PROPOSED THREE-STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 43 AND PART OF 44

R-PLAN 294

1295 SUMMERVILLE AVENUE

CITY OF OTTAWA

APPLICATION FILE NUMBER D07-12-19-0048

SERVICEABILITY REPORT

REPORT No. R-818-19A (REVISION 2)

JANUARY 2020

T. L. MAK ENGINEERING CONSULTANTS LTD.

FEBRUARY 2019

REF. FILE No. 818-19A

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 north side of Summerville Avenue, east of Prince Street and west of Silver Street.

The proposed residential building at 1295 Summerville Avenue is three storeys with a total of 18 units. Floor space for the various levels of the building are as follows: lower level (343.0 sq. m) consisting of (1) bachelor – (1) bedroom unit, (2) – 2 bedroom units; ground floor area (343.0 sq. m) comprising of (1) bachelor – (1) bedroom unit, (3) - 2 bedroom units; second floor area (345.0 sq. m) (1) bachelor - (4) - 2 bedroom units; third floor area (345.0 sq. m) - (4) - 2 bedroom units. Total area of the building is approximately 1,376.0 sq. m.

Area of the development lot is ± 0.0762 ha. In addition to the apartment building, the other development features will comprise of semi permeable parking lot, asphalt access road surface to the rear of the building, rear yard amenity area located at the northeast quadrant of the property, landscape areas, 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 said development property is vacant with approximately one third (±38.0%) of the lot being asphalt paved and located at the rear of the property and the remainder of the lot being landscape covered. Most of the front yard is currently grass covered. Hard surfaces predominantly consisting of paved parking and access roadway surfaces cover most of the existing rear lot.

Terrain of the property is gently sloping from the front to the rear of lot where the entire lot directs flow from south to north.

As for the availability of underground services, there are existing municipal services along the Summerville Avenue road right of way consisting of the following main sizes: a 300 mm diameter storm sewer, a 225 mm diameter sanitary sewer and a 150 mm diameter watermain.

3.) PROPOSED RESIDENTIAL APARTMENT BUILDING SITE

One joint use vehicle entrance located at the southwest corner of the site is proposed to serve this property along with an access roadway along the west property limit to direct vehicular traffic in and out of the site. Vehicle parking will be at the rear of the building where (4) parking spaces are proposed for this site.

A.) Water Supply

Based on discussions with the owner and the City of Ottawa, the building will be installed with a sprinkler system. The building is proposed to be serviced via a 100 mm diameter water service PVC CL-150 DR-18 and sized to minimize head losses to the building from the city main.

The following boundary conditions for 1295 Summerville Avenue which is to be connected to the 150mm diameter watermain along Summerville Avenue were provided by the City on December 17, 2018. The ground elevation at this location is approximately 85.7 m.

- Minimum HGL = 125.5 m
- Maximum HGL = 134.6 m
- Maximum Fire Flow @ 20 psi = 70 L/s

During peak hour flow conditions, the resulting minimum hydraulic grade line of 125.5 m corresponds to a peak hour pressure of 390 kPa (57 psi). This value is well above the minimum pressure requirement of 276 kPa (40 psi).

With respect to the maximum pressure check during average day demands, the resulting maximum hydraulic grade line of 134.6 m corresponds to a pressure of 479 kPa (70 psi). This value is less than the maximum pressure objective of 552 kPa (80 psi).

The City has indicated that for the available fire flow at 20 psi residual pressure is 70 L/s. This is considered to be low and is a function of the old small diameter watermain serving this area. The available fire flow is significantly less than the required calculated Fire Underwriter Survey (FUS) fire flow of 250 L/s (see Appendix A). Thus, the initial proposed building configuration (building footprint, wood frame, and no sprinkler) requires a fire flow demand much larger than can be provided by the City's existing distribution network in the vicinity of this proposed development.

Based on the boundary condition provided, the 150 mm diameter watermain on Summerville Avenue provides anticipated demand flows within the pressure objectives during peak demand and basic demand conditions as per the City of Ottawa's Drinking Water Design Guidelines. However, the available fire flows (70 L/s) is much less than the required fire flows based on FUS calculations (250 L/s).

