PROPOSED

FOUR-STOREY LOW-RISE APARTMENT BUILDING SITE

PART OF LOT 44

R-PLAN 30

501 BRONSON AVENUE

CITY OF OTTAWA

SERVICEABILITY REPORT

REPORT R-818-113A

T.L. MAK ENGINEERING CONSULTANTS LTD.

APRIL 2019

REFERENCE FILE NUMBER 818-113

Introduction

The developer of this property is proposing to redevelop the existing residential lot described as Part of Lot 44 R-Plan 30 by constructing a four-storey residential apartment building consisting of eight (2)-bedroom apartments.

The municipal address of this property is referenced as 501 Bronson Avenue. The site is located on the east side of Bronson Avenue, south of McLeod Street, and north of Flora Street.

The area of this property is ±0.037 hectares. In addition to the four-storey residential building, the other development features will comprise of an interlock paver access to the front and north side entrance of the building, an amenity area in the rear yard, bicycle parking, landscaped areas throughout the site, etc., to meet the City of Ottawa's site plan requirements.

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

Existing Site Conditions and Servicing

This property is occupied by a two-storey residential building, which is a two(2)-storey brick-sided dwelling, with an asphalt driveway located along the south side of the property and a vehicle asphalt parking area found at the rear of this lot.

The site is mostly hard impermeable surfaces that are covered with roof areas, asphalt laneway walkway, and parking. The remainder of the lot is generally grass or landscape areas.

The topography of the land is found to be generally sloping from east to west or front to back.

As for the availability of underground services, there are existing municipal services along Bronson Avenue in front of this property consisting of a 525mm diameter combined sewer and a 400mm diameter water-main for development of this property.

Proposed Residential Apartment Building Site

There are no requirements for vehicle access or parking for this site. Interlock pavers are proposed at the front and north side of the new building for pedestrian access.

A. Water Supply

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

The following boundary conditions for 501 Bronson Avenue, which is to be connected to the 406mm diameter water-main along Bronson Avenue were provided by the City of Ottawa on April 3, 2019. The ground elevation at this location is approximately 69.4m.

- Minimum HGL=107.4m
- Maximum HGL=115.1m
- MXDY + Fire Flow (200L/s)=106.5m

The City of Ottawa has indicated that for the calculated Fire Underwriter Survey (FUS) fire flow of 200L/s (attached), the resulting hydraulic grade-line is 106.5m. This corresponds to a residual pressure of 364kPa (53psi) at this location and is well above the minimum residual pressure requirement of 140kPa (20psi).

During peak hour flow conditions, the resulting minimum hydraulic grade-line of 107.4m corresponds to a peak hour pressure of 373kPa (54psi). This value is above the minimum pressure objective of 276kPa (40psi).

With respect to the maximum pressure check during average-day demands, the resulting maximum hydraulic grade-line of 115.1m corresponds to a pressure of 448kPa (65psi). This value is less than the maximum pressure objective of 552kPa (80psi).

As per the City's latest Technical Bulletin (ISTB-2018-02), the maximum flow contribution to be considered for a Class AA hydrant is 5,700 L/min, if this hydrant is within 75m of the proposed building. If the hydrant is located further than 75m, but within 150m, a flow contribution of 3,800 L/min must be considered. Considering the 12,000 L/min fire flow requirement for the proposed building, three hydrants would be required to service the building at 501 Bronson Avenue Street. As per the attached screen capture from geoOttawa (taken on April 4, 2019, and confirmed via desktop survey), there are two hydrants located within 75m of the property, as well as two additional hydrants within 150m. The number of existing hydrants would meet the intent of ISTB-2018-02's maximum flow per hydrant.

In conclusion, based on the boundary condition provided for the 406mm diameter water-main on Bronson Avenue, provides the anticipated demand flows are within the pressure objectives during peak demand and basic demand conditions as per the City of Ottawa's Drinking Water Design Guidelines. With respect to fire flow, the boundary condition information demonstrates sufficient fire flow per the FUS requirements and

this will be provided through the two hydrants within 75m of the proposed building (11,400 L/min), as well as two additional hydrants within 150, (7,600 L/min).

