ENGINEERING + MANAGEMENT

HUSSON

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

128 LAKESHORE ROAD EAST
CITY OF MISSISSAUGA

PREPARED FOR:
BLACKTUSK GROUP INC.
800-365 BAY STREET
TORONTO, ON M5H 2V1

DATE: DECEMBER 2021

PROJECT: 211246

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PREPARED BY HUSSON
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1.0 INTRODUCTION

The purpose of this report is to provide detailed design information related to the storm drainage and stormwater management (SWM) plan, sanitary and water servicing for the proposed development at 128 Lakeshore Road East, generally west of Hurontario Street in Mississauga. This report will demonstrate the stormwater management measures that will be undertaken to deal with water quantity and quality, the proposed sanitary and water servicing, as well as erosion and sediment control during construction.

1.1 Site Description

The site is located on the north side of Lakeshore Road East, west of Ann Street, generally west of Hurontario Street. The total site area is 930m^2 and has an existing two-storey building that is to be demolished. Refer to **Figure 1** for the site location.

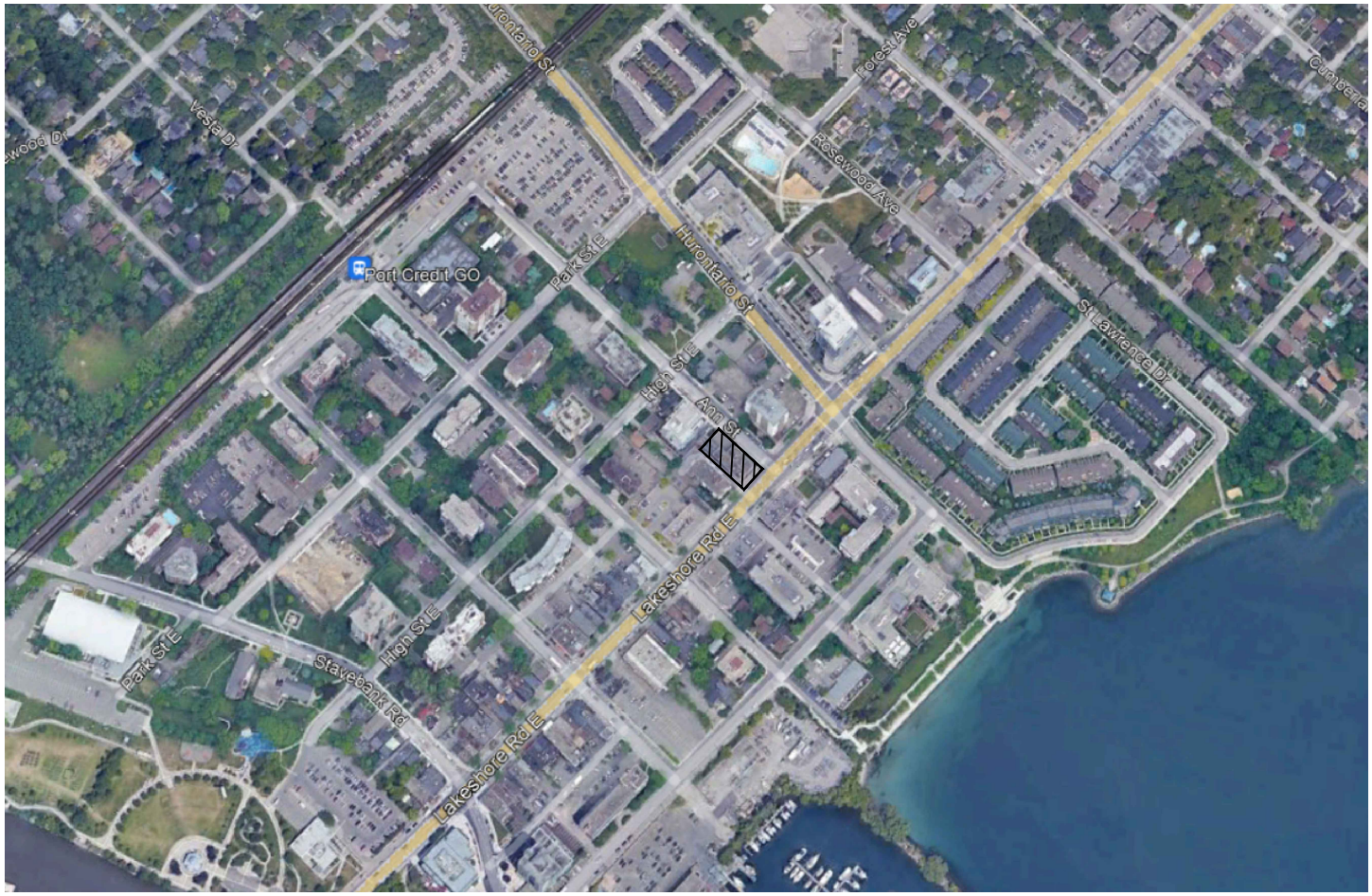
A ten-storey mixed use residential building is proposed for the site, with three levels of underground parking as well as landscaping.

1.2 Background

Water and sanitary connections are proposed to meet the functional needs of the site and to meet the requirements of the Region of Peel. The SWM plan has been designed to meet the requirements of the City of Mississauga (The City) and Credit Valley Conservation (CVC). The following materials were referenced in the preparation of this report.

- The City of Mississauga Development Requirements Manual (DRM), updated and effective January 2020.
- The Stormwater Management Planning and Design Manual (MECP Guidelines), prepared by the Ministry of the Environment, March 2003.
- The Erosion & Sediment Control Guideline for Urban Construction, prepared by the Greater Golden Horseshoe Area Conservation Authorities (GGHA CA), December 2006.
- As-constructed plan and profile drawings for Lakeshore Road and Ann Street, provided by the City and Region.

The proposed SWM scheme has been prepared to meet the City's requirements. Refer to **Appendix A** for the background information.



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LEGEND

SITE LOCATION

FIGURE 1
128 LAKESHORE ROAD EAST
SITE LOCATION PLAN

DATE: DECEMBER 2021 SCALE: N.T.S. PROJECT: 211246

2.0 DESIGN CRITERIA

The following design criteria have been followed in the preparation of the grading, servicing and Stormwater management on the site.

- The DRM requires retention of water on site, to the extent possible, to match pre-development runoff volumes. This requirement is typically achieved by retaining the runoff from a 5mm 24 hour storm on-site, which is equivalent to approximately 50 percent of the total average rainfall volume.
- Water quality controls are required to achieve enhanced water quality control, which requires an 80 percent total suspended solids (TSS) removal level.
- The downstream sewer is at capacity based on discussions with the City, so over-control of the flows onsite to levels below the existing condition is required.
- Provide an erosion and sediment control plan following the Erosion & Sediment Control Guidelines for Urban Construction, prepared by the Greater Golden Horseshoe Area Conservation Authorities (GGHACA), December 2006.

The proposed design has been prepared following these criteria.

3.0 SITE DRAINAGE

All grading will be completed in a manner to satisfy the following goals:

- Maintain sufficient sight lines and existing road gradients.
- Enable gravity servicing connections to the existing sewers on Lakeshore Road.
- Not adversely impact adjacent private properties.
- Achieve stormwater management and environmental objectives required for the site.

The proposed grading of the site has been designed to meet these requirements. Refer to **Drawing C100** for the proposed site grading design.

