FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

1303 LAKESHORE ROAD EAST

CITY OF MISSISSAUGA
REGION OF PEEL

PREPARED FOR:

1303 LAKESHORE RD E LIMITED PARTNERSHIP

PREPARED BY:

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

FEBRUARY 2023

CFCA FILE NO. 2109-6004

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev.0	October 2021	Issued for 1st Submission
Rev.1	August 31, 2022	Issued for 2nd Submission
Rev.2	February 10, 2023	Issued for 3rd Submission

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1.0 Introduction

C.F. Crozier & Associates Inc. (Crozier) was retained by High Street Capital Partners Inc. to prepare a Functional Servicing and Stormwater Management Report. This report will support the applications for an Official Plan Amendment (OPA) and Zoning By-Law Amendment (ZBA) required to permit the residential development at 1303 Lakeshore Road East in the City of Mississauga, Region of Peel (hereby known as 'the proposed development').

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

1.1 Site Description

The subject property is approximately 0.32 ha and currently consists of an existing 2-storey motel, parking/asphalt area and landscaped area. The property, located in a mixed-use neighbourhood is bounded by Lakeshore Road East to the south, Fergus Avenue to the west, residential buildings to the north and east, as well as Applewood Creek to the east. The existing site is currently zoned as Commercial (C4).

The elements envisioned for this development are presented on the Site Plan prepared by Chamberlain Architect Services Limited, dated February 8, 2023, and include:

- 10-storey residential building at the corner of Lakeshore Road East and Fergus Avenue (Combined GFA of 13,365 m^2)
- Three levels of underground parking (195 spaces total)
- Proposed development access & underground parking access from Fergus Avenue

The Site Plan is provided in Appendix A for reference.

2.0 Water Servicing

Region of Peel is responsible for the operation and maintenance of the public water and treatment system in the City of Mississauga and all local systems must connect to the regional system. The existing and proposed water servicing is discussed in the following sections.

2.1 Existing Water Servicing

A review of Region of Peel As-built Drawing No.23374/75 - D, No.46482-D and No. 1518-D indicates that there is:

- An existing 300 mm dia. PVC watermain within Lakeshore Road East, adjacent to the existing site.
- An existing 600 mm dia. CPP watermain and existing 2400 mm dia. CPP Feeder main within Lakeshore Road East.
- An existing 150 mm dia. DI watermain and an abandoned 150 mm dia. DI watermain within Fergus Avenue.

- An abandoned 200 mm diameter CI watermain within Lakeshore Road East, adjacent to the existing site.

- Two existing hydrants near the existing site, along the west boulevard Fergus Avenue and along the north boulevard of Lakeshore Road East across Applewood Creek.

2.2 Design Water Demand

The Region of Peel Public Works Design, Specifications & Procedures Manual – Sanitary Sewer Design Criteria (March 2017) was used to determine the equivalent population estimate for the proposed building. Table 1 uses a unit rate occupancy density of 2.7 persons per unit to determine the equivalent population. The calculations are provided in Appendix B.

Table 1: Equivalent Population Estimate

Number of Units	Population Per Unit	Total Persons
153	2.7	413

The Region of Peel Public Works Design, Specifications & Procedures Manual – Watermain Design Criteria (June 2010) was used to determine the maximum domestic water demand generated by the proposed development based on the equivalent population estimate of 413 persons. An average daily water demand of 280 L/cap/day was used. Table 2 summarizes the estimated design water demand. Appendix B contains water demand calculations.

Table 2: Estimated Domestic Design Water Demand

Building Type	Total Development Area (ha)	Pop.	Average Daily Demand (L/s)	Maximum Day Demand (L/s)	Peak Hour Demand (L/s)
Residential	0.32	413	1.34	2.68	4.02

Note: Total development area based on Site Plan by Chamberlain Architect Services Limited (February 8, 2023).

The domestic water service will be required to convey a peak domestic design water demand of 4.02 L/s.

2.3 Fire Flow Demand

The Fire Underwriters Survey method was used to estimate the fire flow demand for the proposed development. Flow requirements were based on the largest single floor Gross Floor Area (GFA) from the Site Plan prepared by Chamberlain Architect Services Limited dated February 8, 2023.

This calculation is based on the following assumptions:

- Building will use non-combustible construction (unprotected metal structural components) with a coefficient of 0.8 was applied to the fire flow calculations.

- The vertical openings and exterior vertical communications are properly protected therefore, the total floor area used in the calculation includes the largest floor and 25% of the two immediately adjoining floors.

- Proposed building will be equipped with an automatic sprinkler system which reduces the initial fire flow demand of the building by up to 50%. The automated sprinkler system is to be designed by the Mechanical Engineer; therefore, the detailed design of the system is not included in this report.

The proposed fire line is required to accommodate a fire flow of 100 L/s for a duration of 2 hours. Appendix B contains the Fire Underwriters Survey Calculations.

All assumptions are to be confirmed by the Architect as the project progresses to detailed design. It should be noted that the fire flows determined from the FUS method 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 to meet municipally available flows and pressures.

2.4 Proposed Water Servicing

The development is proposed to be serviced by a 200 mm diameter water connection, extending from the existing 300 mm diameter PVC watermain within Lakeshore Road East. The water connection will split at the property line into a 200 mm diameter fire line and a 100 mm diameter domestic service. The Preliminary Site Servicing Plan (attached) illustrates the location of the water service and the connection to the underground parking structure. The internal water system of the building will be designed per the Mechanical Engineer's details and specifications at the detailed design stage.

A hydrant flow test completed by Classic Fire Protection Inc. on July 30, 2021 indicates that the minimum projected fire flow available at 20 PSI is 439.4 L/s. The results of the hydrant flow test have been included in Appendix B.

3.0 Sanitary Servicing

The Region of Peel is responsible for the operation and maintenance of the sanitary sewer network in the City of Mississauga. The existing and proposed sanitary servicing is outlined in the following sections.

3.1 Existing Sanitary Servicing

A review of Region of Peel As-Built Drawing No. C-14108, No.C3585, No. X-4175, indicates that there is:

- An existing 150 mm dia. service line from 1303 Lakeshore Road East to an existing 250 mm dia. sanitary sewer within Fergus Avenue.

- An existing 250 mm dia. sanitary sewer to 750mm dia. sanitary sewer to a 1650 mm sanitary sewer through the intersection of Lakeshore Road East and Fergus Avenue which end at the entrance of the Lakeview Sewer Treatment Plant.

3.2 Design Sanitary Flow

The sanitary flow for the proposed development was calculated with reference to the Region of Peel Public Works Design, Specifications & Procedures Manual – Sanitary Sewer Design Criteria (March 2017), the equivalent population estimate described in Section 2.2, and the total proposed development area illustrated in the Site Plan prepared by Chamberlain Architect Services Limited dated February 8, 2023. Region of Peel design criteria unit sewage flow of 302.8 L/capita/day was used to determine the average daily flow. Infiltration flow into the sanitary sewer and a peaking factor were applied to the unit sewage flow to obtain the total estimated design sewage flow.

A summary of the results is presented in Table 3 and calculations are provided in Appendix C.

Table 3: Estimated Sanitary Design Flows

Building Type	**Total Development Area** (ha)	**Average Daily Flow** (L/s)	**Peak Flow** (L/s)	**Infiltration Flow** (L/s)	**Total Sanitary Flow** (L/s)
Residential	0.32	1.45	5.81	0.06	5.88

Note: Total sanitary flow includes infiltration flow and peak flow.

The domestic sanitary service will be required to convey a total sanitary flow of 5.88 L/s.

3.3 Proposed Sanitary Servicing

Sanitary servicing will be provided by a 150 mm diameter sanitary lateral extending from the existing 250 mm diameter sanitary sewer on Fergus Avenue (west of the proposed development). The pipe capacity for a 150 mm diameter lateral sloping at 2% is 21.5 L/s, which is greater than the total sanitary design flow of 5.88 L/s. Therefore, the proposed sanitary lateral has capacity to convey the design sanitary flow. The Preliminary Site Servicing Plan (attached) illustrates the location of the sanitary lateral and the connection to the underground parking structure. The internal sanitary system of the building will be designed per the Mechanical Engineer's details and specifications at the detailed design stage.

4.0 Drainage Conditions

The drainage conditions for the proposed development in both the existing and proposed conditions are outlined below.

4.1 Existing Drainage Conditions

According to the topographic survey completed by Mandarin Surveyors Limited dated August 24, 2021, the existing site topography conveys stormwater drainage to Fergus Avenue and Lakeshore Road East.

The Pre- and Post-Development Drainage Plan (attached) illustrates the storm catchment delineation based on the existing topography. The existing site is delineated into the following catchments:

- Catchment 101 (A = 0.11 ha; RC = 0.61) consists of drainage from the west side of the existing building to Fergus Avenue. The minor system drainage is directed to an existing ditch along Fergus Avenue. The ditch drainage is collected by an existing ditch-inlet catchbasin and conveyed to the existing storm sewer along Fergus Avenue, ultimately discharging to the existing Lakeshore Road East storm sewer. The Major system drainage is directed to Fergus Avenue.

- Catchment 102 (A = 0.21 ha; RC = 0.82) consists of drainage from the east side of the existing building and associated parking lot. The minor system stormwater will be collected and conveyed to the existing storm sewer along Lakeshore Road East through the existing internal storm sewer network. The major system stormwater is conveyed overland to Lakeshore Road East.

4.2 Proposed Drainage Conditions

Based on the Site Plan prepared by Chamberlain Architect dated February 8, 2023, the proposed development consists of a 10-storey residential building, three levels of underground parking and access from Fergus Avenue.

The proposed grading divides the proposed development into two (2) post-development drainage catchment areas as shown on Figure 1 (attached):

- Catchment 201 (A = 0.29 ha; RC = 0.82) consist of drainage from the proposed building footprint, paved and landscaped area, and east property line swale. Runoff from this catchment, up to the 100-year storm event, will be collected by the internal storm drainage system and conveyed to the proposed stormwater management (SWM) storage tank located in the southwest corner of the underground parking garage. The internal storm drainage system will be designed by the Mechanical Engineer at the detailed design stage.

- Catchment UC01(A = 0.03 ha; RC = 0.65) consists of uncontrolled drainage from west and south portions of the proposed development. The runoff from this catchment will be conveyed overland to Lakeshore Road East and Fergus Avenue.

Upon development, runoff up to the 100-year storm event will be conveyed to the existing 525 mm diameter storm sewer located in Lakeshore Road East via the internal storm sewer network. The stormwater will be controlled upstream of the proposed storm diversion maintenance hole via the internal SWM tank and pumping system, prior to being treated by the proposed Jellyfish. Following water quality treatment, stormwater will be conveyed through the proposed 250 mm diameter storm lateral to the existing 525 mm diameter storm sewer along Lakeshore Road East, located south of the proposed development.

Refer to the Preliminary Site Grading Plan and Pre- and Post-Development Drainage Plan (attached) for proposed grading and drainage patterns.

5.0 Stormwater Management

Stormwater management design criteria were established using the City of Mississauga standards. The stormwater management criteria include:

Water Quantity Control

Provide control for the private storm system to control the 100-year post-development peak flow to 2-year pre-development peak flow in accordance with the Applewood Creek design criteria.The maximum pre-development runoff coefficient to be used for the redevelopment site cannot exceed 0.50.

Water Quality Control

Private stormwater discharging from the proposed development must achieve Ontario Ministry of the Environment, Conservation and Parks (MECP) Enhanced Level of protection (80% total suspended solids (TSS) removal) for water quality control prior to discharging to the City's storm sewer network.

Water Balance

Retention of the first 5 mm of rainfall for private development areas is required by the City of Mississauga Development Requirements Manual (August 2022) by way of infiltration, reuse, or evapotranspiration to achieve the water balance criteria. Filtration may be considered if options are not feasible.

5.1 Stormwater Quantity Control

Using the City of Mississauga intensity-duration-frequency (IDF) data, the Rational Method was used to determine the pre- and post-development flow rates for the proposed development. The Modified Rational Method was then used to determine the required stormwater quantity control volume for the proposed development, in accordance with the Applewood Creek design criteria outlined in Section 5.0.

A summary of the results is presented in Table 4 and calculations are in Appendix D.

Table 4: Summary of Peak Flow Rates and Required Storage Volume

Pre-Development Peak Flow (2-year) (L/s)	Post-Development Peak Flow (100-year) (L/s)					Required Active Storage (m^3)	Provided Storage (m^3)
	Uncontrolled Catchment 201	Uncontrolled Catchment UC01	Dewatering Pump Rate	Target Flow Rate for Catchment 201	Controlled Catchment 201		
27	114	10	0.74	16	16	108	126

Note: Target flow rate shown is the pre-development flow less the flows from UC01 and the dewatering flow rate, to over control the remaining of the proposed development. Required storage shown does not include dead storage volume discussed in Section 5.3.

