FUNCTIONAL SERVICING & STORMWATER MANAGEMENT REPORT

Better Life Retirement Residence (c/o 2564905 Ontario Inc.)

Type of Document:
Final Report

Project Name:
441 Maple Avenue
City of Burlington

Project Number:
ALL-00251529-A1

Prepared and Reviewed By:
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Date + Time Submitted:
2020-10-21

Table of Contents

1 Introduction 3
2 Site Characteristics and Grading 3
3 Water Servicing 6
4 Sanitary Servicing 6
5 Storm Servicing 7
6 Groundwater 7
7 Stormwater Management 7
7.1 Existing Drainage Conditions 7
7.2 Proposed Drainage Conditions 9
7.2.1 Proposed Grading 9
7.2.2 Methodology 9
7.2.3 Proposed Conditions Peak Flows 9
7.2.4 Proposed SWM Quantity Controls 11
7.2.5 Proposed SWM Quality Controls 12
7.2.6 Water Balance 12
8. Erosion and Sediment Control during Construction 13
9. Utilities 13
10. Conclusions 14

List of Figures

Figure 1 – Location Plan

Figure 2 – Site Plan

Figure 3 - Existing Conditions Drainage Plan

Figure 4 – Proposed Conditions Drainage Plan

List of Tables

Table 1 – Peak Flows (Existing Conditions)

Table 2 – Peak Flows (Proposed Conditions – No SWM Controls)

Table 3 – Peak Flows (Proposed Conditions – with SWM Controls)

List of Appendices

Appendix A – Topographic Survey

Appendix B – Water Servicing Calculations

Appendix C – Sanitary Servicing Calculations

Appendix D – Stormwater Management Calculations

Appendix E – Additional Background Documents

1 Introduction

EXP Services Inc. has been retained by Better Life Retirement Residence (c/o 2564905 Ontario Inc.) ("Owner") to prepare a Functional Servicing and Stormwater Report (FSR/SWM) in support of Official Plan Amendment and Zoning By-Law Amendment applications to permit an 11-storey apartment building on approximately 0.29 ha of land in the City of Burlington, Region of Halton. The subject land is municipally known as 441 Maple Avenue, located on the north side of Maple Avenue, bound by an existing parking lot (Burlington Hydro) to the north, and existing developments to the east and west. Refer to Figure 1 for site location plan.

The subject lot is 2,863 square metres (m^2) in area and is currently occupied by a 2-storey long term care facility. The proposed development will be in the form of an 11-storey building containing approximately 140 units with 15,018 m^2 of Gross Floor Area (GFA). Currently, there are three levels of underground parking proposed for approximately 163 parking spots. Refer to the Owner's Site Plan in Figure 2 for reference.

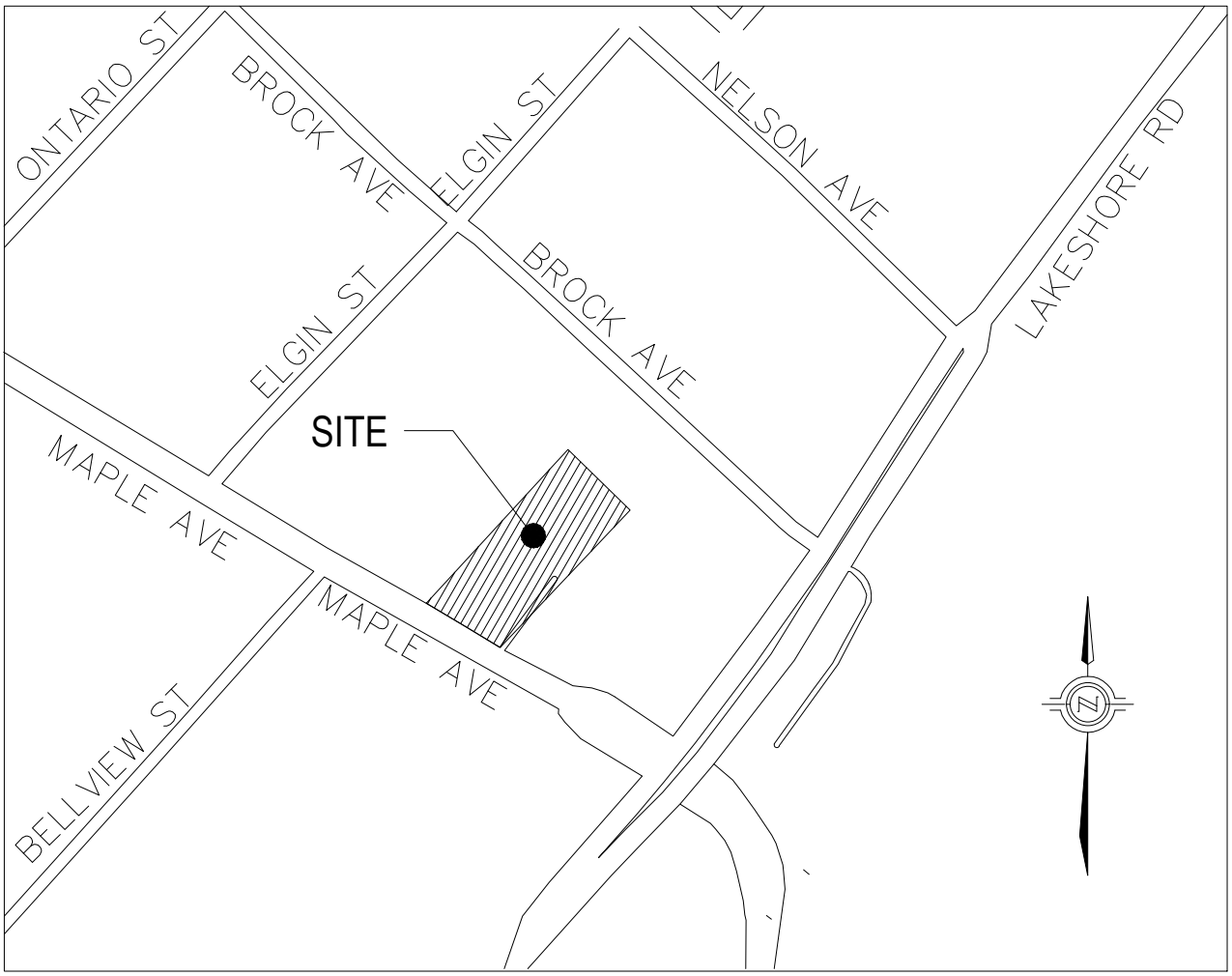
The objective of this combined FSR/SWM Report is to give an overview of the proposed servicing and SWM strategy for the site including outlining the required demands on the municipal system while addressing any corresponding capacity concerns including demonstrating how the City of Burlington criteria have been met. This report has been prepared to address the comments received from both City of Burlington and Region of Halton staff dated March 26, 2019 (original FSR/SWM Report prepared by GHD) as part of the 2nd engineering submission for the ZBA application.

2 Site Characteristics and Grading

The site is characterized by the neighbouring developments and perimeter features along the property. Along the east side of the site there is an existing shared driveway easement for the neighbouring development located at 421 Maple Avenue. Some parking spots directly connect to the shared driveway access (through an access easement) including portions of the parking that utilizes precast curbs to control traffic flow and allow sheet flow drainage through the curbs. Along the north side of the site, surface parking is currently utilized by the long term care facility with the neighbouring property owned by Burlington Hydro through a license agreement. Along the east side of the Burlington Hydro property, an existing gate access is observed which could provide an access to the City of Burlington parking lot adjacent to Brock Avenue. Finally, along the west side of the site, an existing poured concrete retaining wall addresses a grade change between the neighbouring parking lot which is at a higher elevation.

The existing topography across the site shows a high point located in approximately the middle of the site which essentially splits the major overland flow drainage to the north and south towards Maple Avenue. Generally, the site is flat showing a maximum fall of 0.75m within the north catchment.

The proposed grading design ensures all existing elevations along the perimeter of the property are met to ensure no negative impact to the neighbouring properties. Along the west side of the property, a new retaining wall integrated with the underground structure is proposed that does not required reconstructing or disturbing the neighbouring owner's existing retaining wall along the property line. The proposed drainage strategy is further described within the stormwater section of this report. Refer to drawing SG-01 in Appendix D for the proposed site grading details.



exp.	Project:	441 MAPLE AVENUE, BURLINGTON BURLINGTON, ON		
	Title:	LOCATION PLAN		
	Approved by: S.P	Date: JUNE, 2020	Project No.: ALL-00251529-A0	
	Drawn by: J.L	Scale: N.T.S.	Figure no.: FIG-01	

E:\MRK\ALL-00251529-A0\60 Execution\65 Drawings_Civil\2251529-FIG-01 LOCATION PLAN.dwg

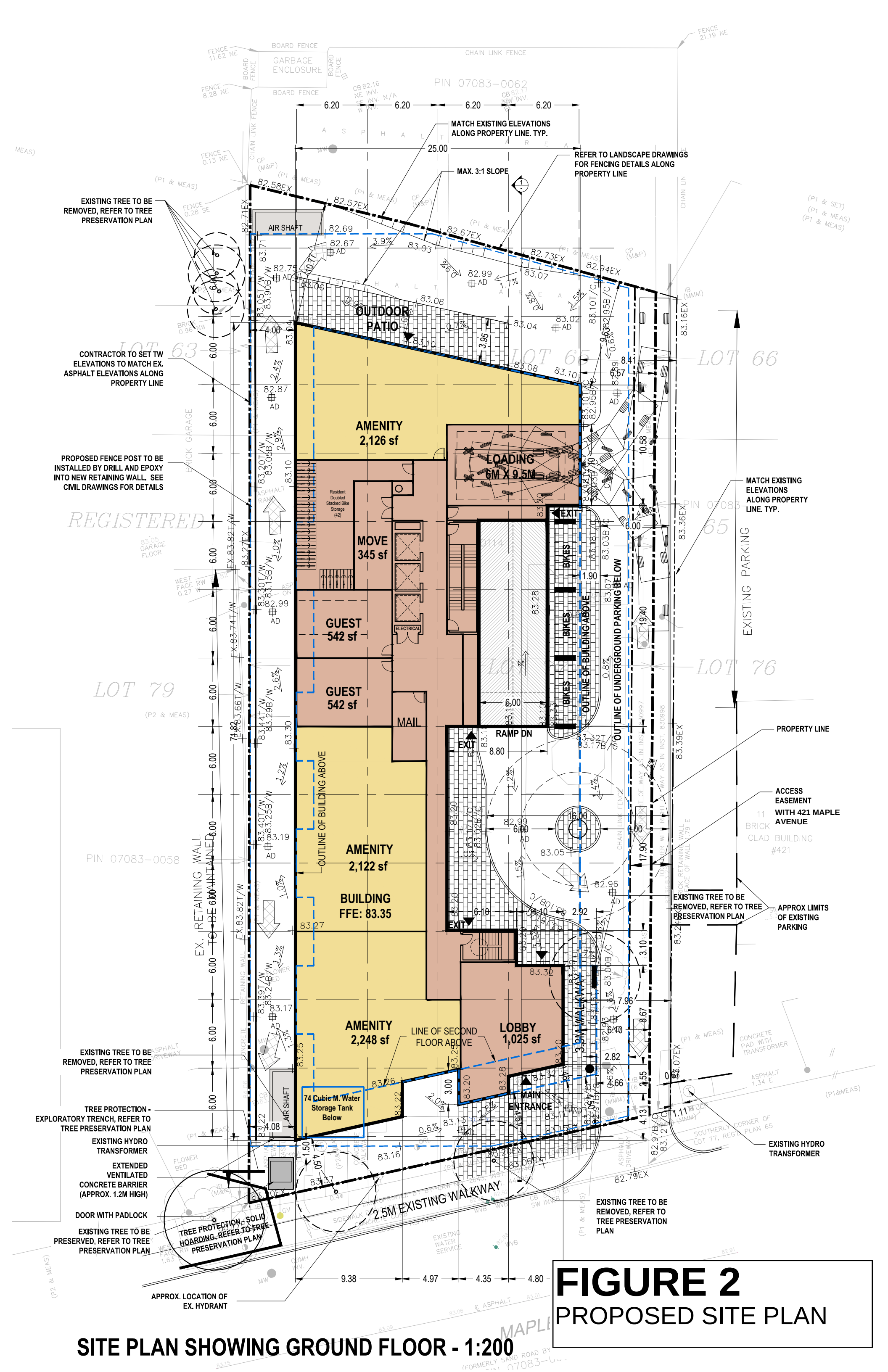


FIGURE 2
PROPOSED SITE PLAN

SITE PLAN SHOWING GROUND FLOOR - 1:200

3 Water Servicing

There is an existing 200mm diameter watermain located on Maple Avenue adjacent to the site, where the site is located within the Region of Halton's pressure Zone OB1. Record drawings for Maple Avenue show that there is currently an existing water service for the site. An existing fire hydrant also is located immediately fronting the site. Refer to Appendix E for the Region Water Operating Map and Maple Avenue record drawings.

The proposed water service connection to the existing 200 mm diameter watermain is shown with two separate connections, 200 mm diameter for fire protection and 150 mm diameter as per Region of Halton standards. The existing water service is proposed to be abandoned within the Maple Avenue right-of-way in accordance to the Region standards. The future building plumbing design is to include a sprinkler system for fire protection, with a siamese connection located near the entrance to the building. Refer to Drawing SG-1 for the proposed watermain servicing details.

To determine the post development domestic water demand on the municipal watermain, the water consumption calculations were prepared in accordance to the Region of Halton criteria. The calculations show that under maximum day conditions, a proposed demand of 1.50 L/s should be considered for the site. Then using the Fire Underwriter's Survey, a fire demand was calculated to be in the range of 133 L/s, giving a maximum day plus fire demand of 134.5 L/s to be used for the purposes of reviewing required fire protection measures. Refer to the supporting calculations in Appendix B.

To verify existing flows and pressures within the municipal watermain, EXP staff coordinated a hydrant flow test on the two closest hydrants to the site location. The flow test results showed that adequate flow can be obtained to meet the maximum day plus fire demand of 134.5 L/s while still maintaining the minimum required 20 psi for the surrounding system. Refer to Appendix B for the hydrant flow test results completed on August 11, 2020.

4 Sanitary Servicing

There is an existing 825 mm diameter trunk sanitary sewer on Maple Avenue which flows in the easterly direction towards Lakeshore Road. Record drawings show an existing sanitary service connection to the site. Refer to Appendix E for the Region Wastewater Operating Map.

The proposed sanitary service connection for the site includes re-using the existing sanitary service connection to the existing 825mm diameter trunk sanitary sewer on Maple Avenue to mitigate any unnecessary new penetrations into the Region's trunk sewer. A CCTV video inspection during the detailed design phase for the site plan application is recommended to verify the diameter and condition of the sanitary service prior to commissioning the service. Refer to the Drawing SG-1 for the proposed sanitary servicing details.

In order to review the existing sanitary demand from the current development, the Region of Halton standards were referenced where a peak sanitary flow of 4.86L/s was calculated and allocated to the Maple Avenue sanitary sewer. EXP staff then reviewed the Owner's proposed development concept and using Region standards, an equivalent population of 210 persons was calculated generating a peak sanitary flow of 2.85 L/s, for an overall theoretical post-development decrease of 2.01 L/s to the Maple Avenue sanitary sewer. Through discussions with Region staff, they have not identified any concerns with the proposed sanitary demand based on the negligible impact on the capacity of the trunk sewer. Please refer to Appendix C for the sanitary demand calculations.

5 Storm Servicing

There is an existing 1050 mm diameter trunk storm sewer located on Maple Avenue which flows in the southerly direction towards Lakeshore Road. Record drawings show that two existing storm services for the site are connected to the trunk storm sewer. Refer to Appendix E for the record drawings.

As part of the proposed storm servicing design, the existing storm services are to be abandoned in accordance to the City of Burlington standards. A new 300 mm diameter storm service is proposed to connect to the existing 1050 mm diameter trunk sewer. An overview of the proposed stormwater management strategy for the site is provided in the next section of this report. Refer to drawing SG-01 for the proposed storm servicing details.

6 Groundwater

The proposed foundation drainage design for the underground parking structure is to include a perimeter weeping tile system where the intercepted flows are collected in a groundwater sump within the future mechanical design. The hydrogeology study completed for the site (prepared by EXP dated March 14, 2019) provided a preliminary estimate for the long-term discharge rate in the range of 160 m^3/day or 1.9 L/s. EXP staff then assessed the required peak flow pumping rate for the groundwater based on the estimated discharge rate and the required hydraulic lift. A groundwater peak pumping rate of 2.5 L/s was then conservatively calculated, where the flows are proposed to be directed through the proposed SWM tank on the P1 level before outletting through the proposed storm service connection to the Maple Avenue system.

7 Stormwater Management

7.1 Existing Drainage Conditions

In order to calculate the theoretical peak flow runoff rates for the site under existing conditions, the catchment boundaries were determined based on the existing topography and runoff coefficients selected based on the percentage of imperviousness. The existing conditions drainage plan is shown on Figure 3 for reference.