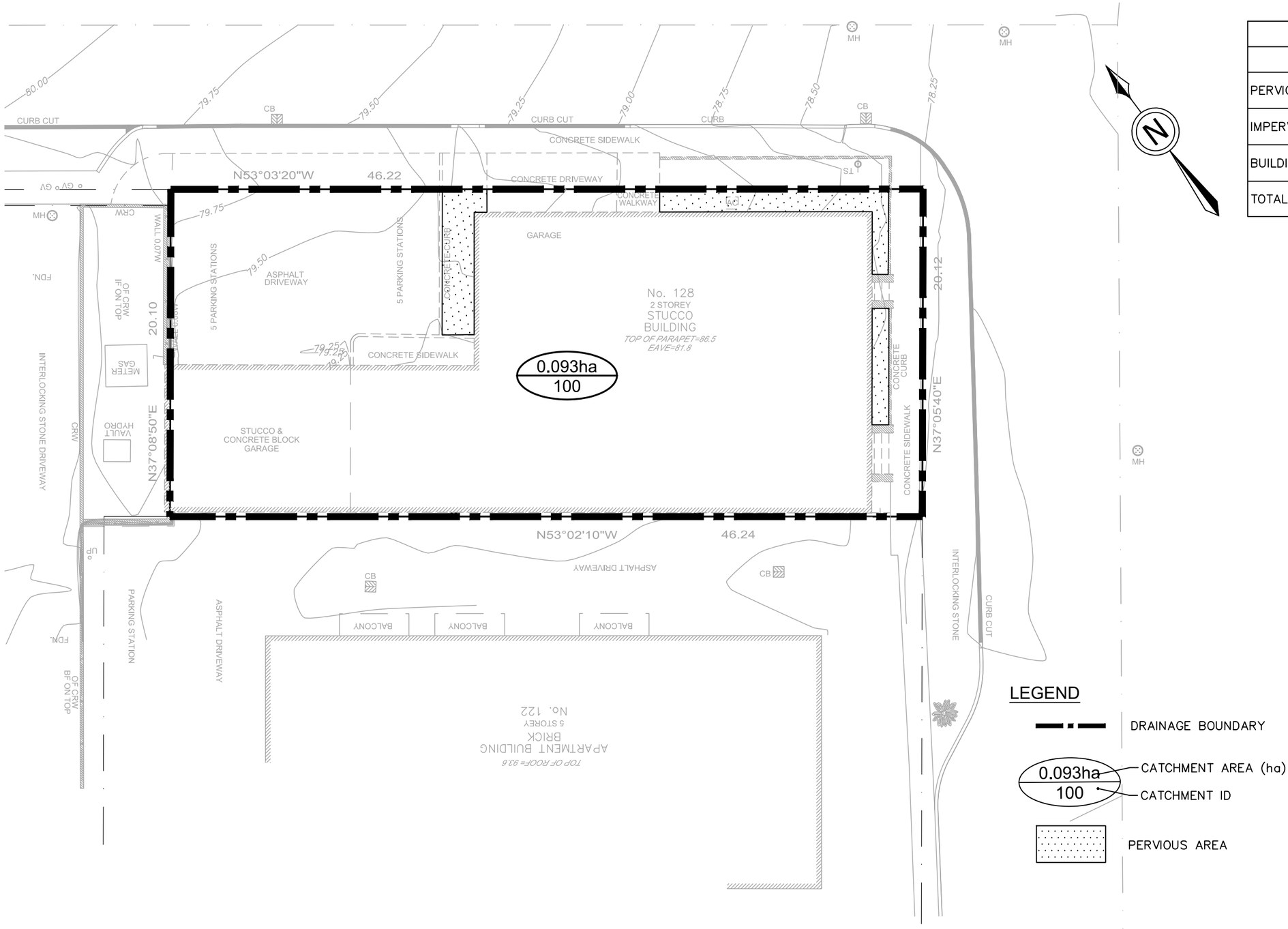
3.1 Existing Drainage

There is an existing 1650mm diameter storm sewer on Lakeshore Road East to the south of the site. There is no storm sewer adjacent to the site on Ann Street. The majority of the existing site generally drains towards Lakeshore Road East. Refer to **Figure 2** for the existing site drainage.

The design of the site is proposed to generally maintain the existing drainage patterns, and outlet at the south to the existing MH.

3.1.1 Target Flows

The existing site runoff coefficient is 0.87 to Lakeshore Road East. In order to reduce the contribution from the site based on the capacity issues identified by the City, the target is based on controlling all flows up to the 100 year event to the 10 year event with a Runoff Coefficient of 0.50.



CATCHMENT 100			
	AREA (ha)	C	C x A
PERVIOUS	0.005	0.25	0.001
IMPERVIOUS	0.026	0.90	0.023
BUILDING	0.062	0.90	0.056
TOTAL	0.093	0.87	0.080

LEGEND

- DRAINAGE BOUNDARY
- 0.093ha / 100 — CATCHMENT AREA (ha) / CATCHMENT ID
- PERVIOUS AREA

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FIGURE 2
128 LAKESHORE ROAD E
EXISTING DRAINAGE

DATE: DECEMBER 2021 SCALE: 1:250 PROJECT: 201246

Therefore, the post development flows will be less than the existing condition, as required. **Table 1** summarizes the target flows for the site.

Table 1. Target Flows

Existing Site (Storm Event)	Catchment Area (m^2)	Runoff Coefficient	Target Flow Rate (L/s)
10 Year	930	0.50	12.8

The proposed design was completed to provide controls for all storm events up to the 100 year storm to meet the target flow rates from the site, as outlined following. Refer to **Appendix B** for the stormwater management calculations.

3.2 Minor System Drainage

The internal storm sewer system will be designed to collect drainage from the building for a 100 year design storm. The system will drain through the building to a cistern located on the basement level.

The controlled flow will be directed to the control MH at the southern portion of the site. There is a small portion of the site, around the perimeter to the south and east, that will direct flows uncontrolled to the Lakeshore Road East Right of Way as a result of grading constraints on the site.

The proposed servicing can be referenced on **Drawing C101**, and the grading design is shown on **Drawing C100.**

4.0 STORMWATER MANAGEMENT PLAN

A stormwater management plan has been prepared for the site following the DRM and MECP Guidelines, to meet the stormwater management criteria for the site. Low-Impact Development (LID) techniques were investigated for the site, including the use of infiltration measures.

4.1 Water Balance

As per the DRM erosion design criteria, retention of runoff from a 5mm design storm on-site is required.

The required retention volume is 4.65m^3 (930m^2 x 5mm). In order to determine the volume required for the infiltration system, the Initial Abstraction for the site was calculated as shown in **Table 2** following.

Table 2. On-Site Retention – Water Balance

Catchment	Area (m^2)	% of Total Area	IA (mm)	IA Over Site (mm)	Retention (m^3)
Rooftop	717	77.1%	1.0	0.77	0.72
Impervious Area	155	16.7%	1.0	0.17	0.16
Landscaped	58	6.2%	5.0	0.31	0.29
Cistern				3.76	3.50
TOTAL:	**930**	**100.0%**		**5.01**	**4.66**

The initial abstraction from the proposed site surfaces will capture 1.17m^3 of rainfall on an annual basis. This reduces the total requirement of 4.65m^3 down to 3.48m^3. Therefore, there is a deficit of 3.48m^3 on an annual basis.

A variety of options are discussed following that could potentially be used to meet the target storage volume.

Permeable Pavement – The surface area could be paved with Permeable Interlocking Concrete Pavers. These are pre-cast pavers that permit water to infiltrate between the paving stones into a clear stone storage reservoir. A permeable pavement with a stone reservoir could be considered a dry-well and, therefore, must be located a minimum of 5m from the building foundation, as per OBC requirements. Therefore, it is not feasible for the site.

Green Roof – Green roofs offer water resource benefits such as water quality, water balance and peak flow controls, in addition to other benefits including improved energy efficiency and reduced heat from the rooftop. However, a green roof is not proposed for the building.

Grassed Swales – Grassed swales are used to provide additional water quality controls for surface water, but in this case the impact would be negligible and not provide sufficient treatment given the limited landscaping proposed on the site. Therefore, this measure is not proposed for this development.

Bioretention – This is a facility that temporarily stores and infiltrates water. Quality treatment is provided by plant material and by filtration through the bed material which consists of a mixture of sand, fines and organic material. The roof drainage could outlet to a bioretention swale and stormwater from frequent storms be infiltrated. This is not proposed for this project given the limited landscaped area on site.

Underground Storage – Storage could be provided in an underground system surrounded by clear stone for infiltration. Storage is provided in both the chambers as well as in the voids within the clear stone, below the outlet invert of the system, so that the required retention volume will only discharge via infiltration. However, infiltration is not feasible for the site due to the minimum 5m separation from the building foundation.

For storms up to the 100-year event, the roof area drains of the proposed building will route drainage to the cistern. Retention will be provided below the outlet invert of the proposed cistern. The total required retention volume is approximately 3.48m^3. It is anticipated that this volume will be re-used on the site through landscape irrigation and other internal measures as feasible, to be confirmed during the detailed design stage.

4.2 Quality Control

Based on the DRM, the water quality criterion for this site is 80 percent average TSS removal from runoff originating onsite. The majority of the site is rooftop or landscaped which produces clean runoff. The split is approximately 77% rooftop area, 23% ground area.

The quality control requirements for the site can be addressed through a combination of the roof and other on-site landscape measures. Overall TSS removal capabilities are based on the following assumptions:

- Rooftop and terraces runoff is generally clean and credited with 80 percent TSS removal. Runoff from the roof and terraces will be routed to the proposed cistern.