Discussions were held with City officials and the City will review and consider the use of the Ontario Building Code's Office of the Fire Marshall Ontario (OFM) methodology for this site due to the small existing 150 mm diameter watermain along Summerville Avenue that has been functioning for over 100 years.

The Ontario Building Code's Office of the Fire Marshal Ontario (OFM) methodology was used to review the building code fire flow requirement for the building located at 1295 Summerville Avenue. The results of this analysis are summarized below.

- According to OFM, the original concept (i.e. 3 storeys, 18 units, Wood Frame, **No sprinklers**) results in a fire flow requirement of **6300 L/min** (105 L/s), which is less than the 15,000 L/min (250 L/s) requirement based on the FUS methodology. However, both fire flow requirements are less than the 4200 L/min (70 L/s) available from the City's distribution system.

- The OFM methodology refers to following NFPA 13 (National Fire Protection Association, see Section 11.2) for **sprinkler system** fire flow requirements. As per NFPA 13, the City's distribution is able to provide a flow (4,200L/min) within the range of Acceptable Flow at Base of Riser (Including Hose Stream Allowance) as shown in Table 11.2.2.1 copied

below. The distribution network can therefore meet the building code's requirements for a **sprinklered design**. It is noted that the sprinkler would have to be designed accordingly based on the available flow and pressure to the site.

Table 11.2.2.1 Water Supply Requirements for Pipe Schedule Sprinkler Systems

Occupancy Classification	Minimum Residual Pressure Required		Acceptable Flow at Base of Riser (Including Hose Stream Allowance)		Duration (minutes)
	psi	bar	gpm	L/min	
Light hazard	15	1	500–750	1900-2850	30–60
Ordinary hazard	20	1.4	850–1500	3200-5700	60–90

To conclude, while the City's existing distribution network and hydrants do not provide the calculated FUS requirements or the OFM requirements without sprinklers (for the proposed concept), the distribution network is capable of meeting the NFPA13 sprinkler design requirements for the proposed design. Therefore, a **sprinklered system** will need to be installed in this building and designed by the owner's mechanical engineer to meet NFPA13 requirements that can achieve a flow of 4200 L/min minimum.

B.) Sanitary Flow

Peak sanitary flow for this proposed development site is estimated at Q = 0.47 L/s with an infiltration rate of 0.02 L/s. This flow will enter the existing 225 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.

Because this existing lot is vacant, the peak sanitary flow estimated for this lot is Q = 0 L/s. Therefore, the estimated net increase in peak flow from this proposed development is 0.47 L/s.

In view that the existing sanitary sewer size is 225 mm diameter in front of this property, an increase in sanitary flow to the sewer system by 0.47 L/s from this residential site is not expected to negatively impact the existing Summerville Avenue sanitary sewer.

Waste water from this site presently outlets to the existing 225mm diameter sanitary sewer on Summerville Avenue which then is routed east to Hollington Street and into the Cave Creek 750mm diameter sanitary collector sewer.

C.) Storm Flow

Stormwater outlet for this proposed property will be the existing 300 mm diameter storm sewer located on Summerville Avenue. The proposed residential apartment building will have a rooftop that 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 in which each will have a release rate of 0.63 L/s (10 U.S. gal/min.) for a total flow rate of 1.26 L/s which then outlets directly

into the existing 300 mm diameter Summerville Avenue storm sewer via the proposed 125 mm diameter PVC storm lateral from the building.

On-site drainage shall be graded to improve the current surface drainage pattern which is front to back drainage. Under the present drainage proposal, the designed grading will create split lot drainage rather than front to back drainage only. Approximately, 160.6 square meters of the site will drain to the front and 247.6 square meters will drain to the rear. The reminder of the site will be occupied by a ±354.0 square meters building.

Based on the site plan from the architect, the average post-development runoff coefficient is estimated at C = 0.67 and A = 0.0762 ha.

An estimation of the pre-development flow condition was carried out using the criteria accepted by the City of Ottawa. From our calculations, C_{pre} = 0.47 whereas the maximum allowable pre-development runoff of coefficient into the Summerville Avenue storm sewer from this site is C = 0.40 (max) for the two (2)-year storm event. See Stormwater Drainage Report (Report No. R818-19) for further details.