B. Sanitary Flow

The peak sanitary flow for the 8 units, which comprise eight(2)-bedroom apartment, is estimated at Q=0.23L/s with an infiltration rate of 0.01L/s. This flow will enter the existing 525mm diameter combined sewer on Bronson Avenue via the proposed 150mm diameter PVC sanitary service lateral from the four(4)-storey residential apartment building.

The existing peak sanitary flow of the site for a single detached dwelling unit is Q=0.05L/s with an infiltration rate of 0.01L/s. The net increase in flow from this proposed development is 0.18L/s.

The net increase in peak sanitary flow of 0.18 will be subtracted from the net allowable controlled release rate regarding storm-water management controlled for this site.

C. Storm Flow

The storm-water outlet for the proposed development property will be the existing 525mm diameter combined sewer located on Bronson Avenue. Storm-water attenuation on site will be accomplished by means of rooftop storage with controlled roof drains that regulate flow off site.

Two(2) roof drains are proposed for this mixed-use building, to restrict flow at a rate of 0.63L/s each or 2x0.63L/s=1.26L/s into the Bronson Avenue combined sewer. The calculated net allowable controlled release rate from this site 1.44L/s-0.18L/s=1.26L/s.

The building foundation weeping-tile drainage system shall have its own separate pipe for gravity flow where weeping-tile water is outletted via a 150mm diameter storm pipe to the existing 525mm diameter combined sewer. The storm-water outlet for the rooftop water from roof drains will be a separately designated proposed 125mm diameter PVC pipe that will also be outletted directly into the existing 525mm diameter combined sewer.

Based on the residential site plan from the owner's architect, the average post-development runoff coefficient is estimated at C=0.63 and A=0.0373 hectares.

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

The pre-development flow rate into a combined sewer for this residential area is the two(2)-year storm event where C_{allow}=0.4 runoff value and t_c=10 minutes, which is typically used by the City of Ottawa. The C_{pre} value that is estimated for this site is 0.9.

Therefore, based on this calculation, on-site retention is required for this proposed development site, because the post=development C value of 0.9 is greater than the C_{allow}=0.4.

The storage volume for the five(5)-year and up to the 100-year event will be stored by means of flat rooftops at the fourth floor of the apartment building.

To control the five(5)-year storm-water release rate off site to a net allowable rate of 1.26L/s, a site storage volume of approximately 2.80m^3 minimum is required during the five(5)-year event. For this site, two(2) flat rooftop storage areas will be used for storm-water management attenuation.

During the five-year storm event for the flat rooftop storage, the ponding depth of Roof Area 1 and 2 is estimated at 100mm at the drain and 0mm at the roof perimeter, assuming a 1.9% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 1.43m^3 and the rooftop storage available at Roof Area 2 is 1.39m^3, for a total of 2.82m^3 which is greater than the required volume of 2.80m^3.

To control the 100-year storm-water release rate off site to a net allowable rate of 1.44L/s, a site storage volume of approximately 7.21m^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 1.9% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 5.04m^3 and the rooftop storage available at Roof Area 2 is 4.89m^3, for a total of 9.93m^3, which is greater than the required volume of 7.21m^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. 818-113 G-1 and 818-113 SWM-1 respectively, the desirable five(5)-year storm and 100-year storm event detention volume of 2.82m^3 and 9.93m^3 respectively will be available on site.

The building weeping tile drainage will outlet via its separate 150mm diameter PVC storm lateral. The roof drains will be outletted via a proposed 125mm PVC storm lateral, where upon both laterals connect directly to the existing Bronson Avenue 525mm diameter combined sewer. Refer to the proposed Grading and Servicing Plan Dwg. 818-113 G-1 for details.