As presented in Table 4, via the internal pumping system, the post-development peak stormwater flows from Catchment 201 are controlled to the target rate. The 108 m^3 of active on-site storage is required to attenuate the flows. The Applewood Creek design criteria was used to calculate the required storage volume. A summary of peak stormwater flows and storage calculations are provided in Appendix D.

An underground stormwater tank, located within the underground parking structure, is proposed to provide 126 m^3 of on-site stormwater storage, which exceeds the requirements for both active storage and dead storage required to satisfy the water balance criteria. The underground stormwater tank will be designed in accordance with the Architectural, Structural, and Mechanical Building Design details and specifications. A pump is proposed to convey the flow from the tank to the existing storm network at a controlled pump rate of 16 L/s. An internal pumping system over-controls peak flows from Catchment 201 to account for uncontrolled flows from Catchment UC01 and the dewatering flow rate, such that the 100-year peak stormwater flow for the entire proposed development area is less than or equal to the 2-year pre-development peak flow. Therefore, the stormwater quantity control criteria is met.

Further details on the stormwater storage tanks and pump design will be determined at the detailed design stage and will be designed in accordance with the Architectural, Structural, and Mechanical details and specifications.

5.2 Stormwater Quality Control

As outlined in Section 5.0, stormwater quality controls for the proposed development must incorporate measures to provide an Enhanced Level of Protection (Level 1) according to the MECP (March 2003) guidelines. Enhanced water quality protection involves the removal of at least 80% of TSS from 90% of the annual runoff volume. Water quality control will be provided through a treatment train approach including swales and a Jellyfish Unit (JF4-2-1).

The Jellyfish Unit (JF4-2-1), or approved equivalent, is proposed to provide the requisite water quality control for Catchment 201. The Jellyfish Unit is sized for 80% removal of the ETV PSD to meet the enhanced level of the TSS removal. The sizing results in Appendix D reflects this qualification. It is proposed to be installed downstream of proposed tank and will treat the stormwater runoff after it is discharged from the stormwater storage tank. As described in Section 5.1, the treated stormwater will be pumped from the tank to the existing storm network and ultimately discharged into Applewood Creek.

The detailed design of Low Impact Development (LID) features will be provided during detailed design at Site Plan Approval.

5.3 Water Balance

As stated in the City of Mississauga Storm Drainage Design Requirements (November 2020), the minimum requirement to promote water balance is retention of the 5 mm rainfall event. The water balance retention volume was calculated based on impervious areas. To be conservative, the entire proposed development area was considered at this stage to account for future changes to the Site Plan. The water balance calculation will be refined as required at the detailed design stage.

A total storage volume of 16.0 m3 (0.32 ha x 5 mm) will be provided on-site to achieve the water balance criteria. The storage will be provided through dead storage in the stormwater tank. Once the final plan area of the underground stormwater tank has been established during detailed design, a depth will be indicated to achieve the required volume.

Water in dead storage can be reused throughout the development as grey water or for irrigation purposes. The volume of stormwater provided as part of the water balance should be discharged within 24-hours after the end of a storm event. On-site LID's can also be used for water balance and alternatives will be explored as the project moves into the detailed design stage.

5.4 Sustainable Stormwater Management

In accordance with the City of Mississauga's Green Development Standards, Low Impact Development (LID) strategies will be considered for use throughout the proposed development during the detailed design stage. The following LID strategies may be applicable for this proposed development:

- Rainwater Harvesting**:** Without pre-treatment, the captured rainwater within the underground storage tanks can be used for outdoor non-potable water uses such as irrigation, or in the buildings as gray water.

- Enhanced Grass Swale and Bioretention: Enhanced grass swales are designed to convey, treat, and attenuate stormwater runoff. This feature slows the water to allow sedimentation, filtration through the soil matrix, evapotranspiration, and infiltration into the underlying native soil. Bioretention methods, such as rain gardens and stormwater planters, allow to temporarily store, treat, and infiltrate runoff. It is typically designed to capture small storm events. Where underground parking facilities exists, infiltration is not a feasible option.

- Enhanced Topsoil**:** Enhanced topsoil provides water quality benefits in addition to water balance storage which will reduce the infrastructure required to store the required water balance volume.

LID strategies and an overall treatment train approach, where possible, will be specified during detailed design.

5.5 Long-Term Groundwater Dewatering

Based on the Hydrogeological Geological Assessment, Proposed Redevelopment, 1303 Lakeshore Road East, Mississauga, Ontario, prepared by Terraprobe Inc. dated October 1, 2021, the proposed development will require long-term dewatering. The maximum long-term groundwater discharge estimate presented in the Terraprobe report is 0.74 L/s. A dewatering pump flow of 0.74 L/s was accounted for in the post-development peak flow calculations. The Terraprobe report indicates that the groundwater exceeds the storm water quality criteria, therefore, the groundwater will need to be treated in accordance with the City of Mississauga Storm Sewer By-Law 259-05 prior to discharge. The dewatering and groundwater treatment system will be designed by a dewatering consultant and specifications will be provided at the detailed design stage. Excerpts from the Terraprobe report are provided in Appendix A.

6.0 Erosion and Sediment Controls During Construction

Erosion and sediment controls will be installed prior to the beginning of any construction activities. They will be maintained until the proposed development is stabilized or as directed by the site engineer and/or City personnel. These controls will be inspected after each significant rainfall event to ensure that they are maintained in proper working condition. An Erosion and Sediment Control Plan, together with detailed phasing and staging requirements, will be tailored to the final detailed design of the development.

The following erosion and sediment controls will be included during construction of the proposed development:

Silt Fencing: A silt fence will be installed on the proposed development perimeter to intercept runoff. The site engineer and the owner may add additional silt fencing if needed prior to, during, and following construction.

Mud Mat: A mud mat will be installed at the entrance of the construction zone to prevent mud tracking from the proposed development onto surrounding lands and perimeter roadway network. All construction traffic will be restricted to this access only.

Siltsacks in Catchbasins: A siltsack shall be installed in the nearby catchbasins along Fergus and Lakeshore Road. All details and locations will be provided during the detailed design stage.

7.0 Conclusion and Recommendations

The proposed development consists of a 10-storey residential building with three levels of underground parking. Based on the information provided in this report, it is feasible to service the proposed development from a functional servicing and preliminary stormwater management perspective.

Our conclusions for the proposed development include:

- Water supply for the proposed development will be provided by a 200 mm diameter PVC water connection extending from the existing 300 mm diameter watermain within Lakeshore Road East. The proposed 200 mm diameter water connection will split at the property line into a 200 mm diameter fire line and a 100 mm diameter domestic service. The internal water distribution system will be designed by the Mechanical Engineer.

- Sanitary servicing for the proposed development will be provided using a 150 mm diameter PVC sanitary service which will connect to the existing 250 mm diameter sanitary sewer on Fergus Avenue from a proposed control manhole at the property line.

- The storm drainage will be collected and conveyed through the proposed internal storm system and discharged through the proposed 250 mm diameter PVC storm sewer lateral to the existing 525 mm diameter storm sewer in Lakeshore Road East. There is an uncontrolled drainage catchment located along the west and south limits of the proposed development which is conveyed overland to Fergus Avenue and Lakeshore Road East.

- The quantity control criteria can be achieved via an underground storage tank and internal pumping system. The underground stormwater tank provides the required storage volumes to attenuate peak flows in accordance with the Applewood Creek design Criteria.

- Quality control will be provided through a Jellyfish JF4-2-1, or approved equivalent. The treatment device will provide an enhanced level of protection (80% TSS removal) therefore achieving the stormwater quality control criteria.

- A storage volume equivalent to 5 mm across the proposed development area will be provided through dead storage in the proposed underground storage tank to achieve the water balance criteria.

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

Respectfully submitted,

C.F. CROZIER & ASSOCIATES INC.

Jayesh Boily, E.I.T.
Land Development

C.F. CROZIER & ASSOCIATES INC.

Matt Britton, P.Eng.
Project Manager – Land Development

JL/JB/cj

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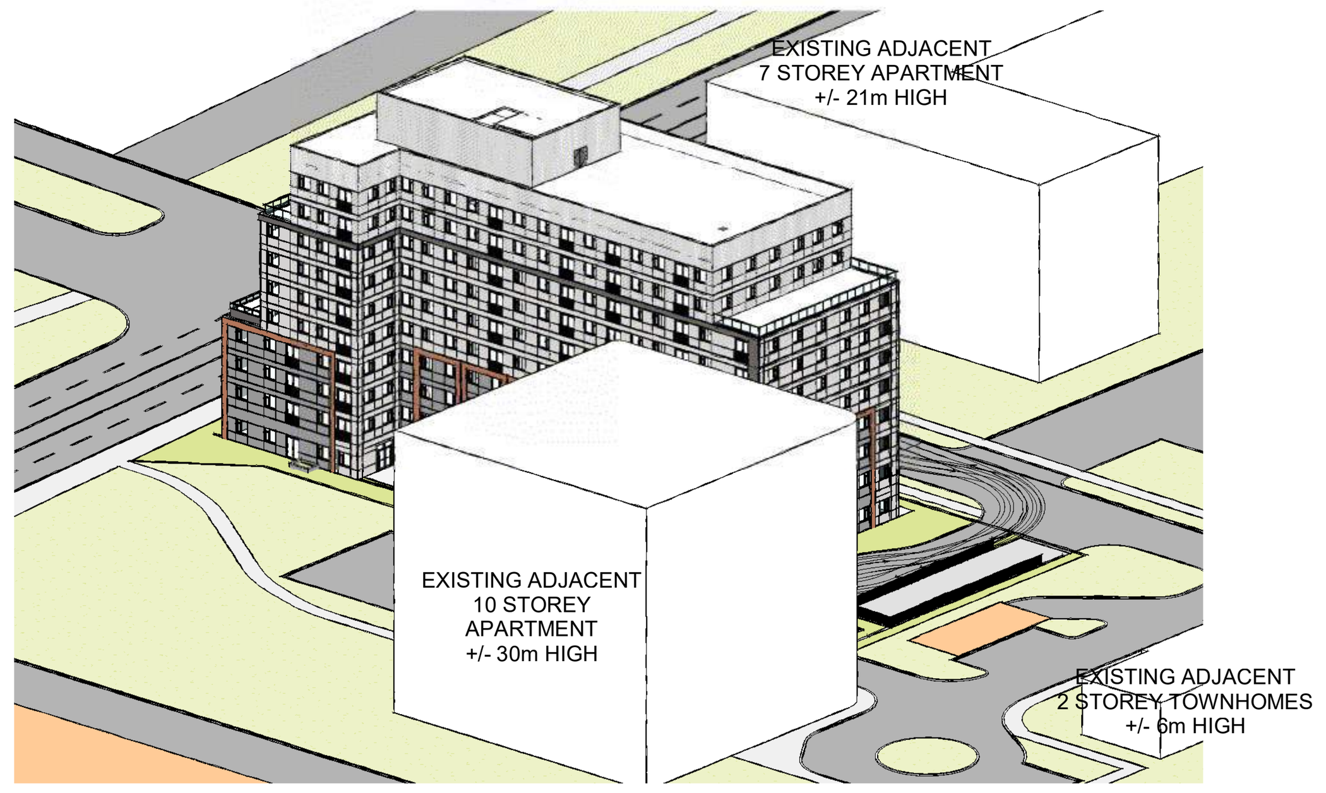
APPENDIX A

Background Information



3 / A001 AXONOMETRIC PERSPECTIVE 1

HEIGHT OF ADJACENT BUILDINGS IS ESTIMATED, AND PROVIDED FOR CONTEXT ONLY (ASSUMING +/- 3m PER FLOOR).

4 / A001 AXONOMETRIC PERSPECTIVE 2

HEIGHT OF ADJACENT BUILDINGS IS ESTIMATED, AND PROVIDED FOR CONTEXT ONLY (ASSUMING +/- 3m PER FLOOR).