- Landscaped areas provide significant infiltration and generally have a lower TSS loading compared to roadways, therefore landscape runoff is credited with 80 percent TSS removal.

As shown in the **Figure 3**, there is no driveway or loading area draining to the cistern. It is not expected that the site will contribute any contaminants to stormwater runoff, therefore there is no requirement for an Oil Grit Separator to meet the City requirements.

4.3 Quantity Control

4.3.1 Target Release Rate

Calculations using a Runoff Coefficient of 0.50 were used to determine the target flows form the site, as outlined in **Section 3.1**.1. The allowable peak release rate for the site is outlined in **Table 1**.

4.3.2 Quantity Control Measures

The following options were considered for quantity control on site:

Rooftop Storage – Controlled flow roof drains could be installed on the rooftop and water could be stored on the rooftops to attenuate peak flows. With typical flat rooftop design, flows can generally be limited to approximately 42L/s/ha. Rooftop storage is not counted for the quantity controls for the site, based on the proposed development.

Underground Storage – A restrictor pipe would be provided at the site outlet; with surplus storage provided in the cistern.

In order to meet the target release rates, cistern storage is proposed to provide quantity control for the proposed development, as follows.

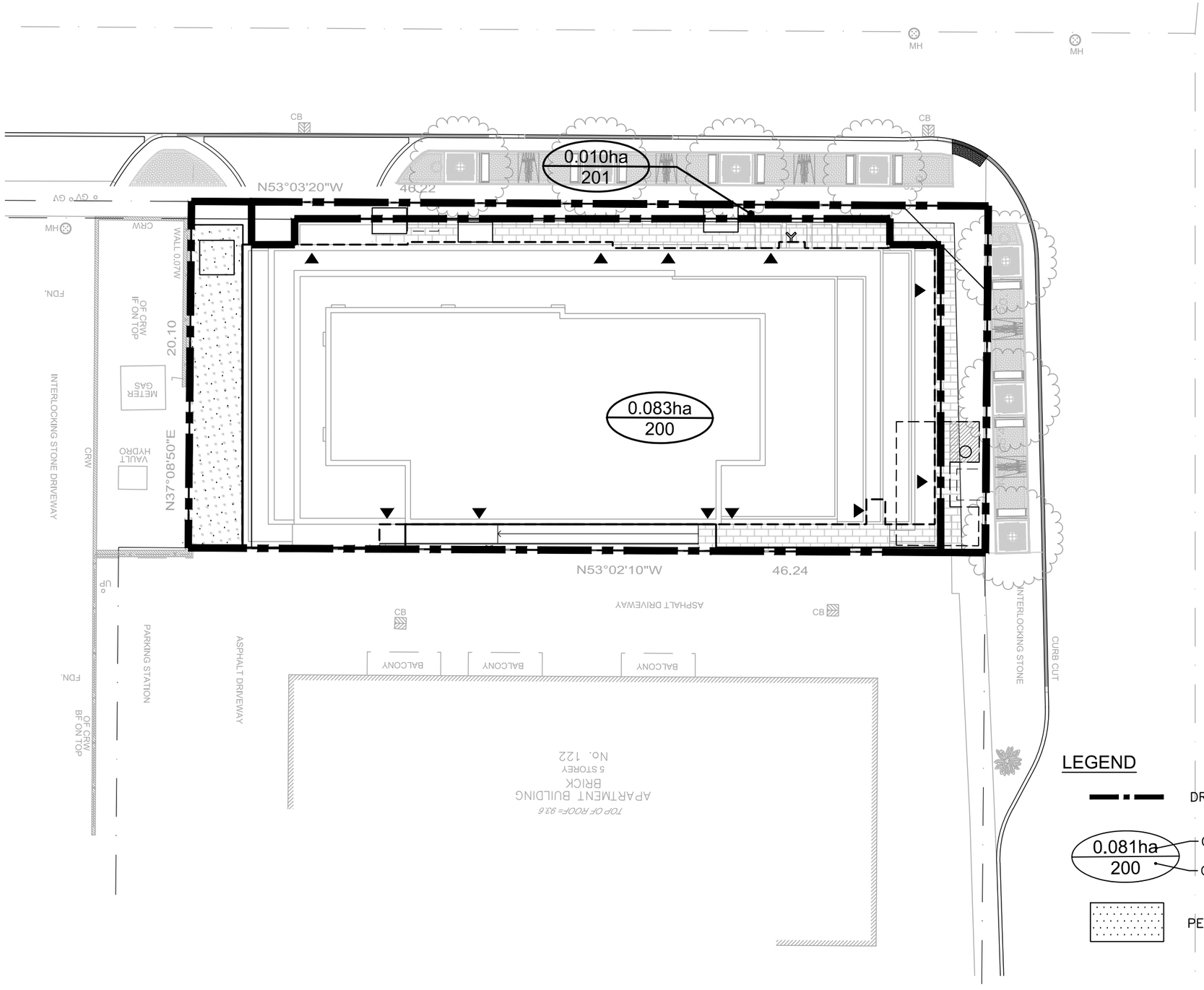
Controlled Site Drainage

In the 100-year event, the required storage volume required to control the flows to meet the 12.8L/s target is approximately 22m^3. Given that pipes and structures would provide a negligible amount of storage, and surface storage cannot be utilized, the cistern would be needed to provide all of the required storage. Approximately 30m^3 of storage is estimated to be provided above the outlet of the proposed cistern – details will be finalized in the detailed design stage of the project.

The summary table following shows the proposed flows for the site outletting to the Lakeshore Road East storm sewer. The majority of flow is captured and routed through the building's mechanical drainage system to the cistern, so that the affected area is controlled to meet the target release rate. The controlled flow will be provided by an ICD at the downstream end of the cistern.

Table 3. Site Quantity Control – Drainage to Lakeshore Road East

Catchment Name	Area (m^2)	Runoff Coefficient (C)	Storage Required (m^3)	100 Year Peak Flow (L/s)
Controlled Area (200)	833	0.85	22	9.1
Uncontrolled Area (202)	97	0.90	-	3.8
Total				12.8



CATCHMENT 2010			
	AREA (ha)	C	C x A
PERVIOUS	0.006	0.25	0.001
IMPERVIOUS	0.006	0.90	0.005
BUILDING	0.072	0.90	0.065
TOTAL	0.083	0.85	0.071

CATCHMENT 200			
	AREA (ha)	C	C x A
IMPERVIOUS	0.010	0.90	0.009

LEGEND

DRAINAGE BOUNDARY

0.081ha / 200 — CATCHMENT AREA (ha) / CATCHMENT ID

PERVIOUS AREA

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FIGURE 3
200 WATER STREET
EXISTING DRAINAGE

DATE: DECEMBER 2021 SCALE: 1:250 PROJECT: 201160

Given the location of the cistern in the basement, it will be feasible to convey the controlled flows to the control MH by gravity. The details will be coordinated with the mechanical engineer in the detailed design stage of the project.

As shown, the proposed development flows for all the storm events meets the target flow, and the proposed flows will be conveyed underground for events up to 10-year storm event. Detailed calculations can be referenced in **Appendix B**. Refer to **Drawing C-101** for details of the proposed servicing for the site.

5.0 WASTEWATER

According to the As Constructed drawings for Ann Street and Lakeshore Road East provided by the City, there is a 250mm diameter sanitary sewer along Ann Street, and a 300mm diameter sanitary sewer along Lakeshore Road adjacent to the site. There is a control MH provided at the property line, connected to the 250mm main sewer on Ann Street by a 150mm diameter sewer, that can service the development.

The anticipated flows from the proposed development have been estimated based on the proposed design, for use by the Region to review the receiving system. Detail of the proposed sanitary connection is shown on **Drawing C-101**.

Based on the single use demand table included in **Appendix C**, the sanitary flow from the site is estimated to be 13L/s based on 576 persons at the proposed site. The existing 250mm sanitary sewer service is capable of conveying this flow.

6.0 WATER DISTRIBUTION

According to the As Constructed drawings for Pepper Mill Court provided by the City, a 300mm diameter watermain has been installed along the northern and eastern side of the Right of Way, adjacent to the site.

A fire flow test has been completed, with the results shown in **Appendix D**.

The following water usage parameters were used to determine the daily water demands for the proposed building as per Region Standards.

