PROPOSED THREE-STOREY

APARTMENT BUILDING SITE

PARTS OF LOT 7 AND 8

R-PLAN 83

258 CARRUTHERS AVENUE

CITY OF OTTAWA

SERVICEABILITY REPORT

REPORT No. R-816-86A

T. L. MAK ENGINEERING CONSULTANTS LTD.

SEPTEMBER 2018

REF. FILE No. 816-86

1.) INTRODUCTION

The developer of the property under consideration is proposing to construct a three-storey residential apartment building on site. It is situated on the west side of Carruthers Avenue, north of Armstrong Street and south of Ladouceur Street.

The three-storey apartment building will consist of a ground floor, second floor, third floor and basement. The gross floor area of the proposed building is ±11,143.7 sq. ft. (±1034.7 sq. m). There are (4) two bedroom, (10) one bedroom and (2) bachelor units proposed in this building.

Area of the development lot is ± 0.0542 ha. In addition to the apartment building, the other development features will comprise of interlock paver entranceway and bike racks at the front of the building, interlock outside sitting area at the rear of the building, landscape area, etc. to meet City of Ottawa site plan requirements.

This report will serve to provide the City of Ottawa with our serviceability brief to address the proposed servicing scheme for this site.

2.) EXISTING SITE CONDITIONS AND SERVICING

Presently, the residential lot under consideration for the apartment building development site is referenced as 258 Carruthers Avenue. There is a one storey dwelling unit and a two storey dwelling unit both of which are situated at the rear of this lot. The existing buildings will be removed from this site in order to construct the new three storey apartment building.

Terrain of the property slopes predominantly from back to front or west to east across the site. Most of the lot under consideration is hard surface covered with the exception of ±93.44 sq.m of grass covered area located at the front northwest quadrant of the site.

As for the availability of underground services, there are existing municipal services along the Carruthers Avenue road right of way consisting of the following main sizes: a 300 mm diameter storm sewer, a 1125 mm diameter sanitary sewer and a 200 mm diameter watermain.

3.) PROPOSED RESIDENTIAL APARTMENT BUILDING SITE

An interlock pedestrian walkway is located at the front entrance of the building as well as (8) bicycle parking at grade. At the rear of the building an interlock outdoor sitting area is provided as part of the amenity space for this site. There is no vehicle access or parking proposed for this site.

A.) Water Supply

From previous discussions with the owner's architect, the building will not be installed with a sprinkler system. The building is proposed to be serviced via a 38 mm diameter water service pipe copper type "K" to the building from the city main.

The new building proposed for 258 Carruthers Avenue is to be serviced from the existing 200 mm diameter watermain along Carruthers Avenue. The ground elevation at this location is approximately 63.9 m. The following potable water boundary conditions were provided by the City on September 25, 2018:

- Minimum HGL = 107.9 m
- Maximum HGL = 114.7 m
- MXDY + Fire Flow (217 L/s) = 101.0 m

For the calculated Fire Underwriter Survey (FUS) fire flow of 217 L/s (attached in Appendix A), the boundary condition hydraulic grade line is 101.0 m. This corresponds to a residual pressure of 364 kPa (53 psi) at this location and is well above the minimum residual pressure requirement of 140 kPa (20 psi). Please refer to the Supporting Hydraulic Calculations (attached in Appendix A) for further details about the determination of the resultant pressures.

During peak hour flow conditions, the resulting minimum hydraulic grade line of 107.9 m corresponds to a peak hour pressure of 431 kPa (63 psi). This value is above the minimum pressure objective of 276 kPa (40 psi) and is considered to be acceptable.

During average day demands, the resulting maximum hydraulic grade line of 114.7 m corresponds to a pressure of 498 kPa (72 psi). This value is less than the maximum pressure objective of 552 kPa (80 psi) and is considered to be acceptable. Additional pressure reduction mitigation measures are not required.