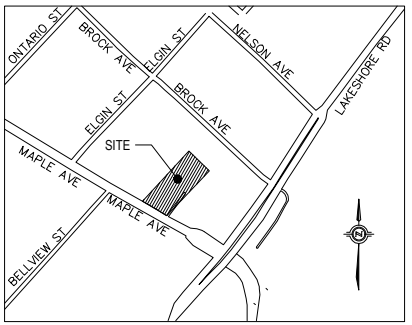
Using a time of concentration of 10min, the peak flows were calculated and are summarized in Table 2 below:

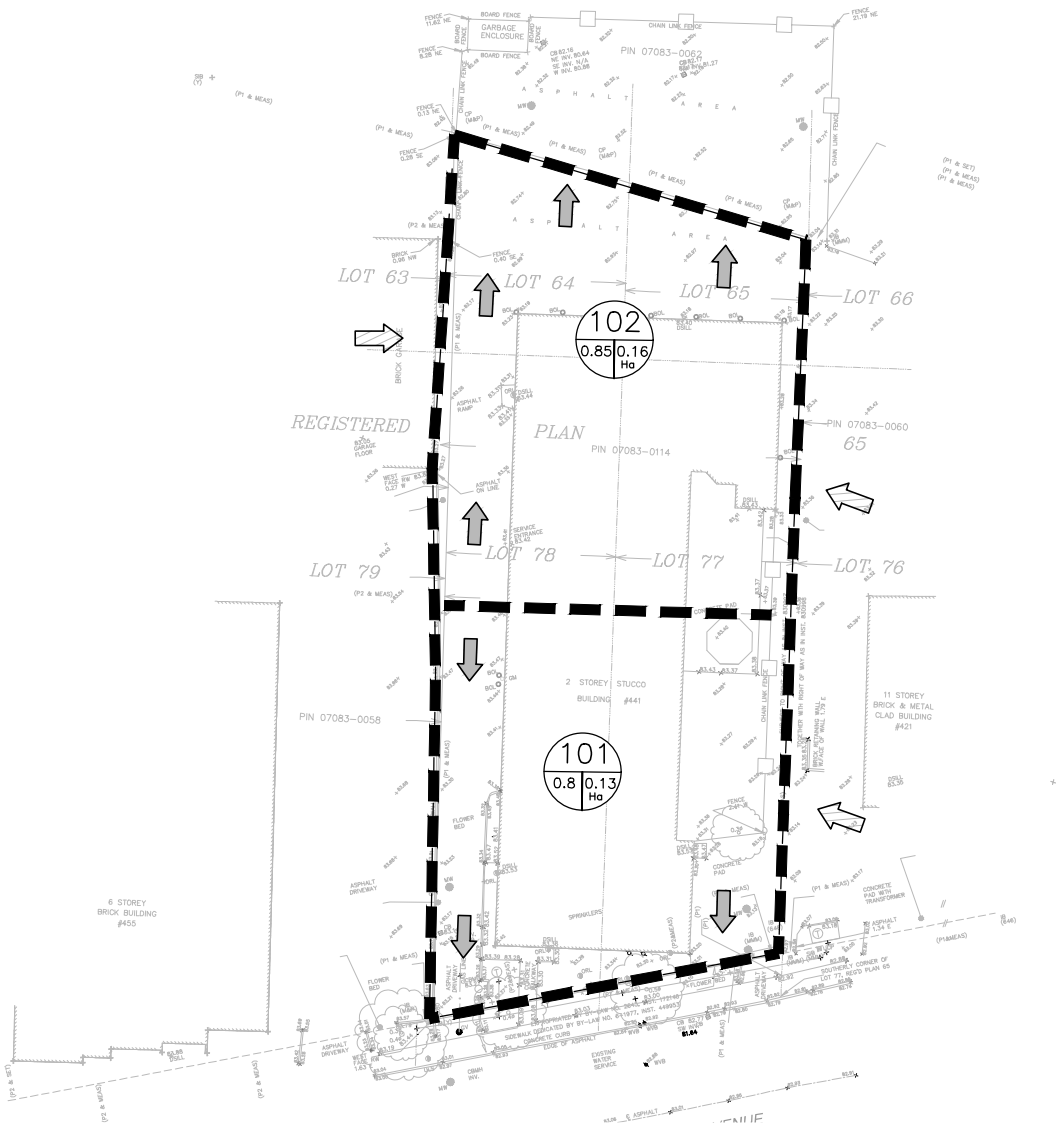
Table 1: Peak Flows (Existing Conditions):

Contributing Area	ID#	Peak Flow -5 Year (L/sec)	Peak Flow -25 Year (L/sec)	Peak Flow -100 Year (L/sec)
North Catchment (Brock Avenue)	102	33.2	48.7	63.1
South Catchment (Maple Avenue)	101	25.5	37.5	51.2

The peak flow runoff calculations can be found in Appendix D.

KEY PLAN





LEGEND

- PROPERTY LINE
- 227.00 EXISTING GRADE
- MAJOR OVERLAND FLOW DIRECTION
- INCOMING EXTERNAL FLOW DIRECTION
- 101 / 0.5 / 0.13 — STORM DRAINAGE ID NUMBER; AREA (ha); RUNOFF COEFFICIENT
- CATCHMENT BOUNDARY

Project:	441 MAPLE AVENUE BURLINGTON, ON				
Title:	EXISTING CONDITIONS DRAINAGE PLAN				
Approved by:	S.P	Date:	AUG. 2020	Project No.:	ALL-00251529-A0
Drawn by:	J.L	Scale:	N.T.S.	Figure no.:	FIG-03

7.2 Proposed Drainage Conditions

7.2.1 Proposed Grading

The existing topography across the site shows a high point located in approximately the middle of the site which essentially splits the major overland flow drainage to the north and south towards Maple Avenue. The proposed grading design generally maintains the existing high point location through the middle of the site while ensuring all existing elevations along the perimeter of the property are met.

A network of area drains are proposed to capture all storm events up to and including the 100-year storm where the flows are conveyed through the plumbing design and outlet into the proposed SWM tank. Any possible incoming external drainage from neighbouring properties is accommodated within the proposed grading design. For any extreme storm events greater than the 100-year event, the proposed grading design provides safe conveyance for the major overland flow without any negative impact to neighbouring properties. Refer to drawing SG-01 for the proposed site grading details.

7.2.2 Methodology

The following is a summary of the key design standards that have been referenced as part of the proposed SWM strategy for the site:

- City of Burlington Site Plan Application Guideline (Dec, 2019)
- City of Burlington Standard Specifications dated (Jan, 2020)
- MECP Stormwater Management Planning and Design Manual (Mar, 2019)

Through various correspondence with City staff, some of the key SWM criteria can be summarized as follows:

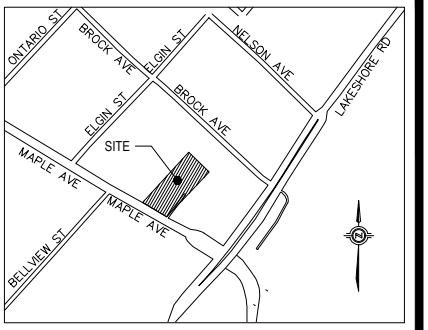
- The post-development peak flows are to be controlled to pre-development rates for the current catchment that discharges to the Maple Avenue storm system for all storms events up to and including 100-year storm
- Stormwater retention on the roof tops of the proposed building is not permitted as per City of Burlington standards
- An emergency overland flow route is to be provided to direct runoff from flows in excess of the 100-year storm event to a safe outlet
- Stormwater is to be treated to Enhanced Quality Controls achieving 80% Total Suspended Solids Removal as defined in the MECP Stormwater Management Planning and Design Manual (Mar, 2019) where oil grit separators are to be designed such that 50% credit is provided by the City of Burlington
- If permanent groundwater dewatering is proposed within the proposed foundation drainage design, incorporate the dewatering requirements into the proposed SWM design

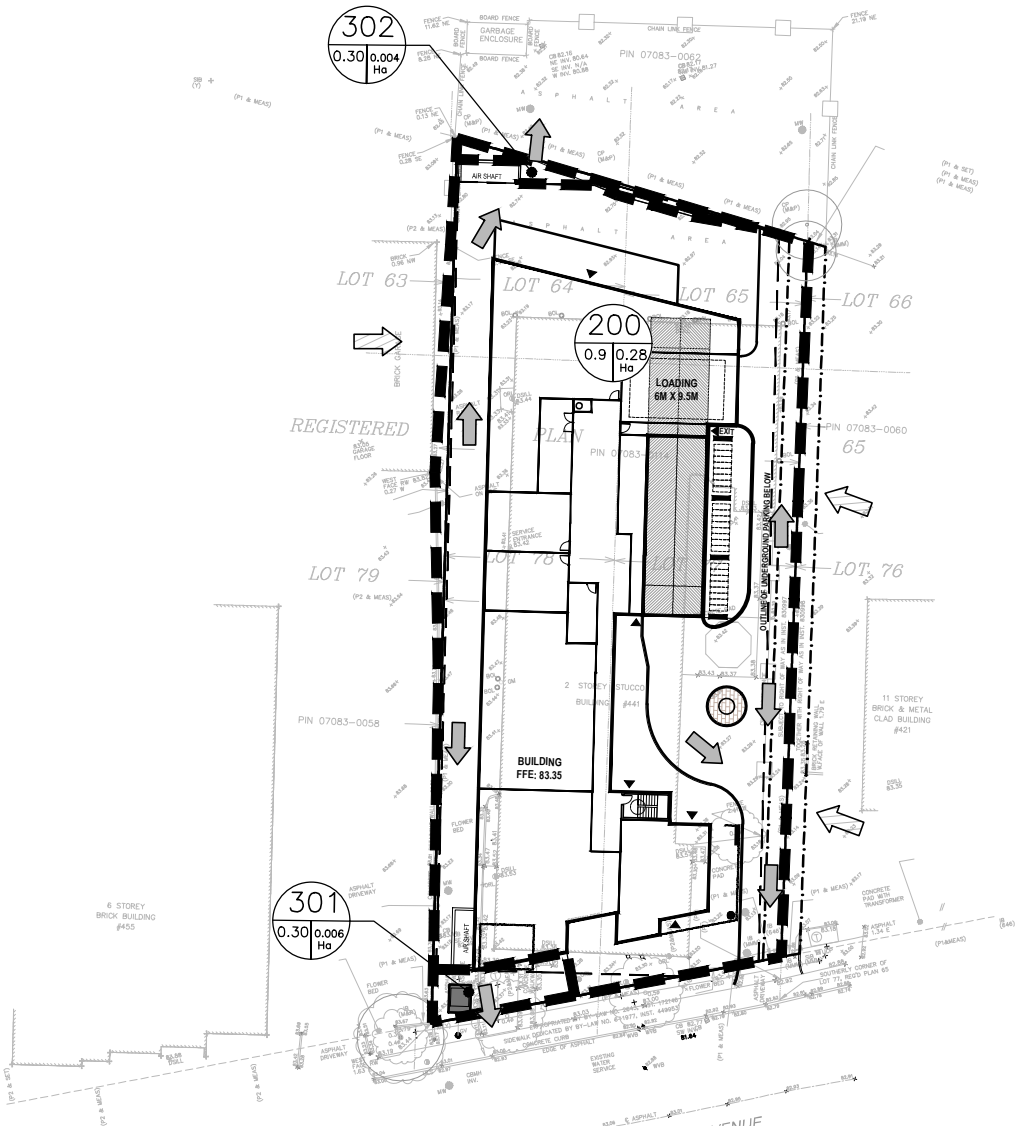
For the required peak storm runoff and SWM storage calculations, the Modified Rational Method was selected which is deemed appropriate for the size of the subject site.

7.2.3 Proposed Conditions Peak Flows

Based on the proposed grading and servicing design for the site, the drainage areas were reviewed to assess the runoff coefficients for each catchment. The proposed conditions drainage areas and runoff coefficients are shown on Figure 4 for reference.

KEY PLAN





LEGEND

- PROPERTY LINE
- 227.00 EXISTING GRADE
- EMERGENCY OVERLAND FLOW DIRECTION (>100 YEAR STORM)
- INCOMING EXTERNAL FLOW DIRECTION (BY-PASSED)
- 101 / 0.5 / 0.13 — STORM DRAINAGE ID NUMBER / AREA (ha) / RUNOFF COEFFICIENT
- CATCHMENT BOUNDARY

Project:	441 MAPLE AVENUE BURLINGTON, ON		
Title:	PROPOSED CONDITIONS DRAINAGE PLAN		
Approved by: S.P	Date: OCT. 2020	Project No.: ALL-00251529-A0	
Drawn by: J.L	Scale: N.T.S.	Figure no.: FIG-04	

The theoretical peak flow runoff rates were then calculated for each under proposed conditions using a time of concentration of 10min for each catchment where the peak flows are summarized in Table 2 below.

Table 2: Peak Flows (Proposed Conditions – No SWM Controls)

Contributing Area	ID#	Peak Flow -5 Year (L/sec)	Peak Flow -25 Year (L/sec)	Peak Flow -100 Year (L/sec)
Controlled Area (SWM Tank)	200	61.7	90.6	110.4
Uncontrolled Area (North)	302	0.3	0.4	0.6
Uncontrolled Area (South)	301	0.4	0.6	0.9
Total:		**62.4**	**91.6**	**111.9**

The peak flow runoff calculations can be found in Appendix D.

7.2.4 Proposed SWM Quantity Controls

As previously mentioned, the proposed SWM design for the site requires all flows up to and including the 100-year storm event are to be controlled to the pre-development rates for the existing catchment tributary to the Maple Avenue system (51.2 L/s).

The maximum allowable release rate for the proposed SWM tank was then calculated as follows:

100-year pre-development peak flow to Maple Avenue (101) =	51.2 L/s
minus 100-year post-development uncontrolled peak flows from site (301 & 302) =	- 1.5 L/s
minus proposed groundwater peak pumping rate =	- 2.5 L/s
gives maximum release rate for proposed SWM tank (200) =	**47.2 L/s**

The results of the SWM storage calculations showed the SWM tank requiring a minimum volume of 40.9 m^3 with an orifice tube of 115 mm diameter before outletting to the Maple Avenue system for the 100-year storm event. However, after reviewing the requirements to meet the lower 5-year storm allowable release rate, it was determined that a SWM tank of volume 72.0 m^3 with an orifice diameter of 75mm diameter will satisfy all storms up to and including the 100-year storm event. The SWM storage calculations have been provided in Appendix D. Refer to the Drawing SG-01 in Appendix D for the SWM tank and orifice tube details.

After implementing the required SWM controls the overall maximum allowable release rate is met, where the peak flow rates for the site can be summarized in Table 3 below:

Table 3: Peak Flows (Proposed Conditions – with SWM Controls)

Contributing Area	ID#	Peak Flow -5 Year (L/sec)	Peak Flow -25 Year (L/sec)	Peak Flow -100 Year (L/sec)
Controlled Area (SWM Tank)	200	20.1	20.1	20.1
Uncontrolled Area (North)	302	0.3	0.4	0.6
Uncontrolled Area (South)	301	0.4	0.6	0.9
Total:		**20.8**	**21.1**	**21.6**

The peak flow runoff calculations can be found in Appendix D.

7.2.5 Proposed SWM Quality Controls

The City of Burlington requires the long-term average removal of 80% total suspended solid (TSS) on an annual loading basis from all runoff leaving the proposed development site based on the post development level of imperviousness. This is required for the long-term removal average of 80% TSS and is consistent with the "Enhanced Protection" levels recommended in MECP Stormwater Management Planning and Design Manual (Mar, 2019). Also as previously mentioned, any proposed oil grit separators (OGS) are only given 50% credit towards meeting this 80% TSS removal requirement.

The proposed SWM quality measures include an OGS where the Jellyfish Filter Unit installed downstream of the SWM tank, upstream of the storm control manhole with exterior access for future maintenance and inspections. Refer to drawing SG-01 for the proposed OGS location. The Jellyfish oil and grit separator Model JF6-3-1-L1 specifications have also been provided in Appendix D for reference.

7.2.6 Water Balance

Low impact development (LID) measures such as bioswales to promote infiltration or rainwater harvesting/reuse, are encouraged by the City of Burlington for water balance purposes. However, due to the Owner's development concept including an underground parking structure that consumes the majority of the property, promoting infiltration within the site is not practical. It has also been confirmed with the Owner that an irrigation system is not likely to be used for this site, therefore rainwater harvesting is not included within the servicing design. However, in order to optimize the initial abstraction from each rainfall event across the site, the proposed landscaping has been optimized within the development concept to address the water balance for the site.

For the proposed landscaping design details refer to the Landscape Plans prepared by Baker Turner Landscape Architects.

8. Erosion and Sediment Control during Construction

During construction it is imperative that the contractor installs and maintains all the necessary erosion and sediment control (ESC) measures to ensure there is no negative impact to surrounding properties and the local municipal sewer systems.

Outside the site, sediment control measures such as catchbasin silt sacks are to be installed inside the existing catchbasins along Maple Avenue immediately adjacent to the site. These silt sacks are to be monitored and maintained after all rainfall events.

Within the site, silt fencing is required to be installed around the perimeter of the sediment to ensure during grading and building activity, that sediment is not transported overland during a rainfall event to neighbouring properties. Similar to the required silt sacks within the catchbasins along Maple Avenue, the silt fence is to be monitored after every rainfall event and repaired as necessary. Mud tracking from construction truck transport is to be mitigated through the use of a proposed mud mat and any other maintenance requirements necessary by the contractor before driving back on municipal roads.

Additional ESC measures not mentioned may be required through the development of the detailed design for the site and the permitting process through the City of Burlington.

9. Utilities

Through correspondence with the active utility agencies in the area, all the required utilities are located within the Maple Avenue right-of-way adjacent to the site. Based on the nature of the proposed development and estimated load demands, utility staff have not indicated any issues with providing the necessary utility service for the development.

