are assumed to have fire-resistive construction and therefore, a construction coefficient of 0.6 was applied to the fire flow calculations (Water Supply for Public Fire Protection by Fire Underwriters Survey, 1999). The proposed residential buildings will be equipped with automatic sprinkler systems which reduces the initial fire flow demand of each

building by up to 50%. Each automated sprinkler system is to be designed by the Mechanical Engineer; therefore, the detailed design of the system is not included in this report.

Table 3 summarizes the estimated design water demand and the required fire flow demand and duration of flow required for each phase. Appendix A contains detailed water demand and fire flow calculations as well as the Region of Peel single use demand table.

Table 3: Estimated Design Water Demand and Fire Flow

Phase Number	Average Daily Demand (L/s)	Maximum Daily Demand (L/s)	Peak Hour Demand (L/s)	Fire Flow (L/s)
Building 1	3.7	6.7	11.2	83
Building 2	2.8	5.1	8.5	83
Building 3	2.8	5.0	8.3	100
Building 4	4.0	7.2	12.0	100
Building 5	1.8	3.2	5.3	83
Total	**15.1**	**27.1**	**45.2**	**100**

Note: An average daily water demand of 270 L/cap/day was used, along with a maximum day factor of 1.8 and a peak hour factor of 3.0 per the o Region of Peel 2020 Water and Wastewater Master Plan.

For this application, the domestic water services for the Site will be designed to convey a water demand equivalent to the total peak hourly demand shown in Table 3. The total domestic peak hour flow entering the Site from the watermain system is 45.2 L/s. The overall required fire suppression flow was estimated to be 100 L/s and will be delivered through a system of proposed on-site private hydrants and Siamese connections.

3.3 Proposed Water Servicing

The proposed residential towers (up to 32 storeys) are higher than 84 m and therefore, require at least two sources of water from a public water system per Ontario Building Code (OBC) 3.2.9.7.4.

Two (2) 250 mm diameter watermains (fire lines) are proposed to service the Site from the existing 300mm watermain along Highway 50 complete with complete with detector check valves in chambers. A 150 mm diameter domestic line is also proposed to service the Site (branched from one fire line 1.2 m away from the property line). The Mechanical Engineer will design the internal private water system including the internal sprinkler system within the building and underground parking structure. Preliminary site servicing details can be found on Figure 1.

4.0 Sanitary Servicing

The Region of Peel is responsible for the operation and maintenance of the sanitary sewer network in the Town of Caledon. The overall area is serviced by the McVean Trunk System and the G.E. Booth Wastewater Treatment Facility according to the 2020 Region of Peel Water and Wastewater Master Plan. The existing and proposed sanitary servicing is outlined in the following sections.

4.1 Existing Sanitary Servicing

A review of the 2020 Region of Peel Water and Wastewater Master Plan and as-constructed drawings indicate that the following infrastructure exists in proximity to the Site:

- Existing 250 mm diameter sanitary sewer on Highway 50 conveys flows south. This sanitary sewer is located on the east side of Highway 50 and crosses to the west side immediate south of the Industrial Road intersection.
- Existing 250 mm diameter sanitary sewer along the south side of Industrial Road conveys flows west. This sanitary sewer merges with the 250 mm diameter sanitary sewer along Highway 50 at an existing sanitary maintenance hole prior to crossing towards the west side of Highway 50.
- Existing 900 mm diameter Albion Vaughan Road sanitary trunk sewer approximately 480 m east of the Site. Aforementioned 250 mm diameter sanitary sewers ultimately convey sewage south along Highway 50 into the Albion Vaughan trunk sewer 1.6 km farther south at its intersection at Mayfield Road.

4.2 Design Sanitary Flow

The sanitary design flow for the subject property was calculated using the 2020 Region of Peel Water and Wastewater Master Plan with reference to Region of Peel Public Works Design, Specifications & Procedures Manual – Linear Infrastructure Sanitary Sewer Manual (March 2017) and the equivalent population estimate described in Section 3.2.

A unit sewage flow of 290 L/cap/d was used, an infiltration flow of 0.26 L/s/ha, and a Harmon peaking factor were applied to the unit sewage flow to obtain the total estimated design sewage flow. This design sewage flow was estimated in a cumulative manner that mirrors the phasing of each building assuming that Building 1 will be constructed first, followed by Building 2, and so on, until full development with the constructed of Building 5. A summary of the results is presented in Table 4 and detailed calculations are provided in Appendix B.

Table 4: Estimated Sanitary Design Flows

Phase	Cumulative Harmon Peaking Factor	Cumulative Average Daily Flow (L/s)	Cumulative Peak Flow (L/s)	Cumulative Infiltration (L/s)	Cumulative Total Design Flow (L/s)
Building 1	3.75	4.0	15.0	0.19	15.2
Buildings 1-2	3.57	7.1	25.2	0.19	25.5
Buildings 1-3	3.44	10.0	34.5	0.19	35.0
Buildings 1-4	3.31	14.3	47.3	0.19	48.1
Buildings 1-5	3.26	16.2	52.8	0.19	53.7
Total	**3.26**	**16.2**	**52.8**	**0.94**	**53.7**

The proposed sanitary services for the Site are designed to convey a total design sanitary demand according to the total flows indicated in Table 4. The total design sanitary flow entering the sanitary sewer system from the Site is 53.7 L/s.

4.3 Proposed Sanitary Servicing

Sanitary servicing will be provided through one (1) 250 mm diameter sanitary lateral is proposed to service the Site at the southwest corner of Building 1 through a property line sanitary maintenance hole extending from the existing 250mm diameter sanitary sewer on Highway 50. The internal sanitary system of the buildings will be designed according to the Mechanical Engineer's details and specifications. Sanitary servicing for each building will be conveyed through the underground mechanical system. Preliminary site servicing details can be found on Figure 1.

5.0 Drainage Conditions

As described in Section 2.0, the subject property currently consists of various paved and unpaved commercial lands. The following subsections detail the existing and proposed drainage conditions for the Site.

5.1 Existing Drainage Conditions

According to the topographic plan provided by ERTL Surveyors, the Site generally drains north to south as two subcatchments towards Industrial Road and Highway 50. Please refer to Figure 3 for the Pre-Development Drainage Plan**.** Table 5 below summarizes the existing drainage from Catchment 101 and Catchment 102.

Table 5: Pre-Development Land Areas and Runoff Coefficients

Catchment	Area (L/s)	Runoff Coefficient
Drainage to Highway 50		
101	1.28	0.50
Drainage to Industrial Road		
102	2.24	0.50
Total	**3.52**	**--**

Stormwater runoff from the southwest portion of the Site (Catchment 101) flows via overland flow towards an existing ditch along Highway 50. The stormwater runoff from the north and east portions of the Site (Catchment 102) drains via overland flow towards an existing ditch along Industrial Road and ultimately drains into the existing ditch along Highway 50. Both areas of the Site are ultimately conveyed to the existing stormwater pond located at the southeast corner of Highway 50 and George Bolton Parkway.

5.2 Proposed Drainage Conditions

The post-development drainage is divided into two controlled areas and four uncontrolled areas based on proposed grading.

<u>Drainage to Highway 50</u>

- Catchment 201: this subcatchment predominantly includes the surface areas and surrounding road, landscaped area, and parking spaces for Building 1 and Building 5 where major overland flow is directed south towards Highway 50.

- UC1 and UC2: these landscaped areas outside of Building 1 and 5 are proposed to drain uncontrolled to Highway 50 as clean and slow-flowing discharge.

<u>Drainage to Industrial Road</u>

- Catchment 202: this subcatchment largely contains the surface areas, roads, landscape, and parking spaces for Building 2, Building 3, and Building 4 where major overland flow is directed south towards Industrial Road.

- UC3 and UC4: these landscaped areas outside of Building 2 and Building 3 are proposed to drain uncontrolled to Industrial Road as clean and slow-flowing discharge.

Overall, surface drainage (minor flows) collected via area drains and rooftop drainage collected via roof drains are proposed to be conveyed through an on-site underground storm sewer system designed in accordance with the mechanical design and specifications. Major flows for Catchment 201 and Catchment 202 will be directed to Highway 50 and Industrial Road, respectively. Details on preliminary site grading can be found on Figure 2.

Table 6 provides a breakdown of post-development site areas and associated runoff coefficients with the proposed drainage conditions shown on the Post-Development Drainage Plan as Figure 4.

Table 6: Post-Development Land Areas and Runoff Coefficients

Catchment	Area (L/s)	Runoff Coefficient
Drainage to Highway 50		
201	1.27	0.90
UC1	0.02	0.25
UC2	0.02	0.25
Drainage to Industrial Road		
202	2.12	0.90
UC3	0.04	0.25
UC4	0.05	0.25
Total	**3.52**	**--**

The drainage catchments and associated parameters illustrated in Table 6 were used to calculate the post-development peak stormwater flows.

6.0 Stormwater Management

The stormwater management criteria for the Site involves controlling the stormwater from the development in accordance with standards set by the Region of Peel, Town of Caledon and the TRCA, and are as follows:

- Water Balance: Retain runoff from a small design rainfall event (typically 5 mm) on-site through evaporation or rainwater reuse.
- Quantity Control (Region standard): Post-development flow to pre-development flow for all storm events up to the 100-year event (using a pre-development maximum runoff coefficient of 0.50).
- Quality Control: 80% Total Suspended Solids (TSS) removal on annual loading basis of the stormwater runoff leaving the development per the MOECP Enhanced Water Quality Control Criteria.

The Site is subject to internal controls for stormwater quantity, quality, and water balance. Due to restrictions in elevation, the entire site cannot be serviced by a single outlet. Therefore, an outlet to Highway 50 and an outlet to Industrial Road are proposed.

The controlled flows for Catchment 201 (outlet to Highway 50) will be detained within an underground storage chamber as active storage in the underground parking structure and discharged through an orifice tube to the existing ditch along Highway 50. Similarly, for Catchment 202 (outlet to Industrial Road), controlled flows will be detained in a chamber as active storage in the underground parking structure and discharged through an orifice tube to the existing ditch along Industrial Road.

Requirements for stormwater quality control will be met using a treatment train approach through a combination of swales and oil-grit separators. Requirements for stormwater quantity control will be met through the control of peak stormwater flows entering the existing roadside ditch system and are outlined in Table 7 and Table 8.

Table 7: Summary of Peak Flow Rates Towards Highway 50

Storm Event (year)	**Peak Flow Rate** (L/s)				**Total Post-Development Peak Flow** (L/s)
	Pre-Development	Post-Development			
	Catchment 101	*Catchment 201 Orifice Discharge*	*UC1*	UC2	
2	151.9	102.6	0.89	0.89	104.4
5	194.4	130.7	1.14	1.14	133.0
10	237.8	151.4	1.40	1.40	154.2
25	277.3	198.0	1.63	1.63	201.2
50	312.3	203.6	1.84	1.84	207.2
100	348.3	220.4	2.05	2.05	224.5

The allowable discharge to Highway 50 will be limited to a flow that is based on the runoff generated each storm event over Catchment 101. This allowable discharge rate to the Highway 50 ditch from the Site was estimated to be 348.3 L/s for the 100-year event.