In conclusion, based on the boundary conditions provided, the above assessment confirms that the proposed development at 258 Carruthers Avenue can be adequately serviced by the existing 200 mm diameter watermain on Carruthers Avenue per the requirements of the Fire Underwriter Survey and City of Ottawa Design Guidelines.

B.) Sanitary Flow

Peak sanitary flow for this proposed development site is estimated at Q = 0.43 L/s with an infiltration rate of 0.02 L/s. This flow will enter the existing 1125 mm diameter sanitary sewer via the proposed apartment building 150 mm diameter PVC sanitary service lateral sloped at 1% (min.). Refer to Appendix B for details.

The peak sanitary flow estimated for the existing lot occupied by a 1 storey residential dwelling unit and a 2 storey residential unit is Q = 0.13 L/s with an infiltration rate of 0.02 L/s. Therefore, the estimated net increase in peak flow from this proposed development is 0.3 L/s.

The existing Carruthers Avenue sanitary sewer size is 1125 mm diameter in front of this property, an increase in sanitary flow to this sanitary sewer system by 0.3 L/s from this residential site is not expected to negatively impact the existing sanitary sewer.

C.) Storm Flow

Stormwater outlet for this proposed property will be the existing 300 mm diameter storm sewer located on Carruthers Avenue. The proposed residential apartment building rooftop is flat and will be able to provide on-site stormwater management (SWM) storage. Roof water from the building will be drained and controlled by two (2) roof drains each with a release rate of 1.26 L/s (20 US gal/min.) which then outlets to the existing Carruthers Avenue storm sewer via a designated proposed 125 mm diameter PVC storm lateral for draining roof water only.

On-site drainage shall be graded from rear to front and surface drained to the road right of way on Carruthers Avenue as is the current site condition.

Based on the site plan from the architect, the average post-development runoff coefficient is estimated at C = 0.61 and A = ±0.0542 ha.

An estimation of the pre-development flow condition was carried out using the criteria accepted by the City of Ottawa.

For development of this residential site (±0.0542 ha.) and in controlling the five (5)-year stormwater release rate off site to a net allowable rate of 3.3 L/s, a site storage volume of approximately 2.70 m^3 minimum is required during the five (5)-year event. For this site, two (2) flat rooftop storage areas will be used for stormwater management attenuation.

During the five-year storm event for the flat rooftop storage, the ponding depth on this rooftop is estimated at 100 mm at the drain and 0 mm at the roof perimeter, assuming a 1.7% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 2.01 m^3, and the rooftop storage available at Roof Area 2 is 1.97 m^3, for a total of 3.98 m^3, which is greater than the required volume of 2.70 m^3.

To control the 100-year stormwater release rate off site to a net allowable rate of 3.3 L/s, a site storage volume of approximately 7.65 m^3 minimum is required during the 100-year event.

During the 100-year storm event for the flat rooftop storage, the ponding depth on this rooftop is estimated at 135 mm at the drain and 0 mm at the roof perimeter, assuming a 1.7% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 4.95 m^3, and the rooftop storage available at Roof Area 2 is 4.82 m^3, for a total of 9.77 m^3, which is greater than the required volume of 7.65 m^3.

Therefore, by means of flat building rooftop storage and grading the site to the proposed grades as shown on the Proposed Site Grading and Servicing Plan Dwg. 816-86, G-1 and the Proposed Rooftop Stormwater Management Plan Dwg. 816-86, SWM-1, the desirable five (5)-year storm

and 100-year storm event detention volume of 3.98 m^3 and 9.77 m^3 respectively will be available on site.

The building weeping tile drainage will outlet via its separate 150 mm diameter PVC storm lateral. The roof drains will be outletted via a proposed 125 mm PVC storm lateral, which wyes into the proposed 150 mm diameter storm lateral where both roof stormwater and weeping tile water will be outletted to the existing Carruthers Avenue 300 mm diameter storm sewer.

