Site Servicing and Stormwater Management Report 224 Preston Street Site Plan, Ottawa, ON

Type of Document:
Site Plan Submission

Client:
224 On Preston Inc.

Project Number: OTT-22019695-A0
Application: DO7-12-23-0060
Plan Number: 18968

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Date Submitted:
February 9, 2024

Revision: 2

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Date Submitted:
February 9, 2024

Legal Notification

This report was prepared by EXP Services Inc. for the account of **224 On Preston Inc**.

Any use that a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this project.

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1 Introduction

224 On Preston Inc. (client) retained EXP Services Inc. (EXP) to undertake a site servicing and stormwater management study in support of a site plan application for the development of 224 Preston Street property located in Ottawa, ON.

The site is legally described as part of Block 123 of registered plan13 in the City of Ottawa. It is located in the southwest corner of Preston Street and Larch Street with frontage along Preston Street (major collector) and Larch Street. The client wishes to develop the site into a six-storey mix-use building. The site is within the Corso Italia District Secondary Plan Refer to Figure 1 for the site location.

This report will discuss the adequacy of the existing municipal sewers and watermains to convey the storm runoff, sanitary flows and water demands that will result from the proposed development. This report also provides a design brief in support of the engineering drawings, for the Site Plan Control Application submission and City of Ottawa approval.

2 Existing Conditions

There is an existing two-story commercial building located in the southeast corner of the site. The remainder of the property consists of hard surface, primarily asphalt paving. The site has frontage on both Preston Street and Larch Street with municipal services within the right of way (ROW) of both.

The subject site is relatively flat and sheet drains primarily towards Larch Street with a small portion of the site draining toward Preston Street.

3 Existing Infrastructure

Based on the information provided on the topographical survey prepared by Annis, O'sullivan, Vollebekk Ltd. Dated December 10, 2021, and the City of Ottawa GIS website, the following municipal infrastructure was identified.

Preston Street

- A 1800mm dia. Concrete Combined sewer pipe within the road.
- A 400mm dia. ductile iron water pipe on the east side of the road.
- A fire hydrant located at the northeast corner of the intersection between Preston Street and Balsam Street.

Larch Street

- A 600mm dia. Concrete Combined sewer pipe within the road.
- A 150mm dia. PVC water pipe within the road.
- A Fire Hydrant near the northwest corner of the subject property.

4 Proposed Development

The proposed development will consist of a six-story mix use building that includes sixteen (16) bachelor units, eight (8) 1-bedroom units, four (4) 2-bedroom units, two (2) 3-bedroom units, one (1) commercial unit and office space on the ground floor and amenity and storage area in the basement level. The building will also have a garbage storage room and a bike storage room in the basement and ground levels. There is one driveway access point located at the northwest corner of the property off Larch Street. Five (5)

pedestrian access points will connect the proposed building to the adjacent streets. Refer to the proposed site plan in Figure 2 for more details.

The proposed development will be serviced using the existing combined sewer and watermain along Larch Street. Stormwater management will be handled at the roof of the proposed building.

5 Referenced Guidelines

Various documents were referred to in preparing the current report including:

- Sewer Design Guidelines, Second Edition, Document SDG002, October 2012, City of Ottawa (Guidelines) including:
  - Technical Bulletin ISDTB-2012-4 (20 June 2012)
  - Technical Bulletin ISDTB-2014-01 (05 February 2014)
  - Technical Bulletin PIEDTB-2016-01 (September 6, 2016)
  - Technical Bulletin ISDTB-2018-01 (21 March 2018)
  - Technical Bulletin ISDTB-2018-04 (27 June 2018)
  - Technical Bulletin ISDTB-2019-02 (08 July 2019)
- Ottawa Design Guidelines – Water Distribution, July 2010 (WDG001), including:
  - Technical Bulletin ISDTB-2014-02 (May 27, 2014)
  - Technical Bulletin ISTB-2018-02 (21 March 2018)
- Ontario Ministry of Transportation (MTO) Drainage Manual, 1995-1997
- Stormwater Management Planning and Design Manual, Ontario Ministry of the Environment and Climate Change, March 2003 (SMPDM).
- Design Guidelines for Drinking-Water Systems, Ontario Ministry of the Environment and Climate Change, 2008 (GDWS).
- Fire Underwriters Survey, Water Supply for Public Fire Protection (FUS), 1999
- Ontario Building Code 2012, Ministry of Municipal Affairs and Housing

6 Watermain Servicing

A new 150mm dia. water service connection will be extended from the existing 150mm dia. watermain on Larch Street to the proposed building. Refer to the site servicing plan C100 for more details on the location of existing and proposed water services.

Fire protection demands have been calculated in subsequent sections using the latest version of the Fire Underwriter Survey. These fire demands will be provided using the existing fire hydrants located at the northwest corner of the property on Larch Street and the hydrant located at northeast corner of Preston Street and Balsam Street.

6.1 Domestic Water Demands

The domestic water demands are estimated below, utilizing parameters from the WDG001 and the GDWS. Table 6.1 summarizes the parameters used.

Table 6-1: Water System Design Criteria

Design Parameter	Value
Population Density – bachelor and 1-bedroom	1.4 persons/unit
Population Density – 2-bedroom	2.1 persons/unit
Population Density – 3-bedroom	3.1 persons/unit
City of Ottawa Average Day Demands	280 L/person/day
Commercial Average Day Demands	28,000 L/ha/day
Max Day Peaking Factor (MECP method when less than 500 persons)	8.77 x Average Day Demands
Peak Hour Factor (MECP method when less than 500 persons)	13.21 x Average Day Demands
City of Ottawa Commercial Max Day Peaking Factor	1.5 x Average Day Demands
City of Ottawa Commercial Peak Hour Factor	1.8 x Max Day Demands
Depth of Cover Required	2.4m
Maximum Allowable Pressure	690 kPa (100 psi)
Minimum Allowable Pressure	275.8 kPa (40 psi)
Minimum Allowable Pressure during fire flow conditions	137.9 kPa (20 psi)

Population:

16- Bachelor Apartments x 1.4 person/unit	= 22.4 Persons
8-1 Bedroom Apartments x 1.4 person/unit	= 11.2 Persons
4-2 Bedroom Apartments x 2.1 person/unit	= 8.4 Persons
2-3 Bedroom Apartments x 3.1 person/unit	= 6.2 Persons
Total	= 48.2 = 49 Persons

191m^2 of Commercial and office space

Average daily water consumption	= 280 L/person/day
Number of residents	= 49
	49 * 280 = 13,720 L/day
Maximum Day Factor	= 8.77 x Avg. Day (from GDWS, Table 3-3)
Maximum Hour Factor	= 13.21 x Avg. Day (from GDWS, Table 3-3)

Commercial area:

Total office space area of both buildings	= 191m^2
Average Day Demand	= 28,000L/ha/day
Average daily water consumption	= 28000L/ha/day * (1hec/10000m^2) * 191m^2
	= 534.8 L/day
Maximum Day Factor	= 1.5 x Avg. Day (from WDG001)
Maximum Hour Factor	= 1.8 x Max. Day (from WDG001)

The average, maximum day and peak hour domestic demands for the building are as follows:

Domestic Residential Water Demands:

Average Day	49 persons * 280 L/person/day = 13,720L/day
	= 13,720 / 86,400 sec/day = 0.159 L/sec
Maximum Day	= 8.77 x 0.159 = 1.39 L/sec

Peak Hour = 13.21 x 0.159 = 2.10 L/sec

Domestic Commercial Water Demands:

Average Day = 534.8L/day x (1 / 86,400) sec/day = 0.01L/sec

Maximum Day = 1.5 x 0.01 = 0.015 L/sec

Peak Hour = 1.8 x 0.01 = 0.018 L/sec

Total Domestic Water Demands:

Average Day = 0.159+0.01 = 0.17L/s

Maximum Day = 1.39+0.01 = 1.40L/s

Peak Hour = 2.10+0.02 = 2.12L/s

Detailed calculations of the domestic water demands are provided in Table B1 of Appendix B.

6.2 Fire Flow Requirements

The required fire flow for the proposed site was estimated based on the Fire Underwriters Survey. The following equation from the latest version of the Fire Underwriters Survey (2020) was used for calculation of the supply rates required to be supplied by the hydrant.

F = 220 * C$\sqrt{A}$ 2

where:

- F = the required fire flow in liters per minute
- C = coefficient related to the type of construction
- A = the total floor area in square meters

Table 6-2: Summary of Required Fire Flow Protection

Item	Design Value
Floors Above Grade	6 floors
Construction Coefficient	1.5
Fire Protection Type	Sprinkler System
Building Height (m)	22.7
Building Area (sq.m)	1909.6
F=220C$\sqrt{A}$ (L/sec)	14,421/min (14,000 rounded to closest 1,000)
Reduction due to low Occupancy	-0%
Reduction due to Sprinkler System	-50%
Increase due to separation	36%
Fire Flow Requirement (L/min)	12,040 or 12,000 L/min (rounded to closest 1,000) or 200 L/sec

The fire flow requirement for the proposed building was found to be 200L/sec. Refer to Table B2 in Appendix B for detailed calculations.

The fire flow required is expected to be accommodated by using the existing fire hydrants located at the northwest corner of the property on Larch Street, the hydrant located at northeast corner of Preston Street and Balsam Street intersection, and the hydrant located at the northeast corner of Preston Street and Willow Street intersection.

Moreover, the boundary conditions of the site were provided by the City of Ottawa staff. The boundaries state that the maximum HGL is 115.3m, the minimum HGL is 107.2m, and the Max daily + fire flow pressure is 84.3m. It is recommended to do a pressure test at the time of construction and install a pressure-reducing valve if required to bring the water pressure down. The correspondence with the City staff regarding the boundary conditions can be found in Appendix B.

7 Sanitary Sewer Design

The site will be serviced with a 150mm dia. PVC sanitary service connected to an existing 600mm dia. concrete combined sewer on Larch Street. A manhole will be provided at the property line for testing and cleanout purposes.