SITE LEGEND

- ENTRANCE / EXIT
- BUILDING SETBACK LINE
- LANDSCAPE BUFFER SETBACK LINE
- SIAMESE CONNECTION
- PROPOSED FIRE HYDRANT
- LIGHT STANDARD
- T — PROPOSED PAD MOUNTED TRANSFORMER (REFER TO ELECTRICAL DRAWINGS
- DROP CURB
- MH — MANHOLE
- CB — CATCHBASIN
- DESIGNATED BARRIER-FREE PARKING SPACE
- CU — PROPOSED MECHANICAL CONDENSING UNIT ON CONCRETE HOUSEKEEPING PAD - SEE MECH DWGS
- HEAVY DUTY ASPHALT
- LANDSCAPE / SOD AREA
- CONCRETE SIDEWALK

SITE STATISTICS

SITE STATISTICS			
DESCRIPTION	AREA (SM)	AREA (SF)	%
BUILDING FOOTPRINT			
BLDG FOOTPRINT	1470.67 m²	15830 ft²	46.4%
	1470.67 m²	15830 ft²	46.4%
HARD LANDSCAPE			
ASPHALT	338.77 m²	3646 ft²	10.7%
CURB	16.93 m²	182 ft²	0.5%
PARKING RAMP	177.06 m²	1906 ft²	5.6%
PAVER	252.36 m²	2716 ft²	8.0%
SIDEWALK	49.53 m²	533 ft²	1.6%
	834.65 m²	8984 ft²	26.3%
SOFT LANDSCAPE			
LANDSCAPE	865.22 m²	9313 ft²	27.3%*
	865.22 m²	9313 ft²	27.3%
OVERALL SITE	3170.61 m²	34128 ft²	100.0%

* CURRENT ZONING REQUIRES MIN. 40% LANDSCAPE AREA.

GFA		
LEVEL	AREA (m²)	AREA (ft²)
GROUND FLOOR	1448 m²	15585 ft²
LVL 2	1468 m²	15800 ft²
LVL 3	1467 m²	15791 ft²
LVL 4	1467 m²	15791 ft²
LVL 5	1326 m²	14276 ft²
LVL 6	1326 m²	14276 ft²
LVL 7	1326 m²	14276 ft²
LVL 8	1326 m²	14276 ft²
LVL 9	1105 m²	11899 ft²
LVL 10	1105 m²	11899 ft²
PARKING LEVEL P1	20 m²	220 ft²
T/O ROOF DECK	272 m²	2925 ft²
GRAND TOTAL	13658 m²	147013 ft²

GFA (BELOW GRADE)		
Level	Area (SM)	Area (SF)
PARKING LEVEL P1	2538.06 m²	27319 ft²
PARKING LEVEL P2	2538.06 m²	27319 ft²
PARKING LEVEL P3	2538.06 m²	27319 ft²
Grand total	7614.19 m²	81958 ft²

PARKING & AMENITY STATISTICS

AMENITY CALCULATIONS		
NAME	AREA (m²)	AREA (ft²)
SHARED (GROUND FLOOR)		
EXTERIOR PATIO & GREEN SPACE	241.7 m²	2602 ft²
INDOOR AMENITY	189.5 m²	2040 ft²
	431.2 m²	4642 ft²
SHARED (FIFTH FLOOR)		
INDOOR AMENITY	47.0 m²	506 ft²
ROOFTOP TERRACE	107.0 m²	1151 ft²
	154.0 m²	1657 ft²
PRIVATE		
BALCONY / TERRACE	432.6 m²	4656 ft²
	432.6 m²	4656 ft²
	1017.8 m²	10955 ft²

VEHICLE PARKING	
DESCRIPTION	COUNT
VISITOR	
PARKING LEVEL P1	
ACCESSIBLE A - 3.4m x 5.8m	1
ACCESSIBLE B - 2.4m x 5.8m	1
TYPICAL PARKING - 2.6m x 5.6m	32
	34
RESIDENT	
PARKING LEVEL P1	
5.6m X 2.6m	25
EV PARKING - 2.6m x 5.6m	2
PARKING LEVEL P2	
5.6m X 2.6m	63
ACCESSIBLE A - 3.4m x 5.8m	1
ACCESSIBLE B - 2.4m x 5.8m	1
PARKING LEVEL P3	
5.6m X 2.6m	69
	161
	195

BICYCLE PARKING	
DESCRIPTION	COUNT
GROUND FLOOR	
BIKE RACK STACKED (1.8m x 0.6m)	82
PARKING LEVEL P1	
BIKE RACK (1.8m x 0.6m)	8
PARKING LEVEL P2	
BIKE RACK (1.8m x 0.6m)	8
PARKING LEVEL P3	
BIKE RACK (1.8m x 0.6m)	8
GROUND FLOOR	
EXTERIOR BIKE RACK (1.8m x 0.6m)	4
	110

PROPOSED AMENITY REQUIREMENTS

REQUIRED AREA: 5.6m² / UNIT
5.6m² x 153 units = **856.8 m² REQ.**

MIN. CONTIGUOUS AREA: 50%
856.8 m² x 50% = **428.4 m²**

AREA PROVIDED: SEE CALCULATIONS ABOVE.
CONTIGUOUS: ALL GROUND FLOOR AMENITY AREAS ARE CONTIGUOUS. SEE AREA ABOVE.

PROPOSED PARKING REQUIREMENTS

168 UNITS x 1.18 PARKING SPACES / UNIT = **198.24**
(199) PARKING SPACES REQUIRED

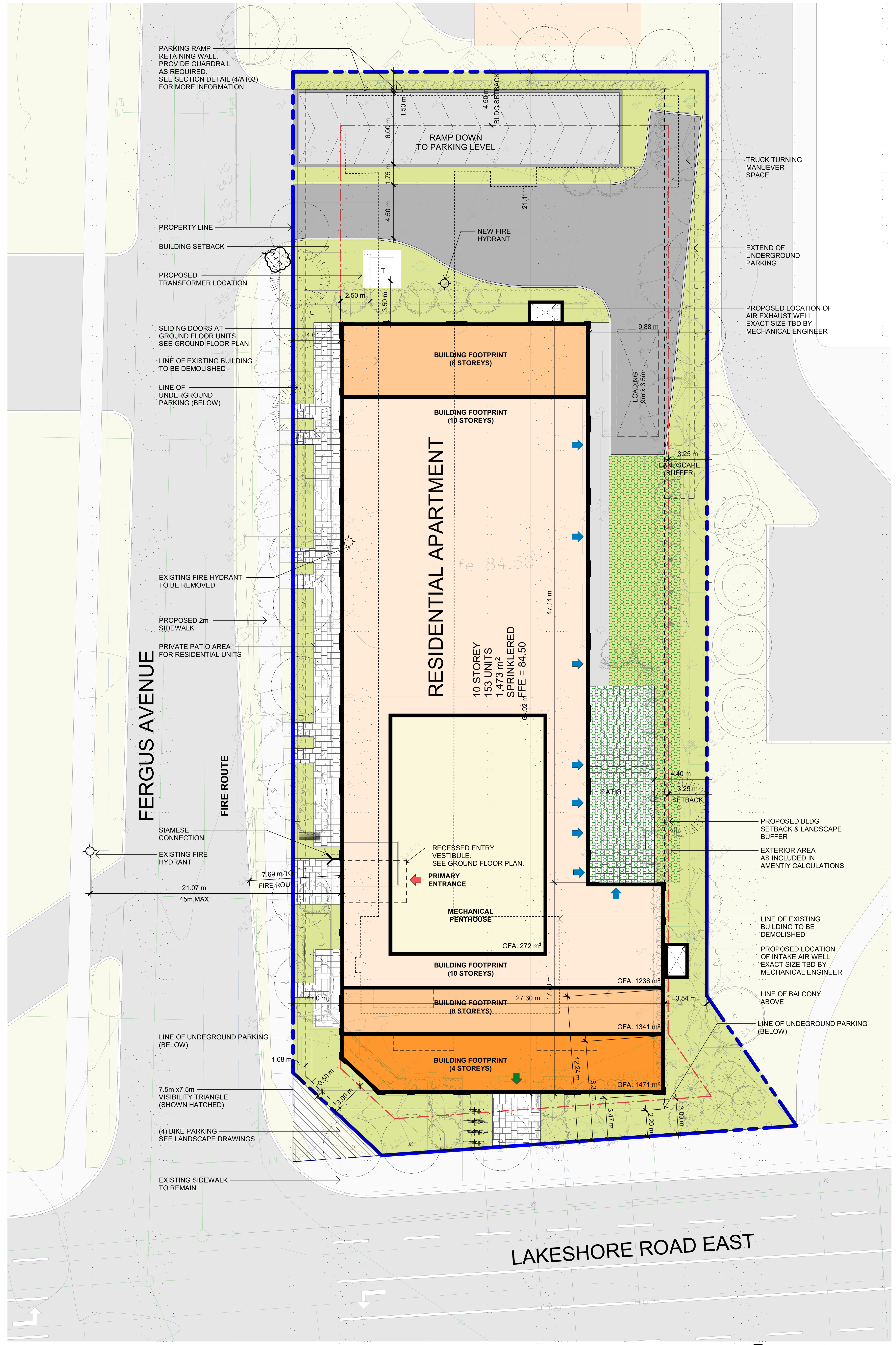
PARKING PROVIDED

196 TOTAL PARKING SPACES PROVIDED

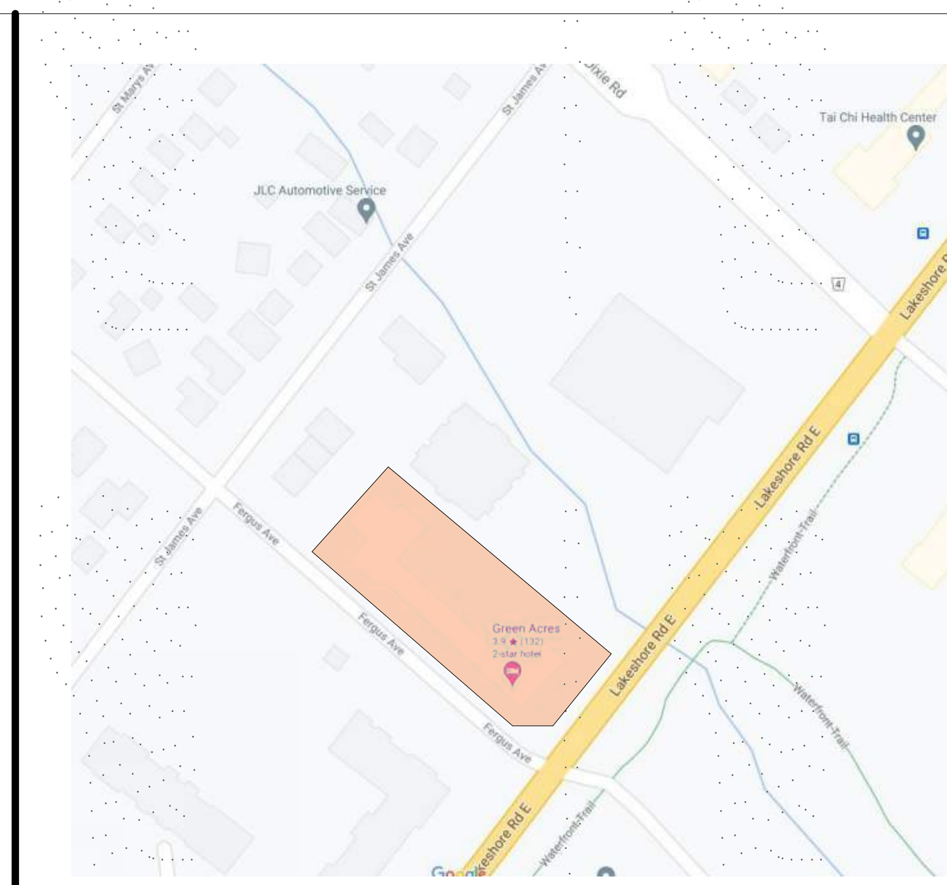
BICYCLE PARKING REQUIREMENTS

CLASS A (ENCLOSED) (0.6 SPACES PER UNIT) — 92 SPACES
CLASS B (OUTDOOR) (0.05 SPACES / UNIT) — 8 SPACES

TOTAL REQUIRED — **100 SPACES**



1 / A001 SITE PLAN 1 : 200



CONTEXT PLAN

LEGAL DESCRIPTION

PARTOF LOTS 5, 6, AND 19
REGISTERED PLAN H-23
CITY OF MISSISSAUGA
REGIONAL MUNICIPALITY OF PEEL

CREDIT NOTES:
THIS SITE PLAN IS BASED UPON AND MUST BE READ IN CONJUNCTION WITH THE SURVEY PLAN PREPARED BY MANDARIN SURVEYORS LIMITED, DATED JUNE 30, 2021, JOB No. 2021-282.