Discharge via the orifice will limit the 100-year post-development runoff to 220.4 L/s. This orifice flow in combination with uncontrolled flows from areas UC1 and UC2 yields a total release rate of 224.5 L/s, which is lower than the pre-development flow rate and therefore satisfies the stormwater quantity control requirement for flows discharging to Highway 50. The same analysis can be applied for each storm event and as demonstrated in Table 7, the post-development peak flow rate for all storm events is equal or less than the pre-development peak flow rates to the same outlet, therefore achieving the quantity control requirement.

Table 8: Summary of Peak Flow Rates Towards Industrial Road

Storm Event (year)	Peak Flow Rate (L/s)				Total Post-Development Peak Flow (L/s)
	Pre-Development	Post-Development			
	Catchment 102	*Catchment 202 Orifice Discharge*	*UC3*	UC4	
2	266.7	97.9	2.56	2.98	103.4
5	341.2	125.3	3.28	3.81	132.3
10	417.4	145.0	4.01	4.66	153.6
25	486.8	189.8	4.68	5.44	199.9
50	548.1	195.1	5.27	6.12	206.5
100	611.4	211.0	5.87	6.83	223.7

The allowable discharge to Industrial Road will be limited to a flow that is based on the runoff generated each storm event over Catchment 102. This allowable discharge rate to the Industrial Road ditch from the Site was estimated to be 611.4 L/s for the 100-year event.

Discharge via the orifice will limit the 100-year post-development runoff to 211.0 L/s. This orifice flow in combination with uncontrolled flows from areas UC3 and UC4 yields a total release rate of 223.7 L/s, which is lower than the pre-development flow rate and therefore satisfies the stormwater quantity control requirement for flows discharging to Industrial Road. The same analysis can be applied for each storm event and as demonstrated in Table 8, the post-development peak flow rate for all storm events is equal or less than the pre-development peak flow rates to the same outlet, therefore achieving the quantity control requirement.

Table 9 and Table 10 summarize the active and dead storage requirements for the Site. The total water balance requirement for the site was estimated to be 122 m^3 and is met through proposed dead storage (to be designed by the Mechanical Engineer) in the underground parking garage where stored water can be re-used for on-site irrigation and greywater reuse.

Table 9: Summary of Active and Dead Storage for Catchment 201

Storm Event (year)	Active Storage Required (m^3)	Maximum Storage Required (m^3)	Water Balance Retention Required (m^3)	Total Storage Required (m^3)
2	133.0	486.6	45.7	532.3
5	194.0			
10	248.2			
25	399.5			
50	420.4			
100	486.6			

An active storage and dead storage volume of 486.6 m^3 and 45.7 m^3, respectively, is required to service Catchment 201. The storage requirement will be satisfied through an underground stormwater tank in the underground parking garage. Details and specifications for the tank are in accordance with mechanical, architectural, and structural designs and specifications.

Table 10: Summary of Active and Dead Storage for Catchment 202

Storm Event (year)	Active Storage Required (m^3)	Maximum Storage Required (m^3)	Water Balance Retention Required (m^3)	Total Storage Required (m^3)
2	138.5	500.7	76.3	577.0
5	201.9			
10	257.0			
25	412.5			
50	433.7			
100	500.7			

An active storage and dead storage volume of 486.6 m^3 and 45.7 m^3, respectively, is required to service Catchment 201. The storage requirement will be satisfied through an underground stormwater tank in the underground parking garage. Details and specifications for the tank are in accordance with mechanical, architectural, and structural designs and specifications.

7.0 Conclusions and Recommendations

The proposed developments can be serviced for water, sanitary, and stormwater in accordance with the Town of Caledon and Region of Peel requirements and standards. Our conclusions and recommendations include:

1. The equivalent population of the proposed development of five (5) multi-storey residential buildings was estimated to be approximately 4,824 persons.

2. Water servicing will be provided through redundant 250 mm diameter fire services and a 150 mm diameter domestic water service. The water servicing will extend from the existing 300 mm diameter watermain on Highway 50 to the limit of the underground parking garage. The internal water system, designed in accordance with Mechanical details and specifications, will provide water servicing for each building.

3. Sanitary servicing will be provided through a 250 mm diameter sanitary lateral extending from the existing 250 mm diameter sanitary sewer on Highway 50 to the limit of the underground parking garage. The internal sanitary sewer network, designed in accordance with Mechanical details and specifications, will provide sanitary servicing for each building.

4. Stormwater quantity, quality, and water balance controls will be provided on-site. Individual storm connections are provided for Building 1 and Building 4, and a separate storm connection will be provided for Buildings 2, 3, and 5, to convey controlled stormwater flows to the municipal ditches.

Should you have any questions or require any further information, please do not hesitate to contact us.

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Justin Lim, M.Sc.
Engineering Intern

C.F. CROZIER & ASSOCIATES INC.

Nicole Segal, M.M.Sc., P.Eng.
Project Engineer

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APPENDIX A

Equivalent Population & Water Demand Calculations

Connection Demand Table

12563 & 12599 Highway 50 & 2 Industrial Road, Town of Caledon

WATER CONNECTION

Connection point [3] Existing 300mm diameter watermain on Highway 50			
Pressure zone of connection point		Zone 6	
Total equivalent population to be serviced [1]		4761 persons	
Total lands to be serviced		3.52 ha	
Hydrant flow test			
Hydrant flow test location			
Test #1 – 12566 Highway 50, Caledon			
	Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure	68.95	461.06	
Maximum water pressure	137.90	506.17	
Hydrant flow test location			
Test #2 – 2 Industrial Drive, Caledon			
Minimum water pressure	68.95	454.18	
Maximum water pressure	137.90	497.78	

No.	Water demands – Phase 1 91 Eglinton		
	Demand type	**Demand**	**Units**
1	Average day flow	15.1	l/s
2	Maximum day flow	27.1	l/s
3	Peak hour flow	45.2	l/s
4	Fire flow [2]	100	l/s
Analysis			
5	Maximum day plus fire flow	127.1	l/s

WASTEWATER CONNECTION

Connection point [4]		Existing 250mm diameter sanitary sewer on Highway 50
Total equivalent population to be serviced		4761
Total lands to be serviced		3.52 ha
6	Wastewater sewer effluent (in l/s)	53.7

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

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

Mark DiConstanzo
12599 Hwy 50 Ltd.
91 Parr Boulevard
Bolton, Ontario
L7E 4E3

November 9th, 2020

RE: Fire Flow Testing Hwy 50 and Industrial Road, Bolton, ON

Watermark has conducted two fire flow tests near the intersection of Highway 50 and Industrial Road, Town of Bolton, Caledon. The testing was completing in accordance with NFPA 291. Region of Peelwater operations staff were on hand to assist.

Test #1 - 12566 Highway 50

Static pressure prior to the test was observed to be 73 PSI. Using 2 x 2.5" ports on one flow hydrant, and 1 x 4" port on a second flow hydrant, a maximum flow rate of 3050 USGPM was achieved. This provided an 14% pressure drop, to 62.5 PSI.

Test #2 - 2 Industral Road

Static pressure prior to the test was observed to be 74 PSI. Using 2 x 2.5" ports on one flow hydrant, and 1 x 4" port on a second flow hydrant, a maximum flow rate of 3050 USGPM was achieved. This provided an 15% pressure drop, to 63 PSI.

Althought the minimum required pressure drop was not acheived (25% of static), the high flow rate acheived provides increased confidence in the projected flow rates and subsequent ratings.

Equipment:

Flow: 1 x 4" HoseMonster with integrated 4" Pitotless Nozzle
Flow: 2 x 2.5" HoseMonster with integrated 2" Pitotless Nozzle
Pressure: HYDREKA Octopus LX Data Logger w/ 20 bar integrated pressure sensor

We strongly feel that all attempts have been made to ensure that the required data as stipulated will be captured, stored and presented in an accurate, efficient and timely manner for the required period. We are pleased Watermark again as your data provider, and we look forward to working with you in the future.

Kind Regards,

Colin Powell

(519) 217-3439
colin.powell@watermark.ca

Watermark Solutions Limited
Unit 117
115 George Street
Oakville, Ontario
L6J 0A2
www.watermark.ca

Hydrant Flow Test Report

Date: 09-Nov-20 Time: 1:30 PM Operator: Colin Powell

Test Location: 12566 Highway 50 Project No.

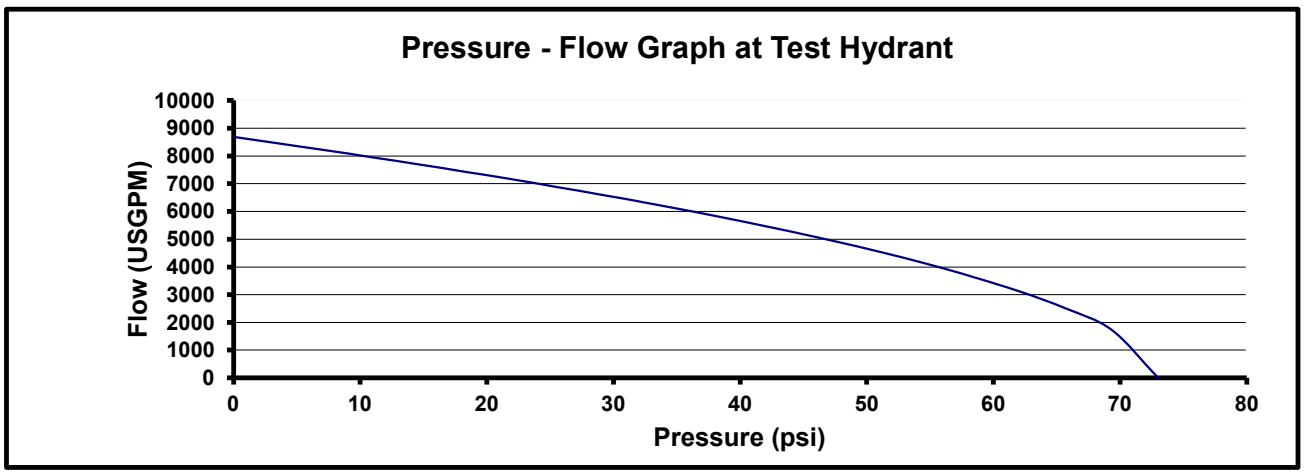
Test Number: 1
N.F.P.A. Colour Code: **BLUE**

STATIC PRESSURE: 73 psi Pressure Drop
RESIDUAL PRESSURE: 62.5 psi 14.4%

Flow Hydrants Location: A - 12544 Highway 50
B - 12525 Hwy 50 (on Industrial Road)

Hydrant No.	Flow Device	Outlet Dia. (in.)	Coefficient (~0.9)	Pitot Gauge Reading (psi)	Flow (USGPM)
A	Pitot	2.5	0.9	18	662
A	Pitot	2.5	0.9	18	662
B	HoseMonster	4"			1725
	TSI	2.5	0.9		
			Total Flow (USGPM)		3049

Available Flow At Test Hydrant at 20 psi 7308 USGPM 6039 IGPM
Available Flow At Test Hydrant at 10 psi 8023 USGPM 6630 IGPM



Comments/Discrepencies/Diagram:

Watermark Solutions Limited
(705) 250-0368 www.watermark.ca

Hydrant Flow Test Report

Date: 09-Nov-20 Time: 1:30 PM Operator: Colin Powell

Test Location: 2 Industrial Drive Project No.