The sanitary sewer system is designed based on a population flow, area-based infiltration allowance and foundation drain allowance. The flows were calculated using the City of Ottawa design guidelines as follows:

Population:

16- Bachelor Apartments x 1.4 person/unit	= 22.4 Persons
8-1 Bedroom Apartments x 1.4 person/unit	= 11.2 Persons
4-2 Bedroom Apartments x 2.1 person/unit	= 8.4 Persons
2-3 Bedroom Apartments x 3.1 person/unit	= 6.2 Persons
Total	= 48.2 = 49 Persons

Commercial Area:

191m^2 of Commercial space

Residential Sanitary Flow:

Average Domestic Flow	= 280 L/person/day
Domestic Flow	= 49 x 280 L/person/day x (1/86,400 sec/day) = 0.159 L/sec
Peak Factor	= 1 + 14 / (4 + (49/1000)$^{0.5}$) * K (K = 1) = 4.32 (4.0 Max)
Q Peak Domestic	= 0.159 L/sec x 4 = 0.64 L/sec

Commercial Sanitary Flow:

Average Domestic Flow	= 28,000 L/gross ha/day
Domestic Flow	= 0.0191 x 28,000 L/ha/day x (1/86,400 sec/day) = 0.006 L/sec
Peak Factor	= 1.5
Q Peak Domestic	= 0.006 L/sec x1.5 = 0.009 L/sec

Infiltration:

Q Infiltration = 0.28 L/ha/sec x 0.047 ha
= 0.013 L/sec

Foundation Drain Allowance:

Q Foundation = 5.0 L/ha/sec x 0.047 ha
= 0.235 L/sec

Total Peak Sewage Flow:

Total Sanitary Flow = 0.64+0.009+0.013+0.235 **= 0.89 L/sec**

The proposed 150mm sanitary pipes having a slope of 1.00% and 2.00% will have a full flow capacity of 15.2 L/s and 21.5 L/s respectively. The proposed pipe capacity is sufficient to accommodate the anticipated sanitary flow from the proposed building. Moreover, a letter from the mechanical engineer confirming that the proposed 150mm sanitary service lateral is sufficient as per building code requirements has been provided. This letter can be found in Appendix C. It is proposed that the existing 600mm dia. concrete combined sewer has enough capacity to accommodate the proposed development.

8 Stormwater Management

8.1 Design Criteria

The proposed stormwater system is designed in conformance with the latest version of the City of Ottawa Design Guidelines (October 2012). Section 5 "Storm and Combined Sewer Design" and Section 8 "Stormwater Management". A summary of the design criteria that relates to this design report is the proceeding sections below.

Minor System Design Criteria

- The storm sewers have been designed and sized based on the Rational Method and the Manning's Equation under free flow conditions for the 2-year storm using a 10-minute inlet time.
- The allowable release rate for the site is limited to a 2-year storm event using a time of concentration of 10 minutes and a runoff coefficient of 0.40. Flows in excess of the 2-year and up to the 100-year storm event will be detained onsite.

Major System Design Criteria

- The major system has been designed to accommodate onsite detention with sufficient capacity to attenuate the 100-year design storm. Excess runoff above the 100-year event will flow overland offsite.
- Onsite storage is provided for up to the 100-year design storm through surface ponding within the roof areas. Calculation of the required onsite storage volumes have been supported by calculations provided in Appendix D.
- Calculation of the required storage volumes has been prepared based on the Modified Rational Method as identified in Section 8.3.10.3 of the City's Sewer Guidelines.
- As noted in the pre-consultation meeting minutes dated June 2, 2022, the roof portion only will be controlled while the remainder of the site will go uncontrolled towards the right of ways (ROWs)

8.2 Pre-Development Conditions

There is an existing structure located in the southeast corner of the subject property. The remainder of the site is currently covered by paved parking and access areas. The calculated runoff coefficient for the site was found to be 0.9. however, based on the City of Ottawa requirements outlined in the pre-consultation meeting minutes, the maximum allowable runoff coefficient for the site will be limited to 0.4. This C value

along with a time of concentration (Tc) of 10 minutes has been used to calculate the allowable release rate for the site. Table D1 to Table D3 in Appendix D provided detailed calculations under pre-development conditions.

8.3 Runoff Coefficients

Runoff coefficients used were based on actual areas taken from CAD. Runoff coefficients for impervious surfaces (roofs, asphalt, and concrete) were taken as 0.90, whereas those for pervious surfaces (grass/landscaping) were taken as 0.20. Average runoff coefficients for sub-catchments (or drainage areas) were calculated using the area weight. The runoff coefficients for pre-development and post-development catchments are provided in **Table D1 and D5** respectively, with a summary provided in in Table 8-1 below.

Table 8-1 – Summary of Runoff Coefficients

Location	Area (hectares)	Pre-Development Runoff Coefficient, C_{AVG}	Post-Development Runoff Coefficient, C_{AVG}
Entire Site	0.047	0.90	0.87

8.4 Calculation of Allowable Release Rate

The allowable release rate from the site is based on 2-year storm event with a runoff coefficient of 0.40 and a time of concentration of 10 minutes. To control runoff from the site to the allowable release rate, post-development flows from the building footprint will be restricted and on-site storage will be provided up to the 100-year storm event.

The following parameters will be used to determine the allowable release rates from the proposed site to the capped 375mm storm sewer at the property line, using the Rational method.

$Q_{ALL} = 2.78\ C\ I\ A$

where:

Q_{ALL} = Peak Discharge (L/sec)
C = Runoff Coefficient (C=0.40)
I = Average Rainfall Intensity for return period (mm/hr)
= 732.951/(Tc+6.199)^0.810 (2-year)
Tc = Time of concentration (mins)
A = Drainage Area (hectares)

Q_{ALL} = 2.78 * 0.40 * 76.81mm/hr * 0.047 ha = 4.01 L/sec

The allowable discharge rate, based on the 2-year storm, was calculated to be 4.01 L/sec. To control runoff from the site it will be necessary to limit post-development flows for all storm return periods up to the 100-year event using flow control and detention of runoff, as noted in the following sections.

8.5 Calculation of Post-Development Runoff

To calculate the post-development runoff coefficient and required storage volumes, the site has been divided into three (3) catchment areas. The area labelled P1 represents the footprint of the building. This area will be controlled using roof drains that will restrict the flow to the allowable release limit. Area P2 will sheet drain towards Larch Street, while area P3 will sheet drain towards Preston Street. Both areas P2 and

P3 are considered uncontrolled. Refer to the post-development watershed plan C400 for more details on the site catchment areas.

The post-development average runoff coefficient for the site was calculated as 0.84. Based on the storm drainage areas the 2-year, 5-year and 100-year post-development peak flows are calculated based on the Rational Method and are summarized in Table 8-2 below with detailed calculations provided in **Table D6** of Appendix D.

Area No	Area (ha)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
		C_{AVG}	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	Q (L/sec)	Q_{CAP} (L/sec)
P1	0.0370	0.90	6.38	1.55	0.90	8.65	(2.10)	1.00	16.48	(4.00)
P2	0.0070	0.76	1.68	(1.68)	0.76	2.26	(2.26)	0.95	4.84	(4.84)
P3	0.0030	0.90	0.67	(0.67)	0.90	0.91	(0.91)	1.00	1.74	(1.74)
Total	0.0470		8.72	3.89		11.83	5.27		23.206	10.58

Table 8-2: Summary of Post-Development Flows

In summary, the building area P1 will be controlled to the allowable release rate calculated for the site using roof drains. Areas P2 and P3 will drain uncontrolled towards the ROW. The total release rate from the site during the 100-yr storm event will be 10.58 L/s.

8.6 Flow Control and Storage Method

It will be necessary to control runoff to the allowable rate; therefore, runoff will be detained using an inlet control device (ICDs) installed at the roof level. This will ensure that sufficient stormwater detention is provided and that the peak flows entering the storm sewer on Larch will be equal to or less than the allowable rate.

Based on the allowable release rate for the site, the required stormwater storage volume for the 100-year storm event will be 8.5 m^3. The release rate from the roof will be controlled using Watts Accutrol drain system. Based on the roof drainage calculation, the maximum release rate from the roof, under the 100-yr storm will be 3.99L/s, which is less than the allocated roof flow of 4L/s as shown in Table 8.2 above. The total storage provided on the roof is 12.6 m^3 with a maximum ponding depth of 140mm.

Detailed calculations using the Modified Rational Method of the onsite storage requirements are provided in Appendix D. The layout of the roof drains as well as a summary of the roof drain position and calculation can be found on the Roof Drainage Plan.

9 Geotechnical Recommendations

A geotechnical investigation was also carried out by EXP Services Inc., summarized in the report dated February 8th 2022. The subsurface condition of the site consists of fill material underlain by loose to very dense glacial till and gravel overlaying limestone bedrock at 5.8m depth. The Geotechnical investigation report notes that groundwater was encountered in the drilled boreholes at depths of 4 to 4.1m. A minimum of 1.5m of earth cover should be provided to the exterior foundations of heated structures to protect from damage against frost penetration.

10 Erosion and Sediment Control

During all construction activities, erosion and sedimentation shall be controlled by the following techniques:

- extent of exposed soils shall be limited at any given time,
- exposed areas shall be re-vegetated as soon as possible,
- filter cloth shall be installed between frame and cover of all new catch basins and catch basin manholes,
- filter cloth shall be installed between frame and cover of the existing catch basins and catch basin manholes as identified on the site grading and erosion control plan,
- light duty silt fencing will be used to control runoff around the construction area. Silt fencing locations are identified on the erosion and sediment control plan.
- visual inspection shall be completed daily on sediment control barriers and any damage repaired immediately. Care will be taken to prevent damage during construction operations,
- In some cases, barriers may be removed temporarily to accommodate the construction operations. The affected barriers will be reinstated at night when construction is completed,
- Sediment control devices will be cleaned of accumulated silt as required. The deposits will be disposed of as per the requirements of the contract,
- during the course of construction, if the engineer believes that additional prevention methods are required to control erosion and sedimentation, the contractor will install additional silt fences or other methods as required to the satisfaction of the engineer, and
- Construction and maintenance requirements for erosion and sediment controls are to comply with Ontario Provincial Standard Specification (OPSS) OPSS 805, and City of Ottawa specifications.

11 Conclusions

This report addresses stormwater runoff from the proposed development located at 224 Preston Street, City of Ottawa, Ontario. The proposed 0.12-acre development will consist of a six-story mix use building that includes 16 bachelor units, eight 1-bedroom units, four 2-bedroom units, two 3-bedroom units, one commercial units on the ground floor and office space along with garbage room and and amenity and storage space in the basement level. The following summarizes the servicing requirements for the site:

- The allowable release rate from the proposed site was calculated based on a runoff coefficient of 0.40 and a time of concentration of 10 minutes for a 2-year storm event, connecting to the 600mm combined sewer pipe within Larch Street. The allowable release rate was calculated to be 4.01 L/sec. Runoff in excess of this will be detained onsite for up to the 100-year storm.
- Inlet control devices (ICDs) will be installed at the roof level to control the release rate from the site to the allowable 4.01L/s. The calculated release rate from the roof is 3.99 L/s. The estimated storage required to control peak flows to the allowable release rate was 8.5 m^3 based on the Modified Rational Method.
- The roof drain will be controlled using Watts Accutrol Drainage system with a maximum release rate of 3.99 L/s under a maximum ponding depth of 140mm.
- The proposed development has a peak sanitary flow of 0.89 L/s based on City of Ottawa Guidelines. 150mm sewer lateral pipes will be installed with a slope of 1.0% and 2.0% having a full flow capacity of 15.2L/s and 21.5L/s. This lateral will extend into the property and connect to the building.