For development of this residential site (±0.0762ha.) and in controlling the two (2)-year stormwater release rate off site to a net allowable rate of 1.26L/s (2 x 0.63L/s), a site storage volume of approximately 6.40m^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. The on-site controlled flow rate of 1.26L/s is approximately 0.18L/s less than the net allowable flow rate of 1.44L/s for this site.

During the five-year storm event for the flat rooftop storage, the ponding depth of Roof Area 1 and 2 is estimated at 110mm at the drain and 0mm at the roof perimeter assuming a 1.6% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 3.23m^3, the rooftop storage available at Roof Area 2 is 3.23m^3 for a total of 6.46m^3, which is greater than the required volume of 6.40m^3.

To control the 100-year stormwater release rate off site to a net allowable rate of 1.26L/s, a site storage volume of approximately 15.30m^3 minimum is required during the 100-year event.

During the 100-year storm event for the flat rooftop storage, the ponding depth of Roof Area 1 and 2 is estimated at 150mm at the drain and 0mm at the roof perimeter assuming a 1.6% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 7.94m^3, the rooftop storage available at Roof Area 2 is 7.94m^3 for a total of 15.88m^3, which is greater than the required volume of 15.30m^3.

Therefore, by means of flat building rooftop storage and grading the site to the proposed grades as shown on the Proposed Grading and Servicing Plan and Proposed Rooftop Stormwater Management Plan Dwg. 818-19 G-1 and 818-19 SWM-1 respectively, the desirable five (5)-year storm and 100-year storm event detention volume of 6.46m^3 and 15.88m^3 respectively will be available on site.

The building weeping tile drainage will outlet via its separate 150mm diameter PVC storm lateral and the roof drains will be outletted via a proposed 125mm PVC storm lateral where both laterals are connected directly to the existing Summerville Avenue 300mm diameter storm sewer.

Water Quality

For this site, based on the architect's site plan, Best Management Practices (BMPs) are proposed to be implemented for this site from details of the revised site plan.

In comparison to the current site conditions, the proposed building has a flat roof area of ±354.0 square meters which is approximately 47% of the site coverage and at the rear of building semi permeable material is proposed for the (4) parking spaces to promote infiltration. This added measure results in the site's stormwater currently draining to the rear being improved compare to that of the existing development conditions for TSS treatment. Combining the roof water, stormwater draining across the semi permeable surfaces at the rear and landscaped area at the front of the lot, all are considered to be clean for the purpose of water quality mitigation. Vegetative areas proposed at the front yard would also allow for infiltration.

Therefore, the water quality for this site from rooftop attenuation and the use of semi permeable material (±60.0m^2) on-site including landscape areas ±228.82m^2 shall provide improvements to the existing site condition in which there are ±285.68m^2 of asphalt surfaces (parking spaces) that drain off-site at the rear of the property.

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 Summerville 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.

LICENSED PROFESSIONAL ENGINEER
01/15/20
TONY L.M. MAK
PROVINCE OF ONTARIO

PROPOSED THREE-STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 43 AND PART OF 44

R-PLAN 294

1295 SUMMERVILLE AVENUE

CITY OF OTTAWA

APPENDIX A

CITY OF OTTAWA

WATER DATA BOUNDARY CONDITIONS

AND

FUS FIRE FLOW CALCULATIONS

TL Mak

From: Baker, Adam [adam.baker@ottawa.ca]
Sent: Monday, December 17, 2018 11:35 AM
To: 'tlmakecl@bellnet.ca'
Subject: 1305 Summerville
Attachments: 1305 Summerville Dec 2018.pdf

Hi Tony,

Please see attached water boundary conditions for 1305 Summerville.

The following are boundary conditions, HGL, for hydraulic analysis at 1305 Summerville (zone 2W) assumed to be connected to the 152mm on Summerville (see attached PDF for location).