- Estimated population = 576
- Water Demand = 280 Liters/cap/day
- Peak Hour Peaking Factor = 3.0
- Maximum Day Peaking Factor = 2.0
- Required minimum fire flow = Estimated using the Fire Underwriters Survey

Using the water usage parameters mentioned above the maximum daily flows and peak hourly flows for the proposed building was determined, as shown in **Table 4** below.

Table 4. Water Demand Summary

Scenario	Bldg Demand (L/s)
Max Day	3.73
Peak Hour	5.61
Max Day with Fire Flow	394.0

Based on the hydrant flow test conducted by L&D Waterworks on October 8th, 2021, the available fire flow at 20psi is approximately 624L/s (9,886gpm). Therefore, there is sufficient flow to service the site based on Region of Peel standards. The Single Use Demand Table can be referenced in **Appendix C**, while the FUS and hydrant flow test results can be seen in **Appendix D**.

7.0 EROSION AND SEDIMENT CONTROL

The erosion and sediment control plan will be prepared following the Erosion and Sediment Control Guidelines for Urban Construction (ESC Guidelines), prepared by The Greater Golden Horseshoe Area Conservation Authorities, December 2006. The plan will be designed to limit sediment and debris from leaving the site during all stages of construction.

The sediment control plan for this site will generally consist of the following:

- A sediment control fence will be installed along the perimeter of the site where the grade will direct flows off-site.
- Site access will be limited to one entrance per phase of construction. A gravel access pad will be installed for staging of construction material and vehicles.
- Any mud tracked from the site should be swept immediately and a sweeper truck should be used as necessary to remove any additional debris.
- Trucks leaving the site should be covered with tarpaulin.
- During dry weather, above freezing construction periods, dust control measures including wetting the site and egress points should be implemented on an as needed basis.
- Once the storm sewer system has been constructed, catchbasin sediment control and protection devices will be installed and maintained until the site is ready to be paved.

Erosion measures will be in place prior to any grading on the site. A program will be in place to monitor and maintain the erosion and sediment controls. The sediment controls will be inspected by the Site Engineer and contractor:

- Once every 7 days and/or
- Within 24 hours following any significant rainfall event or snowmelt.

The inspection frequency can be extended to monthly inspections if there is no construction activity on-site. A detailed erosion and sediment control plan will be completed as part of the SPA submission.

8.0 CONCLUSIONS

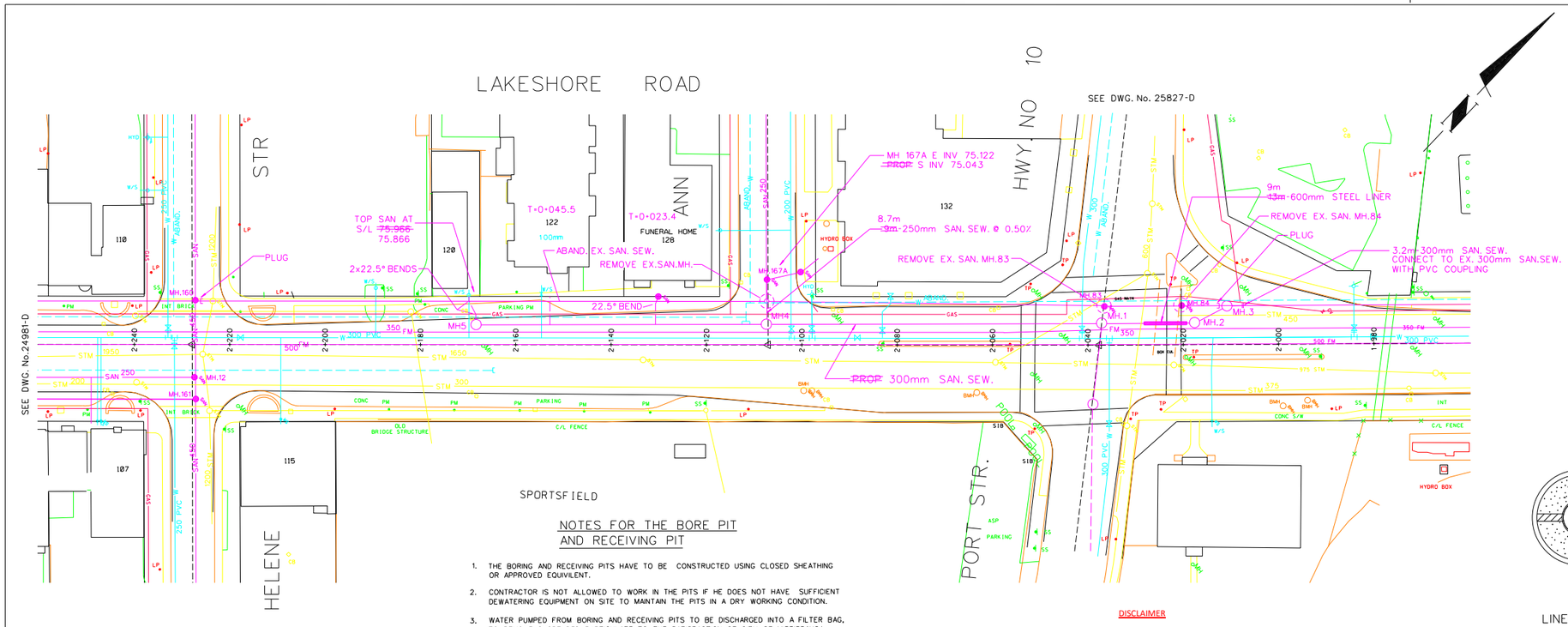
The stormwater management design for the site has been designed to meet the criteria outlined by the City and the MECP Guidelines. The plan will consist of the following:

- The water balance targets for the proposed development will be achieved through the proposed landscape areas and proposed water re-use from the proposed cistern. Best efforts will be made to meet the City's requirements.
- The quality control requirements for the site can be addressed through a combination of the roof and other on-site landscape measures, which meets the City standard for 80 percent overall TSS removal.
- Peak flows for storms up to the 100 year event will be controlled on site to meet the 10 year event with a Runoff Coefficient of 0.5. The proposed development will not have an adverse impact on the existing storm sewer system downstream of the site.
- Sanitary drainage will be conveyed to the existing 250mm diameter sanitary sewer on Ann Street, as per the Region requirements.
- Internal water distribution mains will be connected to the existing watermain located on Ann Street. A hydrant flow test has been completed and the existing system provides sufficient flows to meet the requirements of the proposed development.

Therefore, based on the information provided herein, the stormwater management and site servicing requirements for the Site Plan Approval have been provided.

APPENDIX A

SWM BACKGROUND



NOTES FOR THE BORE PIT AND RECEIVING PIT

1. THE BORING AND RECEIVING PITS HAVE TO BE CONSTRUCTED USING CLOSED SHEATHING OR APPROVED EQUIVILENT.
2. CONTRACTOR IS NOT ALLOWED TO WORK IN THE PITS IF HE DOES NOT HAVE SUFFICIENT DEWATERING EQUIPMENT ON SITE TO MAINTAIN THE PITS IN A DRY WORKING CONDITION.
3. WATER PUMPED FROM BORING AND RECEIVING PITS TO BE DISCHARGED INTO A FILTER BAG, TO REMOVE SUSPENDED PARTICULATE TO THE SATISFACTION OF CITY OF MISSISSAUGA.

DISCLAIMER

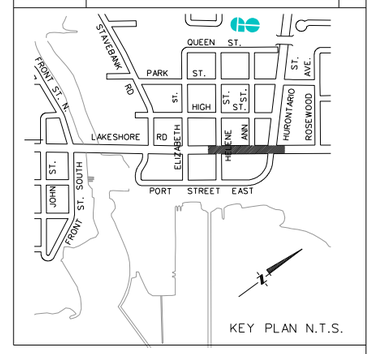
These records are based upon available and unverified information and may prove inaccurate.
The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.