- A new 150mm dia. water service connection will be extended from the existing 150mm dia. watermain on Larch Street to the proposed building. The required peak hour domestic water demand for the site was found to be 2.12L/s.
- The Maximum Required Fire Flow (RFF) based on the Fire Underwriter Survey (FUS) was calculated at 200 L/s. The site fire demands will be provided using the existing fire hydrants located at the northwest corner of the property on Larch Street, the hydrant located at the northeast corner of Preston Street and Balsam Street intersection and the hydrant located at the northeast corner of Preston Street and Willow Street intersection.
- During all construction activities, erosion and sedimentation will be controlled on-site.

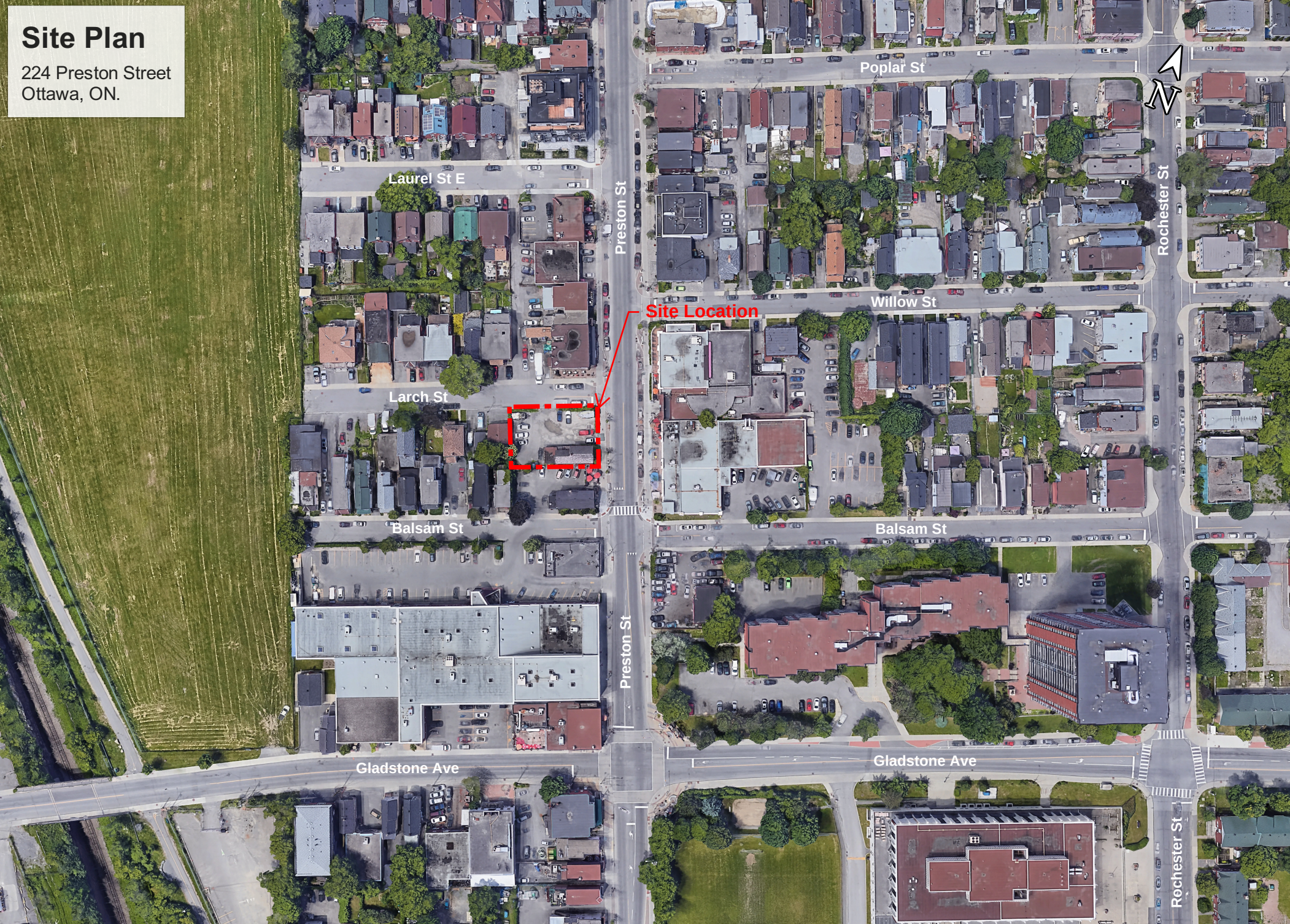
Appendix A – Figures

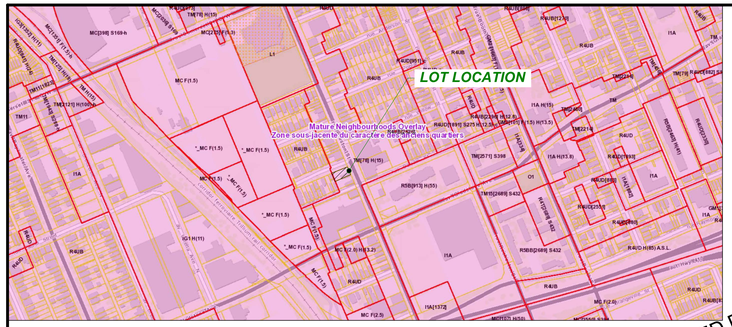
Figure 1: Site Location Plan

Figure 2: Site Plan

Site Plan

224 Preston Street
Ottawa, ON.





2 KEY PLAN & CONTEXT
A1 SCALE N.T.S.

SITE PLAN OF SURVEY PLAN PART OF BLOCK 123 REGISTERED PLAN 13, CITY OF OTTAWA

ZONING: TM[78] H(15)

PROPOSED BUILDING TYPE: 6 STOREY MIXED USE RENTAL BUILDING
30 RESIDENTIAL RENTAL UNITS & 2 COMMERCIAL UNITS

LOT DEPTH: 30.47m (99.97')

ADJACENT ZONING:
NORTH: TM[78] H(15)
SOUTH: TM[78] H(15)
WEST SIDE: R4UB
EAST SIDE: TM[78] H(15)

SCHEDULE 1 AREA: AREA 'B'
SCHEDULE 1A AREA: AREA 'B'

LOT INFO - AFTER ZONING AMENDMENT - ALL MEASUREMENTS MADE TO ROW

R STANDARD	224 PREST: REQUIRED	224 PREST: PROPOSED	EXISTING: MAINT.	NOTES
LOT WIDTH:	15m	15.24m	+0.24m	
LOT AREA:	m2	433.46m2	475.09m2	
HEIGHT:	15m	19.96m	+7.0m	Ammend.
FRONT YARD:	3.0m	2.42m	+0.42m	
CORNER YARD:	3.0m	2.00m	+5.2m	Ammend.
REAR YARD:	7.5m	3.21m	+16.5m	Ammend.
INTERIOR YARD:	0m	0.127m	+0.81m	
AMENITY AREA:	180m2	269.6m2	n/a	
PARKING SPACES:	2 resid.	0	0	
	2 visitor	0	0	Ammend.
BIKE SPACES:	15	35	0	
ACG. FRONT LAND. W.L.C.:	no NO MAX.	n/a	n/a	

BUILDING AREAS

BASEMENT FL. GFA:	-	0.0m2	-
FIRST FL. GFA:	-	271.5m2	-
SECOND FL. GFA:	-	271.5m2	-
THIRD FL. GFA:	-	271.5m2	-
FOURTH FL. GFA:	-	271.5m2	-
FIFTH FL. GFA:	-	221.4m2	-
SIXTH FL. GFA:	-	221.4m2	-
STORAGE:	-	0.0m2	-
GARAGE/CARPORT:	-	0.0m2	-
TOTAL GFA: (ALL FLOORS):	-	1698.1m2	-
TOTAL GFA:	-	1458.1m2	
TOTAL ALL AREAS:	-	2202.8m2	- NOT INCL. CARPORTS

PROPOSED SITE DEVELOPMENT INFO.

NEW GROSS FLOOR AREA:	m2	-	
NEW RESIDENTIAL AREA:	1458.1m2	-	+120m2 EX. DEMO'D
NUMBER OF UNITS:	30+2		Mixed
PROPOSED STOREYS:	6		2
BUILDING COVERAGE:	76.5%		-
SOFT LANDSCAPING CVG.:	8.8%		-
HARD LANDSCAPING CVG.:	6.8%		-
DECKS/PORCH/STEPS:	0.0%		-
ASPHALT CVG.:	11.4%		-
OTHER:	0.7%		-

SURVEY INFO.