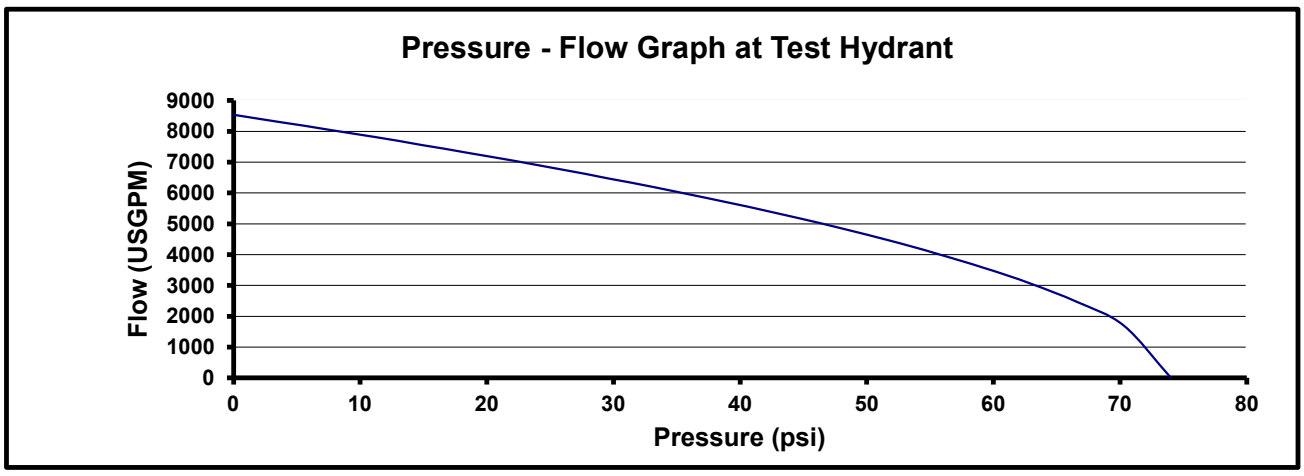
Test Number: 2
N.F.P.A. Colour Code: **BLUE**

STATIC PRESSURE: 74 psi Pressure Drop
RESIDUAL PRESSURE: 63 psi 14.9%

Flow Hydrants Location: A - 12544 Highway 50
B - 12525 Hwy 50 (on Industrial Road)

Hydrant No.	Flow Device	Outlet Dia. (in.)	Coefficient (~0.9)	Pitot Gauge Reading (psi)	Flow (USGPM)
A	Pitot	2.5	0.9	18	662
A	Pitot	2.5	0.9	18	662
B	HoseMonster	4"			1725
	TSI	2.5	0.9		
			Total Flow (USGPM)		3049

Available Flow At Test Hydrant at 20 psi 7199 USGPM 5949 IGPM
Available Flow At Test Hydrant at 10 psi 7890 USGPM 6521 IGPM



Comments/Discrepencies/Diagram:

Watermark Solutions Limited
(705) 250-0368 www.watermark.ca

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Prepared By: JL
Checked By: NRS
Date: 2020-11-13
Revised : 2021-02-12

Site Statistics
12563 & 12599 Hwy 50 & 2 Industrial Road

SUMMARY OF UNIT BREAKDOWN

Site	Single	Semi	Row	Apartment 2+	Apartment 1+	Total Units	Amenity Area (ha)
Building 1	0	0	0	284	235	519	
Building 2	0	5	0	217	206	423	
Building 3	0	8	0	218	187	405	1.25
Building 4	0	12	0	305	294	599	
Building 5	0	0	0	134	124	258	
Total	**0**	**25**	**0**	**1158**	**1046**	**2204**	**1.25**

SUMMARY OF POPULATION

Site	Single	Semi	Row	Apartment 2+	Apartment 1+	Amenity Area Equivalent	Building Equivalent	Total Persons
Building 1	0	0	0	721	395		1179	
Building 2	0	0	0	551	346		897	
Building 3	0	0	0	554	314	63	868	-
Building 4	0	0	0	775	494		1269	
Building 5	0	0	0	340	208		549	
Total	**0**	**0**	**0**	**2941**	**1757**	**63**	**4761**	**4824**

Note: Based on the following Region of Peel People per Unit (PPU) rates provided by Laura Borowiec (email dated January 22, 2021)

Single	4.15
Semi	4.15
Row	3.5
Apartment 2+	2.54
Apartment 1+	1.68
Amenity	50

Amenity area population based on 50 persons/ha per Region of Peel Public Works Design, Specifications & Procedures Manual - Linear Infrastructure - Sanitary Sewer Design Criteria (March, 2017) Section 2.1

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Prepared By: JL
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Date: 2020-11-13
Revised: 2021-02-12

WATER DEMAND CALCULATIONS - EXISTING CONDITIONS
12563 & 12599 Hwy 50 & 2 Industrial Road

Total Site

Average Consumption	250	L/cap/day
Equivalent Population	253	persons
Area	3.61	ha
Average Daily Demand	63,159	L/day
	0.73	**L/s**
Maximum Day Factor	1.4	
Peak Hour Factor	3.0	
Maximum Daily Flow	88,423	L/day
	1.02	**L/s**
Peak Hour Flow	189,478	L/day
	2.19	**L/s**

References

2020 Region of Peel Water and Wastewater Master Plan Volume 3, Section 2.2, Table 1.

Region of Peel Public Works Design, Specifications & Procedures Manual - Linear Infrastructure Sanitary Sewer Design Criteria (July, 2009) - 2.1 - Modified March 2017 REV 0.9 (CS)

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Prepared By: JL
Checked By: NRS
Date: 2020-11-13
Revised: 2021-02-12

WATER DEMAND CALCULATIONS - PROPOSED CONDITIONS
12563 & 12599 Hwy 50 & 2 Industrial Road

Total Site	**Units**	**Building 1**	**Building 2**	**Building 3**	**Building 4**	**Building 5**	**Total**
Average Consumption	L/cap/day	270	270	270	270	270	270
Equivalent Population*	persons	1191	910	880	1281	561	4824
Average Daily Demand	L/day	321,667	245,644	237,712	345,911	151,528	1,302,461
	L/s	**3.7**	**2.8**	**2.8**	**4.0**	**1.8**	**15.1**
Maximum Day Factor	-	1.8	1.8	1.8	1.8	1.8	1.8
Peak Hour Factor	-	3.0	3.0	3.0	3.0	3.0	3.0
Maximum Daily Flow	L/day	579,000	442,159	427,881	622,640	272,750	2,344,430
	L/s	**6.7**	**5.1**	**5.0**	**7.2**	**3.2**	**27.1**
Peak Hour Flow	L/day	965,000	736,932	713,135	1,037,734	454,583	3,907,383
	L/s	**11.2**	**8.5**	**8.3**	**12.0**	**5.3**	**45.2**

*Each building includes an equal portion of the total amenity equivalent population.

References

2020 Region of Peel Water and Wastewater Master Plan Volume 3, Section 2.2, Table 1.

CROZIER CONSULTING ENGINEERS

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation
Building 1

Designed By: JL
Checked By: NRS
Date: 2020-11-13
Updated: 2021-02-12

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

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

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

Proposed Buildings

750 sq.m	25% of each of the immediately adjoining floor above
3000 sq.m	area of largest floor
716 sq.m	25% of each of the immediately adjoining floor below

A = 4,466 sq.m.
C = 0.6 Fire-resistive construction

Therefore F = 8,821 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)		

Non-Combustible	-25%

-2,205 L/min reduction
6,616 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. 10% may be granted if the water supply is standard for both the system and fire departement hose lines required. Additional credit of up to 10% may be given for a fully supervised system.

Complete automatic sprinklers	-50%

-3,308 L/min reduction

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

Exposed buildings

Direction	**Name**	**Distance**	**Charge**	**Surcharge (L/min)**
Construction N	Building 4	30.1 to 45 m	5%	331
Construction S	n/a	> 45 m	0%	0
Construction E	Building 2	20.1 to 30 m	10%	662
Construction W	Building 5	20.1 to 30 m	10%	662
				1,654 L/min Surcharge

Determine Required Fire Flow

No.1	8,821		
No. 2	-2,205 reduction		
No. 3	-3,308 reduction		
No. 4	1,654 surcharge		
Required Flow:	**4,962 L/min**		
Rounded to nearest 1000 L/min:	**5,000 L/min**	or	83.3 L/s
			1,321 USGPM

Required Duration of Fire Flow

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

CROZIER CONSULTING ENGINEERS

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation
Building 2

Designed By: JL
Checked By: NRS
Date: 2020-11-13
Updated: 2021-02-12

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

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

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

Proposed Buildings

613 sq.m	25% of each of the immediately adjoining floor above
2451 sq.m	area of largest floor
577 sq.m	25% of each of the immediately adjoining floor below

A = 3,641 sq.m.
C = 0.6 Fire-resistive construction

Therefore F = 7,965 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)		

Non-Combustible	-25%

-1,991 L/min reduction
5,973 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. 10% may be granted if the water supply is standard for both the system and fire departement hose lines required. Additional credit of up to 10% may be given for a fully supervised system.

Complete automatic sprinklers	-50%

-2,987 L/min reduction

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

Exposed buildings

Direction	**Name**	**Distance**	**Charge**	**Surcharge (L/min)**
Construction N	Building 3	10.1 to 20 m	15%	896
Construction S	Existing	20.1 to 30 m	10%	597
Construction E	n/a	> 45 m	0%	0
Construction W	Building 1	20.1 to 30 m	10%	597
				2,091 L/min Surcharge

Determine Required Fire Flow

No.1	7,965		
No. 2	-1,991 reduction		
No. 3	-2,987 reduction		
No. 4	2,091 surcharge		
Required Flow:	**5,077 L/min**		
Rounded to nearest 1000 L/min:	**5,000 L/min**	or	83.3 L/s
			1,321 USGPM

Required Duration of Fire Flow

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

CROZIER CONSULTING ENGINEERS

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation
Building 3

Designed By: JL
Checked By: NRS
Date: 2020-11-13
Updated: 2021-02-12

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

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

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

Proposed Buildings

647 sq.m	25% of each of the immediately adjoining floor above
2587 sq.m	area of largest floor
608 sq.m	25% of each of the immediately adjoining floor below

A = 3,841 sq.m.
C = 0.6 Fire-resistive construction

Therefore F = 8,181 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)		

Non-Combustible	-25%

-2,045 L/min reduction
6,136 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. 10% may be granted if the water supply is standard for both the system and fire departement hose lines required. Additional credit of up to 10% may be given for a fully supervised system.