CHAMBERLAIN ARCHITECT SERVICES LIMITED ACCEPTS NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE DATA SUPPLIED AND SUCH DATA IS NOT INCLUDED UNDER SEALS OF CERTIFICATION, IF ANY.

ZONING DATA

ZONING BY-LAW 0225-2007
ZONE: RA3
SITE AREA = 3170.61 m2

ITEMS NOTED IN RED TEXT DO NOT COMPLY WITH CURRENT ZONING. SITE SPECIFIC ZONING MAY BE REQUIRED.

REGULATIONS		RA3 ZONE	PROPOSED
MINIMUM LOT FRONTAGE		30 meters	35 meters
FLOOR SPACE INDEX		0.5 MIN. / 1.0 MAX.	4.2
MAXIMUM HEIGHT		38.0 m (12 storeys)	35 meters (10 storeys)
MINIMUM FRONT YARD	< 13m high < 20m high < 26m high > 26m high	7.5 m 8.5 m 9.5 m 10.5 m	3.0 m 8.3 m 12.2 m
MINIMUM EXTERIOR SIDE YARD	< 13m high < 20m high < 26m high > 26m high	7.5 m 8.5 m 9.5 m 10.5 m	4.0 m 4.0 m 4.0 m 4.0 m
MINIMUM INTERIOR SIDE YARD	< 13m high < 20m high < 26m high > 26m high Abutting Res. Zone	4.5 m 6.0 m 7.5 m 9.5 m 4.5 m	3.25 m 3.25 m 3.25 m 3.25 m 3.25 m
MINIMUM REAR YARD	< 13m high < 20m high < 26m high > 26m high Abutting Res. Zone	7.5 m 10.0 m 12.5 m 15.0 m 4.5 m	19 m 25 m 25 m 25 m 19 m
ENCROACHMENTS & PROJECTIONS			
Maximum encroachment into a required yard of a porch, balcony located on the first storey, staircase, landing or awning, provided that each shall have a maximum width of 6.0 m		1.8 m	1.8 m
Minimum setback from a parking structure completely below finished grade, inclusive of external access stairwells, to any lot line		3.0 m	Front: 3.0 m Exterior Side: 0.5 m Interior Side: 3.0 m Rear: 1.5 m
Minimum setback from a waste enclosure/loading area to a street line		10.0 m	10.0 m
MINIMUM LANDSCAPED AREA, LANDSCAPE BUFFER			
Minimum landscaped area		40 % of lot area	27%
Landscape Buffer	Front Exterior Side Interior Side Rear	4.5 m 4.5 m 3.0 m 4.5 m	3.0m 4.0 m 3.0 m 1.5 m
GENERAL PROVISIONS			
MINIMUM CENTRELINE SETBACK	DESIGNATED ROW: 35 meters	17.5 metres + required yard/ setback	11.3 m (Fergus Ave.) 18.7 m (LakeshoreRoad E)
ENCROACHMENT OF EAVES		Maximum of 0.45 metres into any required yard	N/A
ROOFTOP BALCONY		Shall be setback 1.2 metres from all exterior edges of a building structure	N/A
		May be 0.0 metres where the exterior edge of the building faces a street and the building is located ina non-residential zone or the exterior edge of the balcony does not abut a Residential Zone and the building is located in a non-residential zone	N/A
PARKING			
MINIMUM PARKING SPACE DIMENSIONS	W/ A PARKING ANGLE EXCEEDING 15 DEGREES	2.6 x 5.2 metres	2.6 x 5.2 metres
	PARALLEL PARKING SPACE W/ A PARKING ANGLE NOT EXCEEDING 15 DEGREES	2.6 x 6.7 metres	N/A
	THE MINIMUM WIDTH, OTHER THAN ACCESSIBLE OR PARALLEL PARKING SPACE SHALL BE INCREASED TO 2.75 metres WHERE THE LENGTH OF ONE SIDE ABUTS A BUILDING		
	ACCESSIBLE PARKING SPACE	TYPE A: 3.4 X 5.2 metres TYPE B: 2.4 X 5.2 metres	1 PROVIDED 1 PROVIDED
MINIMUM AISLE WIDTH			7.0 metres
LOADING SPACE		1 per building with more than 30 dwelling units.	1 Loading Space (3.5m x 9.0 m)

Chamberlain Architects Constructors Managers

Chamberlain Architect Services Limited

4671 Palladium Way (Unit 1)
Burlington, Ontario. L7M 0W9
CANADA

Phone: 905.631.7777

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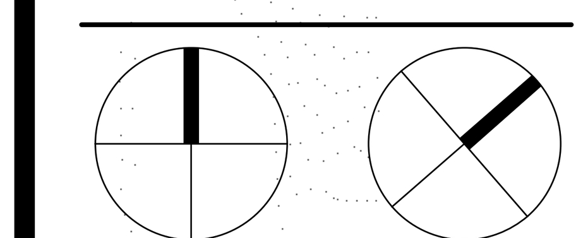
NO.	ISSUED	DATE
1	RE-ZONING APPLICATION	2021.10.01
2	REISSUED FOR ZBA	2022.09.12
3	CLIENT REVIEW (COORD)	2022.12.08
4	CLIENT REVIEW	2023.02.08

SEAL



RESIDENTIAL MID-RISE

1303 LAKESHORE RD E
MISSISSAUGA, ON

SHEET NAME

SITE PLAN

START DATE	JUNE 2021
DRAWN BY	KO/GP
CHECKED BY	LC
SCALE	As indicated
PROJECT NO.	121027
DRAWING	A001

C:\Users\myeung\Documents\121027 - 1303 Lakeshore MISS - Site Plan_Central_mcieslewicz@chamberlainipd.com.rvt

2023-02-09 8:44:23 AM

Terraprobe

Consulting Geotechnical & Environmental Engineering
Construction Materials Inspection & Testing

HYDROGEOLOGICAL ASSESSMENT
PROPOSED REDEVELOPMENT

1303 LAKESHORE ROAD EAST
MISSISSAUGA, ONTARIO

Prepared For: 1303 Lakeshore Road East Limited Partnership
C/O: High Street Capital Partners
488 Huron Street
Toronto, Ontario
M5R 2R3

Attention: Mr. Drew MacMartin, M.Pl.

File No 1-21-0265-46
Issued: October 1, 2021

Terraprobe Inc.

Greater Toronto
11 Indell Lane
Brampton, Ontario L6T 3Y3
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Central Ontario
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Barrie, Ontario L4N 4Y8
(705) 739-8355 Fax: 739-8369

Northern Ontario
1012 Kelly Lake Rd., Unit 1
Sudbury, Ontario P3E 5P4
(705) 670-0460 Fax: 670-0558

www.terraprobe.ca

The results of the groundwater analysis indicate the following:

- The groundwater sample **exceeded** the Limits for **Region of Peel Storm Sewer Discharge** for the following parameters:
    - Total Manganese, (Guideline Limit: 0.05 mg/L, Result: 0.984 mg/L)
    - Total Suspended Solids, (Guideline Limit: 15 mg/L, Result: 147 mg/L)
    - Total Kjeldahl Nitrogen, (Guideline Limit: 1 mg/L, Result: 7.40 mg/L)
    - Fecal Coliform, (Guideline Limit: 0 CFU/100mL, Result: 1 CFU/100mL)
- The groundwater sample **exceeded** the Limits for **City of Mississauga Storm Sewer Discharge** for the following parameters:
    - Total Manganese, (Guideline Limit: 0.05 mg/L, Result: 0.984 mg/L)
    - Total Suspended Solids, (Guideline Limit: 15 mg/L, Result: 147 mg/L)
    - Total Kjeldahl Nitrogen, (Guideline Limit: 1 mg/L, Result: 7.40 mg/L)
    - Total Aluminium, (Guideline Limit: 1.0 mg/L, Result: 5.04 mg/L)
- The groundwater sample **meets** the Limits for **Region of Peel Sanitary Sewer Discharge** for all parameters analyzed.

A true copy of the analysis report, Certificate of Analysis and a chain of custody record for the sample is included **Appendix E**.

preliminary estimate and is subject to revision based on the vertical exit gradient consideration the detailed design stage;

- Design water level set at Elev. ± 81.2 m (based on BH 1) to account for the highest observed water table elevations observed across the Site; and
- Safety factor of 1.5 on the groundwater flow with the inclusion of 25 mm design rainfall event.

6.3 Dewatering Rates

It is noted that if the excavation is exposed to the elements, storm water will have to be managed. The short-term control of groundwater should take into account storm water management from rainfall events. A dewatering system should be designed to take into account removal of rainfall from the excavation. Volumes for a 25 mm design storm have been provided in the quantity estimates. The dewatering rates are estimated as follows:

Ground Water Quantity: Short Term (Construction) – S.F. 1.5 Used						
Location	**Ground Water Seepage**		**25mm Design Rainfall Event**		**Total Volume**	
	L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
Total Site, Permeable Shoring	63,500	44.10	63,000	43.75	**126,500**	**87.85**
Total Site, Impermeable Shoring	4,000	2.78	63,000	43.75	**67,000**	**46.53**
Ground Water Quantity: Long Term (Post Construction) – S.F. 1.5 Used						
Location	**Ground Water Seepage**		**Infiltration 25mm Design Rainfall Event**		**Total Volume**	
	L/day	**L/min**	**L/day**	**L/min**	**L/day**	**L/min**
Total Site, Drained Foundation (Permeable Shoring)	61,000	42.36	3,000	2.08	**64,000**	**44.44**
Total Site, Drained Foundation (Impermeable Shoring)	31,500	21.88	3,000	2.08	**34,500**	**23.96**

As required by Ontario Regulation 63/16, a plan for discharge must consider the conveyance of stormwater from a 100-year storm. The additional volume that will be generated in the occurrence of a 100-year storm event is approximately 237,000 L/day (164.6 L/min) based on the footprint of the excavation area.

The numerical model results for the above assessment are provided in **Appendix G**.

APPENDIX B

Water Demand Calculations

CROZIER CONSULTING ENGINEERS

Project: 1303 Lakeshore Rd. E
Project No.: 2109-6004
Created By: JL
Checked By: JB/MB
Date: 2021-08-25
Updated: 2023-02-10

Domestic Water Demand

Site Area:	0.32	ha
Number of Units:	153	units
Population Density:	2.7	PPU
Population:	413	

Notes & References

Site statistics based on Site Plan issued by Chamberlain Architects dated February 8th, 2023.

Region of Peel Public Works Design, Specifications & Procedure Manual - Sanitary Sewer Design Criteria (March 2017) - Section 2.1

Design Parameters

Average Demand (L/capita/d)
280

Region of Peel Public Works Design, Specifications & Procedure Manual - Watermain Design Criteria (June 2010) - Section 2.3

Water Demand:

Average Daily Demand =	115,668	L/day
	1.34	**L/s**

Peaking Factors

Max Day =	2.0
Peak Hour =	3.0

Region of Peel Public Works Design, Specifications & Procedure Manual - Watermain Design Criteria (June 2010) - Section 2.3

Average Day =	1.34	L/s
Max Day =	**2.68**	L/s
Peak Hour =	**4.02**	L/s

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

Municipality	Average Daily Water Demand (L/s)	Max Day Demand (L/s)	Peak Hourly Demand (L/s)
Region of Peel	1.34	2.68	4.02

CROZIER CONSULTING ENGINEERS

2109-6004 1303 Lakeshore Road East Infill
Fire Protection Volume Calculation

Date: 2023-02-10
Designed By: JL
Checked By: JB/MB

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) plus 25% of immediately adjoining floors

Proposed Buildings

A =	2,197	sq.m.	1468 sq.m	approximate area of largest floor (2nd floor)
C =	0.8	Non-combustible construction	729 sq.m	25% of the two adjoining floors

Therefore F = 8,250 L/min

Fire flow determined above shall not exceed:

30,000 L/min for wood frame construction
30,000 L/min for ordinary construction
25,000 L/min for non-combustible construction
25,000 L/min for fire-resistive construction

2. Values obtained in No. 1 may be reduced by as much as 25% for occupancies having low contents fire hazard or may be increased by up to 25% surcharge for occupancies having a high fire hazard.

Non-Combustible	-25%	Free Burning	15%
Limited Combustible	-15%	Rapid Burning	25%
Combustible	0% (No Change)		

Limited Combustible	-15%

-1,237 L/min reduction
7,013 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.