SURVEY INFO TAKEN FROM
TOPOGRAPHIC PLAN OF SURVEY OF 123, CITY OF OTTAWA
DATED AT:
ANNIS, O'SULLIVAN, VOLLEBEKK LTD
DECEMBER 2021

SITE LEGEND

- EX. TREE TO BE REMOVED
- NEW CONIFEROUS TREE
- DENOTES SOFT LANDSCAPING
- DENOTES HARD LANDSCAPING
- EXISTING BUILDING FOOTPRINT
- PROPOSED RIVERSTONE
- PROPOSED ASPHALT DRIVEWAY
- PROPOSED WOOD DECKS/ BALCONIES
- CAR PARKING SPACE (ASPHALT)
- BICYCLE PARKING (ASPHALT)
- WASTE COLLECTION AREA
- SNOW STORAGE AREA
- PROPOSED/EXISTING ENTRY/EXIT
- PF — TEMPORARY PROTECTION FENCE
- EX. UTILITY POLE
- EX. CHAINED LINK/BOARD FENCE
- PROPERTY LINE
- EXT. LIGHTS

WASTE COLLECTION LEGEND

GB	95YD GARBAGE CONTAINER
BB	2YD FIBRE CONTAINER
B	2YD GWL CONTAINER
G	240L ORGANICS

PRIVATE COLLECTION

SITE NOTES

NEW ROOF DOWN SPOUTS SHALL NOT BE DIRECTED TOWARDS THE ADJACENT PROPERTIES

EXCAVATED MATERIAL TO BE REMOVED FROM PROPERTY

ALL GRADE TO SLOPE 2% AWAY FROM FOUNDATION WALL

ALL MEASUREMENTS ARE METRIC (ACCOMPANYING IMPERIAL MEAS. MAY APPEAR)

EXISTING GRADING AND DRAINAGE PATTERNS NOT TO BE ALTERED UNLESS OTHERWISE NOTED BY THE CIVIL ENGINEER

SNOW ACCUMULATION TO BE REMOVED OFF SITE IMMEDIATELY AS NEEDED

EXISTING PLANTING MATERIAL

CODE	COMMON NAME	QTY.	SIZE (DIA.)	CONDITION/NOTES
DECIDUOUS TREES				
CONIFEROUS TREES				
SHRUBS				

NEW PLANTING MATERIAL

CODE	COMMON NAME	QTY.	SIZE (DIA.)	CONDITION/NOTES
DECIDUOUS TREES				
DT1	RED MAPLE	2	50mm Cal.	
CONIFEROUS TREES				
SHRUBS				

TREE CONSERVATION NOTES

1. ERECT A FENCE AT THE CRITICAL ROOT ZONE (CRZ) OF TREES;
2. DO NOT PLACE ANY MATERIAL OR EQUIPMENT WITHIN THE CRZ OF THE TREE;
3. DO NOT ATTACH ANY SIGNS, NOTICES OR POSTERS TO ANY TREE;
4. DO NOT RAISE OR LOWER THE EXISTING GRADE WITHIN THE CRZ WITHOUT APPROVAL;
5. TUNNEL OR BORE WHEN DIGGING WITHIN THE CRZ OF A TREE;
6. DO NOT DAMAGE THE ROOT SYSTEM, TRUNK OR BRANCHES OF ANY TREE;
7. ENSURE THAT EXHAUST FUMES FROM ALL EQUIPMENT ARE NOT DIRECTED TOWARDS ANY TREE'S CANOPY.

* THE CRITICAL ROOT ZONE (CRZ) IS ESTABLISHED AS RE: 10 CENTIMETRES FROM THE TRUNK OF A TREE FOR EVERY CENTIMETRE OF TRUNK DIAMETER AT BREAST HEIGHT (DBH). THE CRZ IS CALCULATED AS DBH X 10 cm
* TREE PROTECTION FENCE (PF) TO BE ERECTED BEFORE AND REMAIN UNTIL BUILDING CONSTRUCTION HAS COMPLETED AND TO CONSIST OF 1.9m HIGH PLYWOOD HOARDING (SEE DIAGRAM BELOW)

NORTH ARROW

1 SITE PLAN
A1 SCALE 1 = 100

METRES 0 1 2 3 4 5 10 15 20

RESPONSIBILITIES:
DO NOT SCALE DRAWINGS

ALL DESIGN AND CONSTRUCTION TO BE IN ACCORDANCE WITH THE ONTARIO BUILDING CODE 2012

ALL CONTRACTORS MUST WORK IN ACCORDANCE WITH ALL LAWS, REGULATIONS AND BYLAWS HAVING JURISDICTION

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND REPORT ALL ERRORS AND OMISSIONS TO THE ARCHITECT/DESIGNER

GENERAL NOTES:

ONTARIO ASSOCIATION OF ARCHITECTS
LEVENT TATAR
LICENCE
9642

RA REDLINE ARCHITECTURE

REDLINE ARCHITECTURE INC.
Tel: 613-612-2232
info@redlinearchitecture.ca
www.redlinearchitecture.ca

224 PRESTON STREET

SCOPE OF WORK: NEW 6 STOREY - MIXED USE

OWNER/DEVELOPER:
224 ON PRESTON INC.

ARCHITECT:
REDLINE ARCHITECTURE INC.

APPLICANT:

CIVIL ENGINEER:
EXP
1051 BAXTER ROAD
OTTAWA, ON.
K2C-3P1

LANDSCAPING:
DENDRON FORESTRY SERVICES
OTTAWA, ON.
K1S 5B2

SURVEYOR:
AOV LTD.
14 CONCOURSE GATE, SUITE 500
OTTAWA, ON.
K2E-7S6

CONSULTANTS:

STRUCTURAL - TBD
MECHANICAL - TBD
ELECTRICAL - TBD

NO.	REVISION/ISSUE	DATE
4	REVISIONS	00/00/00
3	SITE PLAN REVISIONS	01/24/24
2	SITE PLAN SUBMISSION	08/01/23
1	PRELIMINARIES	07/18/22

PROJECT: **224 PRESTON ST.**
MIXED USE BUILDING
224 PRESTON ST.
OTTAWA, ON K1R-7R1
613-000-0000

DRAWING NAME: SITE PLAN

DRAWN BY: MG/Y

DATE: MAR. 21, 2022

SCALE: AS NOTED

SHEET: SPD1

#18968

FILE NUMBER: D07-12-23-0060

Appendix B – Water Servicing

Table B1: Water Demand Chart

Table B2: Fire Flow Requirements Based on Fire Underwriters Survey (FUS) 2020

Building Separation Distances

Hydrant Distances

Correspondence with the City Regarding Boundary Conditions

TABLE B1

Water Demand Chart

Junction Number (Building)	No. of Units										Total Pop	Residential Demands					Commercial						Total Demands in (L/sec)		
	Singles/Semis/Towns				Apartments							Avg Day Demand (L/day)	Max Day Peaking Factor	Max Hour Peaking Factor	Max Day Demand (L/day)	Peak Hourly Demand (L/day)	Area (m^2)	Avg Demand (L/day)	Peaking Factors (x Avg Day)		Max Day Demand (L/day)	Peak Hour Demand (L/day)	Avg Day (L/s)	Max Day (L/s)	Peak Hour (L/s)
	Single Familty	Semi	Duplex	Townhome	Bachelor	1-Bed Apt	2-Bed Apt	3-Bed Apt	4-Bed Apt	Avg Apt.									Max Day	Peak Hour					
Building					16	8	4	2			49.0	13,720	8.77	13.21	120,347	181,207	191	535	1.5	1.8	802.2	962.6	0.17	1.40	2.12
Totals =					16	8	4	2			49.0	13,720			120,347	181,207					802	963	0.170	1.40	2.12

Unit Densities	Persons/Unit
Singles	3.4
Semi-Detached	2.7
Duplex	2.3
Townhome	2.7
Bachelor Apt Unit	1.4
1-Bed Apt Unit	1.4
2-Bed Apt Unit	2.1
3-Bed Apt Unit	3.1
4-Bed Apt Unit	4.1
Avg. Apt Unit	1.8

Residential

Residential Consumption (L/pers/day) =	280	
Max Day Peaking Factor (* avg day) =	2.5	**8.77**
Peak Hour Factor (* avg day) =	5.5	**13.21**

Based on MECP Table 3-3. Less than 500 persons

Industrrial/Commercial/Institutional Water Consumption

Light Industrial (L/gross ha/day) =	28,000
Heavy Industrial (L/gross ha/day) =	55,000
Commer/Instit (L/m^2 floor/day) =	3
Max Day Peaking Factor (* avg day) =	1.5
Peak Hour Factor (* avg day) =	2.7

Project:	
224 Preston Street Site Plan	
Designed:	Location:
Y. Ammouri M.Eng, P.Eng	224 Preston Street, Ottawa, Ontario
Checked:	
Bruce Thomas, P.Eng	
File Reference:	Page No:
22019695 - Water - Demand Chart.xlsx	1 of 1

TABLE B2: FIRE FLOW REQURIEMENTS BASED ON FIRE UNDERWRITERS SURVEY(FUS) 2020
PROJECT: 224 Preston Street
Building No: **Mix Use**

An estimate of the Fire Flow required for a given fire area may be estimated by:

F = 220 * C * SQRT(A)

where: F = required fire flow in litres per minute
A = total floor area in m^2 (including all storeys, but excluding basements at least 50% below grade)
C = coefficient related to the type of construction

Task	Options	Multiplier	Input				Value Used	Fire Flow Total (L/min)
Choose Building Frame (C)	Wood Frame	1.5	Wood Frame				1.5	
	Ordinary Construction	1						
	Non-combustible Construction	0.8						
	Fire Resistive Construction	0.6						
Input Building Floor Areas (A)			Area	% Used	Area Used		1909.6 m²	
	Mech roof		19.6	100%	19.6			
	Floor 6		282.0	100%	282			
	Floor 5		282.0	100%	282			
	Floor 4		331.5	100%	331.5			
	Floor 3		331.5	100%	331.5			
	Floor 2		331.5	100%	331.5			
	Floor 1		331.5	100%	331.5			
	Basement (At least 50% below grade, not included)		331.5	0%	0			
Fire Flow (F)	F = 220 * C * SQRT(A)							14,421
Fire Flow (F)	Rounded to nearest 1,000							**14,000**

Reductions/Increases Due to Factors Effecting Burning

Task	Options	Multiplier	Input	Value Used	Fire Flow Change (L/min)	Fire Flow Total (L/min)
Choose Combustibility of Building Contents	Non-combustible	-25%	Combustible	0%	0	14,000
	Limited Combustible	-15%				
	Combustible	0%				
	Free Burning	15%				
	Rapid Burning	25%				
Choose Reduction Due to Sprinkler System	**Adequate** Sprinkler Conforms to NFPA13	-30%	Adequate Sprinkler Conforms to NFPA13	-30%	-4,200	9,800
	No Sprinkler	0%				
	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	Standard Water Supply for Fire Department Hose Line and for Sprinkler System	-10%	-1,400	8,400
	Not Standard Water Supply or Unavailable	0%				
	Fully Supervised Sprinkler System	-10%	Fully Supervised Sprinkler System	-10%	-1,400	7,000
	Not Fully Supervised or N/A	0%				

Choose Structure Exposure Distance	Exposures	Separ-ation Dist (m)	Cond	Separation Conditon	Exposed Wall type	Exposed Wall Length: Length (m)	No of Storeys	Length-Height Factor	Sub-Conditon	Type IV-III (U)	Charge (%)	Total Charge (%)	Total Exposure Charge (L/min)	
	North	21.6	4	20.1 to 30	Type IV-III (U)	24.75	6	148.5	4F	5%	5%	36%	5,040	12,040
	East	22.4	4	20.1 to 30	Type IV-III (U)	12.82	6	76.92	4D	3%	3%			
	South	7.8	2	3.1 to 10	Type IV-III (U)	24.75	6	148.5	2F	15%	15%			
	West	3.3	2	3.1 to 10	Type IV-III (U)	12.82	6	76.92	2D	13%	13%			