Complete automatic sprinklers	-50%

-3,068 L/min reduction

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

Exposed buildings

Direction	Name	Distance	Charge	Surcharge (L/min)
Construction N	Existing	10.1 to 20 m	15%	920
Construction S	Building 2	10.1 to 20 m	15%	920
Construction E	Existing	30.1 to 45 m	5%	307
Construction W	Building 4	10.1 to 20 m	15%	920
				3,068 L/min Surcharge

Determine Required Fire Flow

No.1	8,181		
No. 2	-2,045 reduction		
No. 3	-3,068 reduction		
No. 4	3,068 surcharge		
Required Flow:	**6,136 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

CROZIER CONSULTING ENGINEERS

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation
Building 4

Designed By: JL
Checked By: NRS
Date: 2020-11-13
Updated: 2021-02-12

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

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

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

Proposed Buildings

767 sq.m	25% of each of the immediately adjoining floor above
3066 sq.m	area of largest floor
746 sq.m	25% of each of the immediately adjoining floor below

A = 4,579 sq.m.
C = 0.6 Fire-resistive construction

Therefore F = 8,932 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)		

Non-Combustible	-25%

-2,233 L/min reduction
6,699 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. 10% may be granted if the water supply is standard for both the system and fire departement hose lines required. Additional credit of up to 10% may be given for a fully supervised system.

Complete automatic sprinklers	-50%

-3,349 L/min reduction

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

Exposed buildings

Direction	**Name**	**Distance**	**Charge**	**Surcharge (L/min)**
Construction N	n/a	> 45 m	0%	0
Construction S	Building 5	10.1 to 20 m	15%	1005
Construction E	Building 3	10.1 to 20 m	15%	1005
Construction W	Existing	10.1 to 20 m	15%	1005
				3,014 L/min Surcharge

Determine Required Fire Flow

No.1	8,932	
No. 2	-2,233 reduction	
No. 3	-3,349 reduction	
No. 4	3,014 surcharge	
Required Flow:	**6,364 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

CROZIER CONSULTING ENGINEERS

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation
Building 5

Designed By: JL
Checked By: NRS
Date: 2020-11-13
Updated: 2021-02-12

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

where

F = the required fire flow in litres per minute

C = coefficient related to the type of construction:

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

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

Proposed Buildings

458 sq.m	25% of each of the immediately adjoining floor above
1832 sq.m	area of largest floor
458 sq.m	25% of each of the immediately adjoining floor below

A = 2,748 sq.m.
C = 0.6 Fire-resistive construction

Therefore F = 6,919 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)		

Non-Combustible	-25%

-1,730 L/min reduction
5,189 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. 10% may be granted if the water supply is standard for both the system and fire departement hose lines required. Additional credit of up to 10% may be given for a fully supervised system.

Complete automatic sprinklers	-50%

-2,595 L/min reduction

12563 & 12599 Hwy 50 & 2 Industrial Road
Fire Protection Volume Calculation

Water Supply for Public Fire Protection
Fire Underwriters Survey

Part II - Guide for Determination of Required Fire Flow

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

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

Exposed buildings

Direction	Name	Distance	Charge	Surcharge (L/min)
Construction N	Building 4	10.1 to 20 m	15%	778
Construction S	n/a	> 45 m	0%	0
Construction E	Building 1	20.1 to 30 m	10%	519
Construction W	Existing	10.1 to 20 m	15%	778
				2,076 L/min Surcharge

Determine Required Fire Flow

No.1	6,919		
No. 2	-1,730 reduction		
No. 3	-2,595 reduction		
No. 4	2,076 surcharge		
Required Flow:	**4,670 L/min**		
Rounded to nearest 1000 L/min:	**5,000 L/min**	or	83.3 L/s
			1,321 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 Sewage Design Flow Calculations

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Prepared By: JL
Checked By: NRS
Date: 2020-11-13
Revised : 2021-02-12

SANITARY CALCULATIONS - EXISTING CONDITIONS
12563 & 12599 Hwy 50 & 2 Industrial Road

Total Site			
Average Daily Flow	270.0	L/person/day	2020 Region of Peel Water and Wastewater Master Plan Volume 4, Section 2.2, Table 2.
Population	253	persons	
Area	3.61	ha	
Harmon Peaking Factor (M) M = 1+(14/(4+p^0.5))	4.11		
Average Daily Flow	68,212	L/day	
	0.79	**L/s**	
Peak Flow	280,303	L/day	
	3.24	**L/s**	
Infiltration	0.00026	cms/ha	2020 Region of Peel Water and Wastewater Master Plan Volume 4, Section 2.2, Table 2.
	0.00094	cms	
	0.94	**L/s**	
Total Sanitary Flow	**4.18**	**L/s**	

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Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Prepared By: JL
Checked By: NRS
Date: 2020-11-13
Revised: 2021-02-12

CUMULATIVE SANITARY CALCULATIONS - PROPOSED CONDITIONS
12563 & 12599 Hwy 50 & 2 Industrial Road

Total Site	**Units**	**Building 1**	**Buildings 1-2**	**Buildings 1-3**	**Buildings 1-4**	**Buildings 1-5**	**Total**
Average Daily Flow	L/cap/day	290	290	290	290	290	290
Cumulative Population	persons	1191	2101	2982	4263	4824	4824
Average Daily Flow	L/day	345,494	609,334	864,654	1,236,188	1,398,940	1,398,940
	L/s	**4.0**	**7.1**	**10.0**	**14.3**	**16.2**	**16.2**
Harmon Peaking Factor (M) M = 1+(14/(4+p^0.5))	-	3.75	3.57	3.44	3.31	3.26	3.26
Peak Flow	L/day	1,295,493	2,174,729	2,978,455	4,089,885	4,559,699	4,559,699
	L/s	**15.0**	**25.2**	**34.5**	**47.3**	**52.8**	**52.8**
Infiltration	cms/ha	0.00026	0.00026	0.00026	0.00026	0.00026	0.00026
	ha	0.72	1.44	2.17	2.89	3.61	3.61
	L/s	**0.19**	**0.38**	**0.56**	**0.75**	**0.94**	**0.94**
Peak Hour Flow	**L/s**	**15.2**	**25.5**	**35.0**	**48.1**	**53.7**	**53.7**

References

2020 Region of Peel Water and Wastewater Master Plan Volume 3, Section 2.2, Table 1.

Total peak flow based on Harmon Peaking Factor using the total population.

Infiltration area assumed to be uniform across all buildings.

APPENDIX C

Stormwater Management Calculations

CROZIER CONSULTING ENGINEERS

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Preliminary Modified Rational Calculations - Input Parameters

Storm Data: Caledon

Time of Concentration: T_c = 10 min (per city of Town of Caledon standards)

Return Period	A	B	C	I (mm/hr)
2 yr	1,070	7.85	0.8759	85.72
5 yr	1,593	11.00	0.8789	109.68
10 yr	2,221	12.00	0.9080	134.16
25 yr	3,158	15.00	0.9335	156.47
50 yr	3,886	16.00	0.9495	176.19
100 yr	4,688	17.00	0.9624	196.54

Pre-Development Conditions

Catchment 101: Highway 50					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**[1]	**Drainage Node**
Gravel	1.11	11,120	0.90	0.78	Highway 50
Impervious	0.16	1,630	0.90	0.12	
Sub total	**1.28**	**12,750**	**-**	**0.50**	
Catchment 102: Industrial Road					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**[1]	**Drainage Node**
Gravel	2.14	21,350	0.90	0.86	Industrial Road
Impervious	0.10	1,030	0.90	0.04	
Sub total	**2.24**	**22,380**	**-**	**0.50**	
Overall	**3.51**	**35,130**	**-**	**0.50**	-

[1] Conservatively limited to a runoff coefficient of 0.50

Post-Development Conditions

Catchment 201: Highway 50					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**[1]	**Drainage Node**
Pervious	0.13	1,270	0.25	0.03	Highway 50
Impervious	1.14	11,430	0.90	0.81	
Subtotal	**1.27**	**12,700**	**-**	**0.90**	
Catchment 202: Industrial Road					
Land Use	**Area** (ha)	**Area** (m^2)	`	**Weighted Average C**[1]	**Drainage Node**
Pervious	0.21	2,120	0.25	0.03	Industrial Road
Impervious	1.91	19,080	0.90	0.81	
Sub total	**2.12**	**21,200**	**-**	**0.90**	
UC1: Uncontrolled Highway 50					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**	**Drainage Node**
Pervious	0.02	150	0.25	0.25	Highway 50
Impervious	0.00	-	0.90	0.00	
Sub total	**0.02**	**150**	**-**	**0.25**	
UC2: Uncontrolled Highway 50					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**	**Drainage Node**
Pervious	0.02	150	0.25	0.25	Highway 50
Impervious	0.00	-	0.90	0.00	
Sub total	**0.02**	**150**	**-**	**0.25**	
UC3: Uncontrolled Industrial 50					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**	**Drainage Node**
Pervious	0.04	430	0.25	0.25	Industrial Road
Impervious	0.00	-	0.90	0.00	
Sub total	**0.04**	**430**	**-**	**0.25**	
UC4: Uncontrolled Industrial 50					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**	**Drainage Node**
Pervious	0.05	500	0.25	0.25	Industrial Road
Impervious	0.00	-	0.90	0.00	
Sub total	**0.05**	**500**	**-**	**0.25**	
Overall	**3.51**	**35,130**	**-**	**0.88**	-

[1] Conservatively assigned to a runoff coefficient 0.90.