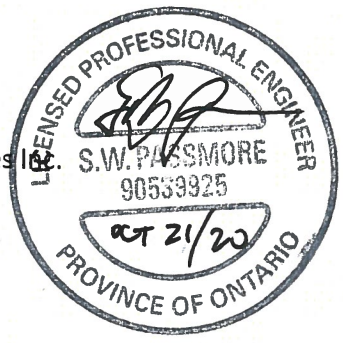
10. Conclusions

In summary, our findings outlined in this FSR/SWM report demonstrate that the proposed development can be adequately serviced and meet the required City of Burlington and Region of Halton criteria, where the results can be summarized as follows:

- The proposed grading design can adequately meet all surrounding property line elevations without any negative impact to neighbouring properties.
- Water servicing can be provided with a new 200 mm diameter fire and 150 mm diameter domestic connection to the existing 200 mm diameter watermain located on Maple Avenue.
- Adequate fire protection can be provided based on the required maximum day plus fire flow demand of 134.5 L/s and the observed hydrant flow testing results completed on August 6, 2020.
- Sanitary servicing can be provided by using the existing sanitary service lateral (pending results of CCTV inspection) which is connected to the existing 825mm diameter sanitary sewer on Maple Avenue.
- Sanitary capacity is available for the proposed development based on the completed calculations.
- Storm servicing can be provided with a new 300mm diameter storm service connection into the existing 1050 mm diameter storm sewer on Maple Avenue.
- Groundwater management can be addressed with proposed foundation drains pumped through the proposed SWM tank at a maximum pumping rate of 2.5 L/s.
- The required utilities can be provided to service the site based on the correspondence with utility agency staff.
- Based on the correspondence with City of Burlington staff the Maple Avenue storm system is the appropriate outlet for the development, where a pre-development runoff coefficient of C=0.80 gives a maximum allowable release rate of 51.2 L/s for the site.
- The required SWM quantity storage can be obtained with the use of an underground cistern of minimum volume 72.0 m^3 and orifice tube of 75mm diameter.
- The required SWM quality controls can be met with the use of a proposed oil and grit separator (Jellyfish Model JF6-3-1-L1) designed to the City's TSS removal specifications.
- Emergency overland flow is directed safely away from the buildings through the site from the proposed grading design without negative impact to surrounding developments.

Sincerely,

EXP Services Inc.



Scott W. Passmore, P.Eng.
Senior Manager, Land Development



Steve Park, P.Eng.
Project Manager, Land Development

Appendix A - Topographic Survey

PLAN BEING PART 1
MUST BE READ IN CONJUNCTION WITH
SURVEY REPORT (BEING PART 2)

SURVEYOR'S REAL PROPERTY REPORT
WITH TOPOGRAPHICAL FEATURES
PLAN OF

PART OF LOTS 64, 65, 77 & 78 REGISTERED PLAN 65

BEING IN THE

CITY OF BURLINGTON

REGIONAL MUNICIPALITY OF HALTON

SCALE 1 : 250

0 5 10 20 metres

MacKAY, MacKAY & PETERS LIMITED – ONTARIO LAND SURVEYORS
© 2018

KNOWN AS MUNICIPAL No. 441 MAPLE AVENUE

SURVEY REPORT (BEING PART 2) (to be read in conjunction with plan being Part 1)

LAND REGISTRY OFFICE TITLE INFORMATION ON SUBJECT PROPERTY INCLUDING BOUNDARIES, EASEMENTS AND RIGHT OF WAYS – JULY 24, 2018

REGISTERED EASEMENTS AND/OR RIGHTS–OF–WAY:

SUBJECT TO A RIGHT OF WAY OVER PART 2, PLAN 20R–20090 AS IN INST. 830997
TOGETHER WITH AN EASEMENT OVER PART 1, PLAN 20R–20090 AS IN INST. 830998
SUBJECT TO AN EASEMENT OVER PART 2, PLAN 20R–20091 IN FAVOUR OF PART OF LOT 79, REGISTERED PLAN 65, PART 1, PLAN 20R–7466 AS IN INST. No. HR1256622
TOGETHER WITH AN EASEMENT OVER PART 1, PLAN 20R–20091 AS IN INST. No. HR1256623

ADDITIONAL REMARKS:

REFER TO PART 1 OF PROPERTY REPORT FOR LOCATION OF BUILDINGS AND OTHER SETBACKS

Note :

MacKAY, MacKAY & PETERS LIMITED grants MAPLE AVE BETTER LIFE ["The Client(s)"], their solicitor and other related parties permission to use "Original Copies" of the Surveyor's Real Property Report in transactions involving "The Client(s)".

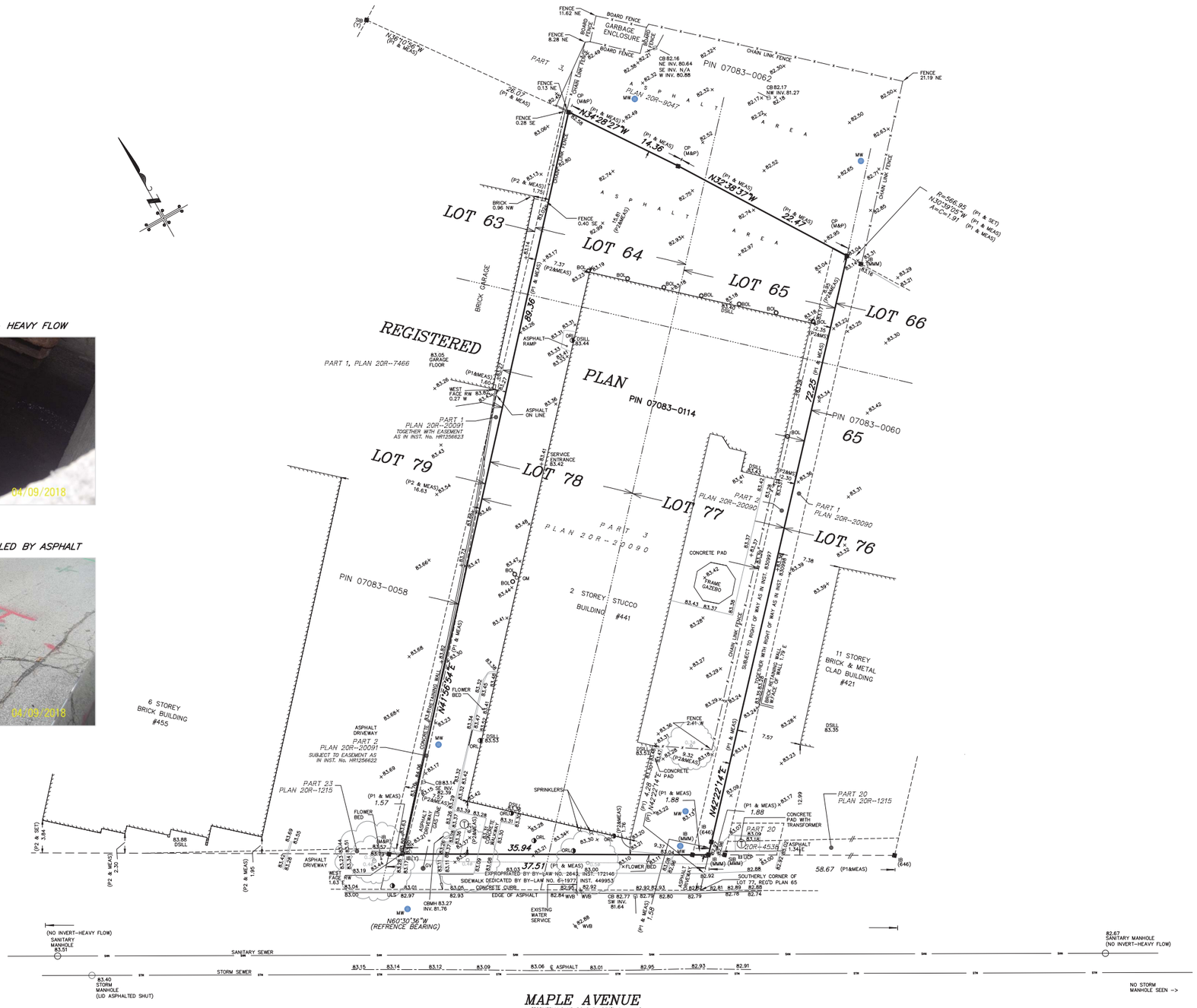
"METRIC" DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

MAPLE AVENUE SANITARY SEWER – HEAVY FLOW



MAPLE AVENUE STORM SEWER – SEALED BY ASPHALT





Legend :

- ■ DENOTES A SURVEY MONUMENT FOUND
- SIB DENOTES STANDARD IRON BAR
- IB DENOTES IRON BAR
- ℄ DENOTES CENTRE LINE
- P1 DENOTES PLAN 20R–20090
- P2 DENOTES PLAN BY MACKAY, MACKAY & PETERS LIMITED, DATED MAY 24, 2014 (FILE 14–025–1)
- # DENOTES ROUND
- CP DENOTES CONCRETE PIN
- PIN DENOTES PROPERTY IDENTIFICATION NUMBER
- WVB DENOTES WATER VALVE BOX
- CB DENOTES CATCH BASIN
- UCP DENOTES UTILITY CABLE PEDESTAL
- T DENOTES TRANSFORMER
- MH DENOTES MANHOLE
- DSILL DENOTES ELEVATION AT DOOR SILL
- MW DENOTES MONITORING WELL
- GV DENOTES GAS VALVE
- BOL DENOTES BOLLARDS
- GM DENOTES GAS METER
- ULS DENOTES UTILITY LIGHT STANDARD
- RW DENOTES RETAINING WALL

BUILDING TIES SHOWN HEREON ARE TO FOUNDATION UNLESS OTHERWISE NOTED.

Benchmark Note:

CITY OF BURLINGTON BENCHMARK No. 314 — ELEVATION = 84.163 METRES (CGVD 1929: 1978 READJUSTMENT)

BRASS CAP IN THE TOP OF CURB AT THE NORTHWESTERLY END OF THE PARAPLEGIC RAMP LOCATED AT THE NORTHEAST INTERSECTION OF MAPLE AVENUE AND ELGIN STREET.

Bearing Reference :

BEARINGS ARE UTM GRID AND ARE REFERRED TO THE NORTHEASTERLY LIMIT OF MAPLE AVENUE, HAVING A BEARING OF N60°30'36"W, AS SHOWN ON PLAN 20R–20090.

Surveyor's Certificate :

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH *THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT* AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 6th DAY OF SEPTEMBER, 2018.

MACKAY, MACKAY & PETERS LIMITED

DECEMBER 5, 2018
DATE

PER: ROSS A. CLARKE, O.L.S.

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2063989

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29(3)

CAD FILE: E:\(20) Halton\Registered Plans\RP0065\Lots 64–66 and 76–78\18–200\18–200.dwg

MACKAY MACKAY & PETERS LIMITED
Established 1906

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e–mail: halton@mmplimited.com
Records of Sewell & Sewell and Yates & Yates LTD.

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PARTY CHIEF:	C.M.
CHECKED BY:	K.J.D.
PROJECT NO.:	18–200

Appendix B – Water Servicing Calculations

Domestic Water Demand Calculations

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

Average Day

Halton Water Wastewater Linear Design Manual - Design Factors page 5

Per Capita Demand = 275 L/caps/d 0.00318287 L/cap/s

Halton Region 2017 Development Charge Study

Unit Category	Population Density	Number of Units
Apartments < 2 Bedrooms	1.329	80
Apartments > 2 Bedrooms	1.725	60

Population total = 210 People

Average Day Demand = 0.67 L/s

Halton Water Wastewater Linear Design Manual - Max Daily Demand Peaking Factor page 5

Maximum Daily Demand Peaking Factor	2.25
Maximum Hourly Demand Peaking Factor	4

Max Daily Demand 1.50 L/s

Fire Flow Calculation

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

Fire Underwriters Survey 1999 Water Supply for Public Fire Protection - Page 17

1 **Estimate of the required fire flow for a given area can be determined by the formula:** $F = 220C\sqrt{A}$

Where F = required fire flow in litres/minute
C = coefficient related to the type of construction
A = total floor area in square meters

For non-combustible construction: C =	0.8	
Total area : A =	2,261 m²	* assuming fire resistive building

Therefore F = 220 x 0.8 x (4405)½ =	**8,368**	**L/m**

Fire Underwriters Survey 1999 Water Supply for Public Fire Protection - Page 18

2 **Reduction for fire hazard**

Non-combustible	25%	
	6,275.90	**L/m**

3 **Reduction for Sprinkler protection**

Sprinkler	30%	
	1,883	**L/m**

4 **Addition for Structures exposed within 45m**

3.1-10m	20%	
10.1-20m	15%	
20.1-30m	10%	
	2,824	**L/m**

5 **Total Estimated Fire flow** **7,217** **L/m**

The estimated fire flow is approx.	**8,000**	**L/m**
	133	**L/s**

JACKSON WATERWORKS

Telephone: 905.229.3176
Toll Free: 800.734.5732
email: jww@bellnet.ca
Website: www.jacksonwaterworks.ca

Mr. Steve Park
EXP
220 Commerce Valley Drive West, Suite 110
Markham Ontario **L3T 0A8**

11 August 2020

Jackson Waterworks has recently completed fire hydrant flow testing at 441 Maple Avenue in Burlington.

We define the Test Hydrants as the ones being flowed, and the Base Hydrant as the one where static and residual pressures are recorded. Wherever possible, we inspect the secondary valve for the Test Hydrants to make sure it is in the fully open position. Likewise, we count the number of turns needed to open the Test Hydrants (to make sure it is opening completely).

We do not use pitot conversion factors for different nozzle profiles. The Engineer may use these factors if desired and warranted.

The secondary valve for the Test Hydrant was not accessible for inspection at the time of test.

Testing was completed in accordance with NFPA 291 guidelines.

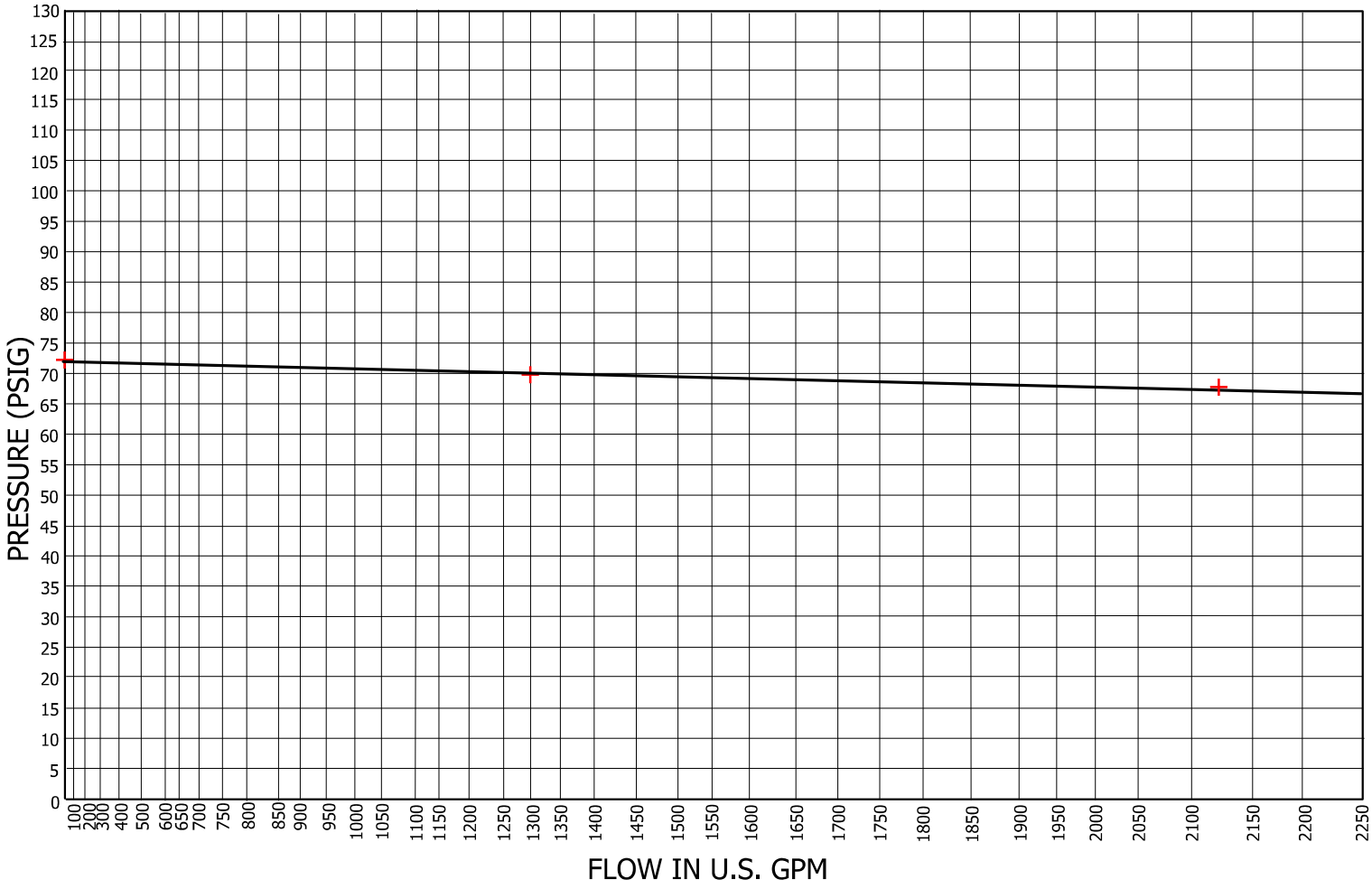
There were no irregularities to report.

Trusting this meets with your approval, we are...