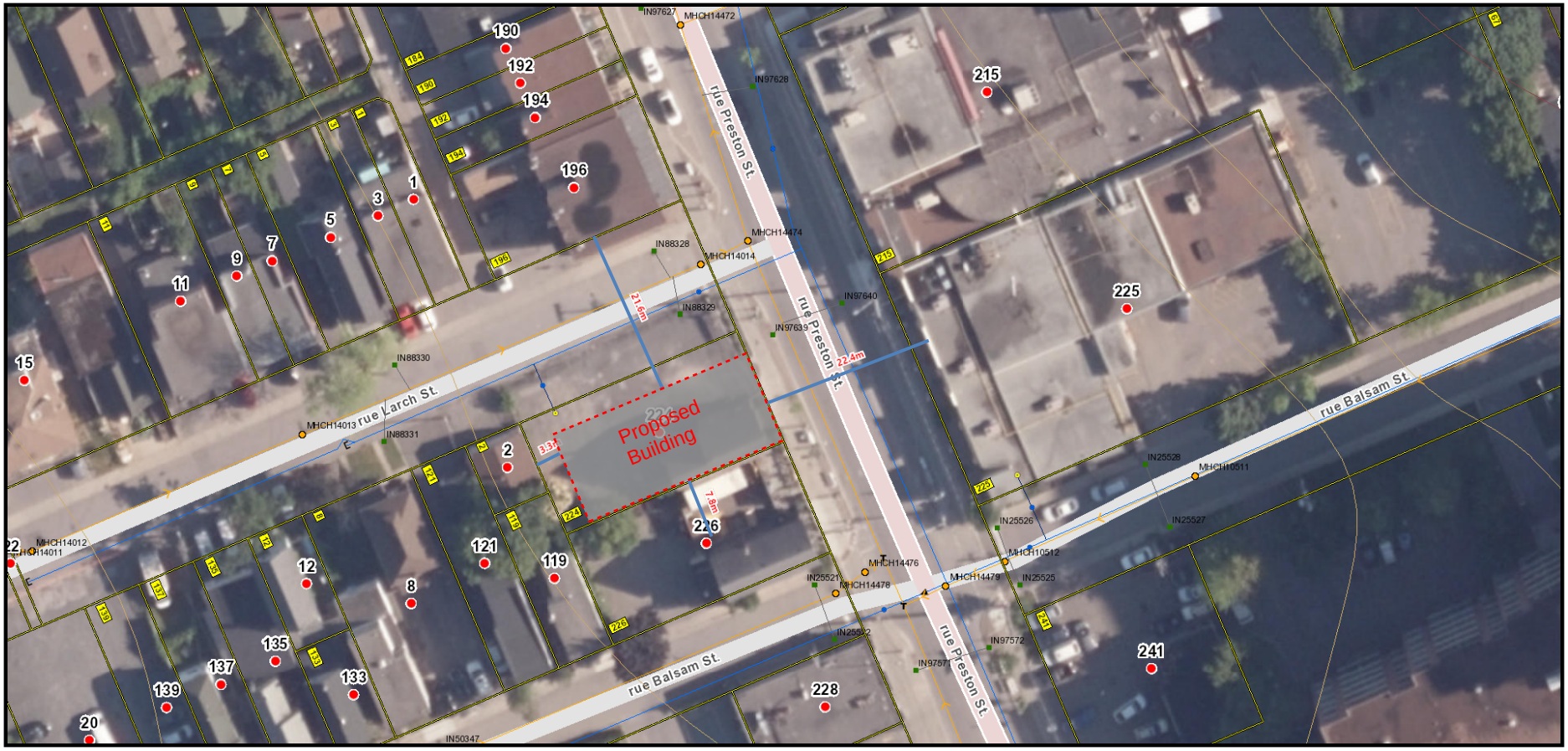
	Total Required Fire Flow, Rounded to the Nearest 1,000 L/min =	**12,000**
	Total Required Fire Flow (RFF), L/sec =	**200**
Obtain Required Fire Flow	Can the Total Fire Flow be Capped at 10,000 L/min (167 L/sec) based on "TECHNCAL BULLETIN ISTB-2018-02", (yes/no) =	**No**
	Total Required Fire Flow (RFF). If RFF < 167 use RFF (L/sec) =	**200**
Fire Flow	Total Required Fire Flow (RFF). If RFF < 167 use RFF (L/sec) =	**200**

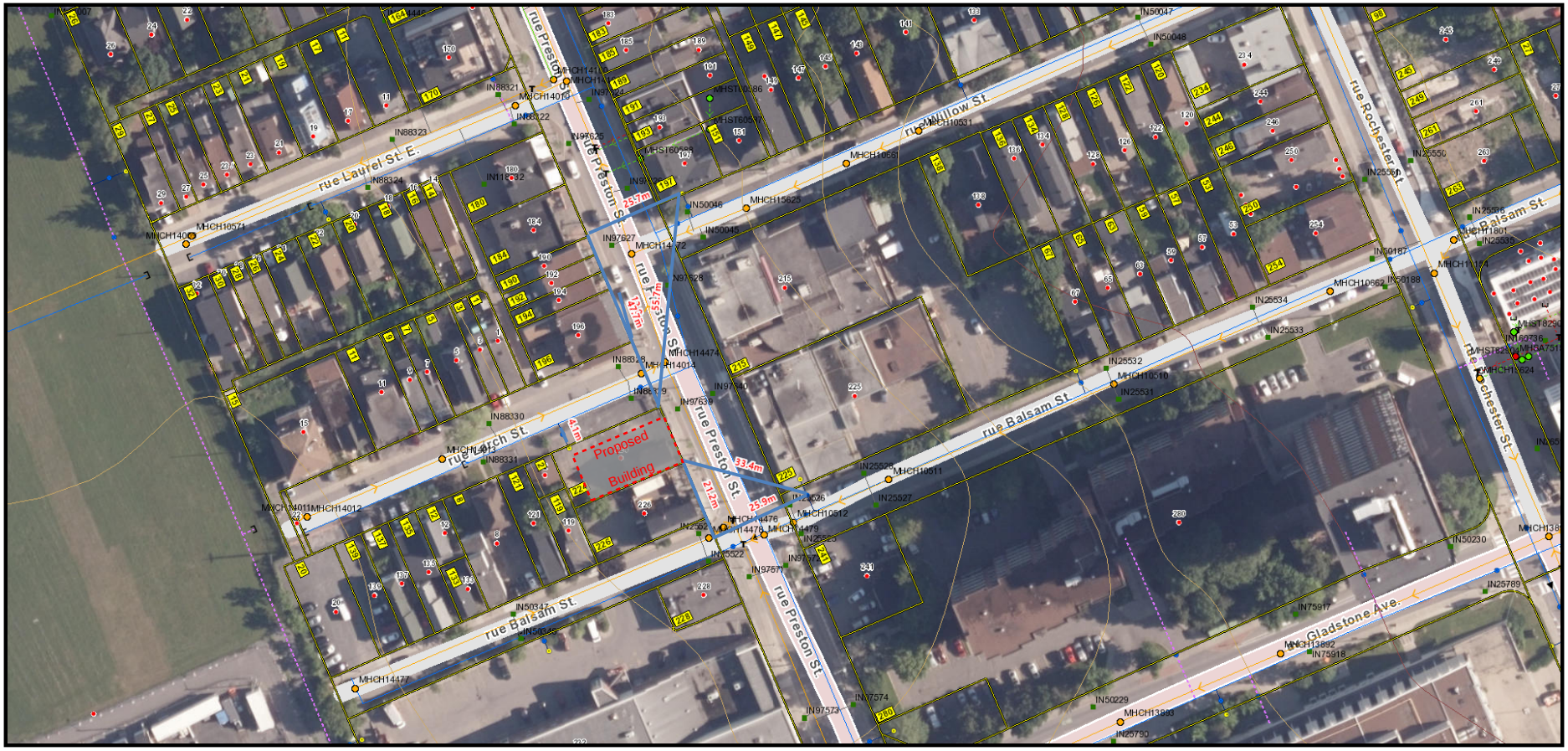
Exposure Charges for Exposing Walls of Wood Frame Construciton (from Table G5)

Type V	Wood Frame
Type IV-III (U)	Mass Timber or Ordinary with Unprotected Openings
Type IV-III (P)	Mass Timber or Ordinary with Protected Openings
Type II-I (U)	Noncombustible or Fire Resistive with Unprotected Openings
Type II-I (P)	Noncombustible or Fire Resistive with Protected Openings

Conditons for Separation

Separation Dist	Condition
0m to 3m	1
3.1m to 10m	2
10.1m to 20m	3
20.1m to 30m	4
> 30.1m	5


Proposed Building
rue Larch St.
rue Preston St.
rue Balsam St.
21.6m
22.4m
3.3m
7.9m
190
192
194
196
1
3
5
7
9
11
15
2
226
121
119
12
8
135
137
139
133
20
215
225
241
228
IN97627
MHCH14472
IN97628
MHCH14474
IN88328
MHCH14014
IN88329
IN97640
IN97639
IN88330
MHCH14013
IN88331
MHCH14012
MHCH14011
IN25528
MHCH10511
IN25526
IN25527
MHCH10512
MHCH14476
MHCH14478
IN25521
IN25525
IN25522
IN97572
IN97571
IN50347


rue Laurel St. E.
rue Preston St.
rue Arch St.
rue Balsam St.
rue Rochester St.
rue Willow St.
Gladstone Ave.
Proposed
Building
4.1m
25.7m
55.7m
47.1m
33.4m
21.2m
25.9m

RA | REDLINE ARCHITECTURE

From: Levent Tatar
VIA EMAIL: info@redlinearchitecture.ca

Yasser Ammouri
EXP | Design Engineer
2650 Queensview Drive
Suite 100
Ottawa On. K2B 8H6

October 19, 2023

Re: 224 Preston Street

This letter is to confirm the following performance standards for water supply for public fire protection to the proposed 6 storey project at 224 Preston Street.

1) Type of Construction / Construction Coefficient / Building Frame: **Wood Frame Construction**

2) Occupancy Coefficient and Combustibility Content: **Combustible Content**

If you have any further concerns or questions feel free to contact me.

Thank you,

Levent Tatar
Redline Architecture INC
613-618-9620
www.redlinearchitecture.ca

ONTARIO ASSOCIATION OF ARCHITECTS
LEVENT TATAR
LICENCE
9542

ENGINEERING WISDOM

October 10, 2023

City of Ottawa.