Equations:

Peak Flow	Intensity
$Q_{post} = 0.0028 \cdot C_{post} \cdot i(T_d) \cdot A$	$i(T_d) = A / (T + B)^C$

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Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Created By: JL
Checked By: NS
Date: 2021-01-22
Updated: 2021-02-12

Modified Rational Calculations - Peak Flow Summary

Peak Flows to Highway 50

Pre-Development

Catchment 101

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.50	85.72	1.28	0.152	151.91
5 yr	0.50	109.68		0.194	194.38
10 yr	0.50	134.16		0.238	237.77
25 yr	0.50	156.47		0.277	277.31
50 yr	0.50	176.19		0.312	312.26
100 yr	0.50	196.54		0.348	348.31

Post-Development

Catchment 201

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.90	85.72	1.27	0.272	272.4
5 yr	0.90	109.68		0.349	348.5
10 yr	0.90	134.16		0.426	426.3
25 yr	0.90	156.47		0.497	497.2
50 yr	0.90	176.19		0.560	559.9
100 yr	0.90	196.54		0.625	624.5

UC1

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.25	85.72	0.02	0.001	0.9
5 yr	0.25	109.68		0.001	1.1
10 yr	0.25	134.16		0.001	1.4
25 yr	0.25	156.47		0.002	1.6
50 yr	0.25	176.19		0.002	1.8
100 yr	0.25	196.54		0.002	2.0

UC2

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.25	85.72	0.02	0.001	0.9
5 yr	0.25	109.68		0.001	1.1
10 yr	0.25	134.16		0.001	1.4
25 yr	0.25	156.47		0.002	1.6
50 yr	0.25	176.19		0.002	1.8
100 yr	0.25	196.54		0.002	2.0

Peak Flows to Industrial Road

Pre-Development

Catchment 102

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.50	85.72	2.24	0.267	266.65
5 yr	0.50	109.68		0.341	341.19
10 yr	0.50	134.16		0.417	417.35
25 yr	0.50	156.47		0.487	486.75
50 yr	0.50	176.19		0.548	548.10
100 yr	0.50	196.54		0.611	611.39

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

Post-Development

Catchment 202

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.90	85.72	2.12	0.455	454.7
5 yr	0.90	109.68		0.582	581.8
10 yr	0.90	134.16		0.712	711.6
25 yr	0.90	156.47		0.830	830.0
50 yr	0.90	176.19		0.935	934.6
100 yr	0.90	196.54		1.042	1042.5

UC3

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.25	85.72	0.04	0.003	2.6
5 yr	0.25	109.68		0.003	3.3
10 yr	0.25	134.16		0.004	4.0
25 yr	0.25	156.47		0.005	4.7
50 yr	0.25	176.19		0.005	5.3
100 yr	0.25	196.54		0.006	5.9

UC4

Storm Event	C	i (mm/hr)	A (ha)	Q (m^3/s)	Q (L/s)
2 yr	0.25	85.72	0.05	0.003	3.0
5 yr	0.25	109.68		0.004	3.8
10 yr	0.25	134.16		0.005	4.7
25 yr	0.25	156.47		0.005	5.4
50 yr	0.25	176.19		0.006	6.1
100 yr	0.25	196.54		0.007	6.8

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 201 Modified Rational Calculations - 2-Year Storm Event

Control Criteria

2 yr: Control Post-Development Peak Flows to Target Flow Rate

2 yr: Uncontrolled Post-Development Flow:

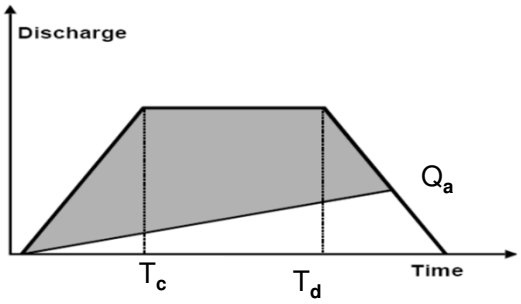
Q_{post}= 272.37 L/s

2 yr: Target Flow Rate:

Qtarget = 150.13 L/s

Qorifice = 0.103 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	85.72	600	0.274	102.8
15	69.05	900	0.221	121.6
20	58.06	1200	0.186	130.2
25	50.24	1500	0.161	133.0
30	44.38	1800	0.142	132.0
35	39.81	2100	0.127	128.4
40	36.14	2400	0.116	123.0
45	33.13	2700	0.106	116.2
50	30.60	3000	0.098	108.4
55	28.46	3300	0.091	99.7
60	26.62	3600	0.085	90.3
Required Storage Volume:				**133.0**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 201 Modified Rational Calculations - 5-Year Storm Event

Control Criteria

5 yr: Control Post-Development Peak Flows to Target Flow Rate

5 yr: Uncontrolled Post-Development Flow:

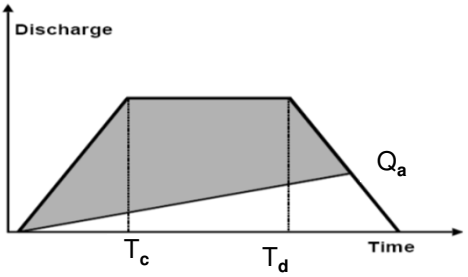
Q_{post} = 348.50 L/s

5 yr: Target Flow Rate:

Qtarget = 192.09 L/s

Qactual= 0.131 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	109.68	600	0.351	132.1
15	90.91	900	0.291	163.8
20	77.89	1200	0.249	181.4
25	68.29	1500	0.219	190.5
30	60.92	1800	0.195	194.0
35	55.06	2100	0.176	193.5
40	50.28	2400	0.161	190.0
45	46.32	2700	0.148	184.4
50	42.96	3000	0.137	177.1
55	40.09	3300	0.128	168.3
60	37.60	3600	0.120	158.5
Required Storage Volume:				**194.0**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 201 Modified Rational Calculations - 10-Year Storm Event

Control Criteria

10 yr: Control Post-Development Peak Flows to Target Flow Rate

10 yr: Uncontrolled Post-Development Flow:

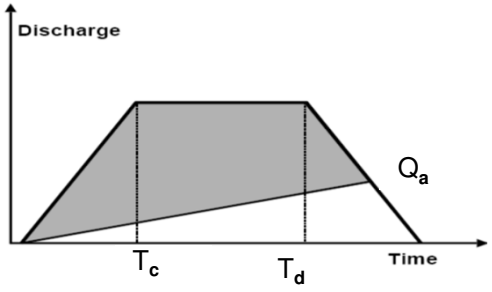
Q_{post} = 426.30 L/s

10 yr: Target Flow Rate:

Qtarget = 234.97 L/s

Qactual= 0.151 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	134.16	600	0.429	166.8
15	111.40	900	0.357	207.3
20	95.47	1200	0.306	230.4
25	83.68	1500	0.268	242.8
30	74.58	1800	0.239	248.0
35	67.34	2100	0.216	248.2
40	61.44	2400	0.197	244.8
45	56.52	2700	0.181	238.6
50	52.37	3000	0.168	230.3
55	48.81	3300	0.156	220.2
60	45.72	3600	0.146	208.8
Required Storage Volume:				**248.2**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 201 Modified Rational Calculations - 25-Year Storm Event

Control Criteria

25 yr: Control Post-Development Peak Flows to Target Flow Rate

25 yr: Uncontrolled Post-Development Flow:

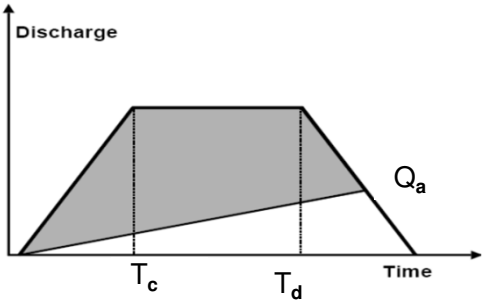
Q_{post}= 497.19 L/s

25 yr: Target Flow Rate:

Qtarget = 274.04 L/s

Qactual= 0.198 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	156.47	600	0.606	244.7
15	131.98	900	0.511	311.4
20	114.29	1200	0.443	352.9
25	100.90	1500	0.391	378.1
30	90.39	1800	0.350	392.4
35	81.93	2100	0.317	398.9
40	74.95	2400	0.290	399.5
45	69.10	2700	0.268	395.7
50	64.13	3000	0.248	388.5
55	59.84	3300	0.232	378.5
60	56.11	3600	0.217	366.3
Required Storage Volume:				**399.5**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 201 Modified Rational Calculations - 50-Year Storm Event

Control Criteria

50 yr: Control Post-Development Peak Flows to Target Flow Rate

50 yr: Uncontrolled Post-Development Flow:

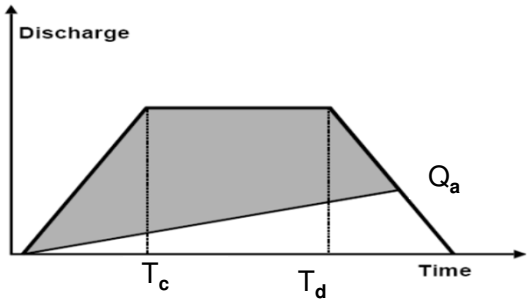
Q_{post} = 559.86 L/s

50 yr: Target Flow Rate:

Qtarget = 308.58 L/s

Qactual= 0.204 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	176.19	600	0.627	253.8
15	149.09	900	0.530	324.5
20	129.36	1200	0.460	368.8
25	114.33	1500	0.407	396.1
30	102.50	1800	0.364	411.8
35	92.93	2100	0.330	419.2
40	85.04	2400	0.302	420.4
45	78.40	2700	0.279	416.9
50	72.75	3000	0.259	409.7
55	67.88	3300	0.241	399.6
60	63.63	3600	0.226	387.1
Required Storage Volume:				**420.4**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 201 Modified Rational Calculations - 100-Year Storm Event

Control Criteria

100 yr: Control Post-Development Peak Flows to Target Flow Rate

100 yr: Uncontrolled Post-Development Flow:

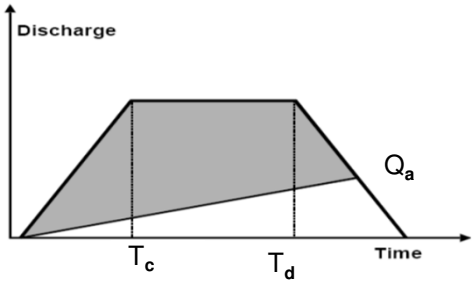
Q_{post} = 624.50 L/s

100 yr: Target Flow Rate:

Qtarget = 344.21 L/s

Qactual= 0.220 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	196.54	600	0.699	287.1
15	166.89	900	0.593	368.8
20	145.13	1200	0.516	421.0
25	128.46	1500	0.457	453.8
30	115.28	1800	0.410	473.5
35	104.59	2100	0.372	483.6
40	95.75	2400	0.340	486.6
45	88.31	2700	0.314	484.2
50	81.95	3000	0.291	477.6
55	76.47	3300	0.272	467.6
60	71.69	3600	0.255	454.9
Required Storage Volume:				**486.6**



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

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

CROZIER
CONSULTING ENGINEERS

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No: 1986-5779
Created By: JL
Checked By: NS
Date: 2021-01-14
Updated: 2021-02-12

ORIFICE RATING CURVE - CATCHMENT 201

Orifice Parameters
Diameter Ø (m) = 0.250
Area (A) (m^2) = 0.0491
Coefficient (C) = 0.80
Orifice Invert= 240.76
Centroid (h)= 240.89
Control MH # =

Orifice Tube
Discharge, Q = CA x sqrt(2gh)