4.) EROSION AND SEDIMENT CONTROL

The contractor shall implement Best Management Practices to provide for protection of the receiving storm sewer during construction activities. These practices are required to ensure no sediment and/or associated pollutants are released to the receiving watercourse. These practices include installation of a silt fence barrier (as per OPSD 219.110 and associated specifications) along Carruthers Avenue and all other areas that sheet drain off-site. Maintenance hole sediment barriers to be AMOCO 4555 nonwoven geotextile or approved equivalent.

Refer to Appendix C for summary of the Development Servicing Study Checklist applicable for this development.

PREPARED BY T. L. MAK ENGINEERING CONSULTANTS LTD.

TONY L. MAK, P. ENG.

PROPOSED THREE-STOREY

APARTMENT BUILDING SITE

PARTS OF LOT 7 AND 8

R-PLAN 83

258 CARRUTHERS AVENUE

CITY OF OTTAWA

APPENDIX A

CITY OF OTTAWA

WATER DATA BOUNDARY CONDITIONS

AND

FUS FIRE FLOW CALCULATIONS

From: TL Mak
To: Richard Buchanan;
Subject: 258 Carruthers Avenue
Date: Thursday, September 20, 2018 2:57:00 PM
Attachments: STANTEC_FUS_FIREFLOW_CALCULATOR_258Carruthers.pdf

Hi Richard,

The proposed multi-unit residential building located at 258 Carruthers Avenue is a 3-storey building with a basement. There is a total of 16 units and are comprised of bachelor, 1-bedroom and 2-bedroom apartments. The building is proposed to be serviced from the 203mm diameter watermain along Carruthers Avenue.

The domestic demands were calculated using the City of Ottawa's Water Design Guidelines where the residential consumption rate of 350 L/cap/d is used to estimate average day demands (AVDY). Maximum day (MXDY) demands were calculated by multiplying AVDY by a factor of 2.5. Peak hourly (PKHR) demands were calculated by multiplying MXDY by a factor of 2.2. Persons per unit (PPU) for each unit were estimated based on the City of Ottawa's Water Design Guidelines. Table 1 shows the estimated domestic demands of the proposed building.

Table 1 - Estimated Domestic Demand

Floor	Unit Type	Number of Units	PPU	BSDY		MXDY		PKHR	
				L/d	L/s	L/d	L/s	L/d	L/s
Basement	1 Bedroom	3	1.4	1,470	0.017	3,675	0.04	8,085	0.09
Basement	Bachelor	1	1.4	490	0.006	1,225	0.01	2,695	0.03
1	1 Bedroom	3	1.4	1,470	0.017	3,675	0.04	8,085	0.09
1	Bachelor	1	1.4	490	0.006	1,225	0.01	2,695	0.03
2	1 Bedroom	2	1.4	980	0.011	2,450	0.03	5,390	0.06
2	2 Bedroom	2	2.1	1,470	0.017	3,675	0.04	8,085	0.09
3	1 Bedroom	2	1.4	980	0.011	2,450	0.03	5,390	0.06
3	2 Bedroom	2	2.1	1,470	0.017	3,675	0.04	8,085	0.09
		16	***Total***	***8,820***	***0.102***	***22,050***	***0.26***	***48,510***	***0.56***

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached spreadsheet. For the FUS calculations, the building is assumed to be wood frame construction. It is understood that the building will also not have a sprinkler system. The resulting total required fire flow is 13,000L/min (217L/s) for a duration of 2.75 hours.

In summary:
AVDY = 8,820L/d (0.102 L/s)
MXDY = 22,050 L/d (0.26 L/s)
PKHR = 48,510 L/d (0.56 L/s)
Fire Flow = 13,000L/min (217L/s)

The City is requested to provide boundary conditions for the Average Day, Maximum Day, Peak Hour and Fire Flow conditions indicated above.

Thank you for your prompt attention to this matter. Please forward the boundary conditions as soon as possible.