Yours truly,



Mark Schmidt
Jackson Waterworks



# of Ports	PORT DIA. (in/mm)	PITOT (psig)	FLOW (usgpm)	RESIDUAL (psig)
1	2.50/63	60	1300	70
2	2.50/63	40/40	2122	67
THEORETICAL FLOW @ 20psi			7550	

General Data	
Test Date	06 August 2020
Test Time	1:00pm
Pipe Dia.	12"
Static	72

Site Information	
Site or Developer Name	EXP
Site Address/Municipality	441 Maple Avenue, Burlington
Location of Test Hydrant	Front of 441 Maple Avenue
Location of Base Hydrant	Front of 421 Maple Avenue
Technician's Comments	No conversion factor used for flow calculation based on round and flush internal nozzle configuration. Flow testing has been conducted in accrodance with NFPA 291 guidelines wherever possible. Refer to attached report for further information. Verified By: Mark Schmidt

Appendix C – Sanitary Servicing Calculations

Sanitary Flow Calculations
Ex. Building

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

Average Day

Halton Water Wastewater Linear Design Manual - Equivalent Population Density demand page 20

Type of Development	**Population Density**			
Hospitals	4	Person/bed		
Beds:	93	bed		
Unit Sewage Flow	1.1	m3/bed/day		
Population total =	372	People		
Flow	**102.3**	**m3/day**	**1.18**	**L/s**

1 | **Average Day Demand =** | **1.18** | **L/s**

Halton Water Wastewater Linear Design Manual - Peak Wastewater Flow Factor page 22
Peak Factor = 1+(14/(4+(P/1000)^1/2))

2 | **Peaking Factor** | **4.04**

City of Toronto Sewer and Watermain manual 1st Revision March 2014 - infiltration allowance page 37

Infiltration allowance	0.286	L/s/ha
Total Area	0.28	ha

3 | **Infiltration** | **0.080** | **L/s**

City of Toronto Sewer and Watermain manual 1st Revision March 2014 - Peak Desgin Flow page 36

Design Flow = average flow x peaking factor + infiltration allowance

4 | **Design Flow =** | **4.86** | **L/s**

Sanitary Flow Calculations
Prop. Building

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A0**
CREATED BY: **J.L**
CHECKED BY **S.P**

Average Day

Halton Region 2017 Development Charge Study

Unit Category	Population Density	Number of Units
Apartments < 2 Bedrooms	1.329	80
Apartments > 2 Bedrooms	1.725	60

Population total = 210 People
Residential Average Flow 0.275 m3/cap/d

Flow **57.7 m3/day** **0.67 L/s**

1 | **Average Day Demand =** | **0.67** | **L/s**

Halton Water Wastewater Linear Design Manual - Peak Wastewater Flow Factor page 22
Peak Factor = 1+(14/(4+(P/1000)^1/2))

2 | **Peaking Factor** | **4.14**

City of Toronto Sewer and Watermain manual 1st Revision March 2014 - infiltration allowance page 37

Infiltration allowance 0.286 L/s/ha
Total Area 0.28 ha

3 | **Infiltration** | **0.080** | **L/s**

City of Toronto Sewer and Watermain manual 1st Revision March 2014 - Peak Desgin Flow page 36

Design Flow = average flow x peaking factor + infiltration allowance

4 | **Design Flow =** | **2.85** | **L/s**

Appendix D – Stormwater Management Calculations

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Oct-20**
PRINTED: **7-Oct-20**

Pre-Development Runoff Coefficients and Peak Flows (Existing Conditions)
City of Burlington

Contributing Area	ID#	Runoff Coefficient	AREA (ha)
South Parcel (To Maple Avenue)	101	0.80	0.13
North Parcel (To Brock Avenue)	102	0.85	0.16
Total		0.83	0.29

Runoff Coefficients

Rooftops	0.9
Asphalt/Concrete	0.9
Parks and Open Space	0.3

Pre-Development Flows for Maple Avenue

Time of Concentration	10	minutes		
5 Year Intensity	88.09	mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	25.5 l/s
25 Year Intensity	117.72	mm/hr	$Q_{(25\ Year)}$ = C*(1.1)*I*A/360	37.5 l/s
100 Year Intensity	141.89	mm/hr	$Q_{(100\ Year)}$ = C*(1.0)*I*A/360	51.2 l/s

---

Pre-Development Flows for Brock Avenue

Time of Concentration	10	minutes		
5 Year Intensity	88.09	mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	33.2 l/s
25 Year Intensity	117.72	mm/hr	$Q_{(25\ Year)}$ = C*(1.1)*I*A/360	48.7 l/s
100 Year Intensity	141.89	mm/hr	$Q_{(100\ Year)}$ = C*(1.0)*I*A/360	63.1 l/s

---

Pre-Development Flows for the Site

Time of Concentration	10	minutes		
5 Year Intensity	88.09	mm/hr	$Q_{(5\ Year)}$ = C*I*A/360	58.6 l/s
25 Year Intensity	117.72	mm/hr	$Q_{(25\ Year)}$ = C*(1.1)*I*A/360	86.2 l/s
100 Year Intensity	141.89	mm/hr	$Q_{(100\ Year)}$ = C*(1.0)*I*A/360	114.3 l/s

---

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Oct-20**
PRINTED: **7-Oct-20**

Post-Development Runoff Coefficients and Peak Flows
City of Burlington

Runoff Coefficients
Rooftops: 0.90
Pavement/Concrete: 0.90
Landscape: 0.30

Contributing Area	ID#	Runoff Coefficient	AREA (Ha)
Impervious/Paved Area of Controlled Area	200	0.90	0.28
Uncontrolled Area to Maple Avenue	301	0.30	0.006
Uncontrolled Area to Brock Avenue	302	0.30	0.004
Total Area Controlled		**0.90**	**0.28**
Total Area Uncontrolled		**0.30**	**0.01**
Total		**0.88**	**0.29**

Post-Development Controlled Flows

Time of Concentration	10 minutes		
5 Year Intensity	88.09 mm/hr	$Q_{(5\ Year)} = C*I*A/360$	61.7 l/s
25 Year Intensity	117.72 mm/hr	$Q_{(25\ Year)} = C*(1.1)*I*A/360$	90.6 l/s
100 Year Intensity	141.89 mm/hr	$Q_{(100\ Year)} = C*(1.0)*I*A/360$	110.4 l/s

Post-Development Uncontrolled Flows to Maple Ave

Time of Concentration	10 minutes		
5 Year Intensity	88.09 mm/hr	$Q_{(5\ Year)} = C*I*A/360$	0.4 l/s
25 Year Intensity	117.72 mm/hr	$Q_{(25\ Year)} = C*(1.1)*I*A/360$	0.6 l/s
100 Year Intensity	141.89 mm/hr	$Q_{(100\ Year)} = C*(1.25)*I*A/360$	0.9 l/s

Post-Development Uncontrolled Flows to Brock Avenue

Time of Concentration	10 minutes		
5 Year Intensity	88.09 mm/hr	$Q_{(5\ Year)} = C*I*A/360$	0.3 l/s
25 Year Intensity	117.72 mm/hr	$Q_{(25\ Year)} = C*(1.1)*I*A/360$	0.4 l/s
100 Year Intensity	141.89 mm/hr	$Q_{(100\ Year)} = C*(1.25)*I*A/360$	0.6 l/s

441 Maple Ave
City of Burlington
100 Year Allowable Release

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Oct-20**
PRINTED: **7-Oct-20**

INPUT

Required Discharge (l/s) =	**47.20**
Max. Water Surface Elev. (m) =	**83.020**
Discharge Pipe Invert (m) =	**80.230**
Discharge Pipe Diameter (mm) =	**300**
Orifice Diameter (mm) =	**115**
Orifice Flow Loss (C) =	**0.62**

OUTPUT

H =	**2.7325**	**m**
g =	**9.806**	
V = (2*g*H)^0.5 =	**7.321**	**m/s**
A = X-section Area =	**0.0104**	**m2**

Orifice Flow = Q = C * A * V * 1000 =	**47.1**	**l/s**

441 Maple Ave
City of Burlington
5 Year Allowable Release

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Oct-20**
PRINTED: **7-Oct-20**

INPUT

Required Discharge (l/s) =	**22.30**
Max. Water Surface Elev. (m) =	**83.020**
Discharge Pipe Invert (m) =	**80.230**
Discharge Pipe Diameter (mm) =	**300**
Orifice Diameter (mm) =	**75**
Orifice Flow Loss (C) =	**0.62**

OUTPUT

H =	**2.7525**	**m**
g =	**9.806**	
V = (2*g*H)^0.5 =	**7.347**	**m/s**
A = X-section Area =	**0.0044**	**m2**

Orifice Flow = Q = C * A * V * 1000 =	**20.1**	**l/s**

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Oct-20**
PRINTED: **7-Oct-20**

Required Storage Volume

City of Burlington

Control 100 year Post Development to 100 Year Pre Development

Controlled Site Area	0.29	Ha
Allowable Release From Site	51.2	l/s
Uncontrolled Runoff From Site (100year)	1.5	l/s
Groundwater Pumping Rate	2.5	l/s
Net Allowable Release From Site	**47.2**	l/s
Orifice Release From Site	**47.1**	l/s
Composite Runoff Coefficient (Controlled Area)	0.9	
Time of Concentration	10	minutes

100 Year Storm I = 1114.2/(t+5)^0.761

Storm Duration (minutes)	Rainfall Intensity (mm/hr)	Total Runoff Q (l/s)	Required Storage Volume (m^3)
1	284.964	229.6	10.9
2	253.422	204.1	18.8
3	228.935	184.4	24.7
4	209.307	168.6	29.2
5	193.180	155.6	32.6
6	179.665	144.7	35.1
7	168.154	135.5	37.1
8	158.217	127.5	38.6
9	149.541	120.5	39.6
10	141.892	114.3	40.3
11	135.091	108.8	40.7
12	129.001	103.9	40.9
13	123.510	99.5	**40.9**
14	118.531	95.5	40.6
15	113.993	91.8	40.3
16	109.838	88.5	39.7
17	106.018	85.4	39.1
18	102.492	82.6	38.3
19	99.225	79.9	37.4
40.9m^3 of Storage is required			

PROJECT: **441 Maple Ave**
PROJECT No: **ALL-00251529-A1**
CREATED: **7-Oct-20**
PRINTED: **7-Oct-20**

Required Storage Volume

City of Burlington

Control 100 year Post Development to 5 Year Pre Development

Controlled Site Area	0.29	Ha
Allowable Release From Site	51.2	l/s
Uncontrolled Runoff From Site (100year)	1.5	l/s
Groundwater Pumping Rate	2.5	l/s
Net Allowable Release From Site	**47.2**	l/s
Orifice Release From Site	**20.1**	l/s
Composite Runoff Coefficient (Controlled Area)	0.9	
Time of Concentration	10	minutes

100 Year Storm I = 1114.2/(t+5)^0.761

Storm Duration (minutes)	Rainfall Intensity (mm/hr)	Total Runoff Q (l/s)	Required Storage Volume (m^3)
2	253.422	204.1	22.1
4	209.307	168.6	35.6
6	179.665	144.7	44.9
8	158.217	127.5	51.5
10	141.892	114.3	56.5
12	129.001	103.9	60.3
14	118.531	95.5	63.3
16	109.838	88.5	65.6
18	102.492	82.6	67.5
20	96.190	77.5	68.9
22	90.718	73.1	69.9
24	85.917	69.2	70.7
26	81.665	65.8	71.3
28	77.871	62.7	71.6
30	74.461	60.0	**71.8**
32	71.378	57.5	71.8
34	68.575	55.2	71.7
72m^3 of Storage is required			

ON-LINE
Jellyfish Filter Sizing Report

Project Information

Date	Friday, November 02, 2018
Project Name	441 Maple Ave
Project Number	
Location	Burlington

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 JF6-3-1-L1 is recommended to meet the water quality objective by treating a flow of 17.7 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 Jellyfish Model has a Peak Flow Capacity of 131 L/s. This model has a sediment capacity of 199 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)	Peak Capacity (L/s)	Bypass MAW	Sediment Capacity (kg)
JF6-3-1-L1	3	1	1.8	17.7	131	Yes	199

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 maintenance is necessary to assure proper functioning of the Jellyfish Filter. The maintenance inverval is designed to be a minimum of 12 months, but this will vary significantly with on-line desings based on storm event conditions, 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:

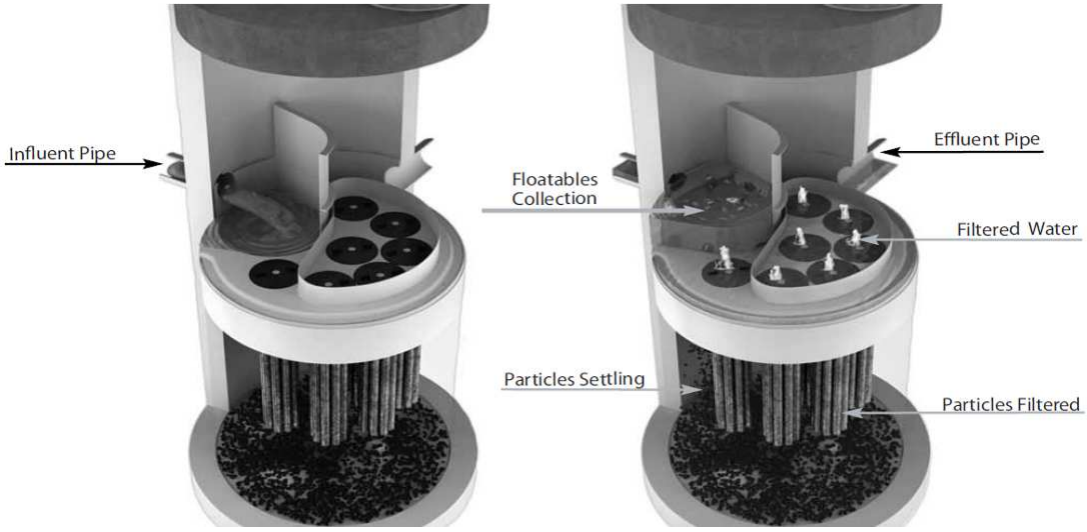
- ☑ 89% of the total suspended solids (TSS) load, including particles less than 5 microns
- ☑ 59% TP removal & 51% TN removal
- ☑ 90% Total Copper, 81% Total Lead, 70% Total Zinc
- ☑ Particulate-bound pollutants such as nutrients, toxic metals, hydrocarbons and bacteria
- ☑ Free oil, Floatable trash 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 59%, and a median Total Nitrogen removal of 51%.

Jellyfish Filter Treatment Functions



Pre-treatment and Membrane Filtration

GENERAL NOTES:

UNLESS OTHERWISE NOTED ON THIS DRAWING THE FOLLOWING REQUIREMENTS SHALL APPLY.

GENERAL

1. CONSTRUCTION OF SEWERS, AND RELATED APPURTENANCES SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT STANDARD DRAWINGS OF THE CITY OF BURLINGTON, THE REGIONAL MUNICIPALITY OF HALTON, AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD).
2. ONTARIO PROVINCIAL STANDARD DRAWINGS TO BE READ IN CONJUNCTION WITH THE REGION OF HALTON REVISIONS.
3. ALL DIMENSIONS ARE IN METRES AND ALL DIAMETERS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
4. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH "THE OCCUPATIONAL HEALTH & SAFETY ACT". THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONTRACTOR AS DEFINED IN THE ACT.
5. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
6. ALL TEMPORARY TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION, PERMANENT SIGNS AND LANE MARKINGS SHALL BE IN ACCORDANCE WITH ONTARIO TRAFFIC MANUAL FOR TEMPORARY CONDITIONS AND MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
7. FOR ALL SEWERS AND WATERMAIN IN FILL SECTIONS, THE COMPACTION SHALL BE VERIFIED PRIOR TO LAYING OF PIPE.
8. ALL EXCAVATIONS TO BE BACKFILLED WITH NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO 95% SPD.
9. ALL UNDERGROUND SERVICE CONNECTIONS AND TRENCHES WITHIN PAVED PORTION OF AN EXISTING ROAD ARE TO BE BACKFILLED WITH UNSHRINKABLE MATERIAL.
10. ALTERNATIVE CONSTRUCTION MATERIALS MAY BE ACCEPTABLE, PROVIDED THAT APPROVAL HAS BEEN OBTAINED FROM THE REGIONAL ENGINEER, CITY OF BURLINGTON AND THE ENGINEER.
11. MUNICIPAL APPROVAL OF THESE DRAWINGS IS FOR MATERIAL AND COMPLIANCE WITH CITY OF BURLINGTON AND PROVINCIAL SPECIFICATIONS AND STANDARDS ONLY. APPROVAL AND INSPECTION OF THE WORKS BY THE CITY OF BURLINGTON STAFF DOES NOT CERTIFY THE LINE AND GRADE OF THE WORKS NOR RELIEVE THE CONTRACTOR OF CERTIFICATION OF ALL WORKS BY THE OWNER'S ENGINEER.
12. ALL DIMENSIONS TO BE CHECKED BY THE CONTRACTOR FOR ACCURACY PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES REPORTED TO THE ENGINEER.
13. ALL SERVICES TO MEET ALL REQUIREMENTS OF THE ONTARIO BUILDING CODE PART 7 CURRENT EDITION

LOCATES AND LIABILITY

1. THE CONTRACTOR SHALL RECTIFY ALL DISTURBED AREAS TO THE ORIGINAL CONDITION OR BETTER AND TO THE SATISFACTION OF THE CITY.
2. THE LOCATION OF ALL UNDER/ABOVE GROUND UTILITIES AND STRUCTURES ARE APPROXIMATE ONLY, AND WHERE SHOWN ON THE DRAWING(S) THE ACCURACY OF THE LOCATION OF SUCH UTILITIES ARE NOT GUARANTEED THE CONTRACTOR SHALL DETERMINE THE LOCATION OF ALL SUCH UTILITIES AND STRUCTURES BY CONSULTING THE APPROPRIATE AUTHORITIES OR UTILITY COMPANIES CONCERNED. THE CONTRACTORS SHALL PROVE THE LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE OR RESTORATION TO SAME.
3. THE OWNER SHALL BE NOTIFIED IMMEDIATELY OF ANY CONFLICTS WITH EXISTING SERVICES.
4. ANY UTILITY WHICH CONFLICTS WITH THE CONSTRUCTION IS TO BE RELOCATED BY THE PROPER AUTHORITY AT THE OWNER'S EXPENSE.