Building will have automatic sprinklers

3,506 L/min reduction

2109-6004 1303 Lakeshore Road East Infill
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%		

Exposed buildings

Name			**Distance**		
North	Residential	1035 Fergus Ave	23 m	10%	701.30
East	Residential	1025 Fergus Ave	18 m	15%	1051.95
West	Residential	1-1285 Lakeshore Rd E	32 m	5%	350.65
West	Residential	2-1285 Lakeshore Rd E	34 m	5%	350.65

2,454 L/min Surcharge

Determine Required Fire Flow

No.1	8,250	
No. 2	-1,237 reduction	
No. 3	-3,506 reduction	
No. 4	2,454 surcharge	
Required Flow:	**5,961 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

PROJECT: 1303 Lakeshore Rd. E
PROJECT No.: 2109-6004
DATE: 2023-02-10

DESIGN: JB
CHECK: JL

Projected Fire Flows - Hydrant Test Dated July 30, 2021

Test	Hydrant Location / ID	Static Pressure	Residual Pressure during Test	Flow from Hydrant Test	Desired Residual Pressure	Projected Fire Flow Available at 20 psi
		Ps	Pt	Qt	Pr	Qr
		(psi)	(psi)	(USGPM)	(psi)	(USGPM)
1	50m East of Lakeshore Rd. E & Fergus Ave.	86	85	725	20	6,965
2			84	1374		9,078

$Q_r = Q_t \times ((P_s - P_r)/(P_s - P_t))^{0.54}$ Formula to determine available flow as per AWWA M17 (1989)

NOTE: Projected fire flows are calculated on the basis of hydrant tests carried out by Classic Fire Protection Inc. dated July 30, 2021

Location of test: Flow: Approximately 50m east of Lakeshore Road East & Fergus Avenue intersection
Residual: Approximately 100m west of Lakeshore Road East & Fergus Avenue intersection

Connection Demand Table

Comprehensive FSR – 1303 Lakeshore Road East, City of Mississauga

WATER CONNECTION

Connection point [3]			
Existing 300 mm dia. PVC watermain at the northeast corner of Lakeshore Road East & Fergus Avenue			
Pressure zone of connection point		1	
Total equivalent population to be serviced [1]		413 persons	
Total lands to be serviced		0.32 ha	
Hydrant flow test			
	Hydrant flow test location		
Approximately 50m east of Lakeshore Road East & Fergus Avenue intersection			
	Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure	579	45.74	NA
Maximum water pressure	586	86.69	NA

Note: Hydrant flow test performed by Classic Fire Protection Inc. dated July 30, 2021

No.	**Water demands**		
	Demand type	**Demand**	**Units**
1	Average day flow	1.34	l/s
2	Maximum day flow	2.68	l/s
3	Peak hour flow	4.02	l/s
4	Fire flow [2]	100.00	l/s
Analysis			
5	Maximum day plus fire flow	102.68	l/s

WASTEWATER CONNECTION

Connection point [4]		Existing 250 mm dia. sanitary sewer along Fergus Avenue approximately 10m north of Lakeshore Road East
Total equivalent population to be serviced		413 persons
Total lands to be serviced		0.32 ha
6	Wastewater sewer effluent (in l/s)	5.88

[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.

APPENDIX C

Sanitary Flow Calculations

Domestic Sanitary Design Flow

			Notes & References
Site Area:	0.32	ha	Site statistics based on Site Plan issued by Chamberlain Architects dated February 8th, 2023.
Number of Units:	153	units	Region of Peel Public Works Design, Specifications & Procedure Manual - Sanitary Sewer Design Criteria (March 2017)
Population Density:	2.7	PPU	
Population:	413		

Design Parameters

Average Flow (L/capita/d)
302.8

Region of Peel Public Works Design, Specifications & Procedure Manual - Sanitary Sewer Design Criteria (March 2017)

Sanitary Design Flow:

Average Daily Flow =	302.8	L/capita/d	Average Daily Flow = Average Daily Flow (L/cap./day) * population / 86400
Average Daily Flow =	**1.45**	L/s	
Harmon Peak Factor: M =	**4.02**		M = 1 + 14 / (4 + (p/1000)^.5)
Peak Flow =	**5.81**	L/s	Peak Flow = Average Daily Flow * M
Infiltration Flow: Infiltration =	0.2	L/ha/s	Region of Peel Public Works Design, Specifications & Procedure Manual - Sanitary Sewer Design Criteria (March 2017)
Total Infiltration =	**0.06**	L/s	
Total Peak Flow =	**5.88**	L/s	Total Peak Flow = Peak Flow + Total Infiltration

Summary Table

Average Daily Flow (L/s)	Peaking Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)
1.45	4.02	5.81	0.06	5.88

APPENDIX D

Stormwater Management Calculations

CROZIER CONSULTING ENGINEERS

Project: 1303 Lakeshore R
Project No.: 2109-6004
Created By: JL/JB
Checked By: JB
Date: 2021.07.28
Updated: 2023.02.10

Modified Rational Calculations - Input Parameters

Storm Data: Mississauga

Time of Concentration: T_c = 15 min (per city of Mississauga Transportation and Works Development Requirements Manual Section 8 - Storm Drainage Design Requirements dated November 2020)

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

Pre - Development Conditions				
Catchment	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**[1]
101	0.11	1072.3	**0.50**	**0.17**
102	0.21	2098.31	**0.50**	**0.33**
Total Site	**0.32**	**3170.6**	**0.50**	**0.50**

Post - Development Conditions					
Land Use	**Area** (ha)	**Area** (m^2)	**C**	**Weighted Average C**	**100-Year Adjusted C**
201	0.29	2860.68	**0.82**	**0.75**	**1.00**
UC01	0.03	309.91	**0.65**	**0.06**	**0.82**
Total Site	**0.32**	**3170.59**	**-**	**0.81**	

Equations:

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

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

Pre- and Post-Development Adjsuted Runoff Coefficients			
Return Period	**Adjsutment**	**Pre-Development**	**Post-Development**
2	1.00	0.50	0.81
5	1.00	0.50	0.81
10	1.00	0.50	0.81
25	1.10	0.55	0.89
50	1.20	0.60	0.95
100	1.25	0.63	0.99

Project: 1303 Lakeshore Rd. E
Project No.: 2109-6004
Created By: JL/JB
Checked By: JB
Date: 2021.07.28
Updated: 2023.02.10

Modified Rational Calculations - Peak Flows Summary

Peak Flows (m^3/s)			
Q_{pre} (2 Year)	**UC01 (100 Year)**	**Dewatering Pump Rate**	**Qtarget (100 Year)**
0.0268	0.010	0.00074	0.016

*Qtarget = Qpre(2 Year) - UC01(100 Year) - Dewatering Pump Rate

*Dewatering Pump Rate = 0.74 L/s, per Hydrogeological Assessment, Proposed Redevelopment, 1303 Lakeshore Road East, Mississauga, Ontario, prepared by Terraprobe Inc., dated October 1, 2021

Equations:

Peak Flow

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

Project: 1303 Lakeshore Rd. E
Project No.: 2109-6004
Created By: JL/JB
Checked By: JB
Date: 2021.07.28
Updated: 2023.02.10

Modified Rational Calculations - 100-Year Post to 2-Year Pre

City of Mississauga Control Criteria

Control 100-year Post Development Peak Flows to 2-year Pre-Development Peak Flow

100 yr: Uncontrolled Post-Development Flow (Catchment 201):

Q_{post} = 0.114 m^3/s

2-Year: Pre-development Flow:

Q_{pre} = 0.027 m^3/s

Q_{target} = 0.016 m^3/s ($Q_{target} = Q_{pre} - Q_{UC01} - Q_{Dewater}$)

Q_{pump} = 0.016 m^3/s (Pumped flow)

Storage Volume Determination				
T_d (min)	i (mm/hr)	T_d (sec)	Q_{Uncont} (m^3/s)	S_d (m^3)
5	242.53	300	0.197	54.3
10	176.31	600	0.143	76.3
15	140.69	900	0.114	88.4
20	118.12	1200	0.096	95.9
25	102.41	1500	0.083	100.7
30	90.77	1800	0.074	103.9
35	81.77	2100	0.066	105.8
40	74.58	2400	0.061	106.9
45	68.68	2700	0.056	107.4
50	63.75	3000	0.052	107.3
55	59.56	3300	0.048	106.8
60	55.95	3600	0.045	106.0
65	52.81	3900	0.043	104.8
70	50.03	4200	0.041	103.4
75	47.58	4500	0.039	101.8
80	45.38	4800	0.037	100.1
85	43.39	5100	0.035	98.1
90	41.60	5400	0.034	96.0
95	39.97	5700	0.032	93.8
100	38.47	6000	0.031	91.4
Required Storage Volume:				**107.4**

Storage Summary	
Active	110
Dead	16

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

Storage
$S_d = Q_{post} - Q_{target} \bullet T_d$

STANDARD OFFLINE
Jellyfish Filter Sizing Report

Project Information

Date	Sunday, February 19, 2023
Project Name	1303 Lakeshore Rd. E
Project Number	2109-6004
Location	Mississauga

Jellyfish Filter Design Overview

This report provides information for the sizing and specification of the Jellyfish Filter. When designed properly in accordance to the guidelines detailed in the Jellyfish Filter Technical Manual, the Jellyfish Filter will exceed the performance and longevity of conventional horizontal bed and granular media filters.

Please see ***www.ImbriumSystems.com*** *for more information.*

Jellyfish Filter System Recommendation

The Jellyfish Filter model JF4-2-1 is recommended to meet the water quality objective by treating a flow of 12.6 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 18 years of TORONTO CENTRAL rainfall data for this site. This model has a sediment capacity of 142 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF4-2-1	2	1	1.2	12.6	142

The Jellyfish Filter System

The patented Jellyfish Filter is an engineered stormwater quality treatment technology featuring unique membrane filtration in a compact stand-alone treatment system that removes a high level and wide variety of stormwater pollutants. Exceptional pollutant removal is achieved at high treatment flow rates with minimal head loss and low maintenance costs. Each lightweight Jellyfish Filter cartridge contains an extraordinarily large amount of membrane surface area, resulting in superior flow capacity and pollutant removal capacity.

Maintenance

Regular scheduled inspections and maintenance is necessary to assure proper functioning of the Jellyfish Filter. The maintenance interval is designed to be a minimum of 12 months, but this will vary depending on site loading conditions and upstream pretreatment measures. Quarterly inspections and inspections after all storms beyond the 5-year event are recommended until enough historical performance data has been logged to comfortably initiate an alternative inspection interval.

Please see ***www.ImbriumSystems.com*** *for more information.*

Thank you for the opportunity to present this information to you and your client.

Performance

Jellyfish efficiently captures a high level of Stormwater pollutants, including:

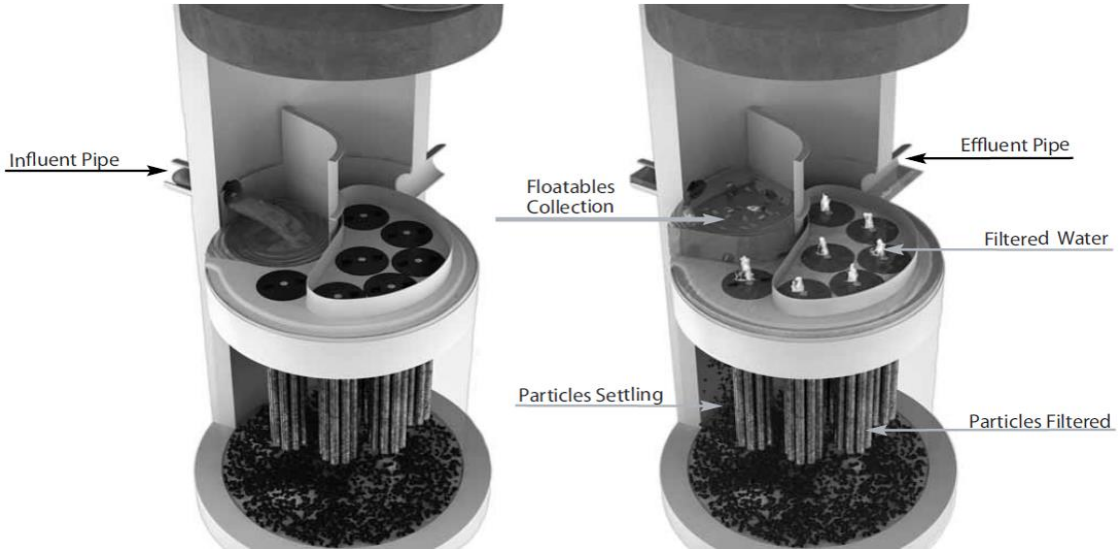
- ☑ 89% of the total suspended solids (TSS) load, including particles less than 5 microns
- ☑ 77% TP removal & 51% TN removal
- ☑ 90% Total Copper, 81% Total Lead, 70% Total Zinc
- ☑ Particulate-bound pollutants such as nutrients, toxic metals, hydrocarbons and bacteria
- ☑ Free oil, Floatable trash and debris

Field Proven Peformance

The Jellyfish filter has been field-tested on an urban site with 25 TARP qualifying rain events and field monitored according to the TARP field test protocol, demonstrating:

- A median TSS removal efficiency of 89%, and a median SSC removal of 99%;
- The ability to capture fine particles as indicated by an effluent d50 median of 3 microns for all monitotred storm events, and a median effluent turbidity of 5 NTUs;
- A median Total Phosphorus removal of 77%, and a median Total Nitrogen removal of 51%.