A. Rating Table

Elevation	Orifice Discharge	UC1 + UC2 Uncontrolled Discharge	Orifice Discharge + Uncontrolled	Pre-Development	Difference	Active Storage Volume	
m	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	m^3	
240.76	-	-	-	-	-	-	ORIFICE INVERT
241.23	0.103	0.002	0.104	0.152	- 0.048	133.00	2 yr
241.45	0.131	0.002	0.132	0.194	- 0.062	193.98	5 yr
241.64	0.151	0.002	0.153	0.238	- 0.085	248.22	10 yr
242.18	0.198	0.002	0.200	0.277	- 0.078	399.51	25 yr
242.25	0.204	0.002	0.205	0.312	- 0.107	420.37	50 yr
242.49	0.220	0.002	0.222	0.348	- 0.126	486.61	100 yr
242.50	-	-	-	-	-	-	TOP OF STORAGE TANK

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 202 Modified Rational Calculations - 2-Year Storm Event

Control Criteria

2 yr: Control Post-Development Peak Flows to Target Flow Rate

2 yr: Uncontrolled Post-Development Flow:

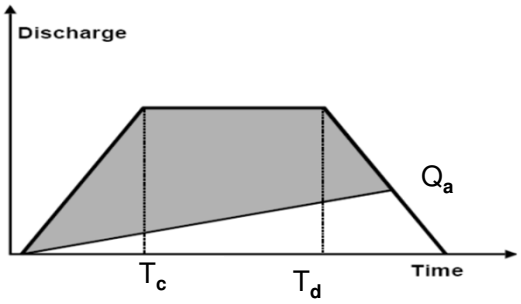
Q_{post}= 454.67 L/s

2 yr: Target Flow Rate:

Qtarget = 261.11 L/s

Qactual= 0.098 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	85.72	600	0.274	105.9
15	69.05	900	0.221	125.6
20	58.06	1200	0.186	135.0
25	50.24	1500	0.161	138.5
30	44.38	1800	0.142	138.3
35	39.81	2100	0.127	135.6
40	36.14	2400	0.116	131.0
45	33.13	2700	0.106	125.0
50	30.60	3000	0.098	117.9
55	28.46	3300	0.091	110.0
60	26.62	3600	0.085	101.4
Required Storage Volume:				**138.5**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 202 Modified Rational Calculations - 5-Year Storm Event

Control Criteria

5 yr: Control Post-Development Peak Flows to Target Flow Rate

5 yr: Uncontrolled Post-Development Flow:

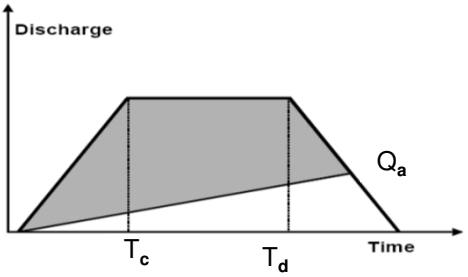
Q_{post} = 581.76 L/s

5 yr: Target Flow Rate:

Qtarget = 334.10 L/s

Qactual= 0.125 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	109.68	600	0.351	135.9
15	90.91	900	0.291	168.4
20	77.89	1200	0.249	187.0
25	68.29	1500	0.219	197.1
30	60.92	1800	0.195	201.4
35	55.06	2100	0.176	201.9
40	50.28	2400	0.161	199.4
45	46.32	2700	0.148	194.7
50	42.96	3000	0.137	188.3
55	40.09	3300	0.128	180.5
60	37.60	3600	0.120	171.6
Required Storage Volume:				**201.9**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 202 Modified Rational Calculations - 10-Year Storm Event

Control Criteria

10 yr: Control Post-Development Peak Flows to Target Flow Rate

10 yr: Uncontrolled Post-Development Flow:

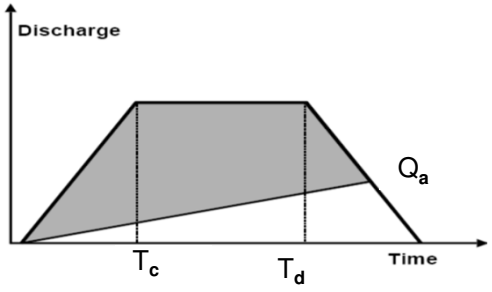
Q_{post} = 711.63 L/s

10 yr: Target Flow Rate:

Qtarget = 408.68 L/s

Qactual= 0.145 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	134.16	600	0.429	170.7
15	111.40	900	0.357	212.2
20	95.47	1200	0.306	236.3
25	83.68	1500	0.268	249.6
30	74.58	1800	0.239	255.8
35	67.34	2100	0.216	257.0
40	61.44	2400	0.197	254.6
45	56.52	2700	0.181	249.4
50	52.37	3000	0.168	242.0
55	48.81	3300	0.156	233.0
60	45.72	3600	0.146	222.5
Required Storage Volume:				**257.0**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 202 Modified Rational Calculations - 25-Year Storm Event

Control Criteria

25 yr: Control Post-Development Peak Flows to Target Flow Rate

25 yr: Uncontrolled Post-Development Flow:

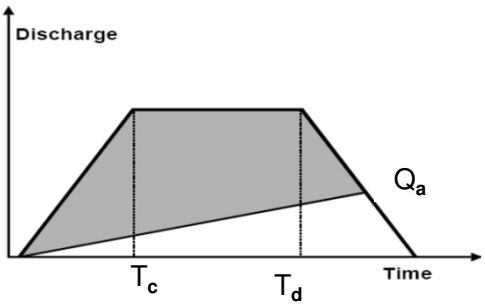
Q_{post}= 829.96 L/s

25 yr: Target Flow Rate:

Qtarget = 476.64 L/s

Qactual= 0.189 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	156.47	600	0.606	249.9
15	131.98	900	0.511	318.0
20	114.29	1200	0.443	360.7
25	100.90	1500	0.391	387.3
30	90.39	1800	0.350	402.8
35	81.93	2100	0.317	410.6
40	74.95	2400	0.290	412.5
45	69.10	2700	0.268	410.1
50	64.13	3000	0.248	404.2
55	59.84	3300	0.232	395.5
60	56.11	3600	0.217	384.6
Required Storage Volume:				**412.5**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 202 Modified Rational Calculations - 50-Year Storm Event

Control Criteria

50 yr: Control Post-Development Peak Flows to Target Flow Rate

50 yr: Uncontrolled Post-Development Flow:

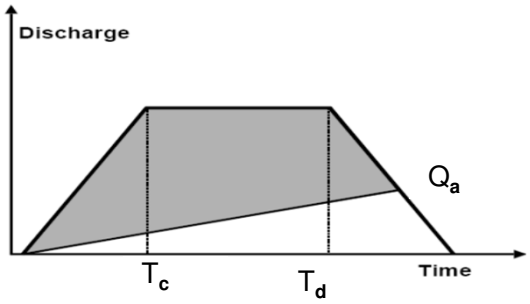
Q_{post} = 934.56 L/s

50 yr: Target Flow Rate:

Qtarget = 536.71 L/s

Qactual= 0.195 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	176.19	600	0.627	259.1
15	149.09	900	0.530	331.2
20	129.36	1200	0.460	376.8
25	114.33	1500	0.407	405.5
30	102.50	1800	0.364	422.5
35	92.93	2100	0.330	431.2
40	85.04	2400	0.302	433.7
45	78.40	2700	0.279	431.6
50	72.75	3000	0.259	425.7
55	67.88	3300	0.241	417.0
60	63.63	3600	0.226	405.8
Required Storage Volume:				**433.7**



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

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

Project: 12563 & 12599 Hwy 50
Project No.: 1986-5779
Created By: MJ
Checked By: NS
Date: 2020-11-13
Updated: 2021-02-12

Catchment 202 Modified Rational Calculations - 100-Year Storm Event

Control Criteria

100 yr: Control Post-Development Peak Flows to Target Flow Rate

100 yr: Uncontrolled Post-Development Flow:

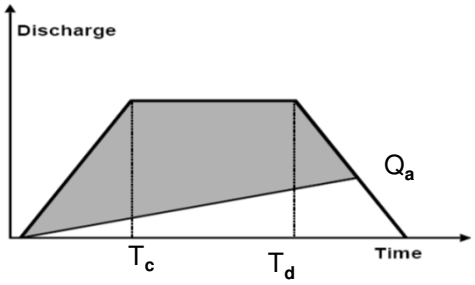
Q_{post} = 1042.48 L/s

100 yr: Target Flow Rate:

Qtarget = 598.69 L/s

Qactual= 0.211 m^3/s

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
10	196.54	600	0.699	292.7
15	166.89	900	0.593	375.9
20	145.13	1200	0.516	429.4
25	128.46	1500	0.457	463.7
30	115.28	1800	0.410	484.7
35	104.59	2100	0.372	496.2
40	95.75	2400	0.340	500.7
45	88.31	2700	0.314	499.7
50	81.95	3000	0.291	494.5
55	76.47	3300	0.272	485.9
60	71.69	3600	0.255	474.6
Required Storage Volume:				**500.7**



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

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

CROZIER
CONSULTING ENGINEERS

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No: 1986-5779
Created By: JL
Checked By: NS
Date: 2021-01-14
Updated: 2021-02-12

ORIFICE RATING CURVE - CATCHMENT 202

Orifice Parameters

Diameter Ø (m) = 0.250
Area (A) (m^2) = 0.0491
Coefficient (C) = 0.80
Orifice Invert= 240.00
Centroid (h)= 240.12
Control MH # =

Orifice Tube

Discharge, Q = CA x sqrt(2gh)

A. Rating Table

Elevation	Orifice Discharge	UC3 + UC4 Uncontrolled Discharge	Allowable Discharge	Pre-Development	Difference	Active Storage Volume	
m	m^3/s	m^3/s	m^3/s	m^3/s	m^3/s	m^3	
240.00	0.00	-	-	-	-	0.00	ORIFICE INVERT
240.44	0.10	0.01	0.10	0.27	-0.16	138.54	2 yr
240.64	0.13	0.01	0.13	0.34	-0.21	201.87	5 yr
240.82	0.14	0.01	0.15	0.42	-0.26	257.03	10 yr
241.31	0.19	0.01	0.20	0.49	-0.29	412.55	25 yr
241.38	0.20	0.01	0.21	0.55	-0.34	433.75	50 yr
241.60	0.21	0.01	0.22	0.61	-0.39	500.69	100 yr
241.60	-	-	-	0.00	-	-	TOP OF STORAGE TANK

CROZIER
CONSULTING ENGINEERS

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Created By: JL
Checked By: NS
Date: 2021-01-14
Updated: 2021-02-12

WATER BALANCE CALCULATIONS

Catchment	Land Use	Area (m^2)	Required Abstraction (mm)	Initial Abstraction (mm)	Abstraction Deficit (mm)	Water Balance Deficit (m^3)
Catchment 201	Impervious	11,430	5	1	4	45.7
	Pervious	1,270		5	0	0.0
Catchment 202	Impervious	19,080		1	4	76.3
	Pervious	2,120		5	0	0.0
UC1	Impervious	0		1	4	0.0
	Pervious	150		5	0	0.0
UC2	Impervious	0		1	4	0.0
	Pervious	150		5	0	0.0
UC3	Impervious	0		1	4	0.0
	Pervious	430		5	0	0.0
UC4	Impervious	0		1	4	0.0
	Pervious	500		5	0	0.0
Site Total		**35,130**	**175.7**	-	-	**122.0**