CONSTRUCTION RESPONSIBILITIES

1. LOCATION OF EXISTING UTILITIES SHOWN AND ALL OTHER EXISTING UTILITIES TO BE ESTABLISHED BY CONTRACTOR IN THE FIELD. THE CONTRACTOR HAVING UNCOVERED ANY UTILITIES THAT ARE NOT SHOWN ON THE PLAN OR STAKED OUT BY BELL, HYDRO, CABLE & GAS UTILITY COMPANIES WILL IMMEDIATELY ADVISE THE ENGINEER FOR APPROPRIATE ACTION. THE CONTRACTOR IS RESPONSIBLE FOR TRACING AND IDENTIFYING ALL EXISTING PRIVATE UTILITIES WITHIN THE WORK AREAS.
2. THE CONTRACTOR(S) SHALL BE SOLELY RESPONSIBLE FOR LOCATING, SUPPORTING AND PROTECTING ALL 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. TWO LANES OF TRAFFIC ARE TO BE MAINTAINED AT ALL TIMES DURING THE PERFORMANCE OF THE WORK ON WABASH AVENUE. THE CONTRACTOR SHALL ADVISE THE CITY OF TORONTO IN WRITING NOT LESS THAN 48 HRS IN ADVANCE OF START OF CONSTRUCTION AND SHALL ACQUIRE THE APPROPRIATE PARTIAL ROAD CLOSURE PERMITS AS NECESSARY.
4. ALL EXISTING PAVEMENTS, CURBS, SIDEWALKS, DRIVEWAYS AND SODDED BOULEVARD AREAS DISTURBED BY THE WORK ARE TO BE REINSTATED EQUAL TO EXISTING AND TO THE SATISFACTORY OF THE CITY OF TORONTO.
5. NEW MANHOLES AND VALVE BOXES, EXISTING VALVE AND CHAMBERS, HYDRANT AND BELL PEDESTALS AND UTILITIES TO BE SET TO FINAL BOULEVARD AND PAVEMENT GRADES.
6. THE CONTRACTOR SHALL NOTIFY IN ADVANCE, AS REQUIRED, THE APPROPRIATE AUTHORITY HAVING JURISDICTION FOR THE ROAD PRIOR TO COMMENCING ANY WORK AND SHALL ACQUIRE AND SATISFY THE REQUIREMENTS OF THE APPROPRIATE PERMITS (FEES, INSPECTIONS, SIGNAGE, TRAFFIC MAINTENANCE, DIVERSION, ETC) FROM THE AUTHORITY.
7. THE CONTRACTOR SHALL SUPPLY AND PLACE TRAFFIC SIGNAGE IN CONFORMANCE WITH THE MTO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES PRIOR TO COMMENCING ANY WITHIN THE MUNICIPAL ROAD/LANE ALLOWANCE.

SILTATION CONTROL

1. CHECK DAMS AND SILTATION CONTROL FENCES SHALL BE INSTALLED AND MAINTAINED AS REQUIRED TO PREVENT SILT FROM FLOWING ONTO THE ADJACENT LANDS.
2. ALL SILTATION CONTROL MEASURES SHALL BE CLEANED AND MAINTAINED AFTER EACH RAINFALL AS DIRECTED AND TO THE SATISFACTION OF THE CITY OF BURLINGTON AND/OR CONSERVATION HALTON.
3. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE ENGINEER, THE CITY OF BURLINGTON AND/OR CONSERVATION HALTON.
4. HOARDING OR SILT FENCING SHALL BE ERECTED AND MAINTAINED PRIOR TO ANY GRADING OR CONSTRUCTION AND SHALL REMAIN IN PLACE AND IN GOOD REPAIR THROUGHOUT THE CONSTRUCTION GRADING PHASE.
5. TERRAFIX SILTSACKS SHALL BE PLACED IN ALL CATCHBASINS. SILT TRAPS ARE TO BE CLEANED REGULARLY AND ARE NOT TO BE REMOVED UNTIL CURBS ARE CONSTRUCTED AND BOULEVARDS AND BACKYARDS ARE GRADED AND SODDED. FILTER FABRIC USED FOR SILT CONTROL SHALL BE TERRA FIX 270R OR AN APPROVED EQUAL.
6. MUD TRACKING AND DUST MUST BE CONTROLLED ON ALL ROADWAYS TO THE SATISFACTION OF THE CITY.

INSPECTIONS AND NOTIFICATIONS

1. THE CITY OF BURLINGTON IS TO BE NOTIFIED 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY UNDERGROUND INSTALLATIONS OR WORK WITHIN THE ROAD IN ORDER TO ARRANGE FOR INSPECTION.
2. THE CONTRACTOR IS TO NOTIFY BURLINGTON HYDRO PRIOR TO BACKFILLING IN THE CASE WHERE ANY BURIED HYDRO HAS BEEN EXPOSED.

ROADWORKS

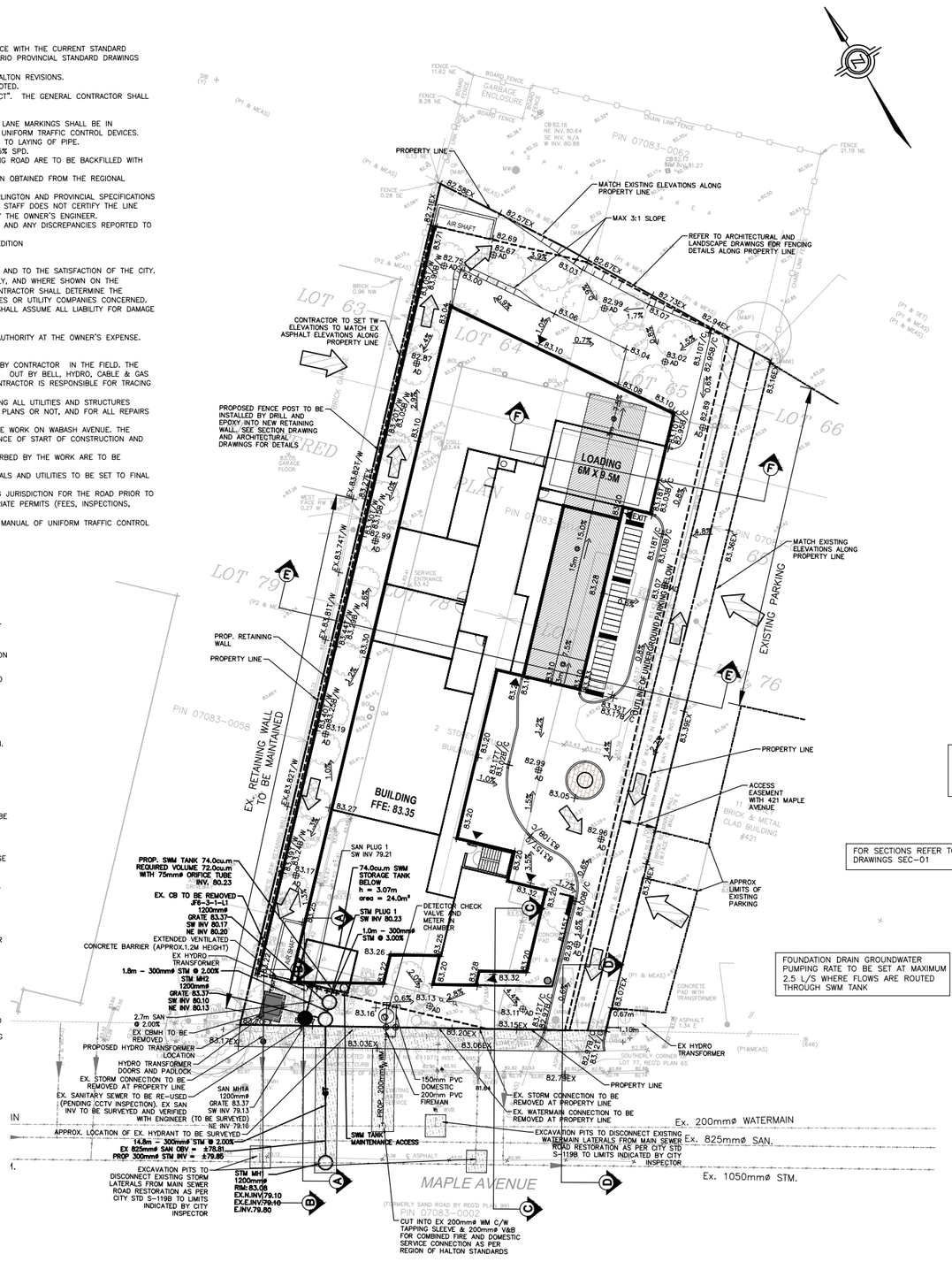
1. APPROVED FILL, FREE OF DELETERIOUS AND ORGANIC MATERIAL AND BOULDERS SHALL BE COMPACTED TO A DRY DENSITY NOT LESS THAN 95% THAN THE SPD, AFTER COMPACTION, SOIL DENSITY TESTS SHALL BE CONDUCTED TO ENSURE ADEQUATE COMPACTION AND STABILITY OF THE FILL AND TEST RESULTS SHALL BE SUBMITTED TO THE ENGINEER.
2. SUBGRADE TO BE PROOF ROLLED PRIOR TO PLACEMENT TO SUB BASE. UNSUITABLE MATERIAL TO BE REMOVED AND REPLACED WITH SELECT FILL OF GRANULAR "B" AND COMPACTED TO 98% SPD.
3. PRIOR TO THE INSTALLATION OF ANY GRANULAR MATERIAL THE SOILS CONSULTANT MUST ISSUE A COMPACTION CERTIFICATE AND OBTAIN APPROVAL FROM THE CITY.
4. BOULEVARDS TO BE SODDED WITH #1 NURSERY SOD ON A MINIMUM 100mm OF SELECT TOPSOIL.
5. MANHOLE FRAMES AND COVERS AND WATER VALVE BOXES SHALL BE SET FLUSH WITH BASE COURSE ASPHALT AND ADJUSTED TO FINAL GRADE AFTER INSTALLATION OF SURFACE ASPHALT AS PER CITY OF BURLINGTON STANDARD DRAWING S-130.
6. STANDARD PARKING SPACES SHALL BE 2.75mx6.0m. ACCESSIBLE PARKING SPACES SHALL BE 2.75mx6.0m AND SHALL HAVE AN ADJACENT ACCESS AISLE AT LEASE 2.0m WIDE, AS PER CITY OF BURLINGTON ACCESSIBILITY DESIGN STANDARD (SECTION 4.3.12).

RESTORATIONS

1. ALL TRENCH EXCAVATIONS WITHIN EXISTING ROAD ALLOWANCES SHALL BE AS BACKFILLED AS PER CITY OF BURLINGTON STANDARD DRAWINGS S-114 AND S-114A.
2. EXISTING PRIVATE FENCING IS TO BE MAINTAINED THROUGHOUT CONSTRUCTION, WHERE REMOVAL OR RELOCATION OF FENCING IS NECESSARY IT SHALL BE RESTORED OR REPLACED TO ORIGINAL CONDITIONS OR BETTER UNDER THE DIRECTION OF THE ENGINEER.
3. DAMAGED CURB, GUTTER AND SIDEWALK TO BE REPLACED WITH 28 MPa CONCRETE TO EXISTING CONDITIONS OR BETTER.
4. PAVEMENT SURFACE ON EXISTING PALLADIUM WAY TO BE REPAIRED BY CONTRACTOR AT THEIR EXPENSE IF DAMAGED BY CONSTRUCTION TRAFFIC.

SITE GRADING

1. PRIOR TO ANY GRADING THE CONTRACTOR SHALL CHECK AND VERIFY ALL EXISTING AND PROPOSED UTILITIES AND SERVICES FOR THEIR LOCATIONS AND ELEVATIONS REPORTING ANY DISCREPANCIES TO THE ENGINEER.
2. THE EXISTING GROUND ELEVATIONS, SERVICING AND SURVEY INFORMATION SHOWN ON THIS DRAWING ARE SUPPLIED FOR THE GENERAL INFORMATION ONLY. IT SHALL BE THE CONSTRACTOR'S RESPONSIBILITY TO VERIFY THE ACCURACY OF ALL INFORMATION OBTAINED FROM THIS DRAWING.
3. THE CONTRACTOR IS RESPONSIBLE FOR THE SUPPLY AND PLACEMENT OF CERTIFIED CLEAN EARTH FILL AND GRANULAR MATERIALS AS NECESSARY TO COMPLETE THE LANDSCAPING GRADING WORKS.
4. ALL GROUND SURFACES SHALL BE EVENLY GRADED WITHOUT LOW POINTS AND PONDING AREAS EXCEPT WHERE AREA DRAINS AND CATCHBASIN OUTLETS ARE PROVIDED.
5. SITE GRADING IS TO BE COMPLETED TO CONFORM TO THE LANDSCAPE DESIGN. REFER TO THE LANDSCAPE DRAWINGS FOR DETAILS.
6. AREA DRAINS AND CATCHBASINS TO BE SET TO ELEVATIONS DETAILED ON THIS DRAWING BY CONTRACTOR.
7. MINIMUM SURFACE GRADES (EXCLUDING SWALES) (A) GRASS YARD AREAS – 2.0% (B) PAVED DRIVEWAY AND PARKING AREAS – 0.6%
8. THE GRADING OF THE SITE IS TO BE PERFORMED TO PROVIDE FINISHED PERIMETER SURFACES WHICH ARE FLUSH WITH GIVEN STREETLINE, PUBLIC LANE AND AND SIDE LINE ELEVATIONS.



SANITARY SEWERS

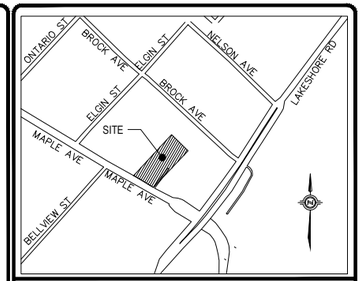
1. SANITARY SEWERS SHALL BE PVC. PVC PIPE IS TO BE BELL AND SPIGOT AND COMPLY TO ASTM D-3034 WITH MINIMUM SDR 35.
2. MINIMUM BEDDING REQUIREMENTS FOR ALL SANITARY SEWER MAINS AND RELATED CONNECTIONS IN A SINGLE TRENCH SHALL BE CLASS B GRANULAR BEDDING AS PER OPSD 802.010 UNLESS OTHERWISE NOTED.
3. SANITARY SEWER MANHOLES FRAME AND COVER AS PER OPSD 401.01.
4. ALL PVC LATERALS TO BE SDR 28 AND SHALL BE ANY COLOUR EXCEPT WHITE. MINIMUM SLOPE OF LATERAL TO BE 2.0%.
5. SINGLE SERVICE CONNECTIONS TO BE MINIMUM 125mm DIA PIPE.
6. TAPPING AT EXISTING SANITARY SEWERS SHALL BE UNDERTAKEN IN ACCORDANCE WITH REGION OF HALTON REQUIREMENTS.
7. ALL SEWERS TO BE VIDEO INSPECTED.
8. ALL SEWERS TO BE FLUSHED PRIOR TO VIDEO INSPECTION.
9. ALL PVC SEWERS ARE TO BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AFTER INSTALLATION. SANITARY SEWERS SHALL ALSO BE TESTED FOR LEAKAGE (LOW AIR PRESSURE). PRIOR TO ASSUMPTION BY THE CITY, PIPE DEFLECTION TESTING SHALL BE REPEATED.

STORM SEWERS

1. ALL SEWER PIPE UP TO AND INCLUDING 375mm DIA SHALL BE PVC, BELL AND SPIGOT AND SHALL COMPLY TO ASTM D-3034 WITH MINIMUM SDR 35.
2. MINIMUM BEDDING REQUIREMENTS FOR ALL SINGLE STORM SEWER MAINS AND ALL RELATED CONNECTIONS SHALL BE HIGH PERFORMANCE CLEAR STONE (HL-8 GRADED) AS PER CITY OF BURLINGTON STANDARD DRAWING S-188.
3. STORM SEWER MANHOLES SHALL BE IN ACCORANCE WITH OPSD 701.010 AND 703.010. FRAME AND COVER AS PER OPSD 401.01 TYPE A. FRAMES TO BE STAMPED "DANGER" AND "STORM".
4. MANHOLE TOPS SHALL BE INITIALLY SET TO BASE COURSE ASPHALT ELEVATION AND ADJUSTED TO GRADE PRIOR TO PLACEMENT OF TOP LIFT OF ASPHALT.
5. ALL TRENCH EXCAVATIONS ARE TO BE BACKFILLED WITH SELECT NATIVE MATERIAL PLACED IN MAXIMUM 200mm LIFT THICKNESS WITHIN 3% OF THE OPTIMUM MOISTURE CONTENT AND COMPACTED TO A MINIMUM OF 95% SPD, UNLESS OTHERWISE SPECIFIED.
6. ALL SEWERS TO BE VIDEO INSPECTED.
7. ALL SEWERS TO BE FLUSHED PRIOR TO VIDEO INSPECTION.
8. ALL PVC SEWERS ARE TO BE TESTED FOR DEFLECTION (MANDREL PASSAGE) AFTER INSTALLATION. PRIOR TO ASSUMPTION BY THE CITY, PIPE DEFLECTION TESTING SHALL BE REPEATED.