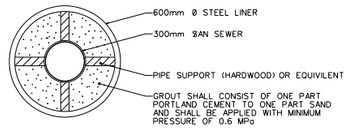
SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.
SAN SEWERS			GAS MAINS		
STORM SEWERS			BELL U/G CABLE		
WATERMAINS			HYDRO U/G CABLE		
TRANSIT			ONT. HYDRO		
PARKS & REC.			CTV		
ONT. CLEAN WATER					

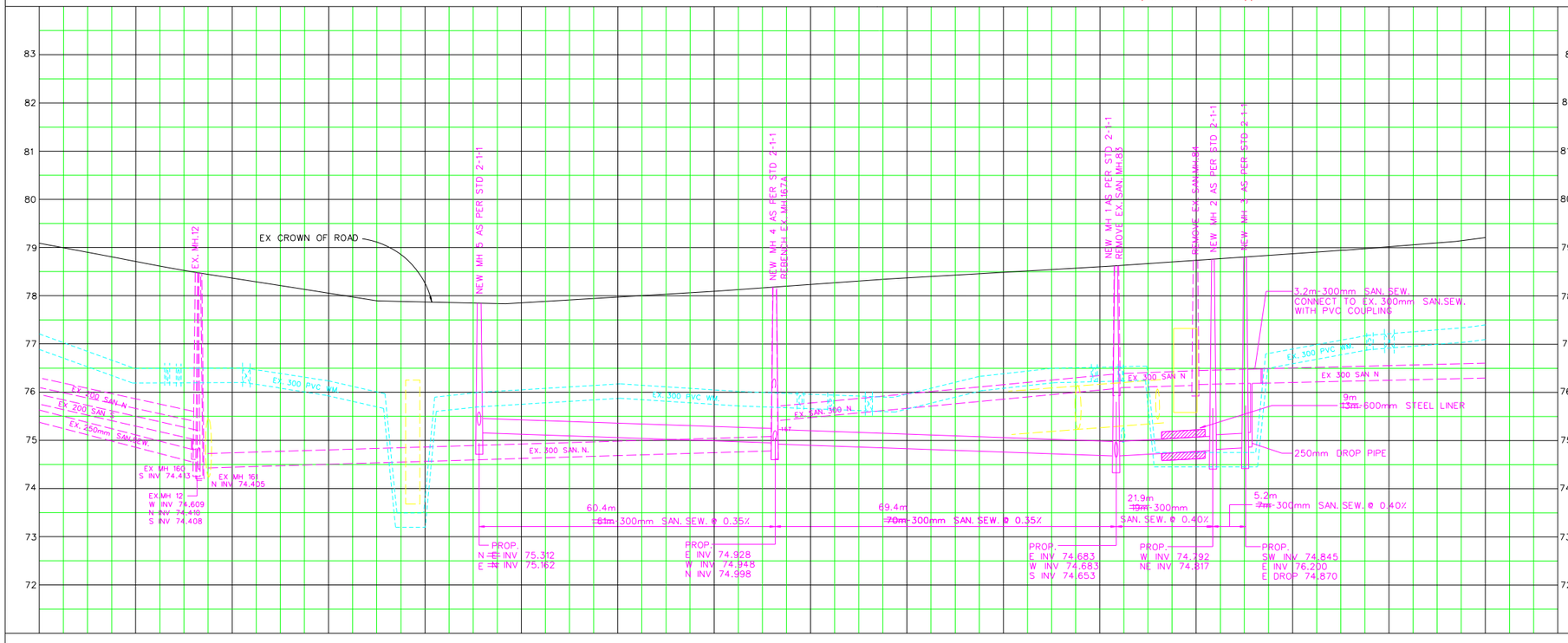
REVISIONS

DATE	DETAILS	INIT.
JULY 17, 2002	AS CONSTRUCTED	Y.C.





LINER DETAIL
N.T.S.



2+260 2+240 2+220 2+200 2+180 2+160 2+140 2+120 2+100 2+080 2+060 2+040 2+020 2+000 1+980 1+960 CHAINAGE

General Notes

- All Driveways ASPHALT Unless Otherwise Noted.
- All Service Locations Are Approximate And Must Be Located Accurately In The Field
- Denotes Building - Not Located
- Denotes Building Located
- Type 'B' Bedding Unless Otherwise Noted (SAN)

B.M. No. Elev.

The Contractor Is Responsible For Locating And Protecting All Existing Utilities Prior To And During Construction Location of Existing Utilities Approximate Only To Be Verified In Field By Contractor.

Designed by ____ Chkd. ____ Approved by ____

NOTICE TO CONTRACTOR

48 HOURS PRIOR TO COMMMENCING WORK NOTIFY THE FOLLOWING

THE REGIONAL MUNICIPALITY OF PEEL
CITY OF MISSISSAUGA WORKS DEPT.
CITY OF BRAMPTON WORKS DEPT.
TOWN OF CALEDON WORKS DEPT.
BELL TELEPHONE COMPANY
CONSUMERS GAS COMPANY
MINISTRY OF TRANSPORTATION
ONTARIO CLEAN WATER AGENCY
HYDRO ELECTRIC POWER COMM. OF ONTARIO
HYDRO ELECTRIC COMM. CITY OF MISSISSAUGA
HYDRO ELECTRIC COMM. CITY OF BRAMPTON
CABLE TELEVISION

76

10m 0 10 20 30m HORIZONTAL SCALE
1m 0 1 2 3m VERTICAL SCALE

Region of Peel
Public Works

LAKESHORE ROAD

300mm SANITARY SEWER

Sta. 1+960 **To Sta.** 2+260

Lots	Area Z-8	Project No. 00-2210 SAN	
Checked by	Drawn by Ed K	Plan No. 26274-D	
Date NOV 00	Sheet 1 of 1		

GENERAL NOTES

1. LOCATION OF ALL EXISTING UTILITIES IN THE FIELD TO BE ESTABLISHED BY THE DEVELOPER.
2. THE DEVELOPER SHALL BE SOLELY RESPONSIBLE FOR LOCATES, EXPOSING, SUPPORTING AND PROTECTING OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES EXISTING AT THE TIME OF CONSTRUCTION IN THE AREA OF HIS WORK, WHETHER SHOWN ON THE PLANS OR NOT, AND FOR ALL REPAIRS AND CONSEQUENCES RESULTING FROM DAMAGE TO SAME.
3. THE DEVELOPER SHALL BE SOLELY RESPONSIBLE TO GIVE 72 HOURS WRITTEN NOTICE TO UTILITIES PRIOR TO CROSSING SUCH UTILITIES, FOR THE PURPOSE OF INSPECTION BY THE CONCERNED UTILITY. THIS INSPECTION WILL BE FOR THE DURATION OF THE CONSTRUCTION, WITH THE CONTRACTOR RESPONSIBLE FOR ALL COST ARISING FROM SUCH INSPECTION.
4. ALL PROPOSED CURBING WITHIN THE MUNICIPAL BOULEVARD AREA FOR THE SITE IS TO SUIT AS FOLLOWS: INDUSTRIAL, COMMERCIAL AND CONDOMINIUM DEVELOPMENTS, ALL ENTRANCES TO THE SITE ARE TO BE IN ACCORDANCE WITH O.P.S.D. 350.10.
5. THE EXISTING DRAINAGE PATTERN WILL BE MAINTAINED EXCEPT WHERE NOTED.
6. THE DEVELOPER WILL BE RESPONSIBLE FOR THE COST OF ANY UTILITY RELOCATIONS NECESSITATED BY THE SITE PLAN.
7. PRIOR TO CONSTRUCTION TAKING PLACE, ALL REQUIRED HOARDING IN ACCORDANCE WITH THE ONTARIO OCCUPATIONAL HEALTH & SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS MUST BE ERECTED AND THEN MAINTAINED THROUGHOUT ALL PHASES OF CONSTRUCTION.
8. THE GEOTECHNICAL AND ENVIRONMENTAL SUITABILITY OF THE FILL WILL BE ASSESSED BY THE GEOTECHNICAL ENGINEER.
9. ALL DIMENSIONS AND ELEVATIONS TO BE VERIFIED PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES FOUND PRIOR TO OR DURING CONSTRUCTION SHALL BE CLARIFIED WITH THE ENGINEER.
10. SIDEWALK CONCRETE STRENGTH 30MPa MINIMUM.

WATER SERVICING NOTES

- ALL MATERIALS AND CONSTRUCTION METHODS MUST CORRESPOND TO THE CURRENT PEEL PUBLIC WORKS STANDARDS AND SPECIFICATIONS.
- WATERMAIN AND/OR WATER SERVICE MATERIALS 100mm (4") AND LARGER MUST BE PVC. SIZE 50mm (2") AND SMALLER SHALL BE COPPER.
- WATERMAINS AND/OR WATER SERVICES ARE TO HAVE A MINIMUM COVER OF 1.7m (5'6") WITH A MINIMUM HORIZONTAL SPACING OF 1.2M FROM THEMSELVES AND ALL OTHER UTILITIES.
- PROVISIONS FOR FLUSHING WATER LINE PRIOR TO TESTING ETC. MUST BE PROVIDED WITH AT LEAST A 50mm (2") OUTLET ON 100mm (4") AND LARGER LINES. COPPER LINES ARE TO HAVE FLUSHING POINTS AT THE END, THE SAME SIZE AS THE LINE. THEY MUST ALSO BE 40SCD OR PIPED TO ALLOW THE WATER TO DRAIN ONTO A PARKING LOT OR DOWN A DRAIN. ON FIRE LINES, FLUSHING OUTLET TO BE 100mm (4") DIAMETER MINIMUM ON A HYDRANT.