CROZIER CONSULTING ENGINEERS

Project: 12563 & 12599 Hwy 50 & 2 Industrial Road
Project No.: 1986-5779
Created By: JL
Checked By: NS
Date: 2021-01-14
Updated: 2021-02-12

Modified Rational Calculations - Summary

Type	Area (ha)	Weighted Average C	Flows to Node
Pre-Development			
Catchment 101	1.28	0.50	Highway 50
Catchment 102	2.24	0.50	Industrial Road
Total	3.51	0.50	-
Post-Development			
Catchment 201	1.27	0.90	Highway 50
Catchment 202	2.12	0.90	Industrial Road
Catchment 203	0.05	0.25	Highway 50
Total	3.44	0.88	-

Pre- and Post-Development Peak Flows to Highway 50

Storm Event	Peak Flow Rate (L/s)				Total Release Rate
	Pre-Development	Post-Development			
	Catchment 101	*Catchment 201 Orifice Discharge*	*UC1*	UC2	(L/s)
2 yr	151.9	102.6	0.89	0.89	104.4
5 yr	194.4	130.7	1.14	1.14	133.0
10 yr	237.8	151.4	1.40	1.40	154.2
25 yr	277.3	198.0	1.63	1.63	201.2
50 yr	312.3	203.6	1.84	1.84	207.2
100 yr	348.3	220.4	2.05	2.05	224.5

Pre- and Post-Development Peak Flows to Industrial Road

Storm Event	Peak Flow Rate (L/s)				Total Release Rate
	Pre-Development	Post-Development			
	Catchment 102	*Catchment 202 Orifice Discharge*	*UC3*	UC4	(L/s)
2 yr	266.65	97.88	2.56	2.98	103.4
5 yr	341.19	125.26	3.28	3.81	132.3
10 yr	417.35	144.95	4.01	4.66	153.6
25 yr	486.75	189.77	4.68	5.44	199.9
50 yr	548.10	195.08	5.27	6.12	206.5
100 yr	611.39	210.98	5.87	6.83	223.7

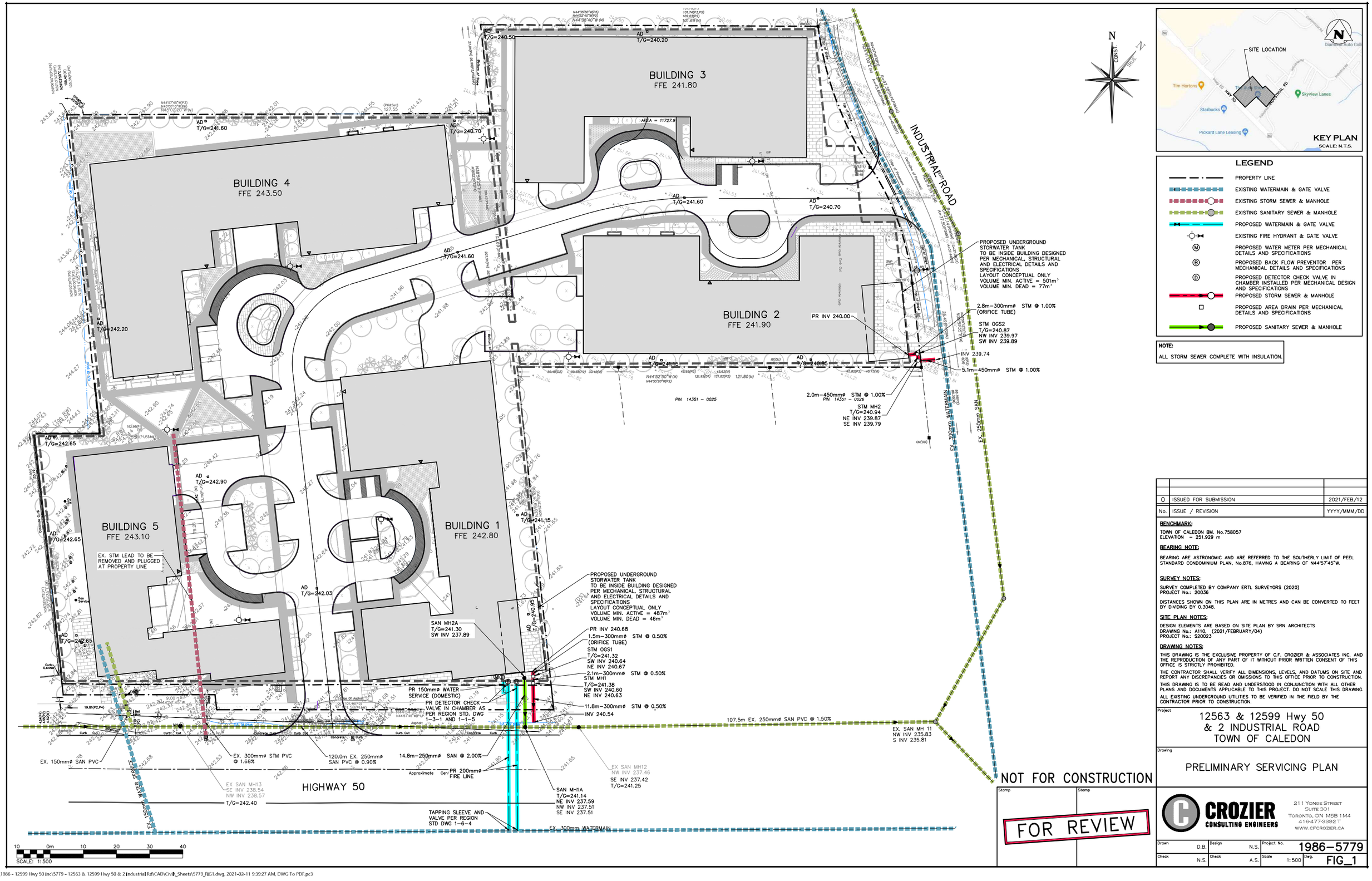
Storage for Drainage to Highway 50 (Catchment 201)

Storm Event	Storage Required (m^3)	Maximum Storage Required (m^3)	Water Balance Retention Required (m^3)	Total Storage Required (m^3)	Total Storage Provided (m^3)
2 yr	133.0	486.6	45.7	532.3	534
5 yr	194.0				
10 yr	248.2				
25 yr	399.5				
50 yr	420.4				
100 yr	486.6				

Storage for Drainage to Industrial Road (Catchment 202)

Storm Event	Storage Required (m^3)	Maximum Storage Required (m^3)	Water Balance Retention Required (m^3)	Total Storage Required (m^3)	Total Storage Provided (m^3)
2 yr	138.5	500.7	76.3	577.0	584
5 yr	201.9				
10 yr	257.0				
25 yr	412.5				
50 yr	433.7				
100 yr	500.7				

FIGURES



LEGEND

- PROPERTY LINE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- EXISTING FIRE HYDRANT & GATE VALVE
- (M) PROPOSED WATER METER PER MECHANICAL DETAILS AND SPECIFICATIONS
- (B) PROPOSED BACK FLOW PREVENTOR PER MECHANICAL DETAILS AND SPECIFICATIONS
- (D) PROPOSED DETECTOR CHECK VALVE IN CHAMBER INSTALLED PER MECHANICAL DESIGN AND SPECIFICATIONS
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED AREA DRAIN PER MECHANICAL DETAILS AND SPECIFICATIONS
- PROPOSED SANITARY SEWER & MANHOLE

NOTE:
ALL STORM SEWER COMPLETE WITH INSULATION.

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR SUBMISSION	2021/FEB/12

BENCHMARK:

TOWN OF CALEDON BM. No.758057
ELEVATION – 251.929 m

BEARING NOTE:

BEARING ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHERLY LIMIT OF PEEL STANDARD CONDOMINIUM PLAN, No.876, HAVING A BEARING OF N44°57'45"W.

SURVEY NOTES:

SURVEY COMPLETED BY COMPANY ERTL SURVEYORS (2020)
PROJECT No.: 20036

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY SRN ARCHITECTS
DRAWING No.: A110, (2021/FEBRUARY/04)
PROJECT No.: S20023

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

12563 & 12599 Hwy 50 & 2 INDUSTRIAL ROAD TOWN OF CALEDON

Drawing

PRELIMINARY SERVICING PLAN

NOT FOR CONSTRUCTION

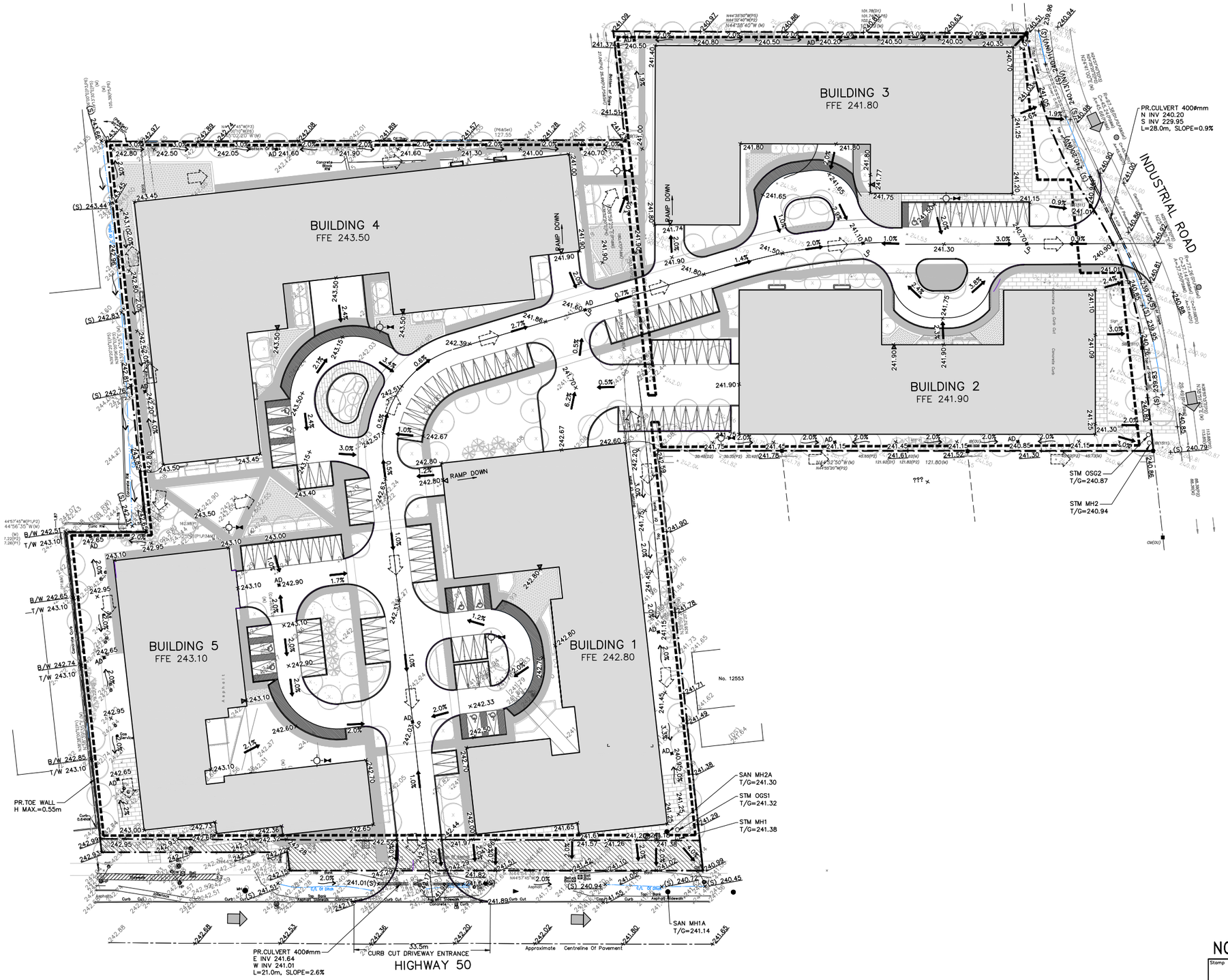
Stamp

FOR REVIEW

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 301
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	D.B.	Design	N.S.	Project No.	1986–5779
Check	N.S.	Check	A.S.	Scale	1:500
				Dwg.	FIG_1