WATERMAINS

1. FLEXIBLE WATERMAIN PIPE UP TO 300mm DIAMETER TO BE PVC DR-18 AND CONFORM TO A.W.W.A. C-900 WITH MECHANICAL JOINTS AS PER A.W.W.A. C-110, AND TO BE INSTALLED WITH A 10 GAUGE TRACER WIRE.
2. FLEXIBLE PIPE BEDDING TO BE OPSD 802.010 WITH COMPACTED GRANULAR B MATERIAL.
3. MINIMUM COVER TO BE 1.7m TO TOP OF PIPE.
4. DEFLECTION AT JOINTS NOT TO EXCEED 2.5 DEGREES AND SHALL BE EQUAL AT ALL JOINTS.
5. GATE VALVES AND BOXES FOR 150mm DIAMETER WATERMAINS AS PER A.W.W.A. STANDARD C-500 AND ARE TO OPEN TO THE LEFT (COUNTER CLOCKWISE).
6. HYDRANTS SHALL MEET THE REQUIREMENTS OF A.W.W.A. STANDARD C-502 AND SHALL BE SET IN ACCORDANCE WITH REGION OF HALTON, AND CITY OF BURLINGTON BUILDING DEPARTMENT STANDARDS, COMPLETE WITH STEAMER CONNECTIONS. THE 100mm STEAMER PORT SHALL FACE THE FIRE ROUTE AND SHALL BE UNOBSTRUCTED BY ANY PROPOSED LANDSCAPING.
7. ALL FITTINGS TO HAVE MECHANICAL RESTRAINTS THAT MEET UNI-B-13-92.
8. ALL TEMPORARY AND PERMANENT WATERMAIN PLUGS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH OPSD 1103.01.
9. TAPPING AT EXISTING WATERMAINS SHALL BE UNDERTAKEN IN ACCORDANCE WITH REGION OF HALTON REQUIREMENTS.
10. ALL WATER CUSTOMERS SUPPLIED BY A WATERMAIN TO BE SHUT DOWN SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST 48 HOURS IN ADVANCE OF THE SHUT DOWN AS PER REGION OF HALTON SPECIFICATIONS. NOTIFICATION SHALL TAKE PLACE UNDER THE ENGINEER'S DIRECTION.
11. MINIMUM HORIZONTAL SEPARATION BETWEEN WATERMAINS (INCLUDING PRIVATE SERVICES) AND STORM AND SANITARY SEWERS SHALL BE 2.5m. WATERMAINS MUST HAVE A MINIMUM VERTICAL CLEARNACE OF 150mm OVER AND 500mm UNDER SEWERS AND ALL OTHER UTILITIES WHEN CROSSING.



LEGEND:

- 110.00 — EXISTING CONTOUR (1.0m)
- NEW SWM TANK MAINTENANCE ACCESS
- NEW STORM MANHOLE
- NEW SANITARY MANHOLE
- AD — PROPOSED AREA DRAIN
- EXISTING CATCHBASIN
- EXISTING MANHOLE
- NEW / EXISTING WATER VALVE AND BOX
- EXISTING HYDRANT
- +109.42 — PROPOSED ELEVATION
- EXISTING ELEVATION
- 0.6% — DRAINAGE ARROW / SLOPE (MAX 3:1)
- EXISTING LIGHT / UTILITY POLE
- PROPERTY LINE
- ACCESS EASEMENT LINE
- SWALE
- INCOMING EXTERNAL OVERLAND FLOW DIRECTION (BY-PASSED)
- EMERGENCY OVERLAND FLOW DIRECTION (>100-YR STORM)
- DISTURBED AREA WITHIN CITY RIGHT-OF-WAY
- NEW RETAINING WALL

No.	REVISIONS	Date	By	App.
A	2ND ZBA SUBMISSION	OCT 2020	JL	SP

S.W.P.PASSMORE
90539925
2020/10/21
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

CHUMIN PARK
100168818
2020/10/21
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF ONTARIO

exp Services Inc.
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220 Commerce Valley Drive West, Suite 110
Markham, ON L3T 0A8
Canada
www.exp.com

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• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

Owner/Client:

BETTER LIFE RETIREMENT RESIDENCE
(C/O 2564905 ONTARIO INC.)

Location:

441 MAPLE AVENUE
CITY OF BURLINGTON

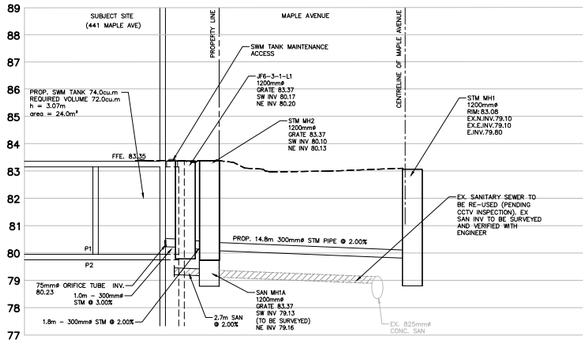
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SITE SERVICING AND GRADING PLAN

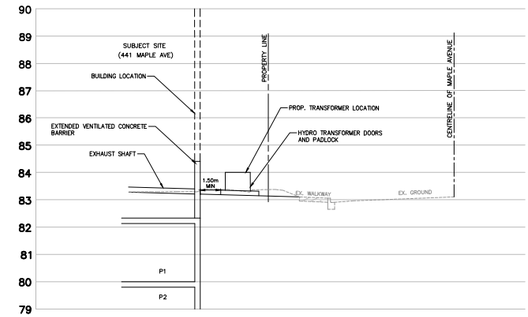
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Scale: 1:250	Date: OCT, 2020	Drawing No.: SG-01	
Project No.: ALL-00251529-A0			

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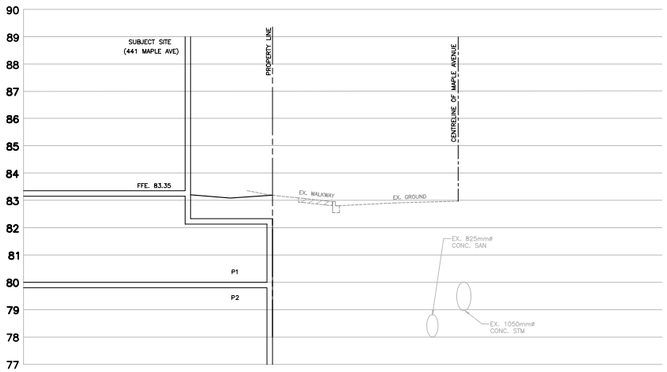
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- SITE PLAN INFORMATION TAKEN FROM ARCHITECTURAL DRAWINGS PREPARED BY MICHAEL SPAZIANI ARCHITECTS INC.
- BACKGROUND MUNICIPAL SERVICING INFORMATION TAKEN FROM RECORD DRAWINGS PROVIDED BY CITY OF BURLINGTON AND REGION OF HALTON
- LANDSCAPE INFORMATION TAKEN FROM LANDSCAPE PLANS PREPARED BY BAKER TURNER INC



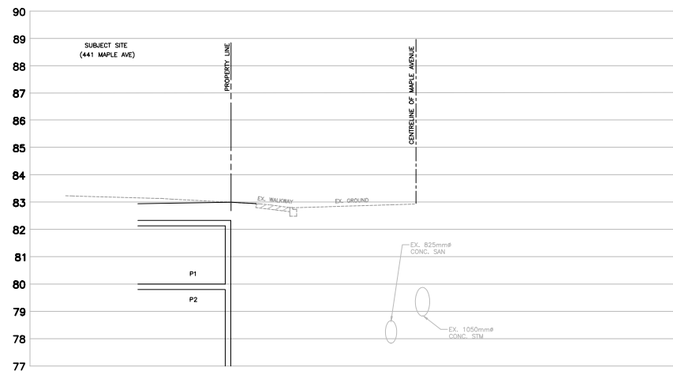
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VERT. 1:100



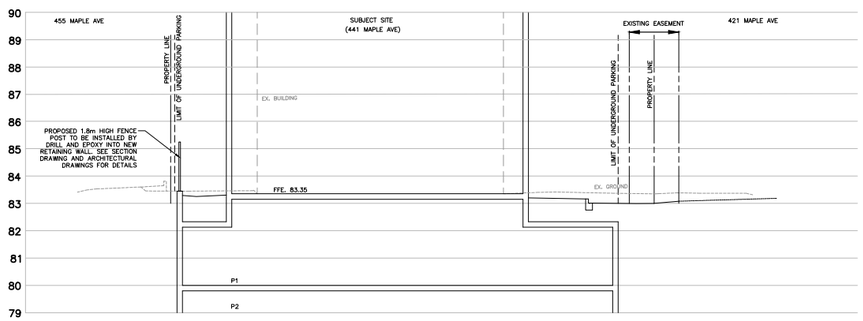
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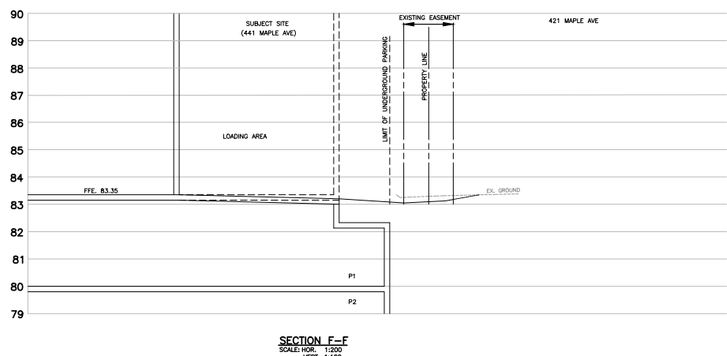
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VERT. 1:100



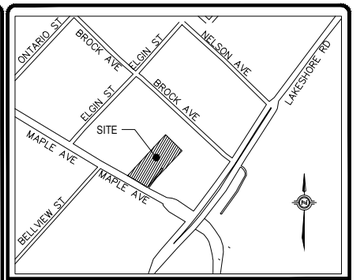
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VERT. 1:100



SECTION E–E
SCALE: HOR. 1:200
VERT. 1:100



SECTION F–F
SCALE: HOR. 1:200
VERT. 1:100



No.	REVISIONS	Date	By	App.
A	2ND ZBA SUBMISSION	OCT 2020	JL	SP

S.W.PASSMORE
90539925
2020/10/21
PROVINCE OF ONTARIO

CHUEMIN PARK
100168818
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Canada
www.exp.com

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• INDUSTRIAL • INFRASTRUCTURE • SUSTAINABILITY •

Owner/Client:

BETTER LIFE RETIREMENT RESIDENCE
(C/O 2564905 ONTARIO INC.)

Location:

441 MAPLE AVENUE
CITY OF BURLINGTON

Title:

CROSS SECTIONS

Designed By: JL	Drawn By: JL	Checked By: SP
Scale: AS SHOWN	Date: OCT, 2020	Drawing No.: SEC-01
Project No.: ALL-00251529-A0		

Appendix E – Additional Background Documents



REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

WATER OPERATING MAPS

TOWN OF BURLINGTON

Protection Valve Type
- Q Air Release
- N Check
- Pressure Reducing
- Surge
- Vacuum

Control Valve
- Valve In Chamber
- System
- Zone Isolation, No ByPass
- Zone Isolation, With ByPass

Fittings
- o Cap
- p Cross
- q Reducer
- v Sleeve
- r Tee
- s Tapping Sleeve

System Structure
- K Booster Station
- L Intake
- J Municipal Well
- I Reservoir
- H Tank
- G Water Purification Plant

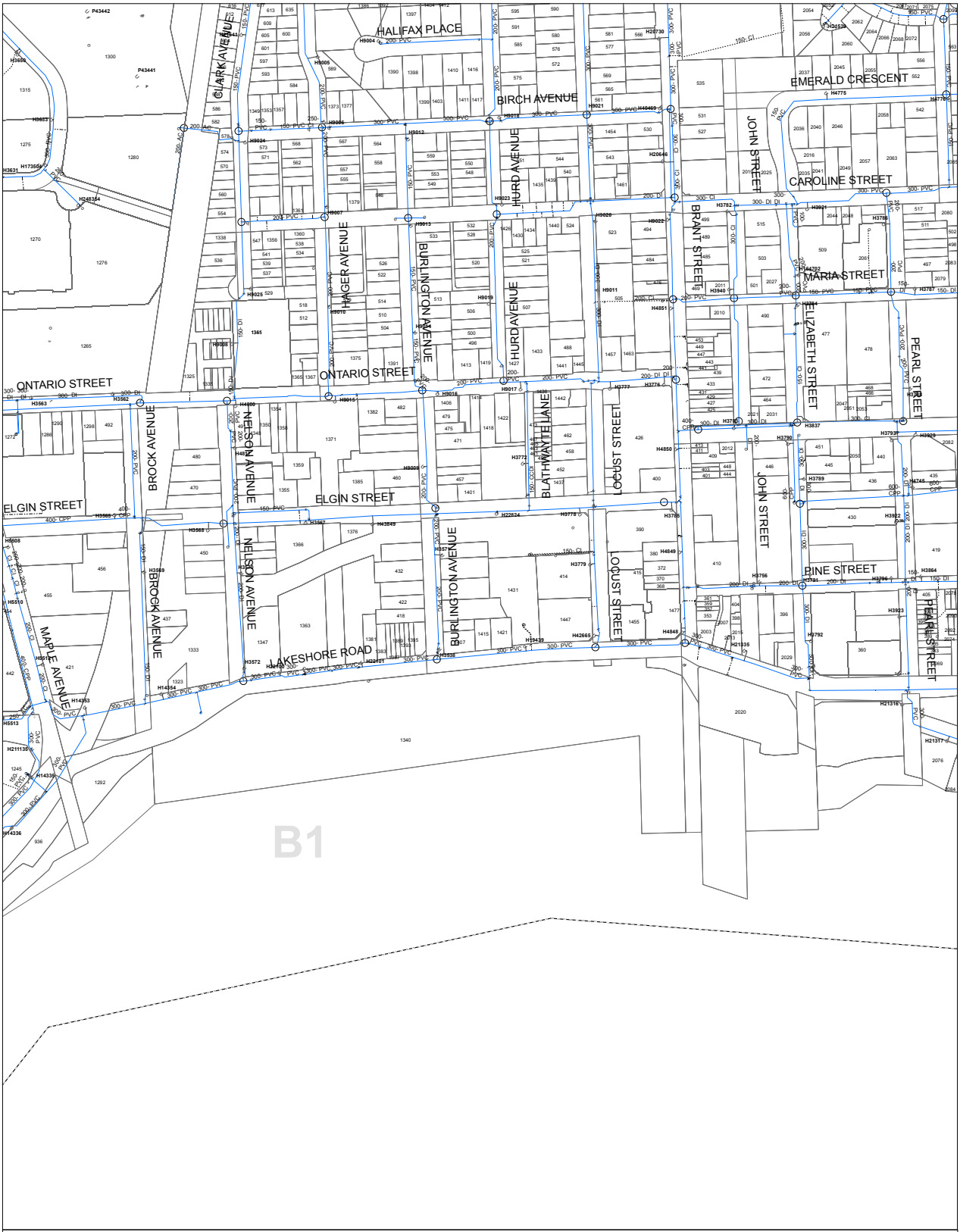
Other
- In Service Watermain
- Proposed Watermain
- Private Watermain/Service Lead
- M System Meter
- U Hydrant
- Chamber
- Pressure Zone
- Municipal Boundary

0 25 50 100 150 200 Meters

Map Index

Grid Number: 202C
Print Date: Oct 26, 2018

REGIONAL MUNICIPALITY OF HALTON IT"S EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED.
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REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

WATER OPERATING MAPS

TOWN OF BURLINGTON

Protection Valve Type
- Q Air Release
- N Check
- Pressure Reducing
- Surge
- Vacuum

Control Valve
- Valve In Chamber
- System
- Zone Isolation, No ByPass
- Zone Isolation, With ByPass

Fittings
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System Structure
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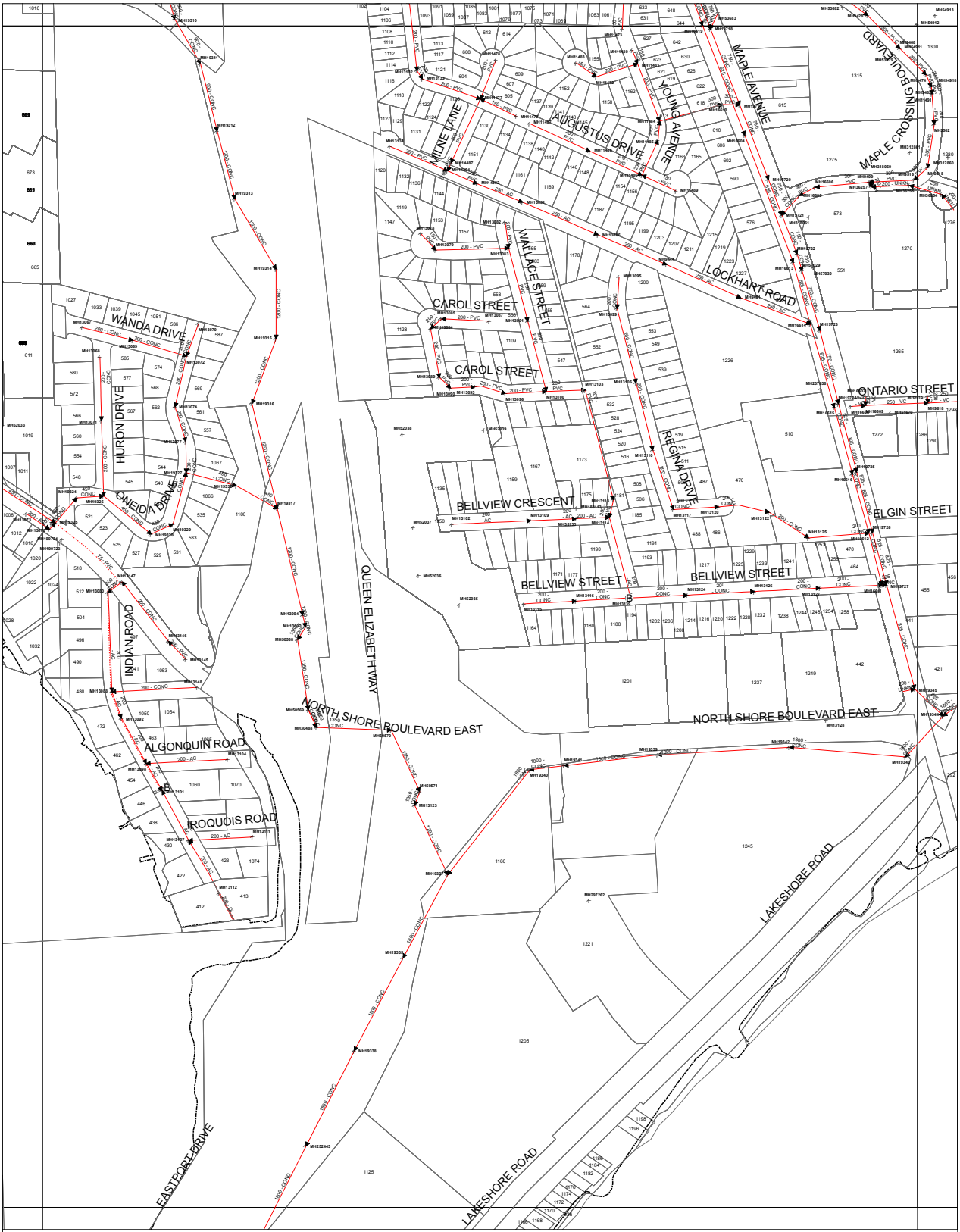
Other
- In Service Watermain
- Proposed Watermain
- Private Watermain/Service Lead
- M System Meter
- U Hydrant
- Chamber
- Pressure Zone
- Municipal Boundary