Jellyfish Filter Treatment Functions



Pre-treatment and Membrane Filtration

Jellyfish® Filter

Project Information

Date:	Sunday, February 19, 2023
Project Name:	1303 Lakeshore Rd. E
Project Number:	2109-6004
Location:	Mississauga

Designer Information

Company:	C.F. Crozier & Associates Inc.
Contact:	Jayesh Boily
Phone #:	

Notes

Rainfall

Name:	TORONTO CENTRAL
State:	ON
ID:	100
Record:	1982 to 1999
Co-ords:	45°30'N, 90°30'W

Drainage Area

Total Area:	0.29 ha
Runoff Coefficient:	0.82

Upstream Detention

Peak Release Rate:	n/a
Pretreatment Credit:	n/a

Design System Requirements

Flow Loading	90% of the Average Annual Runoff based on 18 years of TORONTO CENTRAL rainfall data:	**7.9 L/s**
Sediment Loading	Treating 90% of the average annual runoff volume, 1549 m³, with a suspended sediment concentration of 60 mg/L.	**93 kg**

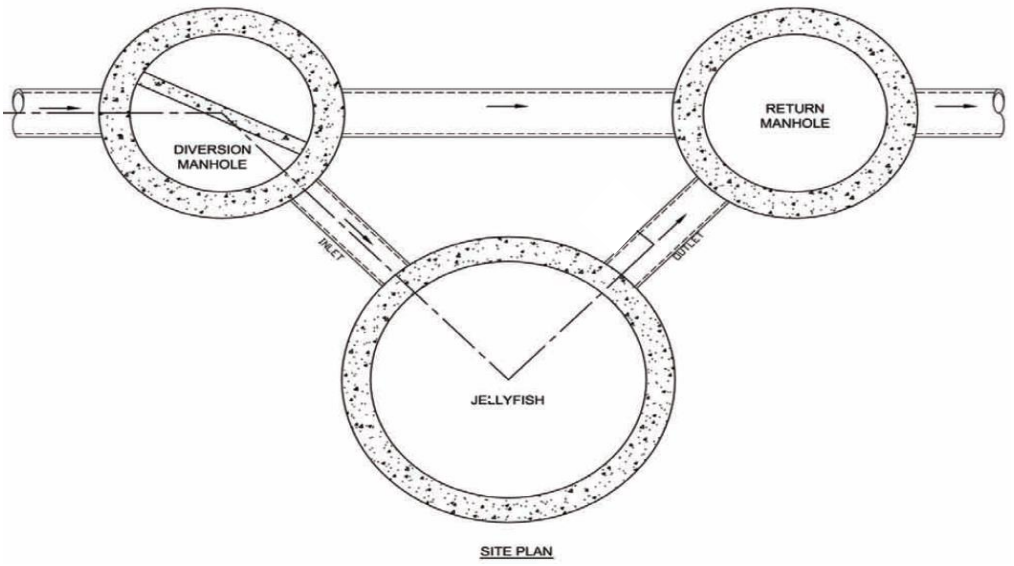
Recommendation

The Jellyfish Filter model JF4-2-1 is recommended to meet the water quality objective by treating a flow of 12.6 L/s, which meets or exceeds 90% of the average annual rainfall runoff volume based on 18 years of TORONTO CENTRAL rainfall data for this site. This model has a sediment capacity of 142 kg, which meets or exceeds the estimated average annual sediment load.

Jellyfish Model	Number of High-Flo Cartridges	Number of Draindown Cartridges	Manhole Diameter (m)	Wet Vol Below Deck (L)	Sump Storage (m³)	Oil Capacity (L)	Treatment Flow Rate (L/s)	Sediment Capacity (kg)
JF4-1-1	1	1	1.2	2313	0.34	379	7.6	85
JF4-2-1	**2**	**1**	**1.2**	**2313**	**0.34**	**379**	**12.6**	**142**
JF6-3-1	3	1	1.8	5205	0.79	848	17.7	199
JF6-4-1	4	1	1.8	5205	0.79	848	22.7	256
JF6-5-1	5	1	1.8	5205	0.79	848	27.8	313
JF6-6-1	6	1	1.8	5205	0.79	848	28.6	370
JF8-6-2	6	2	2.4	9252	1.42	1469	35.3	398
JF8-7-2	7	2	2.4	9252	1.42	1469	40.4	455
JF8-8-2	8	2	2.4	9252	1.42	1469	45.4	512
JF8-9-2	9	2	2.4	9252	1.42	1469	50.5	569
JF8-10-2	10	2	2.4	9252	1.42	1469	50.5	626
JF10-11-3	11	3	3.0	14456	2.21	2302	63.1	711
JF10-12-3	12	3	3.0	14456	2.21	2302	68.2	768
JF10-12-4	12	4	3.0	14456	2.21	2302	70.7	796
JF10-13-4	13	4	3.0	14456	2.21	2302	75.7	853
JF10-14-4	14	4	3.0	14456	2.21	2302	78.9	910
JF10-15-4	15	4	3.0	14456	2.21	2302	78.9	967
JF10-16-4	16	4	3.0	14456	2.21	2302	78.9	1024
JF10-17-4	17	4	3.0	14456	2.21	2302	78.9	1081
JF10-18-4	18	4	3.0	14456	2.21	2302	78.9	1138
JF10-19-4	19	4	3.0	14456	2.21	2302	78.9	1195
JF12-20-5	20	5	3.6	20820	3.2	2771	113.6	1280
JF12-21-5	21	5	3.6	20820	3.2	2771	113.7	1337
JF12-22-5	22	5	3.6	20820	3.2	2771	113.7	1394
JF12-23-5	23	5	3.6	20820	3.2	2771	113.7	1451
JF12-24-5	24	5	3.6	20820	3.2	2771	113.7	1508
JF12-25-5	25	5	3.6	20820	3.2	2771	113.7	1565
JF12-26-5	26	5	3.6	20820	3.2	2771	113.7	1622
JF12-27-5	27	5	3.6	20820	3.2	2771	113.7	1679

Jellyfish Filter Design Notes

- Typically the Jellyfish Filter is designed in an offline configuration, as all stormwater filter systems will perform for a longer duration between required maintenance services when designed and applied in off-line configurations. Depending on the design parameters, an optional internal bypass may be incorporated into the Jellyfish Filter, however note the inspection and maintenance frequency should be expected to increase above that of an off-line system. Speak to your local representative for more information.



Jellyfish Filter Typical Layout

- Typically, 18 inches (457 mm) of driving head is designed into the system, calculated as the difference in elevation between the top of the diversion structure weir and the invert of the Jellyfish Filter outlet pipe. Alternative driving head values can be designed as 12 to 24 inches (305 to 610mm) depending on specific site requirements, requiring additional sizing and design assistance.
- Typically, the Jellyfish Filter is designed with the inlet pipe configured 6 inches (150 mm) above the outlet invert elevation. However, depending on site parameters this can vary to an optional configuration of the inlet pipe entering the unit below the outlet invert elevation.
- The Jellyfish Filter can accommodate multiple inlet pipes within certain restrictions.
- While the optional inlet below deck configuration offers 0 to 360 degree flexibility between the inlet and outlet pipe, typical systems conform to the following:

Model Diameter (m)	Minimum Angle Inlet / Outlet Pipes	Minimum Inlet Pipe Diameter (mm)	Minimum Outlet Pipe Diameter (mm)
1.2	**62º**	**150**	**200**
1.8	59º	200	250
2.4	52º	250	300
3.0	48º	300	450
3.6	40º	300	450

- The Jellyfish Filter can be built at all depths of cover generally associated with conventional stormwater conveyance systems. For sites that require minimal depth of cover for the stormwater infrastructure, the Jellyfish Filter can be applied in a shallow application using a hatch cover. The general minimum depth of cover is 36 inches (915 mm) from top of the underslab to outlet invert.
- If driving head caclulations account for water elevation during submerged conditions the Jellyfish Filter will function effectively under submerged condtions.
- Jellyfish Filter systems may incorporate grated inlets depending on system configuration.
- For sites with water quality treatment flow rates or mass loadings that exceed the design flow rate of the largest standard Jellyfish Filter manhole models, systems can be designed that hydraulically connect multiple Jellyfish Filters in series or alternatively Jellyfish Vault units can be designed.

STANDARD SPECIFICATION
STORMWATER QUALITY – MEMBRANE FILTRATION TREATMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

Specifies requirements for construction and performance of an underground stormwater quality membrane filtration treatment device that removes pollutants from stormwater runoff through the unit operations of sedimentation, floatation, and membrane filtration.

1.2 REFERENCE STANDARDS

ASTM C 891: Specification for Installation of Underground Precast Concrete Utility Structures
ASTM C 478: Specification for Precast Reinforced Concrete Manhole Sections
ASTM C 443: Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM D 4101: Specification for Copolymer steps construction

CAN/CSA-A257.4-M92
Joints for Circular Concrete Sewer and Culvert Pipe, Manhole Sections and Fittings Using Rubber Gaskets

CAN/CSA-A257.4-M92
Precast Reinforced Circular Concrete Manhole Sections, Catch Basins and Fittings

Canadian Highway Bridge Design Code

1.3 SHOP DRAWINGS

Shop drawings for the structure and performance are to be submitted with each order to the contractor. Contractor shall forward shop drawing submittal to the consulting engineer for approval. Shop drawings are to detail the structure's precast concrete and call out or note the fiberglass (FRP) internals/components.

1.4 PRODUCT SUBSTITUTIONS

No product substitutions shall be accepted unless submitted 10 days prior to project bid date, or as directed by the engineer of record. Submissions for substitutions require review and approval by the Engineer of Record, for hydraulic performance, impact to project designs, equivalent treatment performance, and any required project plan and report (hydrology/hydraulic, water quality, stormwater pollution) modifications that would be required by the approving jurisdictions/agencies. Contractor to coordinate with the Engineer of Record any applicable modifications to the project estimates of cost, bonding amount determinations, plan check fees for changes to approved documents, and/or any other regulatory requirements resulting from the product substitution.

1.5 HANDLING AND STORAGE

Prevent damage to materials during storage and handling.

PART 2 – PRODUCTS

2.1 GENERAL

2.1.1 The device shall be a cylindrical or rectangular, all concrete structure (including risers), constructed from precast concrete riser and slab components or monolithic precast structure(s), installed to conform to ASTM C 891 and to any required state highway, municipal or local specifications; whichever is more stringent. The device shall be watertight.

2.1.2 Cartridge Deck The cylindrical concrete device shall include a fiberglass deck. The rectangular concrete device shall include a coated aluminum deck. In either instance, the insert shall be bolted and sealed watertight inside the precast concrete chamber. The deck shall serve as: (a) a horizontal divider between the lower treatment zone and the upper treated effluent zone; (b) a deck for attachment of filter cartridges such that the membrane filter elements of each cartridge extend into the lower treatment zone; (c) a platform for maintenance workers to service the filter cartridges (maximum manned weight = 450 pounds (204 kg)); (d) a conduit for conveyance of treated water to the effluent pipe.

2.1.3 Membrane Filter Cartridges Filter cartridges shall be comprised of reusable cylindrical membrane filter elements connected to a perforated head plate. The number of membrane filter elements per cartridge shall be a minimum of eleven 2.75-inch (70-mm) diameter elements. The length of each filter element shall be a minimum 15 inches (381 mm). Each cartridge shall be fitted into the cartridge deck by insertion into a cartridge receptacle that is permanently mounted into the cartridge deck. Each cartridge shall be secured by a cartridge lid that is threaded onto the receptacle, or similar mechanism to secure the cartridge into the deck. The maximum treatment flow rate of a filter cartridge shall be controlled by an orifice in the cartridge lid, or on the individual cartridge itself, and based on a design flux rate (surface loading rate) determined by the maximum treatment flow rate per unit of filtration membrane surface area. The maximum design flux rate shall be 0.21 gpm/ft² (0.142 lps/m²).