Tony Mak
T.L. Mak Engineering Consultants Ltd.
1455 Youville Drive, Suite 218
Ottawa, ON K1C 6Z7
Tel: 613 837-5516 | Fax: 613 837-5277
E-mail: tlmakecl@bellnet.ca

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection* " by Fire Underwriters' Survey, 1999

Stantec Project #: 163401084
Project Name: 258 Carruthers Avenue
Date: September 20, 2018
Data input by: Kevin Alemany, M.A.Sc, P.Eng.

Fire Flow Calculation #: 1
Building Type/Description/Name: Residential

Notes:

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
		Framing Material						
1	**Choose Frame Used for Construction of Unit**	Coefficient related to type of construction (C)	Wood Frame	1.5	Wood Frame	1.5	m	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (< 2 hrs)	0.7				
			Fire resistive construction (> 2 hrs)	0.6				
		Floor Space Area						
2	**Choose Type of Housing (if TH, Enter Number of Units Per TH Block)**	Type of Housing	Single Family	1	Other (Comm, Ind, Apt etc.)	16	Units	
			Townhouse - indicate # of units	1				
			Other (Comm, Ind, Apt etc.)	1				
2.2	**# of Storeys**	Number of Floors/Storeys in the Unit (do not include basement):			3	3	Storeys	
3	**Enter Ground Floor Area of One Unit**	Average Floor Area (A) based on design with one hour rating for vertical openings and exterior vertical communications:			258 Square Metres (m2)	775	Area in Square Meters (m^2)	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1000L/min						**9,000**
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	**7,650**
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15				
			Rapid burning	0.25				
5.2	**Choose Reduction Due to Presence of Sprinklers**	Sprinkler reduction	Adequate Sprinkler conforms to NFPA13	-0.3	None	0	N/A	**0**
			None	0				
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is not standard or N/A	0	N/A	**0**
			Water supply is not standard or N/A	0				
		Sprinkler Supervision Credit	Sprinkler system is fully supervised	-0.1	Sprinkler not fully supervised or N/A	0	N/A	**0**
			Sprinkler not fully supervised or N/A	0				
5.3	**Choose Separation Distance Between Units**	Exposure Distance Between Units	North Side	3.1 to 10.0m	0.2	0.75	m	**5,738**
			East Side	10.1 to 20.0m	0.15			
			South Side	3.1 to 10.0m	0.2			
			West Side	3.1 to 10.0m	0.2			
6	**Obtain Required Fire Flow, Duration & Volume**	***Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:***						**13,000**
		Total Required Fire Flow (above) in L/s:						**217**
		Required Duration of Fire Flow (hrs)						**2.75**
		Required Volume of Fire Flow (m^3)						**2,145**

From: Buchanan, Richard
To: "TL Mak ";
Subject: FW: 258 Carruthers Avenue
Date: Tuesday, September 25, 2018 12:36:56 PM
Attachments: 258 Carruthers Sept 2018.pdf

Tony;

The following are boundary conditions, HGL, for hydraulic analysis at 258 Carruthers (zone 1W) assumed to be connected to the 203mm on Carruthers (see attached PDF for location).

Minimum HGL = 107.9m

Maximum HGL = 114.7m

MaxDay + FireFlow (217 L/s) = 101.0m

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.

Richard Buchanan, CET

Project Manager, Development Approvals
Planning, Infrastructure and Economic Development Department
Planning & Growth Management Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27801
ottawa.ca/planning / ottawa.ca/urbanisme

From: TL Mak <tlmakecl@bellnet.ca>
Sent: Thursday, September 20, 2018 2:58 PM
To: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Subject: 258 Carruthers Avenue

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Thank you for your prompt attention to this matter. Please forward the boundary conditions as soon as possible.