I:\1900\1986 – 12599 Hwy 50 Inc\5779 – 12563 & 12599 Hwy 50 & 2 Industrial Rd\CAD\Civil_Sheets\5779_FIG1.dwg, 2021-02-11 9:39:27 AM, DWG To PDF.pc3



LEGEND

- PROPERTY LINE
- EXISTING GRADE
- PROPOSED GRADE
- PROPOSED GRADE (TO MATCH EXISTING)
- PROPOSED MINOR FLOW DIRECTION
- PROPOSED GRASSED SWALE
- BUILDING ENTRANCE (PERSONNEL DOOR)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- EXISTING MAJOR OVERLAND FLOW DIRECTION
- EXISTING FIRE HYDRANT & GATE VALVE
- PROPOSED FIRE HYDRANT & GATE VALVE
- UNDERGROUND PARKING
- PROPOSED AREA DRAIN PER MECHANICAL DETAILS AND SPECIFICATIONS
- PROPOSED DETECTOR CHECK VALVE IN CHAMBER INSTALLED PER MECHANICAL DESIGN AND SPECIFICATIONS

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR SUBMISSION	2021/FEB/12

BENCHMARK:

TOWN OF CALEDON BM. No.758057
ELEVATION = 251.929 m

BEARING NOTE:

BEARING ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHERLY LIMIT OF PEEL STANDARD CONDOMINIUM PLAN, No.876, HAVING A BEARING OF N44°57'45"W.

SURVEY NOTES:

SURVEY COMPLETED BY COMPANY ERTL SURVEYORS (2020)
PROJECT No.: 20036

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY SRN ARCHITECTS
DRAWING No.: A110, (2021/FEBRUARY/04)
PROJECT No.: S20023

DRAWING NOTES:

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

Project
12563 & 12599 Hwy 50
& 2 INDUSTRIAL ROAD
TOWN OF CALEDON

Drawing
PRELIMINARY SITE GRADING PLAN

NOT FOR CONSTRUCTION

Stamp

FOR REVIEW

Stamp

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 301
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	D.B.	Design	N.S.	Project No.	1986-5779
Check	N.S.	Check	A.S.	Scale 1:500	Dwg. FIG_2

LEGEND

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

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR SUBMISSION	2021/FEB/12

BENCHMARK:

TOWN OF CALEDON BM. No.758057
ELEVATION – 251.929 m

BEARING NOTE:

BEARING ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHERLY LIMIT OF PEEL STANDARD CONDOMINIUM PLAN, No.876, HAVING A BEARING OF N44°57'45"W.

SURVEY NOTES:

SURVEY COMPLETED BY COMPANY ERTL SURVEYORS (2020)
PROJECT No.: 20036

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY SRN ARCHITECTS
DRAWING No.: A110, (2021/FEBRUARY/04)
PROJECT No.: S20023

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

Project

12563 & 12599 Hwy 50 & 2 INDUSTRIAL ROAD TOWN OF CALEDON

Drawing

PRE–DEVELOPMENT DRAINAGE PLAN

NOT FOR CONSTRUCTION

Stamp

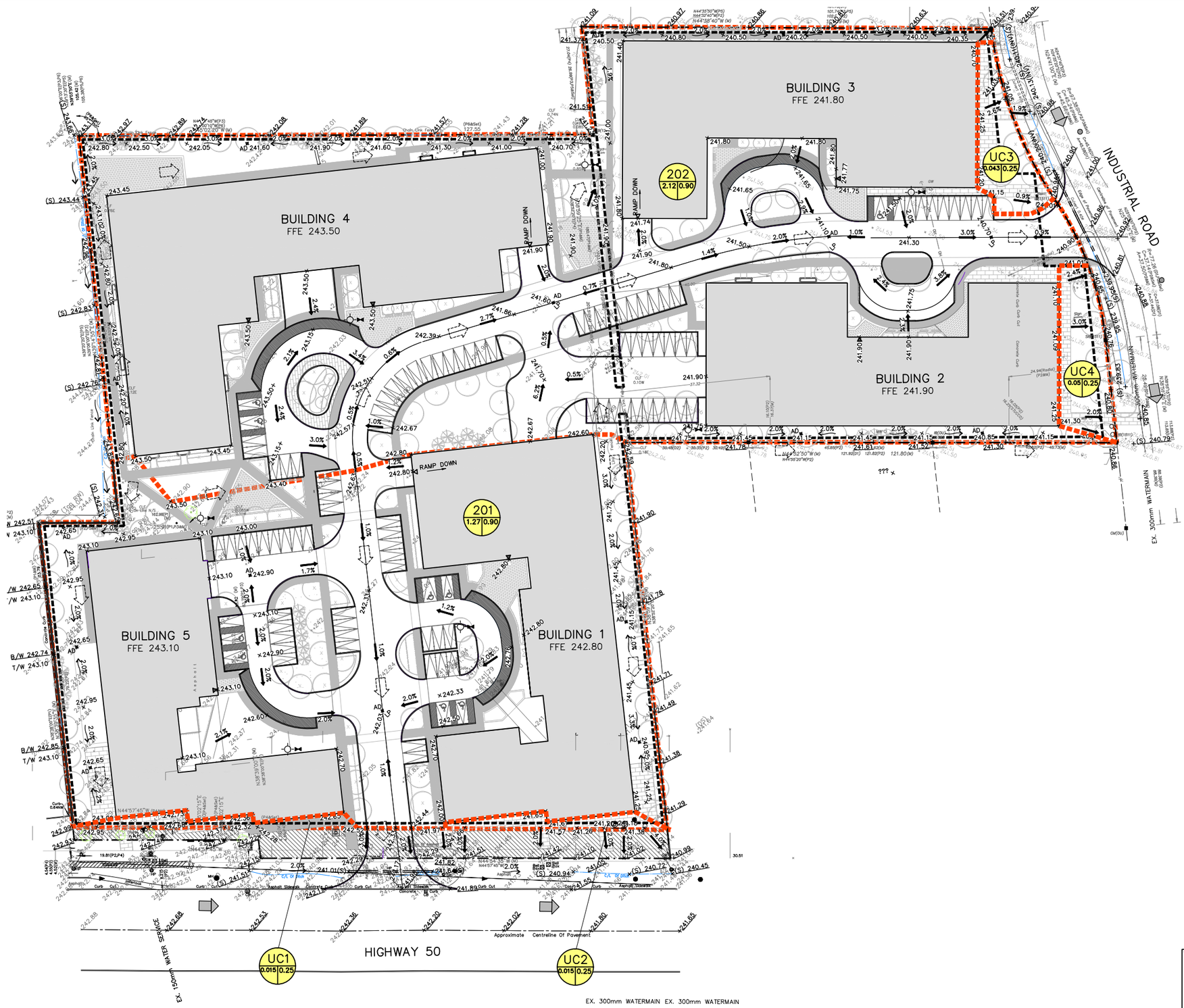
FOR REVIEW

Stamp

CROZIER CONSULTING ENGINEERS
211 YONGE STREET
SUITE 301
TORONTO, ON M5B 1M4
416-477-3392 T
WWW.CFCROZIER.CA

Drawn	Design	Project No.	
D.B.	N.S.	1986–5779	
Check	Check	Scale	Dwg.
N.S.	A.S.	1:500	FIG_ 3

I:\1900\1986 - 12599 Hwy 50 Inc\5779 - 12563 & 12599 Hwy 50 & 2 Industrial Rd\CAD\civil_Sheets\5779_FIG2_4.dwg, 2021-02-11 9:47:37 AM, DWG To PDF.pc3



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING DITCH
- EXISTING GRADE
- EXISTING OVERLAND FLOW DIRECTION
- PROPOSED OVERLAND FLOW DIRECTION
- STORM DRAINAGE CATCHMENT
- ID / A|RC — CATCHMENT I.D. / AREA (ha) | RUNOFF COEFFICIENT
- PROPOSED AREA DRAIN PER MECHANICAL DETAILS AND SPECIFICATIONS
- UNDERGROUND PARKING

No.	ISSUE / REVISION	YYYY/MMM/DD
0	ISSUED FOR SUBMISSION	2021/FEB/12

BENCHMARK:

TOWN OF CALEDON BM. No.758057
ELEVATION – 251.929 m

BEARING NOTE:

BEARING ARE ASTRONOMIC AND ARE REFERRED TO THE SOUTHERLY LIMIT OF PEEL STANDARD CONDOMINIUM PLAN, No.876, HAVING A BEARING OF N44°57'45"W.

SURVEY NOTES:

SURVEY COMPLETED BY COMPANY ERTL SURVEYORS (2020)
PROJECT No.: 20036

DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY SRN ARCHITECTS
DRAWING No.: A110, (2021/FEBRUARY/04)
PROJECT No.: S20023

DRAWING NOTES:

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Project

12563 & 12599 Hwy 50 & 2 INDUSTRIAL ROAD TOWN OF CALEDON

Drawing

POST–DEVELOPMENT DRAINAGE PLAN

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Drawn	D.B.	Design	N.S.	Project No.	1986–5779
Check	N.S.	Check	A.S.	Scale	1:500
				Dwg.	FIG_ 4

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

I:\1900\1986 - 12599 Hwy 50 Inc\5779 - 12563 & 12599 Hwy 50 & 2 Industrial Rd\CAD\Civil_Sheets\5779_FIG2_4.dwg, 2021-02-11 9:46:18 AM, DWG To PDF.pc3