Water Quality

For this site, based on the current site plan from the owner's building designers including criteria set out by the City of Ottawa and recommendations set out by the Rideau Valley Conservation Authority (RVCA), the building's flat rooftops are proposed to provide storm-water quantity control and available water quality protection is being provided for this site. Best Management Practices (BMPs) are proposed to be implemented for this site where possible from the site plan.

In comparison to the original site conditions, the proposed site plan reflects the elimination of pitched rooftops, asphalt parking areas, and drive aisles that result in the site's storm-water being collected on flat rooftops which is greater in lot coverage to that of the existing conditions and are considered clean for quality control mitigation. Vegetative area proposed at the rear of the property would allow for infiltration, in addition to being considered clean.

Also, interlocked/hardened landscaped areas which are largely already presently paved are now designed to direct via sheet drainage across grassed areas at the rear of the site which forms part of the (BMPs) provided on site.

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 Bronson Avenue and all other areas that sheet drain off site. Maintenance hole sediment barriers are to be AMOCO 4555 non-woven geotextile or approved equivalent.

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

PREPARED BY T.L. MAK ENGINEERING CONSULTANTS LTD.

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LICENSED PROFESSIONAL ENGINEER
04/10/19
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PROPOSED FOUR(4)-STOREY LOW-RISE APARTMENT BUILDING SITE

PART OF LOT 44

R-PLAN 30

501 BRONSON AVENUE

CITY OF OTTAWA

APPENDIX A

CITY OF OTTAWA

WATER DATA BOUNDARY CONDITIONS

FUS AND SUPPORTING HYDRAULIC CALCULATIONS

TL Mak

From: Buchanan, Richard [Richard.Buchanan@ottawa.ca]
Sent: Tuesday, April 02, 2019 8:34 AM
To: 'TL Mak'
Subject: FW: 501 Bronson Avenue
Attachments: image001.gif; 501 Bronson March 2019.pdf

Hi Tony

The following are boundary conditions, HGL, for hydraulic analysis at 501 Bronson (zone 1W) assumed to be connected to the 406mm on Bronson (see attached PDF for location).

Minimum HGL = 107.4m

Maximum HGL = 115.1m

MaxDay + FireFlow (200 L/s) = 106.5m

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: March 28, 2019 10:06 AM
To: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Subject: 501 Bronson Avenue

Hi Richard,

The residential building at 501 Bronson Avenue is proposed to be 4 storeys (plus a basement) with a total of 8 units (2-bedroom apartments). The building will be serviced from the 406mm diameter watermain along Bronson Avenue. The average floor area of the building is approximately 200 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	Number of Units	PPU	AVDY		MXDY		PKHR	
			L/d	L/s	L/d	L/s	L/d	L/s
2 Bedroom	8	2.1	5,880	0.068	14,700	0.170	32,340	0.374
		Total	**5,880**	**0.068**	**14,700**	**0.170**	**32,340**	**0.374**

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 have a sprinkler system. It was assumed that the basement is more than 50% above the ground level. The resulting total required fire flow is 12,000 L/min (200 L/s) for a duration of 2.5 hours.

In summary:
AVDY = 5,880 L/d (0.068 L/s)
MXDY = 14,700 L/d (0.170 L/s)
PKHR = 32,340 L/d (0.374 L/s)
Fire Flow = 12,000 L/min (200 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
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Ottawa, ON K1C 6Z7
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E-mail: tlmakecl@bellnet.ca


Boundary Condition for 501 Bronson
406mm
203mm
MCLEOD ST
BRONSON AVE
914mm
102mm
FLORA ST
152mm
203mm
N
Legend
Pipe Ownership
Ownership
Private
Public
470
492
498
506
520
303
581
568
574
576
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580
582
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Stantec