Building Official II, Building Code Services Branch

Re: Proposed Project at Address: 224 Preston St , Ottawa, Ontario

File No: D02-02-23-0040, D07-12-23-0060

With reference to your comments we wish to comment for items related to your requested information:

53. The mechanical engineer needs to provide a letter (signed and sealed) confirming each building sprinkler system will meet the requirements of a fully supervised system as per the NFPA and are fully supervised by a monitored fire alarm system as per OBC to support applying the maximum 50% sprinkler protection credit to the FUS method. Otherwise, a maximum credit of 40% should only be applied. Provide this letter within the Appendix to confirm that the buildings will be complete with a sprinkler system conforming to NFPA13.

- Each building sprinkler system will meet the requirements of a fully supervised system as per the NFPA and are fully supervised by a monitored fire alarm system as per OBC to support applying the maximum 50% sprinkler protection credit to the FUS method, the buildings will be complete with a sprinkler system conforming to NFPA13.

We hope that the above explanation answers your question. Please do not hesitate to call undersigned in case of any queries.

Yours truly,

Mohamed Amer, P.Eng.

143 Deercroft Ave • OTTAWA, ONTARIO • K2J5H8 TEL. 613-366-8101
E-MAIL: Info@wisdomengineering.ca FAX. 613-366-8101

Yasser Ammouri

From: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Sent: Tuesday, January 30, 2024 11:24 AM
To: Yasser Ammouri
Cc: Bruce Thomas
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.
Attachments: 224 Preston Street REVISED January 2024.pdf

Follow Up Flag: Follow up
Flag Status: Flagged

The following are boundary conditions, HGL, for hydraulic analysis at 224 Preston Street (zone 1W) assumed to be connected to the 152 mm watermain on Larch Street (see attached PDF for location).

Minimum HGL: 107.2 m

Maximum HGL: 115.3 m

Max Day + Fire flow (200 L/s): 84.3 m

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Thanks
Nishant

From: Yasser Ammouri <Yasser.Ammouri@exp.com>
Sent: January 08, 2024 7:57 AM
To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Cc: Bruce Thomas <Bruce.Thomas@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

Hello Nishant,

Happy New Year.

Please accept this email as a request for the revised boundary conditions:

Below are the new parameters:
Type of Development and Units : 6 storey mix-use building. commercial and office spaces on the ground floor, 16 bachelor units, eight (8) 1-berdoom units, four (4) 2-bedroom units and two (2) 3-bedroom units.
· Site Address: 224 Preston Street, Ottawa, Ontario K1R 7R1
· A plan showing the proposed water service connection location. (attached servicing plan)
· Average Daily Demand (L/s) 0.17L/s
· Maximum Daily Demand (L/s) 1.40 L/s
· Peak Hour Demand (L/s) 2.12 L/s
· Fire Flow (L/min) 12,000 L/min

Regards.

Yasser Ammouri, M.Eng., P.Eng., PMP
EXP | Design Engineer
t : +1.343.804.4900 | e : yasser.ammouri@exp.com

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From: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Sent: Wednesday, December 13, 2023 4:00 PM
To: Yasser Ammouri <Yasser.Ammouri@exp.com>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

Hello Yasser,

I have noticed that Fire flow demand has increased in the latest submission. New BC should be requested from the City if Fire flow demand increases during the design stage.

Here are my draft comments. Final comments will be sent out by File lead.

Thanks
Nishant Jhamb, P.Eng
Project Manager |Gestionnaire de projet

Planning, Real Estate and Economic Development Department
Development Review - Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 23112, nishant.jhamb@ottawa.ca

From: Jhamb, Nishant
Sent: November 10, 2022 4:08 PM
To: Yasser Ammouri <Yasser.Ammouri@exp.com>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

The following are boundary conditions, HGL, for hydraulic analysis at 224 Preston Street (zone 1W) assumed to be connected to the 152 mm watermain on Larch Street (see attached PDF for location).

Minimum HGL: 107.2 m

Maximum HGL: 115.3 m

Max Day + Fire flow (133 L/s): 98.0 m

The maximum pressure is estimated to be more than 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required.

These are for current conditions and are based on computer model simulation.

Disclaimer: The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation.

Thanks
Nishant

From: Yasser Ammouri <Yasser.Ammouri@exp.com>
Sent: November 10, 2022 3:23 PM
To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

Hello Nishant,

I wanted to follow up with you regarding the boundary conditions.
Please let us know if you have received anything from the water department.

Thank you.

Yasser Ammouri, M.Eng., P.Eng.
EXP | Design Engineer
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From: Yasser Ammouri
Sent: Monday, October 24, 2022 9:37 AM
To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

Hello Nishant,

I hope you had a good weekend.
Please find the 2020 FUS calculations attached here.

If you need anything else, please let us know.

Regards.

Yasser Ammouri, M.Eng., P.Eng.
EXP | Design Engineer
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From: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Sent: Thursday, October 20, 2022 11:52 AM
To: Yasser Ammouri <Yasser.Ammouri@exp.com>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

Hello Yasser, I have received the following comment from Water department.

Could you request the consultant adjust their request to use the 2020 FUS method for fire demand?

Thanks
Nishant

From: Yasser Ammouri <Yasser.Ammouri@exp.com>
Sent: October 20, 2022 11:37 AM
To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

Thanks Nishant,

If you need anything else, please let me know.

Regards.

Yasser Ammouri, M.Eng., P.Eng.
EXP | Design Engineer
t : +1.343.804.4900 | e : yasser.ammouri@exp.com
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From: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Sent: Thursday, October 20, 2022 11:11 AM
To: Yasser Ammouri <Yasser.Ammouri@exp.com>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

Thank you Yasser

I have sent the request to Water Resource team, please note it may take 2-3 weeks to get the BCs.

Thanks
Nishant

From: Yasser Ammouri <Yasser.Ammouri@exp.com>
Sent: October 19, 2022 2:56 PM
To: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: RE: 224 Preston Street. (PC2022-0118) water boundary conditions.

ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Hello Nishant,

Thank you for your prompt response.
Please find the FUS calculations attached here.

Regards.

Yasser Ammouri, M.Eng., P.Eng.
EXP | Design Engineer
t : +1.343.804.4900 | e : yasser.ammouri@exp.com
exp.com | legal disclaimer
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From: Jhamb, Nishant <nishant.jhamb@ottawa.ca>
Sent: Wednesday, October 19, 2022 1:54 PM
To: Yasser Ammouri <Yasser.Ammouri@exp.com>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: FW: 224 Preston Street. (PC2022-0118) water boundary conditions.

Hello Yasser

Thank you for the request, Can you please send us the FUS calculation as well.
Please ensure FUS calculations are as per latest FUS 2020 guide.

Have a Good Day
Nishant Jhamb, P.Eng
Project Manager |Gestionnaire de projet
Planning, Real Estate and Economic Development Department
Development Review - Central Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 23112, nishant.jhamb@ottawa.ca

From: Yasser Ammouri <Yasser.Ammouri@exp.com>
Sent: October 19, 2022 10:19 AM
To: Kadri, Nader <nader.kadri@ottawa.ca>; nishant.jhamb@ottawwa.ca; Saunders, Evan <evan.saunders@ottawa.ca>
Cc: Momen Siam <Momen.Siam@exp.com>
Subject: 224 Preston Street. (PC2022-0118) water boundary conditions.

Hello,

We are the civil consultant for the proposed project on 224 Preston Street. (PC2022-0118)
As noted in the meeting minutes (attached here), water boundary conditions are required to confirm adequate flow.

Could you please provide us with the boundary conditions?

- Type of Development and Units : 6 storey mix-use building. 2 commerical spaces on the ground floor, 19 bachelor units and nine (9) 1-berdoom units
- Site Address: 224 Preston Street, Ottawa, Ontario K1R 7R1
- A plan showing the proposed water service connection location. (attached is a preliminary servicing plan)
- Average Daily Demand (L/s) 0.136L/s
- Maximum Daily Demand (L/s) 1.194 L/s
- Peak Hour Demand (L/s) 1.791 L/s
- Fire Flow (L/min) 10,000 L/min

If you have any questions, please feel free to contact me.

Have a good day.

Yasser Ammouri, M.Eng., P.Eng.
EXP | Design Engineer
t : +1.343.804.4900 | e : yasser.ammouri@exp.com
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Appendix C – Sanitary Sewer Design Sheets

Table C1: Sanitary Sewer Calculation Sheet

Building Code Conformance Letter from Mechanical Engineer

TABLE C1 - SANITARY SEWER CALCULATION SHEET

LOCATION				RESEDENTIAL AREAS AND POPULAITONS												COMMERCIAL			INDUSTRIAL			INSTITUTIONAL			INFILTRATION			FOUNDATION DRAIN			TOTAL	SEWER DATA							
Street	U/S MH	D/S MH	Desc	Area (ha)	NUMBER OF UNITS								POPULATION		Peak Factor	Peak Flow (L/sec)	AREA (ha)		Peak Flow (L/sec)	AREA (ha)		Peak Factor (per	AREA (Ha)	ACCU AREA (Ha)	Peak Flow (L/sec)	AREA (ha)		INFILT FLOW (L/sec)	AREA (ha)		FOUND FLOW (L/sec)	FLOW (L/s)	Nom Dia (mm)	Actual Dia (mm)	Slope (%)	Length (m)	Capacity (L/sec)	Q/Q_{CAP} (%)	Full Velocity (m/s)
					Singles	Semis	Towns	Bachelor	1-Bed Apt.	2-Bed Apt.	3-Bed Apt.	4-Bed Apt.	INDIV	ACCU			INDIV	ACCU		INDIV	ACCU					INDIV	ACCU		INDIV	ACCU									
Site	BLDG	SAN MH 1		0.05				16	8	4	2		49	49	4.00	0.64	0.0191	0.0191	0.009285							0.047	0.047	0.013	0.047	0.047	0.235	0.89	150	150	2.00	1.6	21.5	4%	1.72
	SANMH 2	Combined Sewer												49	4.00	0.64		0.019	0.009285								0.047	0.013		0.047	0.235	0.89	150	150	1.00	9.4	15.2	6%	1.21
				0.047					**8**	**4**	**2**		**49**													**0.047**												

Residential Avg. Daily Flow, q (L/p/day) =	280	Commercial Peak Factor =	1.5	(when area >20%)	Peak Population Flow, (L/sec) =	P*q*M/86.4	Unti Type	Persons/Unit	Designed:	Project:
Commercial Avg. Daily Flow (L/gross ha/day) =	28,000		1.0	(when area <20%)	Peak Extraneous Flow, (L/sec) =	I*Ac	Singles	3.0	Y. Ammouri M.Eng, P.Eng, PMP	224 Preston Street
or L/gross ha/sec =	0.324				Residential Peaking Factor, M =	1 + (14/(4+P^0.5)) * K	Semi-Detached	2.7		
Institutianal Avg. Daily Flow (L/s/ha) =	28,000	Institutional Peak Factor =	1.5	(when area >20%)	A_c = Cumulative Area (hectares)		Townhomes	2.7	Checked:	Location:
or L/gross ha/sec =	0.324		1.0	(when area <20%)	P = Population (thousands)		Single Apt. Unit	1.4		
Light Industrial Flow (L/gross ha/day) =	35,000						2-bed Apt. Unit	2.1	Bruce Thomas, P.Eng.	224 Preston Street, Ottawa, Ontario
or L/gross ha/sec =	0.40509	Residential Correction Factor, K =	1.00		Sewer Capacity, Qcap (L/sec) =	$1/N \ S^{1/2} \ R^{2/3} \ A_c$	3-bed Apt. Unit	3.1		
Heavy Industrial Flow (L/gross ha/day) =	55,000	Manning N =	0.013		(Manning's Equation)		4-bed Apt. Unit	3.8	File Reference:	Page No:
or L/gross ha/sec =	0.637	Peak extraneous flow, I (L/s/ha) =	0.28	(Total I/I)						
Extraneous Flows from Existing Areas (L/s/gross ha) =	5.00								22019695 - SAN Design Sheet.xlsx	**1 of 1**

January 04, 2024

City of Ottawa.