0 25 50 100 150 200 Meters

Map Index

Grid Number: 203C
Print Date: Oct 26, 2018

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REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

SANITARY OPERATING MAPS

TOWN OF BURLINGTON

Sewer Types

- Treated Discharge Sewer
- Untreated Discharge Sewer
- ForceMain
- Proposed ForceMain
- Gravity Sewer (In Service)
- Gravity Sewer (Out of Service)
- Proposed Gravity Sewer

Maintenance Hole Types

- K Maintenance Hole
- J Chamber

Major System Facilities

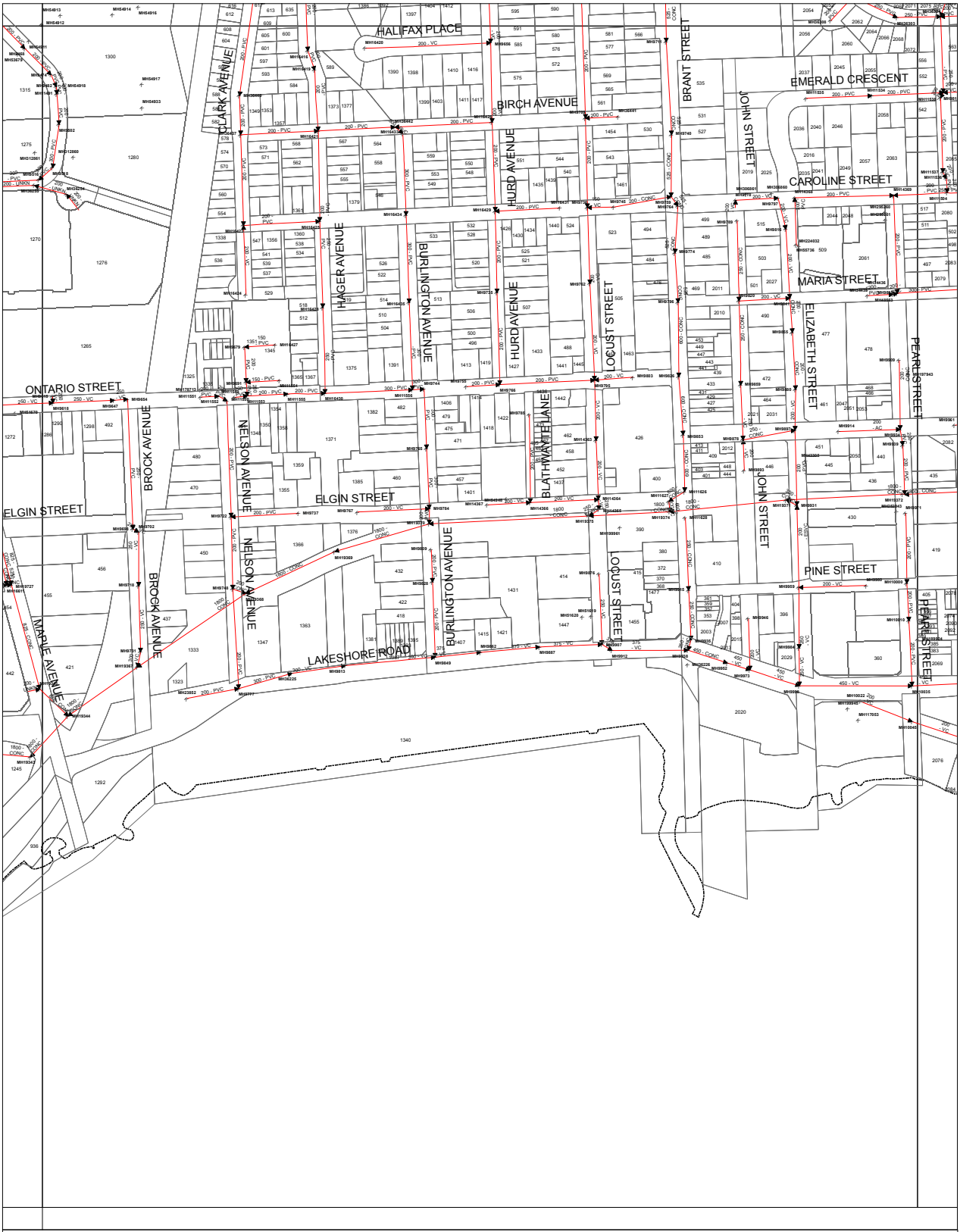
- E Wastewater Storage Tank
- G Wastewater Treatment Plant
- B Pumping Station
- Municipal Boundary

0 25 50 100 150 200 Meters

Map Index

Grid Number: 202D
Print Date: Oct 19, 2018

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Halton REGION

REGIONAL MUNICIPALITY OF HALTON
Department of Public Works

SANITARY OPERATING MAPS

TOWN OF BURLINGTON

Sewer Types

- Treated Discharge Sewer
- Untreated Discharge Sewer
- ForceMain
- Proposed ForceMain
- Gravity Sewer (In Service)
- Gravity Sewer (Out of Service)
- Proposed Gravity Sewer

Maintenance Hole Types

- K Maintenance Hole
- J Chamber

Major System Facilities

- E Wastewater Storage Tank
- G Wastewater Treatment Plant
- B Pumping Station
- Municipal Boundary

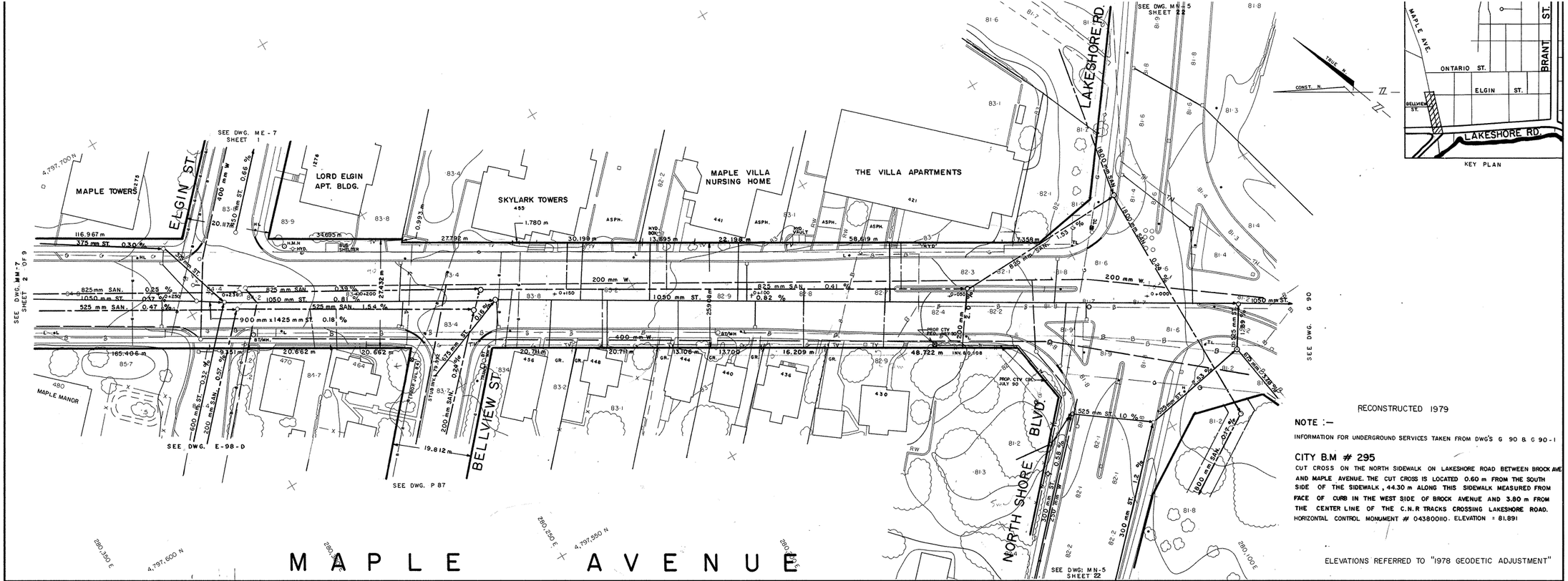
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Map Index

Grid Number: 203C
Print Date: Oct 19, 2018

REGIONAL MUNICIPALITY OF HALTON IT"S EMPLOYEES, OFFICERS AND AGENTS ARE NOT RESPONSIBLE FOR ANY ERRORS, OMISSIONS OR INACCURACIES WHETHER DUE TO THEIR NEGLIGENCE OR OTHERWISE. ALL INFORMATION SHOULD BE VERIFIED.
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MM-7
SH 1



RECONSTRUCTED 1979

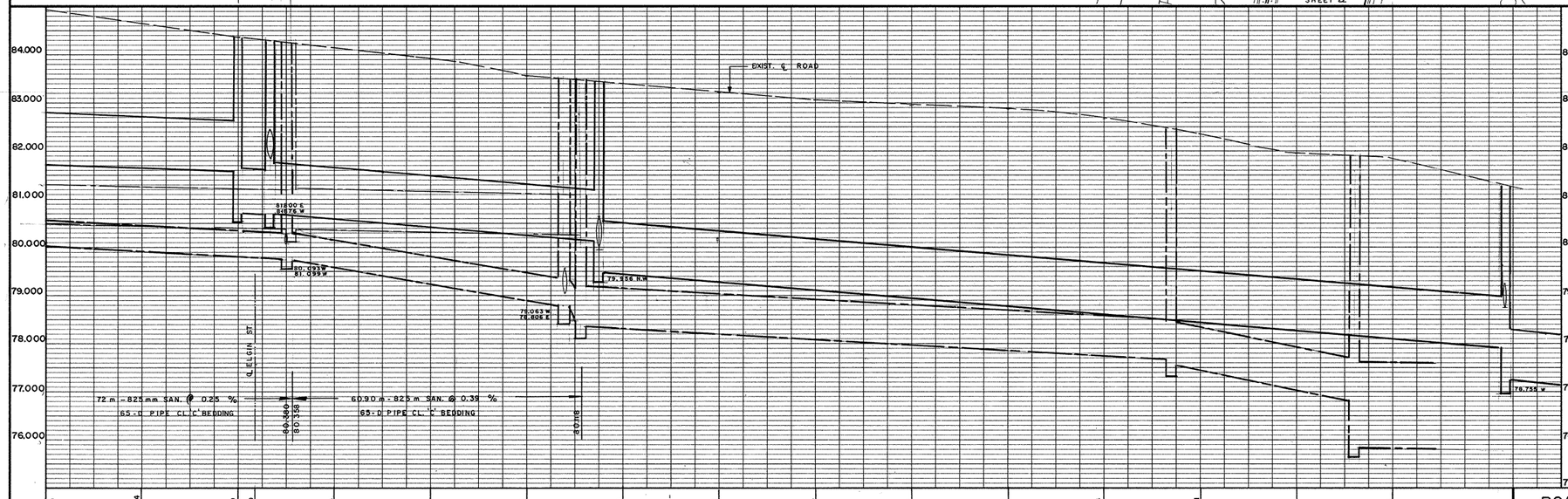
NOTE :–

INFORMATION FOR UNDERGROUND SERVICES TAKEN FROM DWG'S G 90 8 G 90-1

CITY B.M # 295

CUT CROSS ON THE NORTH SIDEWALK ON LAKESHORE ROAD BETWEEN BROCK AVE AND MAPLE AVENUE. THE CUT CROSS IS LOCATED 0.60 m FROM THE SOUTH SIDE OF THE SIDEWALK, 44.30 m ALONG THIS SIDEWALK MEASURED FROM FACE OF CURB IN THE WEST SIDE OF BROCK AVENUE AND 3.80 m FROM THE CENTER LINE OF THE C.N.R TRACKS CROSSING LAKESHORE ROAD. HORIZONTAL CONTROL MONUMENT # 043800110. ELEVATION = 81.891

ELEVATIONS REFERRED TO "1978 GEODETIC ADJUSTMENT"



ROAD GRADE	84.920	84.664	84.380	84.330	84.176	83.921	83.556	83.408	83.201	83.083	82.961	82.871	82.694	82.381	81.971	81.848
STORM SEWER	133 m – 1050 mm ST. @ 0.37 % 65-D PIPE CL.'B' BEDDING			81.556 80.706	80.694 80.694	68.60 m – 1050 mm ST. @ 0.81 % 65-D PIPE CL. 'B' BEDDING		80.136 79.469	189 m – 1050 mm ST. @ 0.82 % 65-D PIPE CL.'B' BEDDING						77.917 77.216	
SANITARY SEWER	70 m – 525 mm SAN. @ 0.47 % 100-D PIPE CL.'B' BEDDING				79.724 79.372	59.80 m – 525 mm SAN. @ 1.54 % 100-D PIPE CL. 'B' BEDDING		78.732	78.493 78.340	123 m – 825 mm SAN. @ 0.41 % 65-D PIPE CL. 'C' BEDDING			77.694 77.542	46 m – 825 mm SAN. @ 1.53 % 65-D PIPE CL. 'C' BEDDING		76.838 76.805
CHAINAGE	0+280	0+260	0+240	0+236.1	0+220	0+200	0+180	0+160	0+140	0+120	0+100	0+080	0+060	0+040	0+020	0+000

Nº	DATE	BY	REVISIONS
1	OCT./80	D.MIS	AS CONSTRUCTED (CONTR. 79-7), FIELD NOTE M-194

DESIGN | CHECKED | DATE OCT. /84

DRAWN M. Al-I | CHECKED

SCALE HOR 1:500 (5 m 0 10 20 m) VER 1:50 (0.5 m 0 1 2 m)

REFERENCES
S-03-133-E
S-0427-E
G 90, G 90-1
TYP. X-SEC. G 90 SP SH. 1 & 2

APPROVALS

Municipal

DIRECTOR OF PUBLIC WORKS

DATE

Regional

FIELD NOTES M-233

STAMP

CONSULTANT

CITY OF BURLINGTON

DEPARTMENT OF PUBLIC WORKS

MAPLE AVENUE

LAKESHORE RD. — 50 m N. ELGIN ST.

MUNICIPAL DRAWING Nº MM-7

REGIONAL DRAWING Nº

CONTRACT Nº

CONSULTANT DRAWING Nº

SHEET 1 OF

MM-7 SH 1

CITY OF BURLINGTON
"SERVICE ... AN ATTITUDE, A COMMITMENT"

INTEROFFICE MEMORANDUM

Capital Works Department
Development and Infrastructure Group

Date: March 26, 2019

TO: Melissa Morgan
Planner, Development Review

CC: Curt Benson
Director of Planning Services, Regional Municipality of Halton

Angelo Capone
Coordinator of Site Engineering, Capital Works Department

FROM: Annette Simpson
Capital Works, Development and Infrastructure Division

Re: 441 Maple Avenue
Better Life Retirement Residence
SITE ENGINEERING COMMENTS (1st Submission)
Application to amend Official Plan and Zoning By-law to permit an 11 Storey residential building with 153 units and three storey's of underground parking

File: 505-02/19, 520-03/19

Site Engineering has completed the review of the February 13, 2019 submission to amend the Official Plan and Zoning By-Law to permit the development of an 11 Story residential building with 153 units and three levels of underground parking on a 0.28 hectare site. **Site Engineering is unable to provide a recommendation at this time as we require revisions to the submitted reports and drawings that may affect the site layout, to confirm that City requirements and standards can be met and all Site Engineering concerns have been addressed.** Below are our preliminary comments on the materials submitted.

Please be advised that Site Engineering's review of this application is considered preliminary at this time. Please note that Site Engineering may provide additional comments, raise additional concerns, or request additional information upon receiving the outstanding information, and upon further comprehensive review of its contents.

Please also understand that some of the comments below may be duplicated in the various sections as often the same comments apply to different reports and drawings prepared

by different consultants. Please ensure comments are shared between consultants are addressed consistently across all reports and drawings, i.e. if there was a change to site layout on the engineering drawings please ensure it is also reflected on the architectural drawings, and if the building footprint changes please ensure that information is also shared with the noise and environmental consultants. Site Engineering would also request that the Applicant receive comments from all vested departments and agencies prior to making any changes to ensure a comprehensive revision to the design is achieved.

1.1 Right of Way

1. The deemed Right of Way (ROW) of Maple Avenue is 26m, it is a City of Burlington owned road, the actual width meets deemed, no widening required.