NS AND MAINTENANCE DIVISION.

GENERAL SERVICING NOTES

- ALL CURB STOPS TO BE 3.0m (10') OFF THE FACE OF BUILDING UNLESS OTHERWISE NOTED.
- HYDRANT AND VALVE SET TO REGION STANDARD 1-6-1, DIMENSION A AND B, 0.7m (2') AND 0.9m (3') AND TO HAVE PUMPER NOZZLE.
- WATERMAINS TO BE INSTALLED TO GRADES AS SHOWN ON APPROVED SITE PLAN. COPY OF GRADE SHEET MUST BE SUPPLIED TO INSPECTOR PRIOR TO COMMENCEMENT OF WORK, WHERE REQUESTED BY INSPECTOR.
- WATERMAINS MUST HAVE MINIMUM VERTICAL CLEARANCE OF 0.3m (12") OVER / 0.5m (20") UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.
- ALL PROPOSED WATER PIPING MUST BE ISOLATED FROM EXISTING LINES IN ORDER TO ALLOW INDEPENDENT PRESSURE TESTING AND CHLORINATING FROM EXISTING SYSTEMS.
- ALL LIVE TAPPING AND OPERATION OF REGION WATER VALVES SHALL BE ARRANGED THROUGH THE REGION INSPECTOR ASSIGNED OR BY CONTACTING THE OPERATIONS AND MAINTENANCE DIVISION.

GENERAL SERVICING NOTES

1. THE LOCATION OF ALL EXISTING UTILITIES AND SERVICES TO BE VERIFIED BY THE DEVELOPER PRIOR TO CONSTRUCTION. MIN. 1.7m HORIZONTAL AND 0.3m (CROSSING ABOVE) OR 0.5m (CROSSING BELOW) VERTICAL CLEARANCE. MUST DAYLIGHT ALL CORNERS WHEN CROSSING REGION INFRASTRUCTURE.
2. THIS PLAN SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANT'S PLANS. ANY DISCREPANCIES SHALL BE CLARIFIED PRIOR TO CONSTRUCTION. INFORMATION RELATED TO DIMENSIONS FOR PRIVATE ROAD, PARING AND SETBACKS BE TAKEN FROM THE SITE PLAN PREPARED BY GIANNONE PETRICONE ASSOCIATES Inc. ARCHITECTS.
3. ALL SERVICES AND APPURTENANCE MATERIAL AND CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH THE LATEST CITY OF MISSISSAUGA, REGIONAL MUNICIPALITY OF PEEL, ONTARIO PLUMBING CODE AND ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS.
4. O.P.S.D. REFERS TO ONTARIO PROVINCIAL STANDARD DRAWING.
5. ALL REMOVED OR DAMAGED CURBS, SIDEWALK AND SOD RESULTING FROM SERVICE INSTALLATION SHALL BE REINSTATED BY SERVICING DEVELOPER TO THE CITY OF MISSISSAUGA STANDARDS.
6. WATERMAIN RECONSTRUCTION TRENCH BACKFILL TO BE UNSHRINKABLE FILL AS PER CITY STANDARDS.

LEGEND

- PROPOSED STORM SEWER MANHOLE
- EXISTING SANITARY SEWER MANHOLE
- EXISTING STORM SEWER MANHOLE
- EXISTING CATCHBASIN
- PROPERTY LINE
- UNDERGROUND PARKING LIMIT
- EXISTING HYDRANT
- PROPOSED HYDRANT
- EXISTING HYDROPOLE/LIGHT
- LIMIT OF DISTURBANCE (PROPOSED)
- EX. SIDEWALK TO REMAIN
- PROP. SIDEWALK

SERVICE DATA

SERVICE	DATE	INIT.	SERVICE	DATE	INIT.

REVISIONS

DATE	DETAILS	INIT.

NOTE:

1. ALL DIMENSIONS AND ELEVATIONS ARE METRIC, UNLESS OTHERWISE NOTED.
2. SITE PLAN PROVIDED BY BROOKMCILROY DATED : JUNE 1, 2015
3. TOPOGRAPHIC SURVEY COMPLETED BY JD. BARNES Ltd DATED : JULY 4TH, 2012
4. DEVELOPER TO BE RESPONSIBLE FOR LOCATION OF ALL EXIST'G U/G & OVERHEAD UTILITIES. VARIOUS UTILITIES CONCERNED TO BE GIVEN REQUIRED ADVANCE NOTICE PRIOR TO ANY DIGGING, FOR STAKE OUT.

DATE	SUBMISSION	INIT.
18/05/17	SERVICING AGREEMENT SUBMISSION	S.P.
17/02/17	SERVICING AGREEMENT SUBMISSION	M.P.
08/05/16	SERVICING AGREEMENT SUBMISSION	S.P.

BENCHMARK

CITY BM No. 650179 ELEV. 85.641

ELEVATIONS ARE REFERRED TO THE CITY OF MISSISSAUGA BENCH MARK No. 650179, LOCATED AT C.N.R BRIDGE OVER HURON'ARIO STREET. TABLET IN TOP OF SIDEWALK ON N.W. SIDE OF RAILWAY 1 FEET N.E. AND, 2 FEET N.W. OF EDGE OF CURB), HAVING A PUBLISHED ELEVATION OF 85.641 METERS

LOCAL BENCHMARK No.1
CUT CROSS IN CONCRETE SIDEWALK AT DRIVEWAY ENTRANCE. EL= 81.24m

LOCAL BENCHMARK No.2
CUT CROSS IN CONCRETE SIDEWALK AT WALKWAY ENTRANCE. EL= 81.29m

INSPECTION

- [x] WATERMAINS
- [ ] ROADWORK
- [ ] SHOP DRAWINGS
- [ ] STORM SEWERS
- [x] SANITARY SEWERS
- [ ] TRAFFIC

DATE: Jan 26/18 ST TECHNICAL ANALYST

LICENSED PROFESSIONAL ENGINEER S.W. PASSMORE 90539925 MAY 10/17 PROVINCE OF ONTARIO

GHD Inc.
6705 Millcreek Drive, Unit 1
Mississauga Ontario L5N 5M4
T 1 416 213 7121 F 1 416 890 8499
E ytomail@ghd.com W www.ghd.com

F. S. 6810 LIMITED PARTNERSHIP

6 Ann Street, 77 High St East & 81 High St East (OZ 14/007)

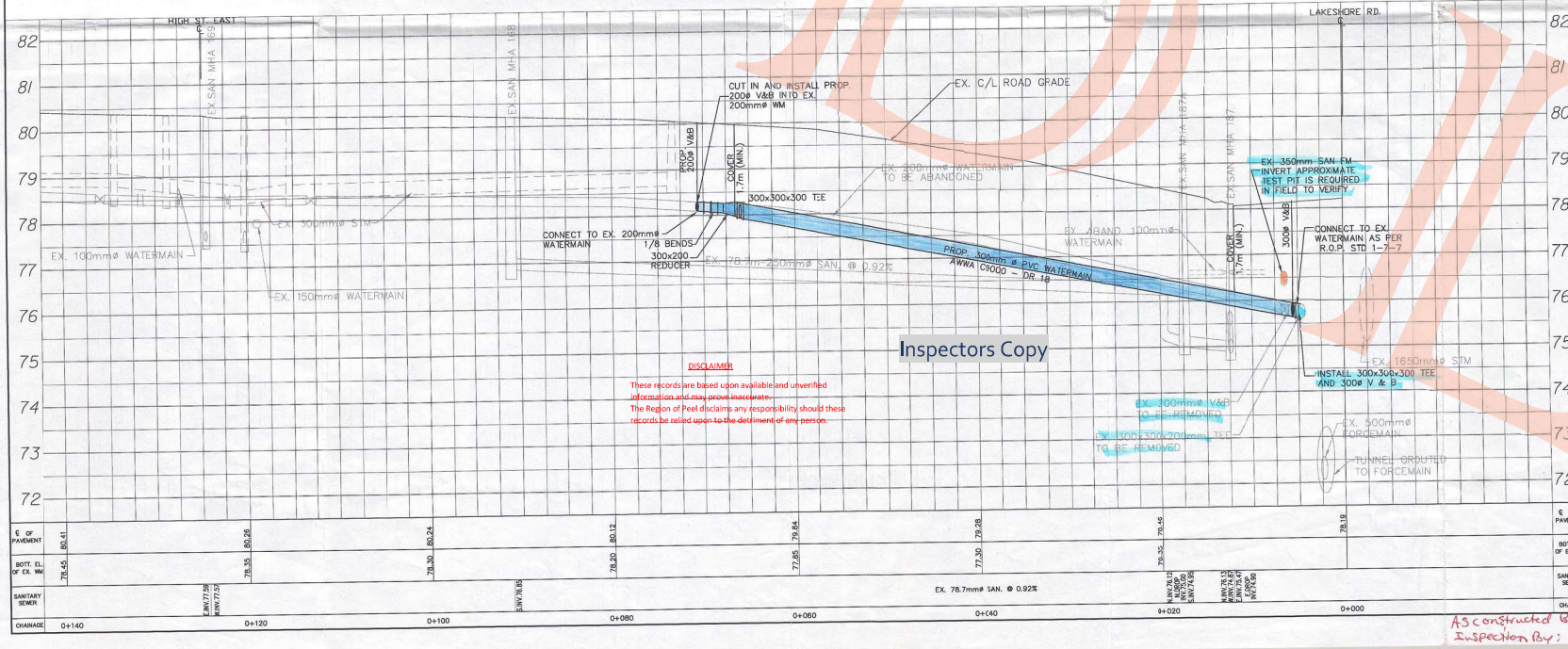
MISSISSAUGA Transportation and Works Z-08.305