Building Official II, Building Code Services Branch

Re: Proposed Project at Address: 224 Preston St , Ottawa, Ontario

File No: D02-02-23-0040, D07-12-23-0060

With reference to your comments we wish to comment for items related to your requested information:

13. Confirm with Mechanical Engineer if 150mm sanitary service lateral sufficient as per Building code requirements?

- This confirms that the 150mm sanitary service lateral is adequate in accordance with building code requirements.

We hope that the above explanation answers your question. Please do not hesitate to call undersigned in case of any queries.

LICENSED PROFESSIONAL ENGINEER
04/01/24
M. AMER-MOHAMED
100051885
PROVINCE OF ONTARIO

Yours truly,

Mohamed Amer, P.Eng.

143 Deercroft Ave • OTTAWA, ONTARIO • K2J5H8 TEL. 613-366-8101
E-MAIL: Info@wisdomengineering.ca FAX. 613-366-8101

Appendix D – SWM Design Sheets

Table D1: Calculation of Average Runoff Coefficients for Pre-Development Conditions

Table D2: Calculation of Peak Runoff Under Pre-Development Condtions

Table D3: Estimation of Allowable Peak Flows

Table D4: Average Runoff Coefficients For Post-Development Conditions

Table D5: Summary of Post-Development Peak Flows (Uncontrolled and Controlled)

Table D6: Storage Volumes for 2-year, 5-year, and 100-year Storms (MRM)

Table D7: 5-year & 100-year Roof Design Sheet - For Roof Drains using Flow Controlled Roof Drains

TABLE D1

CALCULATION OF AVERAGE RUNOFF COEFFICIENTS FOR PRE-DEVELOPMENT CONDTIONS

Area No.	Outlet Location	Asphalt Areas C=0.90		Roof Areas C=0.90		Concrete / Pavers C=0.90		Grassed Areas C=0.20		Sum AC	Total Area (m^2)	C_{AVG}
		Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C	Area (m^2)	A * C			
E1	ROW	470.00	423.0							423.0	470.00	0.90

TABLE D2

CALCULATION OF PEAK RUNOFF UNDER PRE-DEVELOPMENT CONDTIONS

Area No	Outlet Location	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr			Storm = 5 yr			Storm = 100 yr		
				I_2 (mm/hr)	Cavg	Q_2 (L/sec)	I_5 (mm/hr)	Cavg	Q_5 (L/sec)	I_{100} (mm/hr)	Cavg	Q_{100} (L/sec)
E1	ROW	0.04700	10	76.81	0.90	9.0	104.29	0.90	12.3	178.56	1.00	23.3

Notes

1) Intensity, I = 732.951/(Tc+6.199) $^{0.810}$ (2-year, City of 0ttawa)

2) Intensity, I = 998.071/(Tc+6.035) $^{0.814}$ (5-year, City of 0ttawa)

3) Intensity, I = 1735.688/(Tc+6.014) $^{0.820}$ (100-year, City of Ottawa)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) Allowable Capture Rate is based on 2-year storm at Tc=10 minutes, and discharging to combined sewer on Bronson Avenue

TABLE D3

ESTIMATION OF ALLOWABLE PEAK FLOWS (Based on Max C=0.40 with Tc=10mins & 2-yr Storm)

Area No	Outlet Location	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr		
				I_2 (mm/hr)	Cavg	Q_{2ALLOW} (L/sec)
Site	ROW	0.04700	10	76.81	0.40	4.01

Allowable Discharge (based on 2-yr storm)

Notes

1) Intensity, I = 732.951/(Tc+6.199) $^{0.810}$ (2-year, City of 0ttawa)

2) Allowable Capture Rate is based on 2-year storm at Tc=10 minutes, and C value of 0.40

TABLE D4

AVERAGE RUNOFF COEFFICIENTS FOR POST-DEVELOPMENT CONDITIONS

$C_{ASPH/CONC}$ = 0.90 C_{ROOF} = 0.90 C_{GRASS} = 0.20

Area No.	Asphalt & Conc Areas (m^2)	A * C_{ASPH}	Roof Areas (m^2)	A * C_{ROOF}	Grassed Areas (m^2)	A * C_{GRASS}	Sum AC	Total Area (m^2)	C_{AVG}	Comment
P1		0.9	332	0.9		0.2	298.8	332	0.90	Building footprint
P2	82	0.9		0.9	21	0.2	78.0	103	0.76	Uncontrolled towards Larch Street
P3	35	0.9		0.9		0.2	31.5	35	0.90	Uncontrolled towards Preston Street
Totals								470	0.87	

Notes

TABLE D5

SUMMARY OF POST-DEVELOPMENT PEAK FLOWS (Uncontrolled and Controlled)

Area No	Area (ha)	Time of Conc, Tc (min)	Storm = 2 yr				Storm = 5 yr				Storm = 100 yr			
			C_{AVG}	I_2 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_5 (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)	C_{AVG}	I_{100} (mm/hr)	Q (L/sec)	Q_{CAP} (L/sec)
P1	0.0332	10	0.90	76.81	6.38	**1.55**	0.90	104.19	8.65	**2.10**	1.00	178.56	16.48	**4.00**
P2	0.0103	10	0.76	76.81	1.67	**(1.67)**	0.76	104.19	2.26	**(2.26)**	0.95	178.56	4.84	**(4.84)**
P3	0.0035	10	0.90	76.81	0.67	**(0.67)**	0.90	104.19	0.91	**(0.91)**	1.00	178.56	1.74	**(1.74)**
total (storm)	0.0470				8.72	3.89			11.83	5.27			23.06	10.58
foundation drain														

Notes

1) Intensity, I = 732.951/(Tc+6.199) $^{0.810}$ (2-year, City of 0ttawa)

2) Intensity, I = 998.071/(Tc+6.035) $^{0.814}$ (5-year, City of 0ttawa)

3) Intensity, I = 1735.688/(Tc+6.014) $^{0.820}$ (100-year, City of Ottawa)

4) Cavg for 100-year is increased by 25% to a maximum of 1.0

5) Time of Concentration, Tc = ***10 mins***

6) For Flows under column Qcap which are shown in brackets ***(0.0)*** *, denotes flows that are uncontrolled)*

Table D6 Storage Volumes for 2-year, 5-Year and 100-Year Storms (MRM)

Area No: **P1**

C_{AVG} = 0.90 (2-yr)

C_{AVG} = 0.90 (5-yr)

C_{AVG} = 1.00 (100-yr, Max 1.0)

Time Interval = 10.00 (mins)

Drainage Area = 0.0332 (hectares)