Each membrane filter cartridge shall allow for manual installation and removal. Each filter cartridge shall have filtration membrane surface area and dry installation weight as follows (if length of filter cartridge is between those listed below, the surface area and weight shall be proportionate to the next length shorter and next length longer as shown below):

Filter Cartridge Length (in / mm)	Minimum Filtration Membrane Surface Area (ft2 / m2)	Maximum Filter Cartridge Dry Weight (lbs / kg)
15	106 / 9.8	10.5 / 4.8
27	190 / 17.7	15.0 / 6.8
40	282 / 26.2	20.5 / 9.3
54	381 / 35.4	25.5 / 11.6

2.1.4 Backwashing Cartridges The filter device shall have a weir extending above the cartridge deck, or other mechanism, that encloses the high flow rate filter cartridges when placed in their respective cartridge receptacles within the cartridge deck. The weir, or other mechanism, shall collect a pool of filtered water during inflow events that backwashes the high flow rate cartridges when the inflow

event subsides. All filter cartridges and membranes shall be reusable and allow for the use of filtration membrane rinsing procedures to restore flow capacity and sediment capacity; extending cartridge service life.

2.1.5 Maintenance Access to Captured Pollutants The filter device shall contain an opening(s) that provides maintenance access for removal of accumulated floatable pollutants and sediment, removal of and replacement of filter cartridges, cleaning of the sump, and rinsing of the deck. Access shall have a minimum clear vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

2.1.6 Bend Structure The device shall be able to be used as a bend structure with minimum angles between inlet and outlet pipes of 90-degrees or less in the stormwater conveyance system.

2.1.7 Double-Wall Containment of Hydrocarbons The cylindrical precast concrete device shall provide double-wall containment for hydrocarbon spill capture by a combined means of an inner wall of fiberglass, to a minimum depth of 12 inches (305 mm) below the cartridge deck, and the precast vessel wall.

2.1.8 Baffle The filter device shall provide a baffle that extends from the underside of the cartridge deck to a minimum length equal to the length of the membrane filter elements. The baffle shall serve to protect the membrane filter elements from contamination by floatables and coarse sediment. The baffle shall be flexible and continuous in cylindrical configurations, and shall be a straight concrete or aluminum wall in rectangular configurations.

2.1.9 Sump The device shall include a minimum 24 inches (610 mm) of sump below the bottom of the cartridges for sediment accumulation, unless otherwise specified by the design engineer. Depths less than 24 inches may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

2.2 PRECAST CONCRETE SECTIONS

All precast concrete components shall be manufactured to a minimum live load of HS-20 truck loading or greater based on local regulatory specifications, unless otherwise modified or specified by the design engineer, and shall be watertight.

2.3 JOINTS All precast concrete manhole configuration joints shall use nitrile rubber gaskets and shall meet the requirements of ASTM C443, Specification C1619, Class D or engineer approved equal to ensure oil resistance. Mastic sealants or butyl tape are not an acceptable alternative.

2.4 GASKETS Only profile neoprene or nitrile rubber gaskets in accordance to CSA A257.3-M92 will be accepted. Mastic sealants, butyl tape or Conseal CS-101 are not acceptable gasket materials.

2.5 FRAME AND COVER Frame and covers must be manufactured from cast-iron or other composite material tested to withstand H-20 or greater design loads, and as approved by the

local regulatory body. Frames and covers must be embossed with the name of the device manufacturer or the device brand name.

2.6 DOORS AND HATCHES If provided shall meet designated loading requirements or at a minimum for incidental vehicular traffic.

2.7 CONCRETE All concrete components shall be manufactured according to local specifications and shall meet the requirements of ASTM C 478.

2.8 FIBERGLASS The fiberglass portion of the filter device shall be constructed in accordance with the following standard: ASTM D-4097: Contact Molded Glass Fiber Reinforced Chemical Resistant Tanks.

2.9 STEPS Steps shall be constructed according to ASTM D4101 of copolymer polypropylene, and be driven into preformed or pre-drilled holes after the concrete has cured, installed to conform to applicable sections of state, provincial and municipal building codes, highway, municipal or local specifications for the construction of such devices.

2.10 INSPECTION All precast concrete sections shall be inspected to ensure that dimensions, appearance and quality of the product meet local municipal specifications and ASTM C 478.

PART 3 – PERFORMANCE

3.1 GENERAL

3.1.1 Verification – The stormwater quality filter must be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV).

3.1.2 Function - The stormwater quality filter treatment device shall function to remove pollutants by the following unit treatment processes; sedimentation, floatation, and membrane filtration.

3.1.3 Pollutants - The stormwater quality filter treatment device shall remove oil, debris, trash, coarse and fine particulates, particulate-bound pollutants, metals and nutrients from stormwater during runoff events.

3.1.4 Bypass - The stormwater quality filter treatment device shall typically utilize an external bypass to divert excessive flows. Internal bypass systems shall be equipped with a floatables baffle, and must avoid passage through the sump and/or cartridge filtration zone.

3.1.5 Treatment Flux Rate (Surface Loading Rate) – The stormwater quality filter treatment device shall treat 100% of the required water quality treatment flow based on a maximum design treatment flux rate (surface loading rate) across the membrane filter cartridges of 0.21 gpm/ft² (0.142 lps/m²).

3.2 FIELD TEST PERFORMANCE

At a minimum, the stormwater quality filter device shall have been field tested and verified with a minimum 25 TARP qualifying storm events and field monitoring shall have been conducted according to the TARP 2009 NJDEP TARP field test protocol, and have received NJCAT verification.

3.2.1 Suspended Solids Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median TSS removal efficiency of 85% and a minimum median SSC removal efficiency of 95%.

3.2.2 Runoff Volume – The stormwater quality filter treatment device shall be engineered, designed, and sized to treat a minimum of 90 percent of the annual runoff volume determined from use of a minimum 15-year rainfall data set.

3.2.3 Fine Particle Removal - The stormwater quality filter treatment device shall have demonstrated the ability to capture fine particles as indicated by a minimum median removal efficiency of 75% for the particle fraction less than 25 microns, an effluent d_{50} of 15 microns or lower for all monitored storm events.

3.2.4 Turbidity Reduction - The stormwater quality filter treatment device shall have demonstrated the ability to reduce the turbidity from influent from a range of 5 to 171 NTU to an effluent turbidity of 15 NTU or lower.

3.2.5 Nutrient (Total Phosphorus & Total Nitrogen) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Phosphorus removal of 55%, and a minimum median Total Nitrogen removal of 50%.

3.2.6 Metals (Total Zinc & Total Copper) Removal - The stormwater quality filter treatment device shall have demonstrated a minimum median Total Zinc removal of 55%, and a minimum median Total Copper removal of 85%.

3.3 INSPECTION and MAINTENANCE

The stormwater quality filter device shall have the following features:

3.3.1 Durability of membranes are subject to good handling practices during inspection and maintenance (removal, rinsing, and reinsertion) events, and site specific conditions that may have heavier or lighter loading onto the cartridges, and pollutant variability that may impact the membrane structural integrity. Membrane maintenance and replacement shall be in accordance with manufacturer's recommendations.

3.3.2 Inspection which includes trash and floatables collection, sediment depth determination, and visible determination of backwash pool depth shall be easily conducted from grade (outside the structure).

3.3.3 Manual rinsing of the reusable filter cartridges shall promote restoration of the flow capacity and sediment capacity of the filter cartridges, extending cartridge service life.

3.3.4 The filter device shall have a minimum 12 inches (305 mm) of sediment storage depth, and a minimum of 12 inches between the top of the sediment storage and bottom of the filter cartridge tentacles, unless otherwise specified by the design engineer. Variances may have an impact on the total performance and/or longevity between cartridge maintenance/replacement of the device.

3.3.5 Sediment removal from the filter treatment device shall be able to be conducted using a standard maintenance truck and vacuum apparatus, and a minimum one point of entry to the sump that is unobstructed by filter cartridges.

3.3.6 Maintenance access shall have a minimum clear height that provides suitable vertical clear space over all of the filter cartridges. Filter cartridges shall be able to be lifted straight vertically out of the receptacles and deck for the entire length of the cartridge.

3.3.7 Filter cartridges shall be able to be maintained without the requirement of additional lifting equipment.

PART 4 – EXECUTION

4.1 INSTALLATION

4.1.1 PRECAST DEVICE CONSTRUCTION SEQUENCE

The installation of a watertight precast concrete device should conform to ASTM C 891 and to any state highway, municipal or local specifications for the construction of manholes, whichever is more stringent. Selected sections of a general specification that are applicable are summarized below.

4.1.1.1 The watertight precast concrete device is installed in sections in the following sequence:

- aggregate base
- base slab
- treatment chamber and cartridge deck riser section(s)
- bypass section
- connect inlet and outlet pipes
- concrete riser section(s) and/or transition slab (if required)
- maintenance riser section(s) (if required)
- frame and access cover

4.1.2 The precast base should be placed level at the specified grade. The entire base should be in contact with the underlying compacted granular material. Subsequent sections, complete with joint seals, should be installed in accordance with the precast concrete manufacturer's recommendations.

4.1.3 Adjustment of the stormwater quality treatment device can be performed by lifting the upper sections free of the excavated area, re-leveling the base, and re-installing the sections. Damaged sections and gaskets should be repaired or replaced as necessary to restore original condition and watertight seals. Once the stormwater quality treatment device has been constructed, any/all lift holes must be plugged watertight with mortar or non-shrink grout.

4.1.4 Inlet and Outlet Pipes Inlet and outlet pipes should be securely set into the device using approved pipe seals (flexible boot connections, where applicable) so that the structure is watertight, and such that any pipe intrusion into the device does not impact the device functionality.

4.1.5 Frame and Cover Installation Adjustment units (e.g. grade rings) should be installed to set the frame and cover at the required elevation. The adjustment units should be laid in a full bed of mortar with successive units being joined using sealant recommended by the manufacturer. Frames for the cover should be set in a full bed of mortar at the elevation specified.

4.2 MAINTENANCE ACCESS WALL
In some instances the Maintenance Access Wall, if provided, shall require an extension attachment and sealing to the precast wall and cartridge deck at the job site, rather than at the precast facility. In this instance, installation of these components shall be performed according to instructions provided by the manufacturer.

4.3 FILTER CARTRIDGE INSTALLATION Filter cartridges shall be installed in the cartridge deck only after the construction site is fully stabilized and in accordance with the manufacturer's guidelines and recommendations. Contractor to contact the manufacturer to schedule cartridge delivery and review procedures/requirements to be completed to the device prior to installation of the cartridges and activation of the system.

PART 5 – QUALITY ASSURANCE

5.1 FILTER CARTRIDGE INSTALLATION Manufacturer shall coordinate delivery of filter cartridges and other internal components with contractor. Filter cartridges shall be delivered and installed complete after site is stabilized and unit is ready to accept cartridges. Unit is ready to accept cartridges after is has been cleaned out and any standing water, debris, and other materials have been removed. Contractor shall take appropriate action to protect the filter cartridge receptacles and filter cartridges from damage during construction, and in accordance with the manufacturer's recommendations and guidance. For systems with cartridges installed prior to full site stabilization and prior to system activation, the contractor can plug inlet and outlet pipes to prevent stormwater and other influent from entering the device. Plugs must be removed during the activation process.

5.2 INSPECTION AND MAINTENANCE

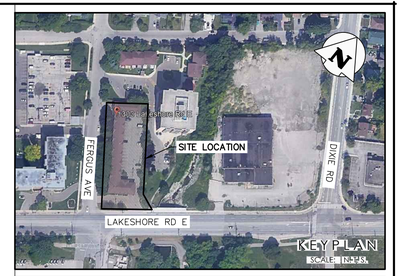
5.2.1 The manufacturer shall provide an Owner's Manual upon request.

5.2.2 After construction and installation, and during operation, the device shall be inspected and cleaned as necessary based on the manufacturer's recommended inspection and maintenance guidelines and the local regulatory agency/body.

5.3 REPLACEMENT FILTER CARTRIDGES When replacement membrane filter elements and/or other parts are required, only membrane filter elements and parts approved by the manufacturer for use with the stormwater quality filter device shall be installed.