Minimum HGL = 125.5m

Maximum HGL = 134.6m

Available Flow @20psi = 70 L/s assuming a ground elevation of 85.7m

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,

Adam Baker, EIT
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
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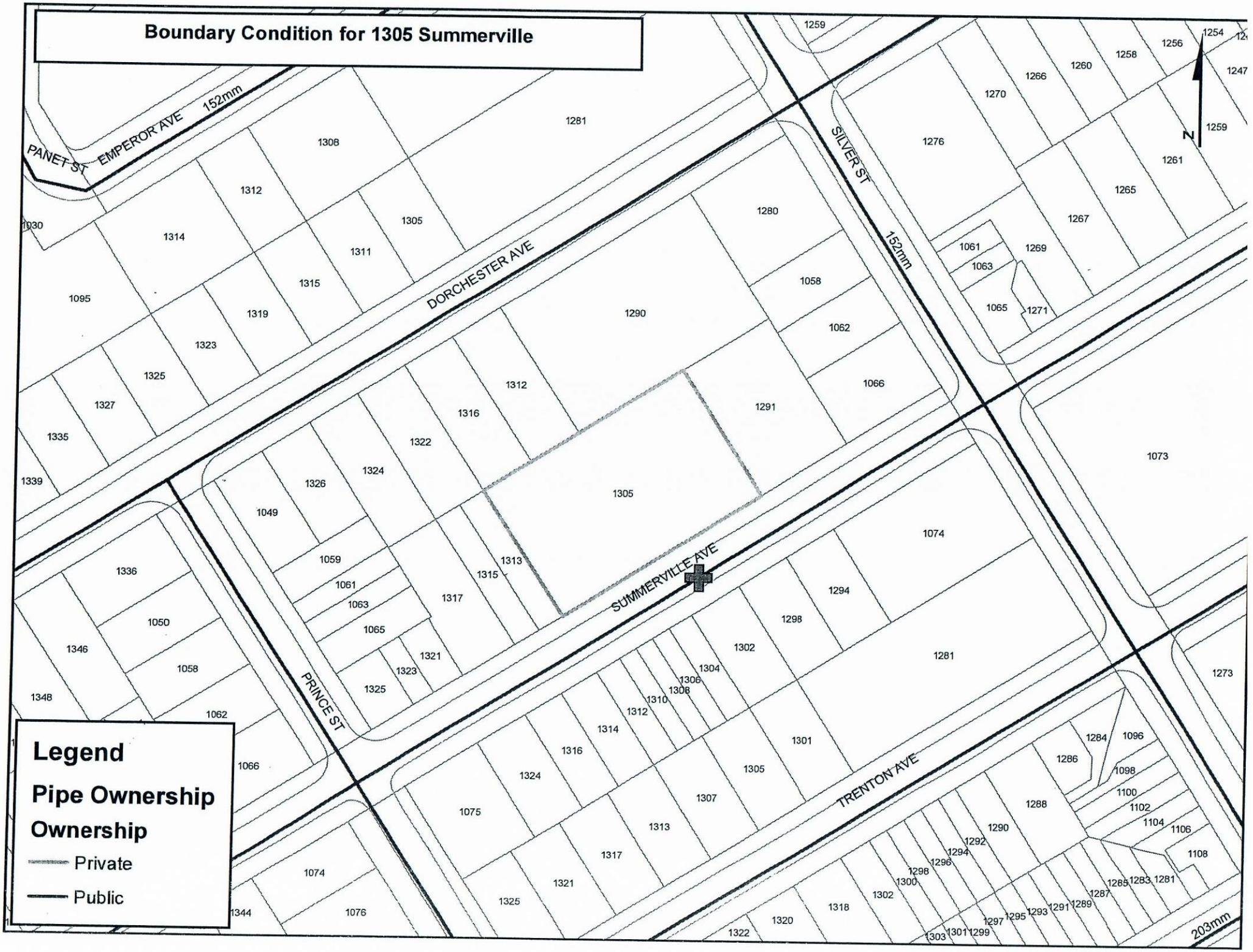

Legend

Pipe Ownership

Ownership

Private

Public

TL Mak

From: TL Mak [tlmakecl@bellnet.ca]
Sent: Wednesday, December 12, 2018 10:05 AM
To: Adam Baker
Subject: 1305 Summerville Avenue
Attachments: STANTEC_FUS_FIREFLOW_CALCULATOR_1305 Summerville.pdf

Hi Adam,

The proposed residential building at 1305 Summerville Avenue is proposed to be 3 storeys with a total of 18 unit comprised of bachelor, 1-bedroom and 2-bedroom apartments. The building is to be serviced from the 152mm diameter watermain along Summerville Avenue. The total area of the building is approximately 1,376 m^2.