PLAN & PROFILE
ANN STREET
300 mm DIA WATERMAIN WORKS
STA. 0+000 TO STA. 0+140

REGION FILE No			
SCALE HOR. 1 : 250 VERT. 1 : 50	AREA	PROJECT No.	11979
DRAWN BY S.Y.	CHECKED BY S.P.	PLAN No.	P-101
DATE APRIL, 2016	SHEET 4 OF 3		(62560-D)

As constructed by: Summit concrete & Drain
Inspection By: John Sedona July 30th 2018

ANN STREET



NOTE
HYDRO DUCT TO BE LOCATED 150 mm FROM PROPERTY LINE ON ANN STREET

UTILITY NOTES:

1. A MIN. 0.6m HORIZONTAL (1.0m FOR BORING AND 0.3m VERTICAL CLEARANCE MUST BE MAINTAINED) VERTICAL CLEARANCE MUST BE INCREASE TO 0.6m FOR MAINS NPS 12 AND LARGER. INFORMATION OF COVER OVER EXISTING PLANTS IS NOT AVAILABLE. EXPOSURE BY HAND IS RECOMMENDED. A MINIMUM OF 0.15m OF SAND BACKFILL PADDING IS TO BE PLACED AROUND MAINS/SERVICES BEFORE BACKFILLING WITH UNSHRINKABLE FILL. BEFORE DIGGING ENBRIDGE GAS MAINS/SERVICES MUST BE LOCATED ON SITE. CALL ONTARIO ONE CALL (1-800-400-2255) 5 DAY IN ADVANCE
2. GASMAINS TO BE FIELD LOCATED CALL FOR GAS LOCATES BEFORE YOU DIG ONTARIO ONE 1-800-400-2255 FREE LOCATE SERVICE
3. 0.6m MIN. HORIZONTAL CLEARANCE REQUIRED, 0.3M MIN. VERTICAL CLEARANCE REQUIRED AT CROSSING
4. MAINTAIN MIN. 2.6m HORIZONTAL 0.3 VERTICAL CLEARANCE FROM BELL AND ROGERS. WITHIN 1m OF AND ON CROSSING BELL/ROGERS HAND DIG. CALL 1.800.400.2255/1-800-738-7853 FOR LOCATES
5. CALL UTILITY COMPANIES IN ADVANCE REGARDING CONSTRUCTION SCHEDULE
6. STAKEOUTS REQUIRED, HAND DIG WITHIN 1.0m OF EX. ENERSOURCE HYDRO MISSISSAUGA DISTRIBUTION PLANT. DIRECTIONAL BORING IS NOT ALLOWED WITHIN 1.0m OF EX. HYDRO DISTRIBUTION PLANT WITHOUT TEST HOLES & HYDRO FIELD APPROVAL. FOR POLE SUPPORT CONTACT: STUART ROSS 905.283.4046

Inspectors Copy

DISCLAIMER
These records are based upon available and unverified information and may prove inaccurate.
The Region of Peel disclaims any responsibility should these records be relied upon to the detriment of any person.

APPENDIX B

STORMWATER MANAGEMENT DESIGN CALCULATIONS

Rational Method Calc.

Project:	128 Lakeshore
Project No.:	211246
Municipality:	City of Mississauga
Catchment:	Pre-Development

Pre-Development Flow	Catchment 100	
	10 Year (Target)	100 Year (Actual)
Runoff Coefficient (C) =	0.50	0.87
Area (A) =	0.093	0.093
A:	1010.00	1450.00
B:	4.60	4.90
C:	-0.78	-0.78
Tc:	15.0	15.0
Intensity (I) mm/hr =	99.2	140.7
Peak Flow (Q) L/s =	**12.8**	**31.4**

To Lakeshore (100)

	Area (m2)	C	CxA
Building	621	0.90	558.9
Landscape	50	0.25	12.5
Impervious Area	259	0.90	233.1
	930	0.87	804.5

Rational Method Calc.

Project:	128 Lakeshore
Project No.:	211246
Municipality:	City of Mississauga
Catchment:	Proposed Uncontrolled Area

Uncontrolled Flow	Catchment 201
	100 Year
Runoff Coefficient (C) =	0.99
Area (A) =	0.0097
A:	1450.00
B:	4.90
C:	-0.78
Tc:	15.0
Intensity (I) mm/hr =	140.7
Peak Flow (Q) L/s =	3.8

Uncontrolled to Lakeshore (201)

	Area (m2)	C	CxA
Landscape	0	0.25	0.0
Impervious Area	97	0.90	87.3
	97	0.90	87.3

Controlled Area (200)

	Area (m2)	C	CxA
Impervious Roof	717	0.90	645.3
Landscape	58	0.25	14.5
Impervious Area	58	0.90	52.2
	833	0.85	712.0

Modified Rational Method

Project:	128 Lakeshore
Project No.:	211246
Municipality:	City of Mississauga
Catchment:	Controlled Area (200)

			100-Year
Area:	0.083 ha	Rainfall $I=A*(T+B)^C$	
Runoff Coefficient:	0.85	A:	1450
100-yr Runoff Coefficient:	0.99	B:	4.9
Target Flow:	0.0091 m^3/s	C:	-0.78
Storage Required	22 m^3		

Initial Time 15 min Increment 5 min

Time (min)	Intensity (mm/hr)	Peak Flow (m^3/s)	Runoff Volume (m^3)	Discharge Volume (m^3)	Storage Volume (m^3)
15	140.7	0.032	29.01	8.15	20.9
20	118.1	0.027	32.47	10.87	21.6
25	102.4	0.023	35.19	13.58	21.6
30	90.8	0.021	37.43	16.30	21.1
35	81.8	0.019	39.34	19.02	20.3
40	74.6	0.017	41.00	21.73	19.3
45	68.7	0.016	42.48	24.45	18.0
50	63.8	0.015	43.81	27.17	16.6
55	59.6	0.014	45.03	29.88	15.1
60	56.0	0.013	46.14	32.60	13.5
65	52.8	0.012	47.18	35.32	11.9
70	50.0	0.011	48.14	38.04	10.1
75	47.6	0.011	49.04	40.75	8.3
80	45.4	0.010	49.89	43.47	6.4
85	43.4	0.010	50.70	46.19	4.5
90	41.6	0.010	51.46	48.90	2.6
95	40.0	0.009	52.19	51.62	0.6
100	38.5	0.009	52.88	54.34	-1.5
105	37.1	0.008	53.54	57.05	-3.5
110	35.8	0.008	54.18	59.77	-5.6
115	34.7	0.008	54.79	62.49	-7.7
120	33.6	0.008	55.38	65.20	-9.8
125	32.6	0.007	55.95	67.92	-12.0
130	31.6	0.007	56.50	70.64	-14.1