Tony Mak
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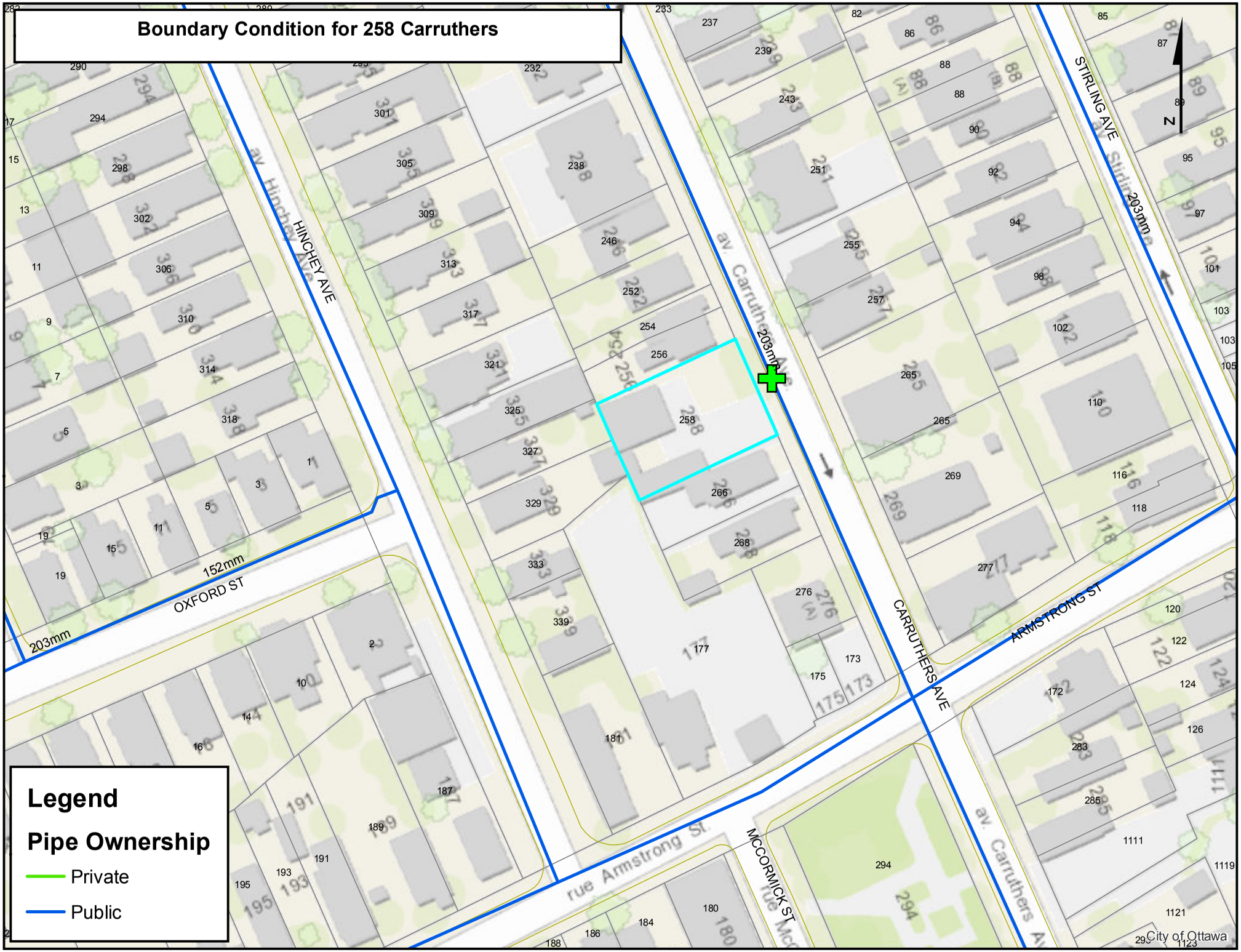
Boundary Condition for 258 Carruthers
HINCHEY AVE
av. Carruthers
STIRLING AVE
Stirling
203mm
152mm
OXFORD ST
203mm
CARRUTHERS AVE
ARMSTRONG ST
rue Armstrong St
MCCORMICK ST
av. Carruthers
N
Legend
Pipe Ownership
Private
Public
City of Ottawa

FUS Fire Flow Calculation

Calculations based on: "*Water Supply for Public Fire Protection* " by Fire Underwriters' Survey, 1999

Stantec Project #: 163401084
Project Name: 258 Carruthers Avenue
Date: September 20, 2018
Data input by: Kevin Alemany, M.A.Sc, P.Eng.