END OF SECTION

FIGURES



LEGEND

- PROPERTY LINE
- EXISTING WATERMAIN & GATE VALVE
- EXISTING STORM SEWER & MANHOLE
- EXISTING SINGLE / DOUBLE CATCHBASIN
- EXISTING SANITARY SEWER & MANHOLE
- PROPOSED WATERMAIN & GATE VALVE
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE CONNECTION
- (M) PROPOSED WATER METER TO BE INSTALLED WITHIN BUILDING PER MECHANICAL DESIGN AND SPECIFICATIONS
- (D) PROPOSED DETECTOR CHECK VALVE PER REGION OF PEEL STD 1-3-1 AND 1-1-5
- PROPOSED STORM SEWER & MANHOLE
- PROPOSED SINGLE / DOUBLE CATCHBASIN
- PROPOSED SANITARY SEWER & MANHOLE
- PROPOSED ELECTRICAL TRANSFORMER (BY OTHERS)
- AD PROPOSED AREA DRAIN PER MECHANICAL DESIGN AND SPECIFICATIONS

No.	ISSUE / REVISION	YYYY/MMM/DD
2	ISSUED FOR 3RD SUBMISSION	2023/FEB/10
1	ISSUED FOR 2ND SUBMISSION	2022/AUG/31
0	ISSUED FOR 1ST SUBMISSION	2021/OCT/04

BENCHMARK NOTE:

ELEVATIONS ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK NO. 291 LOCATED ON THE NORTH FACE, 0.61 M WEST OF THE EAST CORNER OF A WHITE BRICK BUILDING #1258, ON THE SOUTH SIDE OF LAKESHORE RD E, 113 m WEST OF FERGUS AVENUE, HAVING A PUBLISHED ELEVATION OF 84.11 METERS.

SURVEY NOTES:

SURVEY COMPLETED BY MANDARIN SURVEYORS LTD. (2021/AUG/24)
REFERENCE No.: 2021-282

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B BY REAL TIME NETWORK (POWERNET) OBSERVATIONS
UTM ZONE 17, NAD83 (GSRS)

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY CHAMBERLAIN ARCHITECT SERVICES LTD.
DRAWING No.: A001, REV.4 (2023/FEB/08) (RECEIVED FEB 2023)
PROJECT No.: 121027

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.

NOT FOR CONSTRUCTION

Stamp

FOR REVIEW

Stamp

Project
RESIDENTIAL MID-RISE
1303 LAKESHORE RD E
CITY OF MISSISSAUGA

Drawing
PRELIMINARY SITE SERVICING PLAN

CROZIER
CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
905.875.0026 T
905.875.4915 F
WWW.CFCROZIER.CA

Drawn	J.B./R.L.	Design	J.B./J.L.	Project No.	2109-6004
Check	J.B./R.L.	Check	M.B./N.C.	Scale	1:250
				Dwg.	C701

PR. BUILDING
RESIDENTIAL APARTMENTS
# UNITS = 153
# STOREYS = 10
FFE = 84.50

PR. WALL AROUND RAMP TO UNDERGROUND PARKING TO BE PER ARCHITECTURAL DESIGN & SPECIFICATIONS C/W FENCE ON TOP PER LANDSCAPE PLANS

SUBDRAIN BELOW C/L OF SWALE IN AREAS WHERE SLOPE IS LESS THAN 2%

PR. GRADING AND SLOPE FOR RAMP DOWN TO BE PER ARCHITECTURAL DESIGN & SPECIFICATIONS

PR. FIRE HYDRANT TO BE CONNECTED TO INTERNAL WATERMAIN SYSTEM PER MECHANICAL DESIGN & SPECIFICATIONS

GROUND FLOOR VESTIBULE

PR. EMERGENCY OVERFLOW AND MAINTENANCE HATCH
T/G 83.97
LID PER OPSD 401.010 TYPE B

PR. STM MH
T/G 83.79

PR. STM MH
T/G 83.85

PR. JF4-2-1
T/G 83.88

PR. CB
T/G 83.92

PR. CB
T/G 83.88

PR. CB
T/G 83.90

PR. CB
T/G 83.70

PR. CB
T/G 83.60

PR. CB
T/G 83.50

PR. CB
T/G 83.45

AD 1
T/G 84.14

AD 2
T/G 84.09

AD 3
T/G 84.25

AD 4
T/G 84.25

AD 5
T/G 83.90

TW 84.64
BW 84.10
BC 84.49

TW 84.64
BW 84.00
BC 84.49

TW 84.30
BW 84.30

PR RETAINING WALL (DESIGN BY OTHERS)
MAX HEIGHT = 0.64m

MATCH EXISTING GRADES ALONG PROPERTY LINE

MATCH EX. CURB

MATCH EX. CURB

MATCH EX. CURB

MATCH EX. CURB

MATCH EX. CURB

MATCH EX. CURB

23.6m CURB CUT

PROPOSED TRANSFORMER (BY OTHERS)

LIMIT OF UNDERGROUND PARKING STRUCTURE

LIMIT OF UNDERGROUND PARKING STRUCTURE

PR. 2m WIDE SIDEWALK

GRADING REQUIRED OUTSIDE PROPERTY LINE TO ACCOMMODATE ENTRANCE TO BE COORDINATED BETWEEN OWNER AND CITY

PR. SAN MH
T/G 84.10

REMOVE EX. CURB CUT AND REPLACE WITH CURB & GUTTER PER OPSD 600.040 4.4m

REMOVE EXISTING DRIVEWAY ACCESS AND REGRADE BOULEVARD TO MATCH NEW CURB AND SIDEWALK

LAKESHORE ROAD EAST BOULEVARD DESIGN TO BE COMPLETED BY OTHERS AS PART OF LAKESHORE BRT STUDY

MATCH EXISTING GRADES ALONG PROPERTY LINE

MATCH EX. CURB

REMOVE EX. CURB CUT AND REPLACE WITH CURB & GUTTER PER OPSD 600.040
15.9m

MATCH EX. CURB

REMOVE EXISTING DRIVEWAY ACCESS AND REGRADE BOULEVARD TO MATCH NEW CURB AND SIDEWALK LAKESHORE ROAD EAST BOULEVARD DESIGN TO BE COMPLETED BY OTHERS AS PART OF LAKESHORE BRT STUDY

LAKESHORE ROAD EAST

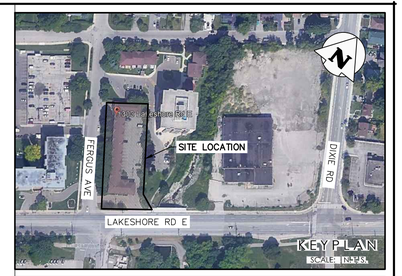
(FORMERLY LAKESHORE ROAD)
(BY NAME CHANGE BY-LAW No. 3943, REGISTERED AS BY-LAW No.695)
(ROAD ALLOWANCE BETWEEN CONCESSIONS 2 AND 3, S.D.S.)
PIN 13482-0083(LT)

FERGUS AVENUE

N

CONST.

TRUE



LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING OVERLAND FLOW DIRECTION
- ×215.00 EXISTING GRADE
- ×215.00 PROPOSED GRADE
- ×215.00 PROPOSED GRADE (TO MATCH EXISTING)
- 2.0% PROPOSED MINOR FLOW DIRECTION
- 2.0% PROPOSED GRASSED SWALE
- PROPOSED SLOPE (3:1 MAX.)
- BUILDING ENTRANCE (PERSONNEL DOOR)
- BUILDING ENTRANCE (OVERHEAD DOOR)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- PROPOSED ELECTRICAL TRANSFORMER
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE (FIRE DEPT.) CONNECTION
- PROPOSED LIMIT OF UNDERGROUND PARKING
- PROPOSED AREA DRAIN

NOTE:
1. ROADWAY ELEVATIONS ARE BOTTOM OF CURB (BC) UNLESS OTHERWISE NOTED

NOT FOR CONSTRUCTION

Stamp

FOR REVIEW

Stamp

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

No.	ISSUE / REVISION	YYYY/MMM/DD
2	ISSUED FOR 3RD SUBMISSION	2023/FEB/10
1	ISSUED FOR 2ND SUBMISSION	2022/AUG/31
0	ISSUED FOR 1ST SUBMISSION	2021/OCT/04

BENCHMARK NOTE:

ELEVATIONS ARE REFERRED TO THE CITY OF MISSISSAUGA BENCHMARK NO. 291 LOCATED ON THE NORTH FACE, 0.61 M WEST OF THE EAST CORNER OF A WHITE BRICK BUILDING #1258, ON THE SOUTH SIDE OF LAKESHORE RD E, 113 m WEST OF FERGUS AVENUE., HAVING A PUBLISHED ELEVATION OF 84.11 METERS.

SURVEY NOTES:

SURVEY COMPLETED BY MANDARIN SURVEYORS LTD. (2021/AUG/24)
REFERENCE No.: 2021-282

BEARINGS ARE UTM GRID, DERIVED FROM OBSERVED REFERENCE POINTS A AND B BY REAL TIME NETWORK (POWERNET) OBSERVATIONS
UTM ZONE 17, NAD83 (CSRS)

SITE PLAN NOTES:

DESIGN ELEMENTS ARE BASED ON SITE PLAN BY CHAMBERLAIN ARCHITECT SERVICES LTD.
DRAWING No.: A001, REV.4 (2023/FEB/08) (RECEIVED FEB 2023)
PROJECT No.: 121027

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

RESIDENTIAL MID-RISE
1303 LAKESHORE RD E
CITY OF MISSISSAUGA

Drawing

PRELIMINARY SITE GRADING PLAN

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

Drawn	Design	Project No.	
J.B./R.L.	J.B./J.L.		2109-6004
Check	Check	Scale	Dwg.
J.B./R.L.	M.B./N.C.	1:250	C702

PRE–DEVELOPMENT

POST–DEVELOPMENT

LEGEND

- PROPERTY LINE
- EXISTING CONTOUR (0.5m)
- EXISTING CONTOUR (1.0m)
- EXISTING OVERLAND FLOW DIRECTION
- EXISTING GRADE (215.00)
- PROPOSED SLOPE (3:1 MAX.)
- BUILDING ENTRANCE (PERSONNEL DOOR)
- BUILDING ENTRANCE (OVERHEAD DOOR)
- PROPOSED MAJOR OVERLAND FLOW DIRECTION
- EXISTING STORM DRAINAGE CATCHMENT
- PROPOSED STORM DRAINAGE CATCHMENT
- PROPOSED ELECTRICAL TRANSFORMER
- PROPOSED FIRE HYDRANT & GATE VALVE
- PROPOSED SIAMESE (FIRE DEPT.) CONNECTION
- CATCHMENT I.D. (ID) / AREA (ha) | RUNOFF COEFFICIENT

EX. 450mm ø CONC. STM @ 0.5%

EX. STM MH
T/G 84.36
N INV 81.85
S INV 81.85
W INV 82.60

101 | 0.11 | 0.61

102 | 0.21 | 0.82

201 | 0.29 | 0.82

UC01 | 0.03 | 0.65

PR. BUILDING
RESIDENTIAL APARTMENTS
# UNITS = 153
# STOREYS = 10
FFE = 84.50

PR. SWM STORAGE IN UNDERGROUND PARKING
ACTIVE VOLUME = 115 m³
RE–USE VOLUME = 16 m³
VOLUME REQUIRED = 135 m³
AREA FOR ILLUSTRATION ONLY. FINAL DESIGN SUBJECT TO ARCHITECTURAL AND STRUCTURAL DESIGN AND SPECIFICATIONS.

EX. STM MH
T/G 83.87
N INV 81.50
E INV 81.42
W INV 81.43

EX. 525mm ø CONC. STM @ 0.60%

EX. 525mm ø CONC. STM @ 1.2%

EX. CULVERT

FERGUS AVENUE

LAKESHORE ROAD EAST

(FORMERLY LAKESHORE ROAD)

(BY NAME CHANGE BY–LAW No. 3943, REGISTERED AS BY–LAW No.695)

(ROAD ALLOWANCE BETWEEN CONCESSIONS 2 AND 3, S.D.S.)

No.1303
2 STOREY
BRICK BUILDING
D.S.=84.59

No.1303
STOREY
D.S.=84.59
ROOF=92.24

1 STOREY STUCCO BUILDING

SCALE: 1:250

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NOT FOR CONSTRUCTION

Stamp

FOR REVIEW

Project

RESIDENTIAL MID–RISE
1303 LAKESHORE RD E
CITY OF MISSISSAUGA

Drawing

PRE– AND POST–DEVELOPMENT
DRAINAGE PLAN

CROZIER CONSULTING ENGINEERS
2800 HIGH POINT DRIVE
SUITE 100
MILTON, ON L9T 6P4
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Check	Check	Scale	Dwg.
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