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 configured building.

Table 1 - Estimated Domestic Demand

Unit Type	# of Units	PPU	BSDY		MXDY		PKHR	
			L/d	L/s	L/d	L/s	L/d	L/s
Bachelor	3	1.4	1,470	0.017	3,675	0.043	8,085	0.094
1 Bedroom	2	1.4	980	0.011	2,450	0.028	5,390	0.062
2 bedroom	13	2.1	9,555	0.111	23,888	0.276	52,553	0.608
Total	18		***10,535***	***0.122***	***26,338***	***0.305***	***57,943***	***0.671***

The fire flow required was determined following the Fire Underwriter Survey (FUS) method and is provided in the attached spreadsheet. For this analysis, the building was classified as wood frame construction with building contents that are limited in combustibility. It is understood that the building will not have a sprinkler system, and the lower level is more than 50% below ground. The resulting total required fire flow is 15,000 L/min (250 L/s) for a duration of 3.25 hours.

In summary:
AVDY = 10,535 L/d (0.122 L/s)
MXDY = 26,338 L/d (0.305 L/s)
PKHR = 57,943 L/d (0.671 L/s)
Fire Flow = 15,000 L/min (250 L/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

Stantec

FUS Fire Flow Calculation

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

Stantec Project #: 163401084
Project Name: 1305 Summerville
Date: December 3, 2018
Data inputted by: Alexandre Mineault-Guitard, M.A.Sc., EIT
Data reviewed 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.)	18	Units	
			Townhouse - indicate # of units	1				
			Other (Comm, Ind, Apt etc.)	18				
2.2	# of Storeys	Number of Floors/Storeys in the Unit (do not include basement if 50% below grade):			3	3	Storeys	
3	Enter Ground Floor Area of One Unit	Average Floor Area (A) based total floor area of all floors (non-fire resistive construction):			343 Square Metres (m2)	1,029	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 * VA) Round to nearest 1000L/min						11,000
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	9,350
			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	20.1 to 30.1m	0.1	0.65	m	6,078
			East Side	0 to 3.0m	0.25			
			South Side	20.1 to 30.1m	0.1			
			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:*						15,000
		Total Required Fire Flow (above) in L/s:						250
		Required Duration of Fire Flow (hrs)						3.25
		Required Volume of Fire Flow (m^3)						2,925

PROPOSED THREE-STOREY

RESIDENTIAL APARTMENT BUILDING SITE

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CITY OF OTTAWA

APPENDIX B

SANITARY SEWER DESIGN SHEET

PAGE 1 OF 1

SANITARY SEWER DESIGN SHEET

q = average daily per capita flow (280 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
1 BEDROOM APT. = 1.4
2 BEDROOM APT. = 2.1

$M = 1 + \frac{14}{4 + \sqrt{P}}$ 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													
1305 SUMMERVILLE AVENUE	SITE	EX. 225ϕ SAN. SWR		(3X 1.4 ppu) +		(2X 1.4 ppu) +				(13X 2.1 ppu)							
			34.3	0.076	34.3	0.076	4	0.45	0.02	0.47	16.5	150	PVC	1.0 (min.)	19.8	1.12	

LICENCED PROFESSIONAL ENGINEER
03/06/19
TONY L-M. MAK
PROVINCE OF ONTARIO

(FILE # 818-19)

DESIGN	TLM
CHECKED	TLM
DATE	FEBRUARY, 2019

PROJECT 1295 SUMMERVILLE AVENUE
PROPOSED THREE STOREY APARTMENT BUILDING SITE - CITY OF OTTAWA

SHEET No. 1 of 1

PROPOSED THREE-STOREY

RESIDENTIAL APARTMENT BUILDING SITE

PART OF LOT 43 AND PART OF 44

R-PLAN 294

1295 SUMMERVILLE 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.

- [x] 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.
- [x] 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.
- [x] 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.
- [x] Descriptions of how the conveyance and storage capacity will be achieved for the development.
- [x] 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.
- [x] 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