Fire Flow Calculation #: 1
Building Type/Description/Name: Residential

Notes:

Table A: Fire Underwriters Survey Determination of Required Fire Flow - Long Method

Step	Task	Term	Options	Multiplier Associated with Option	Choose:	Value Used	Unit	Total Fire Flow (L/min)
		Framing Material						
1	**Choose Frame Used for Construction of Unit**	Coefficient related to type of construction (C)	Wood Frame	1.5	Wood Frame	1.5	m	
			Ordinary construction	1				
			Non-combustible construction	0.8				
			Fire resistive construction (< 2 hrs)	0.7				
			Fire resistive construction (> 2 hrs)	0.6				
		Floor Space Area						
2	**Choose Type of Housing (if TH, Enter Number of Units Per TH Block)**	Type of Housing	Single Family	1	Other (Comm, Ind, Apt etc.)	16	Units	
			Townhouse - indicate # of units	1				
			Other (Comm, Ind, Apt etc.)	1				
2.2	**# of Storeys**	Number of Floors/Storeys in the Unit (do not include basement):			3	3	Storeys	
3	**Enter Ground Floor Area of One Unit**	Average Floor Area (A) based on design with one hour rating for vertical openings and exterior vertical communications:			258 Square Metres (m2)	775	Area in Square Meters (m^2)	
4	**Obtain Required Fire Flow without Reductions**	Required Fire Flow (without reductions or increases per FUS) (F = 220 * C * √A) Round to nearest 1000L/min						**9,000**
5	**Apply Factors Affecting Burning**	**Reductions/Increases Due to Factors Affecting Burning**						
5.1	**Choose Combustibility of Building Contents**	Occupancy content hazard reduction or surcharge	Non-combustible	-0.25	Limited combustible	-0.15	N/A	**7,650**
			Limited combustible	-0.15				
			Combustible	0				
			Free burning	0.15				
			Rapid burning	0.25				
5.2	**Choose Reduction Due to Presence of Sprinklers**	Sprinkler reduction	Adequate Sprinkler conforms to NFPA13	-0.3	None	0	N/A	**0**
			None	0				
		Water Supply Credit	Water supply is standard for sprinkler and fire dept. hose line	-0.1	Water supply is not standard or N/A	0	N/A	**0**
			Water supply is not standard or N/A	0				
		Sprinkler Supervision Credit	Sprinkler system is fully supervised	-0.1	Sprinkler not fully supervised or N/A	0	N/A	**0**
			Sprinkler not fully supervised or N/A	0				
5.3	**Choose Separation Distance Between Units**	Exposure Distance Between Units	North Side	3.1 to 10.0m	0.2	0.75	m	**5,738**
			East Side	10.1 to 20.0m	0.15			
			South Side	3.1 to 10.0m	0.2			
			West Side	3.1 to 10.0m	0.2			
6	**Obtain Required Fire Flow, Duration & Volume**	***Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:***						**13,000**
		Total Required Fire Flow (above) in L/s:						**217**
		Required Duration of Fire Flow (hrs)						**2.75**
		Required Volume of Fire Flow (m^3)						**2,145**

Supporting Hydraulic Calculations

Stantec Project #: 163401084
Project Name: 258 Carruthers Ave
Date: September 26, 2018
Data inputted by: Kevin Alemany, M.A.Sc., P.Eng.
Data reviewed by: Kevin Alemany, M.A.Sc., P.Eng.