Cistern Volume:	30 m^3
Footprint:	30 m^2
Height:	1 m
Sump Volume	4 m^3
Footprint:	8.0 m^2
Height:	0.5 m
Uncontrolled Flow	0.0038 m^3/s
Total Peak Flow	0.0128 m^3/s
Target	0.0128 m^3/s
Difference	0.0000 m^3/s
Storage Required:	25 m^3
Storage Provided:	30 m^3

APPENDIX C

DEMAND TABLE

Connection Single Use Demand Table

WATER CONNECTION

Connection point [3]			
Pressure zone of connection point			
Total equivalent population to be serviced [1]		576 persons	
Total lands to be serviced		0.093ha	
Hydrant flow test		Completed on October, 2021.	
Hydrant flow test location		Northeast Corner of Lakeshore Road, East at Ann Street.	
	Pressure (kPa)	Flow (in l/s)	Time
Minimum water pressure	413.7	164.0	9:35am
Maximum water pressure	530.9	92.9	9:35am

No.	**Water demands**		
	Demand type	**Demand**	**Units**
1	Average day flow	1.87	l/s
2	Maximum day flow	3.73	l/s
3	Peak hour flow	5.61	l/s
4	Fire flow [2]	390.3	l/s
Analysis			
5	Maximum day plus fire flow	394.0	l/s

WASTEWATER CONNECTION

Connection point [4]		
Total equivalent population to be serviced [1]		576 persons
Total lands to be serviced		0.093ha
6	Wastewater sewer effluent (in l/s)	13 l/s

[1] The calculations should be based on the development estimated population (employment or residential).

[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 popopulation 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 D

FUS AND HYDRANT FLOW TEST SUMMARY

Hydrant Flow Test Report

SITE NAME:

SITE ADDRESS / MUNICIPALITY: **128 Lakeshore Road East, Mississauga**

TEST HYDRANT LOCATION : **Northeast Corner of Lakeshore Road, East at Ann Street**

BASE HYDRANT LOCATION: **1st Fire Hydrant East of Hurontario Street on Lakeshore Road East**

TEST BY: Luzia Wood

TEST DATE: October 08,2021

TEST TIME: 9:35Am

TEST DATA

FLOW HYDRANT — Pipe Diam. (in / mm): 300mm P.V.C.

	PITOT 1	PITOT 2
SIZE OPENING (inches):	2.5	2.5
COEFFICIENT (**note 1**):	0.90	0.90
PITOT READING (psi):	77	60 / 60
FLOW (usgpm):	**1472**	**2599**

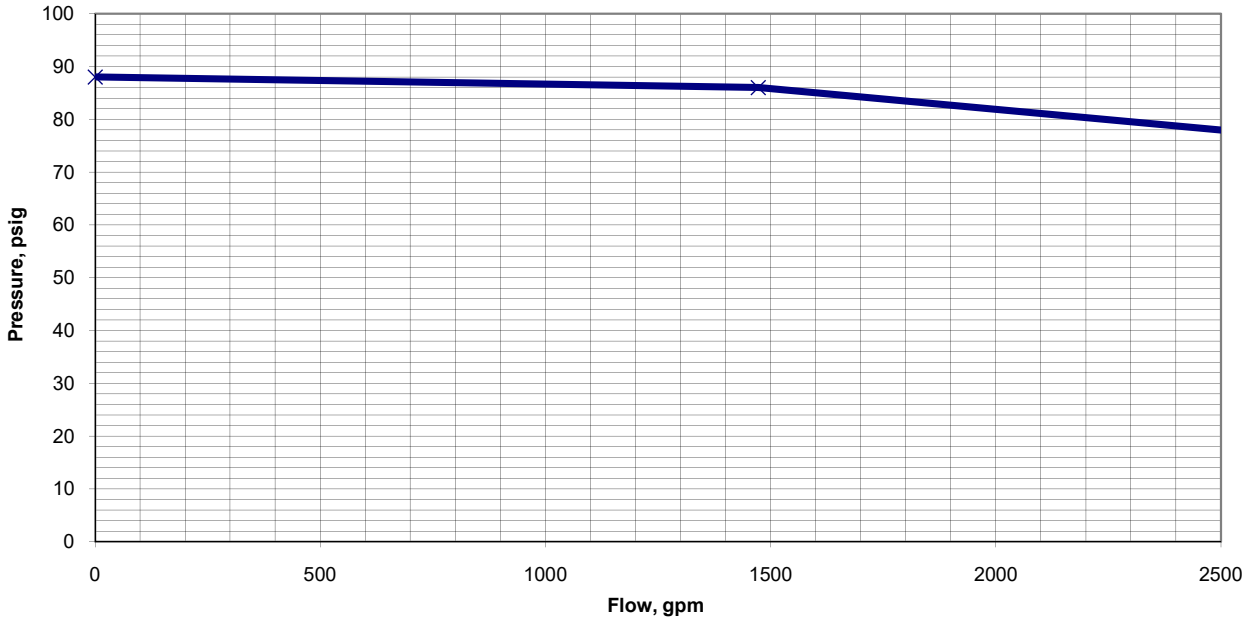
THEORETICAL FLOW @ 20 PSI 9886

BASE HYDRANT — Pipe Diam. (in / mm): 300mm P.V.C.

STATIC READING (psi): 88 RESIDUAL 1 (psi): 86 RESIDUAL 2 (psi): 82

REMARKS:

NOTE 1: Conversion factor of .90 used for flow calculation based on rounded and flush internal nozzle configuration. No appreciable difference in pipe invert between flow and base hydrants.



491 Port Maitland Rd
Dunnville, ON N1A 2W6

Fire Flow Requirements

Project: 128 Lakeshore Road East
Project No.: 211246
Municipality: Mississauga

GUIDE FOR DETERMINATION OF REQUIRED FIRE FLOW
(as per the Water Supply for Public Fire Protection 1999 manual by the Fire Underwriters Survey)

STEP 1
Determine the fire flow.

Required Fire Flow (F)	F = 220 x C x sqrt(A)		The required fire flow in litres per minute.
Maximum Floor Area (A) =	28376.1	m2	The total floor area in square metres (including all storeys, but excluding basements at least 50% below grade) in the building being considered.
Coefficient (C) =	0.6		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 = 0.8 for non-combustible construction (unprotected metal structural) = 0.6 for fire-resistive construction (fullyprotected frame,floors, roof).
F =	22300	L/min.	

STEP 2
Determine the increase or decrease for occupancy.

	0%		Reduction for Low Hazard Occupancy (Dwellings).
Decrease	0	L/min.	

STEP 3
Determine the decrease, if any, for automatic sprinkler protection.

	50%		
Decrease	11150	L/min.	

STEP 4
Determine the total increase for exposures (Not to Exceed 75%).

west (15m)	15%		0 to 3m - 25% Increase
north (22m)	10%		3.1 to 10m - 20% Increase
east (30m)	10%		10.1 to 20m - 15% Increase
South (7m)	20%		20.1 to 30m - 10% Increase
	55.0%		30.1 to 45m - 5% Increase
Increase	12265	L/min.	Greater then 45m - No Increase

STEP 5
Determine the minimum required fire flow.

F =	**23,000**	**L/min.**	**Round to the nearest 1000L/min.**
QR =	9883	USGPM	**Flow Test Results**
	37,413	**L/min.**	

Fire Flow Calculation

Project: 128 Lakeshore Road East
Project No.: 211246
Municipality: Mississauga

GUIDE FOR CALCULATING CAPACITY AT 20psi FOR FIRE FLOW
(as per the NFPA 291: Recommended Practice for Fire Flow Testing and Marking of Hydrants. (2010). (Section 4.10.1.2.))

The Formula for Calculating Rated Capacity at 20psi

$$\mathbf{Q_R = Q_F \times (H_R / H_F)^{0.54}}$$

Where:

Q_R = Rated Capacity at 20psi (in GPM)

Q_F = Total test flow (in GPM)

H_R = Static Pressure minus 20 psi

H_F = Static Pressure minus Residual Pressure

Flow Test Parameters:		Based on hydrant flow test by L&D Waterworks, dated Oct 8, 2021.
Static Pressure	88.0 psi	
Residual Pressure	86.0 psi	
Test Flow Rate	1472 GPM	
Q_R =	1472 x ((	88.0 psi - 20) / (88.0 psi - 86.0 psi))$^{0.54}$
Q_R =	**9883 GPM**	
	37,413 L/min	

DRAWINGS

HUSSON

ENGINEERING + MANAGEMENT

200 CACHET WOODS COURT, SUITE 204
MARKHAM, ON L6C 0Z8
HUSSON.CA