1.2 Environmental Site Condition

A Phase One Environmental Site Assessment prepared by Blue Frog Environmental Consulting Inc. dated January 9, 2019, and an Environmental Update Letter prepared by Blue Frog Environmental Consulting Inc. dated December 12, 2018 have been submitted for this application. Additionally, a previous Phase 1 Environmental Assessment prepared by Trow Consulting Engineering Ltd. Dated April 29, 1994 has been provided. Blue Frog Environmental Consulting Inc. extended reliance to the City of Burlington on the January 9, 2019 report in a letter dated February 11, 2019 signed by Gerry Parrott. The executed Environmental Site-Screening Questionnaire has also been provided. We have reviewed the aforementioned and have the following comments/questions:

1. Please note that the Region of Halton also comments on Environmental, therefore please be advised that in case of discrepancy between comments, the most stringent shall apply.
2. Section 4.2 indicates no evidence of fill materials on site, yet the Terraprobe Geotechnical Investigation Section 2.1.1 indicates a layer of fill 0.8m to 2.3m below grade. Please share the Geotechnical report with the Environmental Engineer, and revise the report as necessary to address the findings of the Geotechnical report.
3. Section 7.2 and 7.3 of the Phase One ESA outlines potentially contaminating activities in close proximity to the site and areas of potential environmental concern (APEC) on the site. Section 8.0 indicates that there may be contaminants on site that would be addressed at the time of underground parking excavation. Section 8.2 only indicates that a Record of Site Condition is not mandatory as it is not a change of use. It is our opinion based on the information contained in the Phase One ESA that **a Phase Two ESA is warranted**. We request that a Phase Two ESA be undertaken and submitted for review prior to finalizing our comments on the rezoning/official plan amendment application, alternatively a Hold

zoning on the property until the Environmental has been satisfactorily addressed may be considered, please understand that Planning and Region of Halton would also need to approve this approach. Please note that depending on the results of the Phase Two ESA further environmental investigation may be required, up to (possibly) a Record of Site Condition.

4. In addition to item 3 above, please also provide a letter of reliance for the Phase Two ESA.

1.3 Stormwater Management

We have reviewed the Functional Servicing and Stormwater Management Report prepared by GHD dated Nov. 15, 2018, Stormwater Management Section (Region of Halton will review Sanitary and Water information) and have the following comments/questions:

1. The report indicates the existing drainage is split with 0.125 hectares draining to Maple Avenue and 0.170 hectares draining east over Hydro One lands. The post-development plan indicates that the entire property will drain towards Maple Avenue. The post development flows must meet the predevelopment flows of the portion of the site that currently drains to Maple Avenue. Appendix D indicates that predevelopment flows for areas 101A and 101B (the existing portion of the site that drains towards Maple Ave.) are $0.024m^3/s$ for 2 year, $0.033m^3/s$ for 5 year, $0.038m^3/s$ for 10 year, $0.045m^3/s$ for 25 year, $0.049m^3/s$ for 50 year and $0.054m^3/s$ for 100 year storm. The post-development flows for all storms look to exceed the predevelopment flows towards Maple Ave. The storage calculations provided are based on controlling to $0.046m^3/s$, where it should be to the storms stated above. Please revise the calculations to confirm that the 2 through 100 year post development storm flows are controlled to the 2 through 100 year predevelopment flows for only the area that currently drains towards Maple Ave. (i.e. 101A & 101B only), as well as update storage requirements.
2. The Appendix D orifice tube calculation may also need to be revised
3. Please update Figures 3 and 4 to show runoff coefficients as well as area ID's and hectares
4. The Terraprobe Inc. Geotechnical Report included in the development submission package indicates there is groundwater at about 3.5m below existing grade. The report further advises that a waterproof wall system (for underground parking structure) with a subfloor drainage system is recommended. In the preconsultation notes confirmation of permanent dewatering was required. Please revise the report to include estimates of groundwater that is to be permanently managed in the storm water system and revise the storage requirements as necessary. Contrary to Section 6.5, it is important to determine at this stage the storage tank requirements as it is a

tight site and we need to confirm that there is adequate area to provide storm water storage without taking additional underground parking spaces at the Site Plan stage if the application is successful.

5. We require a revised storm water management section of the Functional Servicing Report, including all calculations, figures and drawings addressing comments above and within this letter, signed and stamped by the Professional Engineer. Please note that additional comments/requirements may arise once a comprehensive review of the revised report/addendum is completed.

1.4 Servicing & Grading

We have reviewed GHD Drawing SS & SG1, dated Nov. 15/18 and have the following comments:

1. There are two existing storm lines that are noted as "to be abandoned at property line"; we ask that they be removed to the mainline within the Municipal Right of Way, and noted as such on the drawing. Please also note that restoration of Maple Ave. will be as per S-119B, to limits indicated by the City inspector.
2. We defer to the Region of Halton with regard to their requirements for the existing sanitary sewer service and watermain that will not be reused.
3. Section 6.1.2 of the SWM section of the FSR indicates a 100mm orifice tube to control post development flows, however Section A-A on the drawing does not show the orifice tube, please show where the orifice tube will be located.
4. Please provide grades for the ramp to the underground parking, there should be a "flat" (2%-5% max) area min. 6m length at the top of the ramp with appropriate transition grades, please refer to the Site Plan Application Guidelines for further details.
5. Is it possible to raise the entrance grade to the underground ramp so that it is the same height as top of curb? This would reduce risk of overland flow into the underground parking structure. Possibly via a speed bump at the entrance?
6. There is one catch basin (area drain?) in the front NW corner that appears to be outside the underground parking footprint – will this be connected to the storm system or to the interior mechanical storm drainage system?
7. Please define the difference between area drains and catch basins on the drawing, and revise the legend accordingly.
8. Part of the entrance laneway and the curb is shown outside the south property line on 421 Maple's property, our understanding is that this area is an easement for access for both 441 and 421 Maple Avenue, would the curb restrict 421 Maple's access to their spaces along their north property line? Is there written permission to do so?
9. Please also show the entrance and parking for the north side of 421 Maple Ave. so that it can clearly be seen how the proposed development will interface with the adjacent existing south neigbouring development and maintain the existing easement requirements.
10. Please dimension the distance from the existing hydro/transformer vault on the south side of the proposed entrance to the back of curb, min. 1.2m is required.
11. The limits of the underground parking are very close to the north neighbouring property (455 Maple), there is an existing retaining wall that is very close to the property line that

accommodates a +/- half meter grade difference – would it be more practical to incorporate a new retaining wall on top of the underground parking within the limits of the proposed development and restore the edge of parking of 455 Maple? Or is it possible to raise the grades of the underground parking/foundation wall/ground floor so that the finish floor elevation is similar to north neighbouring property and eliminate the grade difference/retaining wall.

12. A solid (double board) wood fence (or alternative solid material) will need to go on top of the retaining wall to prevent light trespass into the ground floor guest suites of the proposed development. A solid fence may be desirable along the whole north property line to reduce risk of snow removal being piled onto the north landscape strip from the adjacent parking area. This is a site plan issue, however we wanted to advise early on to ensure it will be incorporated into the final site design.
13. Similar to above, we would suggest that a solid wood (double board) fence also be installed along the east property line as significant landscaping to mitigate headlight trespass from the adjacent parking lot into the proposed outdoor patio/amenity area for residents. This should be reflected on the Site Plan.
14. Is there a surface swale along the north property line? Please show.
15. The grade at the front property line is higher than the finish floor elevation of the ground floor – the finish floor elevation should be higher than the municipal boulevard/sidewalk, there should be min. 0.15m between outside (non-sidewalk) ground and top of foundation wall (or floor slab) and then the outside grade at the front of the building should slope away from the building to the municipal sidewalk, min, 2%. There should not be a low area between the municipal boulevard/sidewalk and the building face.
16. The outdoor patio grade is noted as 7%, which is pretty steep for people using walkers/canes/etc. (as it is a proposed retirement residence) can the walkway grade be softened to 2%?
17. Similar to above the sidewalk around the lobby has grades greater than 2% is it possible to soften?
18. Please provide a few sections to demonstrate how the proposed development will interface with the existing neighbouring properties. One through the front amenity/lobby, one through the center of the building and one through the amenity/loading dock area, including to the building faces of the neighbouring properties. Please ensure the sections show building faces/parking areas/curbs/retaining walls/swales/property lines/etc.
19. Please also provide two sections at the front for grades only (similar limits to section AA), showing the centerline of Maple Ave., curb, sidewalk, boulevard, foundation and finish floor elevation and all grades in between, one on the north end at the amenity room and one on the south end at the lobby showing the walkway to the municipal sidewalk.
20. Confirm if there is any surface ponding proposed, i.e. if ponding in the 100 year storm show the limits on the drawing.
21. What will happen to the existing catch basin in the parking lot that is currently used by the existing building? Where is it connected to? Through 441 Maple or to Brock Ave.? please note on drawing.

1.5 Environmental Noise

We have reviewed the Environmental Noise Feasibility Study dated November 28, 2018 prepared by RWDI, and offer the following comments/questions:

1. Section 2.1.2 indicated that City of Burlington staff provided traffic counts and growth rates, please advise as to who provided the information? We consulted with our transportation department regarding the traffic counts, and they indicted that the traffic counts utilized for the calculations (shown in Table 2) were less than the City's counts. Please contact Florin Patrau (florin.patrau@burlington.ca) for up to date traffic counts and future % increase estimates, there is a small fee for the information. Please re-calculate the estimated sound levels based on City information and include a copy of the correspondence in the appendix of the report.
2. The QEW is approx. 500m from the site, and possibly at a higher elevation, generally with single family homes in between the highway and the proposed development in the Belleview Ave. area – please confirm if it is a source of noise or not by providing calculations.
3. There are hydro towers and lines in close proximity to the site, are they a source of noise?
4. Are there any impulsive sounds in the area?
5. Is the rooftop mechanical on the Burlington Art Gallery a source of noise?
6. The Ornament calculations in Appendix B indicate Receptor R1 at 15m elevation and R2 at 4.5m elevation, calculations for both OLA's with barriers were also provided. Please provide additional receptors at the front of the building (facing Maple Ave.) on the 5th floor and 11th floor, as well as for the rear of the building on the 5th floor and 11th of the building.
7. Were field measurements taken? We would ask that measurements on site be taken to supplement estimated noise levels that were calculated and provided.
8. Please note that a detailed assessment of mechanical equipment for the site, including underground parking fans/vents/doors/etc. will be required at the site plan stage (if this application is approved)

1.6 Geotechnical Investigation

We have reviewed the Geotechnical Investigation dated December 18, 2018, prepared by Terraprobe Inc. and have the following comments:

1. Section 2.2 outlines groundwater elevations for design purposes, and 3.5 indicates that basement drainage will be required, please provide an estimate of flow that will need to be permanently managed in the storm water management for the site and share the information with the Civil Engineer so that they can size the storm water storage requirements of the site.
2. Appendix D indicates a schematic drainage system, including a caisson wall,

waterproofing, etc., the preconsultation notes asked for a construction management plan including a drawing to show that excavation/shoring/tiebacks/etc. are within the limits of the subject property. There is an area at the front of the property where there is a zero lot line. Please consult with the Architect to provide a detail of the underground parking structure both during construction and after to determine limits of construction and permanent limits of the underground parking structure and components to confirm it is within the subject property, and constructible from within the subject property. More than one detail may be required, one for area of underground parking structure at or close to zero lot line and one for the underground parking structure where there is more distance to property line if different than zero lot line design.

3. Confirm if it is anticipated that a Permit to Take Water from the MOECP will be required (for permanent or temporary construction dewatering of the underground parking structure).
4. If the geotechnical report is updated as a result of the above please provide a revised report for our review and records.

1.7 Architectural Drawings

Please ensure that all revised drawings coordinate, some comments below may be duplicated as similar information appears on multiple drawings. Please also refer to Section 1.4 (and 1.6 above) for comments on the Preliminary Servicing & Grading Plans, and incorporate any site layout changes into the architectural drawings.

1. MSAi Drawing SP1 indicates new curb and part of the laneway on the south neighbouring property (but within easement), this curb looks like it could restrict access to the north parking spaces of 421 Maple, the spaces are not shown on this drawing so it is difficult to confirm – is there written permission to do this?
2. MSAi Drawing A01 indicates a portion of the Maple Avenue building/underground structure frontage as zero lot line, please be advised that the City does not allow encroachments into the Municipal Right of Way. In some instances tie-backs may be allowed, however a detail showing all aspects of the underground parking (foundation drainage, shoring, forms, tie-backs, etc.) structure will need to be submitted for review prior to confirmation. Please work with the Geotechnical and Structural Engineers to confirm requirements. Please clearly show the property line on all drawings. Please submit two details, one for during construction showing shoring, over dig, tiebacks, etc., and one for permanent conditions including detailing if tiebacks or other items are to remain in place, permanently.
3. MSAi Drawing A01 indicates the barrier free parking spaces in the NE corner of the parking garage, we request that the barrier free parking spaces be located directly adjacent to the entrance to the elevator lobby, as this is a proposed retirement building it is likely the spaces will be frequently used by residents with mobility

constraints.

4. What is the plan for the rear easterly existing parking area that the current retirement home utilizes? It is cut off from the public parking further east by trees/shrubs – will it be joined with the public parking area after construction? Will it be utilized for staging during construction? Please advise.
5. Please dimension the width of the sidewalk from the building face to the back of curb at the stairwell corner to the drop off area, is it min. 1.83m wide?
6. Please revise architectural drawings/site plan layout to address the above comments.
7. Please also note:
    a. At the site plan stage lighting will be looked at closely, for both vehicle laneways and pedestrian walkways, please ensure there is room for lighting, i.e. poles for laneways will need to maintain min. 1.2m setback from back of curb, the walkways and other public areas will also require lighting allowing for facial recognition (i.e. not bollard lighting). The Burlington Guidelines for Outdoor Lighting and the Burlington Accessibility Design Standards can be found on the City of Burlington website.

    b. Further to above, lighting trespass will be looked at closely, please consult with a lighting designer early on in the design process to ensure lighting trespass of maximum 2 lux can be adhered to, and zero trespass would be strongly encouraged.

    c. At the site plan stage snow storage areas will need to be identified, these areas cannot be located in required parking spaces, amenity areas or in laneways/fire routes. The City's strong preference is for snow storage to be located in landscaped (grass) areas adjacent to curbing to allow for pretreatment prior to release into the storm sewer system. Please note that stating "snow to be removed from site" will not be accepted.

2.1 Items to be addressed by the Applicant/Revisions to material required:

Prior to finalizing comments on the 441 Maple Avenue Re-Zoning and Official Plan Amendment application, Site Engineering requires the following information to be submitted for review:

1. Provide a Phase Two Environmental Site Assessment, prepared in Accordance with O. Reg. 153/04,

2. Provide details/sections for the underground parking structure in the area of zero lot line to confirm it is constructible within the property limits, encroachments within the Municipal Right of Way will not be permitted. Two drawings are required, one for during construction showing shoring, over dig, tiebacks, etc., ad one for permanent conditions. If the design is different for areas greater than zero lot line please provide additional details.

3. Provide a construction management plan to demonstrate how access to 421 Maple Avenue will be maintained for the duration of construction, and to outline if any temporary surface

encroachments into the Municipal Right of Way are proposed.

4. Provide an updated stormwater management plan as per comments in Section 1.3 above.
5. Provide an updated Noise feasibility Study as per Section 1.5 above.
6. Provide either an updated Geotechnical report or an addendum to the Geotechnical Report as per Section 1.6 above.
7. Provide updated engineering and architectural drawings as outlined inspections 1.4 and 1.7 above.
8. Please provide a written summary with the next submission outlining how each of the comments in sections 1.2 to 1.7 have been addressed.

Please also note the following:

The Applicant/Developer is cautioned that notwithstanding the above a full detailed review of all documents, reports and drawings will be completed at the time of Site Plan Application(s).

Site Engineering's review of this application is considered preliminary at this time. Please note that Site Engineering may provide additional comments, raise additional concerns, or request additional information upon receiving the aforementioned information, and upon further comprehensive review of its contents.

If you have any questions, please do not hesitate to call or email. Please advise the Applicant that I am happy discuss the comments above if they have questions or require clarification on the site engineering comments, or to meet with them or their consultants prior to resubmission of updated materials, to ensure our comments have been addressed satisfactorily.

Yours truly,

Annette Simpson, B.A., C.Tech.

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annette.simpson@burlington.ca

Scott Passmore

From: Malik, Umar <Umar.Malik@burlington.ca>
Sent: Monday, July 27, 2020 1:20 PM
To: Steve Park; Simpson, Annette
Cc: Scott Passmore; Kim Harrison
Subject: RE: 441 Maple Avenue - Follow up email for Today's conf. call and CIty's catchment plans

exp. CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Steve,

Please see our responses in highlight in your email below.

Umar

From: Steve Park <Steve.Park@exp.com>
Sent: Thursday, July 16, 2020 2:32 PM
To: Malik, Umar <Umar.Malik@burlington.ca>; Simpson, Annette <Annette.Simpson@burlington.ca>
Cc: Scott Passmore <Scott.Passmore@exp.com>; Kim Harrison <kharrison@blretirement.com>
Subject: 441 Maple Avenue - Follow up email for Today's conf. call and CIty's catchment plans

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi Annette, as per our discussion in the conf. call today, please see the attached PDFs of the City's original storm catchment plan and current catchment plan based on the Topo survey.

Once you review those catchment plans, please provide your responses in principle on the following questions that we've asked in the meeting.

1. In the event that we can not drain into Brock Avenue, would it be possible to control our entire site catchment in post-development condition to the catchment ID 101 (0.125ha) in pre-development condition as indicated in the current catchment plan? Yes, please control to pre-development conditions.

2. Considering the drainage restrictions, the site needs to be over-controlled. Would it be allowable to have a Rooftop storage for the SWM quantity control since we are far away from the MTO regulation? The City prefers site storage to be located on the ground. We can consider rooftop storage if it is necessary for technical reasons or as a BMP. Please refer to the City's new SWM guidelines available on our website for guidance in this regard.

I copied this email to Umar as well.

Thanks,

Steve Park, P.Eng.
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