Boundary Conditions provided by the City

Scenario 1: Peak Hour (Min HGL): 107.9 m; and
Scenario 2: Average Day (Max HGL): 114.7 m;
Scenario 3: Maximum Day Hour and Fire Flow: 101 m.

Sample Calculations

HGL (m) = hp + hz *(1)*

where: hp = Pressure Head (m); and hz = Elevation Head (m), estimated from topography.

For Scenario 1, we have:

HGL(m) = 107.9 and hz (m) = 63.9.

Rearranging Equation 1, we can calculate the Pressure Head (hp) as follow:

hp (m) = HGL - hz

hp = 107.9 - 63.9 m = 44 m.

To convert from Pressure Head (m) to a pressure value (kPa), the following equation can be used:

P (kPa) = (ρ * g * hp) / 1000 *(2)*

where: ρ = density of water = 1000 kg/m^3; and g = gravitational acceleration = 9.81 m/s^2.

Using Equation 2, we can calculate the Pressure Head (hp) as follow:

P (kPa) = (1000 * 9.81 * 44) / 1000

P = 431 kPa.

Considering that 1 kPa = 0.145 psi, the pressure under Scenario 1 is equal to:

P = 63 psi.

Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows:
Scenario 2: P = 72 psi; and Scenario 3: P = 53 psi.

<u>To summarize:</u>

Scenario 1: Minimum Pressure under Peak Hour Demand: 431 kPa (63 psi)
Scenario 2: Maximum Pressure under Average Day Demand: 498 kPa (72 psi)
Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 364 kPa (53 psi)

PROPOSED THREE-STOREY

APARTMENT BUILDING SITE

PARTS OF LOT 7 AND 8

R-PLAN 83

258 CARRUTHERS AVENUE

CITY OF OTTAWA

APPENDIX B

SANITARY SEWER DESIGN SHEET

PAGE 1 OF 1

SANITARY SEWER DESIGN SHEET

q = average daily per capita flow (350 L/cap. d)
I = unit of peak extraneous flow (0.28 L/ha. s)
M = peaking factor = 4
Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow

DENSITY
- BACHELOR APT. = 1.4 PPU
- 1 BEDROOM APT. = 1.4 PPU
- 2 BEDROOM APT. = 2.1 PPU

$M = 1 + \frac{14}{4 + \sqrt{P}}$ where P population in 1000's

$Q(p) = \frac{PqM}{86.4}$ (L/s)

Q(i) = IA (L/s) where A = area in hectares

Q(d) = Q(p) + Q(i) (L/s)

LOCATION			INDIVIDUAL		CUMULATIVE		Peaking factor M	Pop. flow Q(p) (L/s)	Peak extraneous flow Q(i) (L/s)	Peak design flow Q(d) (L/s)	PROPOSED SEWER						
STREET	FROM	TO	Pop.	Area A (hectares)	Pop.	Area A (hectares)					Length (m)	Pipe size (mm)	Type of pipe	Grade %	Capacity (L/s) n=0.013	Full flow velocity (m/s)	Actual velocity at Q(d)
					RESIDENTIAL												
258 CARRUTHERS AVENUE	SITE	EX. 1125ø SAN. SWR.			(12 X 1.4 ppu) + (4 X 2.1 ppu)												
			25.2	0.054	25.2	0.054	4	0.41	0.02	0.43	12.0	150	PVC	1.0 (min.)	19.8	1.12	

09/20/18

(FILE # 816-86)

DESIGN	TLM	PROJECT	258 CARRUTHERS AVENUE PROPOSED THREE STOREY APARTMENT BUILDING SITE - OTTAWA
CHECKED	TLM		
DATE	SEPT. 2018		

SHEET No. 1 of 1

PROPOSED THREE-STOREY

APARTMENT BUILDING SITE

PARTS OF LOT 7 AND 8

R-PLAN 83

258 CARRUTHERS AVENUE

CITY OF OTTAWA

APPENDIX C

DEVELOPMENT SERVICING STUDY CHECKLIST

SUMMARY

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