FUS Fire Flow Calculation

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

Stantec Project #: 163401084
Project Name: 501 Bronson Avenue
Date: March 19, 2019
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.)	8	Units	
			Townhouse - indicate # of units	1				
			Other (Comm, Ind, Apt etc.)	8				
2.2	# of Storeys	Number of Floors/Storeys in the Unit (do not include basement if 50% below grade):			5	5	Storeys	
3	Enter Ground Floor Area of One Unit	Average Floor Area (A) based total floor area of all floors (non-fire resistive construction):			200 Square Metres (m2)	999	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						10,000
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	8,500
			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	Adequate Sprinkler conforms to NFPA13	-0.3	N/A	-2,550
			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	0 to 3.0m	0.25	0.7	m	5,950
			East Side	20.1 to 30.1m	0.1			
			South Side	0 to 3.0m	0.25			
			West Side	20.1 to 30.1m	0.1			
6	Obtain Required Fire Flow, Duration & Volume	*Total Required Fire Flow, rounded to nearest 1000 L/min, with max/min limits applied:*						12,000
		Total Required Fire Flow (above) in L/s:						200
		Required Duration of Fire Flow (hrs)						2.50
		Required Volume of Fire Flow (m^3)						1,800

Stantec

Supporting Hydraulic Calculations

Stantec Project #: 163401084
Project Name: 501 Bronson Ave
Date: April 4, 2019
Data inputted by: Alexandre Mineault-Guitard, M.A.Sc., EIT
Data reviewed by: Kevin Alemany, M.A.Sc., P.Eng.

Boundary Conditions provided by the City

Scenario 1: Peak Hour (Min HGL): 107.4 m;
Scenario 2: Average Day (Max HGL): 115.1 m; and
Scenario 3: Maximum Day Hour and Fire Flow: 106.5 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) = 107.4 and hz (m) = 69.4.

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

hp (m) = HGL - hz

∴ hp = 107.4 - 69.4 m = 38 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 * 38) / 1000

∴ P = 373 kPa.

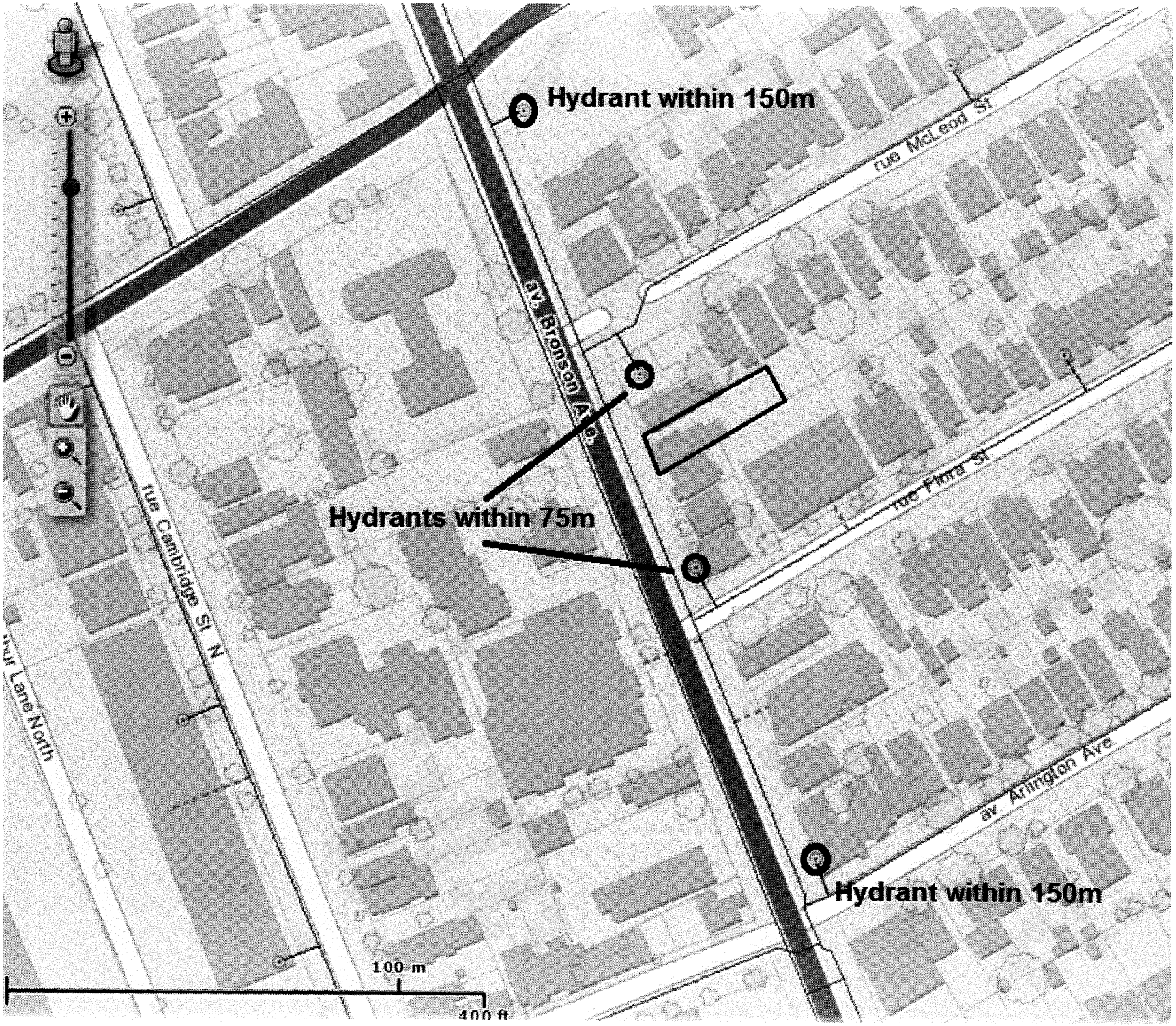
Considering that 1 kPa = 0.145 psi, the pressure under Scenario 1 is equal to:

P = 54 psi.

Applying the same procedures, the pressures under Scenario 2 and Scenario 3 are calculated as follows:
Scenario 2: P = 65 psi; and Scenario 3: P = 53 psi.

To summarize:

Scenario 1: Minimum Pressure under Peak Hour Demand: 373 kPa (54 psi)
Scenario 2: Maximum Pressure under Average Day Demand: 448 kPa (65 psi)
Scenario 3: Minimum Pressure under Maximum Day + Fire Flow Demand: 364 kPa (53 psi)


Hydrant within 150m
Hydrants within 75m
Hydrant within 150m
av Bronson Ave
rue McLeod St
rue Flora St
av Arlington Ave
rue Cambridge St N
100 m
400 ft

PROPOSED FOUR(4)-STOREY LOW-RISE APARTMENT BUILDING SITE

PART OF LOT 44

R-PLAN 30

501 BRONSON AVENUE

CITY OF OTTAWA

APPENDIX B

CITY OF OTTAWA

SANITARY SEWER DESIGN SHEET

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 (MAX.)
Q (p) = peak population flow (L/s)
Q (i) = peak extraneous flow (L/s)
Q (d) = peak design flow

RESIDENTIAL DENSITY

2 BED = 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)
510 BRONSON AVENUE	SITE	EX. 525Ø COMBINED SEWER	16.8	0.038	16.8	0.038	4	0.22	0.01	0.23	8.0	150	PVC	1.0 (min)	19.8	1.12	

LICENCED PROFESSIONAL ENGINEER
04/17/19
TONY L-M. MAK
PROVINCE OF ONTARIO

FILE# 918-113

DESIGN	TLM
CHECKED	TLM
DATE	APRIL 2019

PROJECT 510 BRONSON AVENUE
PROPOSED FOUR STOREY RESIDENTIAL APARTMENT BUILDING SITE

SHEET No. 1 of 1

PROPOSED FOUR(4)-STOREY LOW-RISE APARTMENT BUILDING SITE

PART OF LOT 44

R-PLAN 30

501 BRONSON 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