Actual Release Rate (L/sec) = 4.00

Percentage of Actual Rate (City of Ottawa requirement) = 100%

Release Rate Used for Estimation of 100-year Storage (L/sec) = 4.0

Duration (mins)	Release Rate = 1.55 (L/sec); Return Period = 2 (years); IDF Parameters, A = 733.0, B = 0.810, C = 6.199 (I = A/(T_c+C)					Release Rate = 2.10 (L/sec); Return Period = 5 (years); IDF Parameters, A = 998.1, B = 0.814, C = 6.053 (I = A/(T_c+C)					Release Rate = 4.0 (L/sec); Return Period = 100 (years); IDF Parameters, A = 1735.7, B = 0.820, C = 6.014 (I = A/(T_c+C)				
	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)	Rainfall Intensity, I (mm/hr)	Peak Flow (L/sec)	Release Rate (L/sec)	Storage Rate (L/sec)	Storage (m^3)
0	167.2	13.9	1.5	12.3	0.0	230.5	19.1	2.1	17.0	0.0	398.6	36.8	4.0	32.8	0.0
10	76.8	6.4	1.5	4.8	2.9	104.2	8.7	2.1	6.6	3.9	178.6	16.5	4.0	12.5	7.5
20	52.0	4.3	1.5	2.8	3.3	70.3	5.8	2.1	3.7	4.5	120.0	11.1	4.0	7.1	8.5
30	40.0	3.3	1.5	1.8	3.2	53.9	4.5	2.1	2.4	4.3	91.9	8.5	4.0	4.5	8.1
40	32.9	2.7	1.5	1.2	2.8	44.2	3.7	2.1	1.6	3.8	75.1	6.9	4.0	2.9	7.0
50	28.0	2.3	1.5	0.8	2.3	37.7	3.1	2.1	1.0	3.1	64.0	5.9	4.0	1.9	5.7
60	24.6	2.0	1.5	0.5	1.8	32.9	2.7	2.1	0.6	2.3	55.9	5.2	4.0	1.2	4.2
70	21.9	1.8	1.5	0.3	1.1	29.4	2.4	2.1	0.3	1.4	49.8	4.6	4.0	0.6	2.5
80	19.8	1.6	1.5	0.1	0.5	26.6	2.2	2.1	0.1	0.5	45.0	4.2	4.0	0.2	0.7
90	18.1	1.5	1.5	0.0	-0.2	24.3	2.0	2.1	-0.1	-0.4	41.1	3.8	4.0	-0.2	-1.1
100	16.7	1.4	1.5	-0.2	-0.9	22.4	1.9	2.1	-0.2	-1.4	37.9	3.5	4.0	-0.5	-3.0
110	15.6	1.3	1.5	-0.3	-1.7	20.8	1.7	2.1	-0.4	-2.4	35.2	3.2	4.0	-0.8	-5.0
120	14.6	1.2	1.5	-0.3	-2.4	19.5	1.6	2.1	-0.5	-3.5	32.9	3.0	4.0	-1.0	-6.9
130	13.7	1.1	1.5	-0.4	-3.2	18.3	1.5	2.1	-0.6	-4.5	30.9	2.9	4.0	-1.1	-9.0
140	12.9	1.1	1.5	-0.5	-4.0	17.3	1.4	2.1	-0.7	-5.6	29.2	2.7	4.0	-1.3	-11.0
150	12.3	1.0	1.5	-0.5	-4.8	16.4	1.4	2.1	-0.7	-6.7	27.6	2.5	4.0	-1.5	-13.1
160	11.7	1.0	1.5	-0.6	-5.6	15.6	1.3	2.1	-0.8	-7.8	26.2	2.4	4.0	-1.6	-15.2
170	11.1	0.9	1.5	-0.6	-6.4	14.8	1.2	2.1	-0.9	-8.9	25.0	2.3	4.0	-1.7	-17.3
180	10.6	0.9	1.5	-0.7	-7.2	14.2	1.2	2.1	-0.9	-10.0	23.9	2.2	4.0	-1.8	-19.4
190	10.2	0.8	1.5	-0.7	-8.0	13.6	1.1	2.1	-1.0	-11.1	22.9	2.1	4.0	-1.9	-21.5
200	9.8	0.8	1.5	-0.7	-8.8	13.0	1.1	2.1	-1.0	-12.2	22.0	2.0	4.0	-2.0	-23.7
210	9.4	0.8	1.5	-0.8	-9.7	12.6	1.0	2.1	-1.1	-13.3	21.1	2.0	4.0	-2.0	-25.8
220	9.1	0.8	1.5	-0.8	-10.5	12.1	1.0	2.1	-1.1	-14.5	20.4	1.9	4.0	-2.1	-28.0
230	8.8	0.7	1.5	-0.8	-11.3	11.7	1.0	2.1	-1.1	-15.6	19.7	1.8	4.0	-2.2	-30.2
240	8.5	0.7	1.5	-0.8	-12.2	11.3	0.9	2.1	-1.2	-16.7	19.0	1.8	4.0	-2.2	-32.3
250	8.2	0.7	1.5	-0.9	-13.0	10.9	0.9	2.1	-1.2	-17.9	18.4	1.7	4.0	-2.3	-34.5
260	8.0	0.7	1.5	-0.9	-13.8	10.6	0.9	2.1	-1.2	-19.0	17.8	1.6	4.0	-2.4	-36.7
270	7.7	0.6	1.5	-0.9	-14.7	10.3	0.9	2.1	-1.2	-20.2	17.3	1.6	4.0	-2.4	-38.9
280	7.5	0.6	1.5	-0.9	-15.5	10.0	0.8	2.1	-1.3	-21.3	16.8	1.6	4.0	-2.4	-41.2
290	7.3	0.6	1.5	-0.9	-16.4	9.7	0.8	2.1	-1.3	-22.5	16.3	1.5	4.0	-2.5	-43.4
300	7.1	0.6	1.5	-1.0	-17.3	9.5	0.8	2.1	-1.3	-23.7	15.9	1.5	4.0	-2.5	-45.6
310	6.9	0.6	1.5	-1.0	-18.1	9.2	0.8	2.1	-1.3	-24.8	15.5	1.4	4.0	-2.6	-47.8
320	6.7	0.6	1.5	-1.0	-19.0	9.0	0.7	2.1	-1.4	-26.0	15.1	1.4	4.0	-2.6	-50.1
330	6.6	0.5	1.5	-1.0	-19.8	8.8	0.7	2.1	-1.4	-27.2	14.7	1.4	4.0	-2.6	-52.3
Max =					**3.3**					**4.5**					**8.5**

Notes

1) Peak flow is equal to the product of 2.78 x C x I x A

2) Rainfall Intensity, I = A/(Tc+C)^B

3) Release Rate = Min (Release Rate, Peak Flow)

4) Storage Rate = Peak Flow - Release Rate

5) Storage = Duration x Storage Rate

6) Maximium Storage = Max Storage Over Duration

7) Parameters a,b,c are for City of Ottawa

City of Ottawa IDF Data (from SDG002)

IDF curve equations (Intensity in mm/hr)

100 year Intensity = 1735.688 / (Time in min + 6.014) $^{0.820}$

50 year Intensity = 1569.580 / (Time in min + 6.014) $^{0.820}$

25 year Intensity = 1402.884 / (Time in min + 6.018) $^{0.819}$

10 year Intensity = 1174.184 / (Time in min + 6.014) $^{0.816}$

5 year Intensity = 998.071 / (Time in min + 6.053) $^{0.814}$

2 year Intensity = 732.951 / (Time in min + 6.199) $^{0.810}$

Table D7: 5-year & 100-year Roof Design Sheet - For Roof Drains using Flow Controlled Roof Drains

Project: 224 Preston
Location: Ottawa, ON.
Date: Apr 2023

Area #	Drain Type	Roof Drain Type	No Drains per Area	No of Weirs per Drain	Weir Position	Runoff Coeff (Cavg)		Drainage Area		5-year Event						100-year Event						Storage Required *(MRM)*		Maximium Storage Provided at Spill Elevation				
						5-year	100-year	m^2	ha	Runoff Rate (L/sec)	5yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	Runoff Rate (L/sec)	100yr Ponding Depth (mm)	Roof Drain Capacity Per Weir (gpm)	Roof Drain Capacity Per Drain per weir (gpm)	Roof Drain Capacity Per Drain (L/sec)	Total Flow From Roof Drains (L/sec)	5-year (m^3)	100-year (m^3)	Area Available for Storage (m^2)	Max Prism Depth (mm)	Max Volume (m^3)	5-yr Volume (m3)	100-yr Volume (m3)
A1	RD	RD1	1	1	3-1/4 open	0.90	1.00	129.7	0.0130	3.381	105	12.8	12.8	0.804	0.804	6.438	140	14.5	14.5	0.915	0.915	1.77	4.24	103.8	150	5.2	3.63	4.84
A2	RD	RD1	1	1	3-1/4 open	0.90	1.00	96.8	0.0097	2.523	99	12.5	12.5	0.785	0.785	4.805	135	14.3	14.3	0.899	0.899	1.10	2.83	77.4	150	3.9	2.56	3.48
A3	RD	RD1	1	1	2-Closed	0.90	1.00	14.5	0.0015	0.378	60	5.0	5.0	0.315	0.315	0.720	112	5.0	5.0	0.315	0.315	0.04	0.24	11.6	150	0.6	0.23	0.43
A4	RD	RD1	1	1	3-1/4 open	0.90	1.00	11.5	0.0012	0.300	59	10.5	10.5	0.659	0.300	0.571	74	11.2	11.2	0.707	0.571	0.03	0.05	9.2	150	0.5	0.18	0.23
A5	RD	RD1	1	1	3-1/4 open	0.90	1.00	8.7	0.0009	0.227	60	10.5	10.5	0.662	0.227	0.432	74	11.2	11.2	0.707	0.432	0.02	0.04	7.0	150	0.4	0.14	0.17
A6	RD	RD1	1	1	3-1/4 open	0.90	1.00	54.0	0.0054	1.408	86	11.8	11.8	0.744	0.744	2.681	122	13.6	13.6	0.858	0.858	0.39	1.16	43.2	150	2.2	1.24	1.76
Totals						0.90	1.00	**315**	**0.0315**	8.217		**62.95**		**3.97**	**3.18**	**15.65**		**69.75**		**4.40**	**3.99**	**3.35**	**8.57**	**209**		**12.6**	**8.0**	**10.9**
Min											**59**				`		**74**											
Max											**105**						**140**											

Runoff Based on the Following:

Storm Frequency (years) =	5	100
Time of Conc (mins) =	10	10
Storm Intensity (mm/hr) =	104.2	178.6

Qyr(cont) = 2.4
V2yr = 2.5

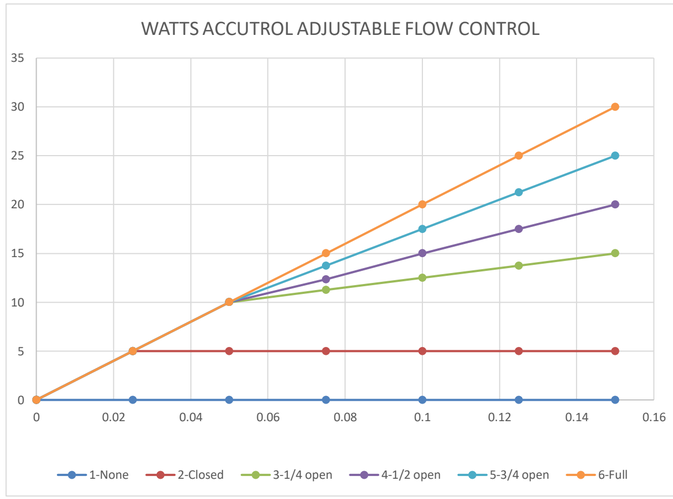
Roof Drains have Following Flow Rates: WATTS Flow Conttolled Drain

Weir Position		Flow (gpm) per depth							Max Flow Rate per Weir
		0	25	50	75	100	125	150	
		0	0.025	0.05	0.075	0.1	0.125	0.15	
1-None		0	0	0	0	0	0	0	0.000
2-Closed		0	5	5	5	5	5	5	0.315
3-1/4 open		0	5	10	11	13	14	15	0.946
4-1/2 open		0	5	10	12	15	18	20	1.262
5-3/4 open		0	5	10	14	18	21	25	1.577
6-Full		0	5	10	15	20	25	30	1.893

Roof Drain Types

Drain Type =	RD1	RD2
Max Overflow Depth (mm)	150 mm	150 mm
Flow Controlled (Yes/No)	Yes	No
Ponding	Yes	No
Weir Desc	Accutrol	n/a
No. Weirs	1	n/a

1.125



Appendix E – Drawings

(Included on a separate Cover)

Appendix F – City of Ottawa Checklist

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☒ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☐ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☐ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☐ Confirm consistency with Master Servicing Study, if available
☒ Availability of public infrastructure to service proposed development
☒ Identification of system constraints
☒ Identify boundary conditions
☒ Confirmation of adequate domestic supply and pressure
☒ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
☒ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☐ Address reliability requirements such as appropriate location of shut-off valves
☐ Check on the necessity of a pressure zone boundary modification.
☒ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☒ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☒ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☒ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☒ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☒ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☒ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☐ Set-back from private sewage disposal systems.
- ☐ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☐ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☐ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☐ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☐ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☐ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☒ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☒ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☒ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario