PROPOSED THREE-STOREY

LOW-RISE APARTMENT BUILDING SITE

NORTH HALF OF LOT 17

R-PLAN 58319

368 CHAPEL STREET

CITY OF OTTAWA

SERVICEABILITY REPORT

REPORT No. R-817-61A (REV. 2)

JANUARY 2019

T. L. MAK ENGINEERING CONSULTANTS LTD.

NOVEMBER 2017

REF. FILE No. 817-61

1.) INTRODUCTION

The developer of the property under consideration is proposing to construct a three-storey low-rise residential apartment building on site. It is situated on the west side of Chapel Street, north of Somerset Street East and south of Osgoode 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 ±7,792.0 sq. ft. (±723.5 sq. m). There are (1) two bedroom and (6) three bedroom units proposed in this building.

Area of the development lot is ± 0.0379 ha. In addition to the apartment building, the other development features will comprise of an interlock paver walkway along the north and south side 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 368 Chapel Street. A one (1) storey dwelling unit currently occupies the front of this lot. The existing building will be retained and modified to form part of the new three storey apartment building.

Terrain of the property is relatively flat and slopes predominantly from front to back or east to west across the site. The rear or west half of the lot is presently lightly, vegetative grassed area.

As for the availability of underground services, there are existing municipal services along the Chapel Street road right of way consisting of the following main sizes: a 450 mm diameter storm sewer, a 300 mm diameter sanitary sewer and a 300 mm diameter watermain.

3.) PROPOSED RESIDENTIAL APARTMENT BUILDING SITE

An interlock pedestrian walkway located at the southeast corner of the site is proposed to provide access to this property. There is no vehicle access or parking proposed for this site.

A.) Water Supply

From previous discussions with the owner, 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.

Based on the City's current boundary conditions provided from an e-mail dated October 31, 2017 for hydraulic analysis (refer to Appendix A) in which a low-rise three-storey apartment building development is being serviced from a 300 mm diameter watermain, the calculated boundary conditions (HGL) are as follows:

- Minimum HGL = 106.5 m
- Maximum HGL = 115.5 m
- MaxDay (0.14 L/s) + Fire Flow (200 L/s) = 105.8 m

The ground elevation at street level at the location of the connection is approximately 59.4 m.

The City has indicated that for the calculated Fire Underwriter Survey (FUS) fire flow of 200 L/s (attached) the resulting hydraulic grade line is 105.8 m. This corresponds to a residual pressure of 455 kPa (66 psi) at this location and is well above the minimum residual pressure requirement of 140 kPa (20 psi).

During peak hour flow conditions, the resulting minimum hydraulic grade line of 106.5 m corresponds to a peak hour pressure of 462 kPa (67 psi). This value is above the minimum pressure objective of 276 kPa (40 psi).

With respect to the maximum pressure check during average day demands, the resulting maximum hydraulic grade line of 115.5 m corresponds to a pressure of 550 kPa (79.8 psi). This value is below the maximum pressure objective of 552 kPa (80 psi).

In conclusion, based on the boundary conditions provided, the 300 mm diameter watermain along Chapel Street provides adequate fire flow capacity as per the Fire Underwriters Survey and provides anticipated demand flows.

B.) Sanitary Flow

Peak sanitary flow for this proposed development site is estimated at Q = 0.35 L/s with an infiltration rate of 0.01 L/s. This flow will enter the existing 300 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 1½ storey residential dwelling unit is Q = 0.07 L/s with an infiltration rate of 0.01 L/s. Therefore, the estimated net increase in peak flow from this proposed development is 0.28 L/s.

The existing Chapel Street sanitary sewer size is 300 mm diameter in front of this property, an increase in sanitary flow to this sanitary sewer system by 0.28 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 450 mm diameter storm sewer located on Chapel Street. 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 three (3) roof drains each with a release rate of 0.63 L/s (10 US gal/min.) which then outlets to the existing Chapel Street storm sewer via a designated proposed 125 mm diameter PVC storm lateral for draining roof water only. Refer to the Proposed Rooftop Stormwater Management Plan Dwg. 817-61 SWM-1 for details.

On-site drainage shall be graded from front to rear and surface drained to the rear of this property as is the current site condition.

Based on the site plan from the architect, the average post-development runoff coefficient is estimated at C = 0.64 and A = ±0.0379 ha.

An estimation of the pre-development flow condition was carried out using the criteria accepted by the City of Ottawa. The maximum allowable pre-development runoff of coefficient into the Chapel Street storm sewer at this site is C = 0.4.

For development of this residential site (±0.0379ha.) and in controlling the five(5)-year storm-water release rate off site to a net allowable rate of 1.9L/s, a site storage volume of approximately 1.89m^3 minimum is required during the five(5)-year event. For this site, three(3) 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 3 is estimated at 100mm at the drain and 0mm at the roof perimeter and the ponding depth of Roof Area 2 is estimated at 50mm at the drain and 0mm at the roof perimeter, assuming a 1.8% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 0.66m^3, the rooftop storage available at Roof Area 2 is 0.098m^3 and the rooftop storage available at Roof Area 3 is 1.63m^3, for a total of 2.39m^3, which is greater than the required volume of 1.89m^3.

To control the 100-year storm-water release rate off site to a net allowable rate of 1.9L/s, a site storage volume of approximately 5.25m^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 3 is estimated at 150mm at the drain and 0mm at the roof perimeter and the ponding depth of Roof Area 2 is estimated at 100mm at the drain and 0mm at the roof perimeter, assuming a 1.8% minimum roof pitch to the drain. The rooftop storage available at Roof Area 1 is 2.26m^3, the rooftop storage available at Roof Area 2 is 0.83m^3, and the rooftop storage available at Roof Area 3 is 5.19m^3, for a total of 8.28m^3, which is greater than the required volume of 5.25m^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. 817-61 G-1 and 817-61 SWM-1 respectively, the desirable five(5)-year storm and 100-year storm event detention volume of 2.39m^3 and 8.28m^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 Chapel Street 450mm 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 Chapel Street 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
02/04/09
TONY L-M. MAK
PROVINCE OF ONTARIO

PROPOSED THREE-STOREY

LOW-RISE APARTMENT BUILDING SITE

NORTH HALF OF LOT 17

R-PLAN 58319

368 CHAPEL STREET

CITY OF OTTAWA

APPENDIX A

CITY OF OTTAWA

WATER DATA BOUNDARY CONDITIONS

AND

FUS FIRE FLOW CALCULATIONS

From: TL Mak
To: John Wu;
Subject: 368 Chapel Street
Date: Thursday, October 26, 2017 8:45:00 AM
Attachments: STANTEC_FUS_FIREFLOW_CALCULATOR_368Chapel.pdf

Hi John,

The proposed multi-unit residential building located at 368 Chapel Street is a 3-storey building with a basement. There is a total of 7 units and are comprised of 2-bedroom, and 3-bedroom apartments. The building is proposed to be serviced from the 305 mm diameter watermain along Chapel Street.

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

Unit Type	Number of Units	PPU	AVDY		MXDY		PKHR	
			L/d	L/s	L/d	L/s	L/d	L/s
2 Bedrooms	1	2.1	735	0.009	1,838	0.02	4,043	0.05
3 Bedrooms	6	3.1	6,510	0.075	16,275	0.19	35,805	0.41
		Total	***7,245***	***0.084***	***18,113***	***0.21***	***39,848***	***0.46***

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 not have a sprinkler system. The resulting total required fire flow is 12,000 L/min (200 L/s) for a duration of 2.5 hours.

In summary:
AVDY = 7,245 L/d (0.084 L/s)
MXDY = 18,113 L/d (0.21 L/s)
PKHR = 39,848 L/d (0.46 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
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: 368 Chapel Street
Date: October 19, 2017
Data input by: Alexandre Mineault-Guitard, M a Sc., EIT

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)
1	Choose Frame Used for Construction of Unit	**Framing Material**						
		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				
2	Choose Type of Housing (if TH, Enter Number of Units Per TH Block)	**Floor Space Area**						
		Type of Housing	Single Family	1	Other (Comm, Ind, Apt etc.)	1	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:			1,961 Square Feet (ft2)	547	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						**8,000**
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	**6,800**
			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	0.7	m	**4,760**
			East Side	20.1 to 30.1m	0.1			
			South Side	0 to 3.0m	0 25			
			West Side	10.1 to 20.0m	0.15			
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**

From: Wu, John
To: TL Mak ;
Subject: RE: 368 Chapel Street
Date: Tuesday, October 31, 2017 11:59:47 AM
Attachments: 368 Chapel Oct 2017.pdf

Here is the result:

******The following information may be passed on to the consultant, but do NOT forward this e-mail directly. ******

The following are boundary conditions, HGL, for hydraulic analysis at 368 Chapel (zone 1W) assumed to be connected to the 305 mm on Chapel (see attached PDF for location).

Minimum HGL = 106.5 m

Maximum HGL = 115.5 m

Max Day + Fire Flow = 105.8 m

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

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

John

From: TL Mak [mailto:tlmakecl@bellnet.ca]
Sent: Thursday, October 26, 2017 8:46 AM
To: Wu, John <John.Wu@ottawa.ca>
Subject: 368 Chapel Street

Hi John,

The proposed multi-unit residential building located at 368 Chapel Street is a 3-storey building with a basement. There is a total of 7 units and are comprised of 2-bedroom, and 3-bedroom apartments. The building is proposed to be serviced from the 305 mm diameter watermain along Chapel Street.

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

Unit Type	Number of Units	PPU	AVDY		MXDY		PKHR	
			L/d	L/s	L/d	L/s	L/d	L/s
2 Bedrooms	1	2.1	735	0.009	1,838	0.02	4,043	0.05
3 Bedrooms	6	3.1	6,510	0.075	16,275	0.19	35,805	0.41
		Total	***7,245***	***0.084***	***18,113***	***0.21***	***39,848***	***0.46***

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 not have a sprinkler system. The resulting total required fire flow is 12,000 L/min (200 L/s) for a duration of 2.5 hours.

In summary:
AVDY = 7,245 L/d (0.084 L/s)
MXDY = 18,113 L/d (0.21 L/s)
PKHR = 39,848 L/d (0.46 L/s)
Fire Flow = 12,000 L/min (200 L/s)

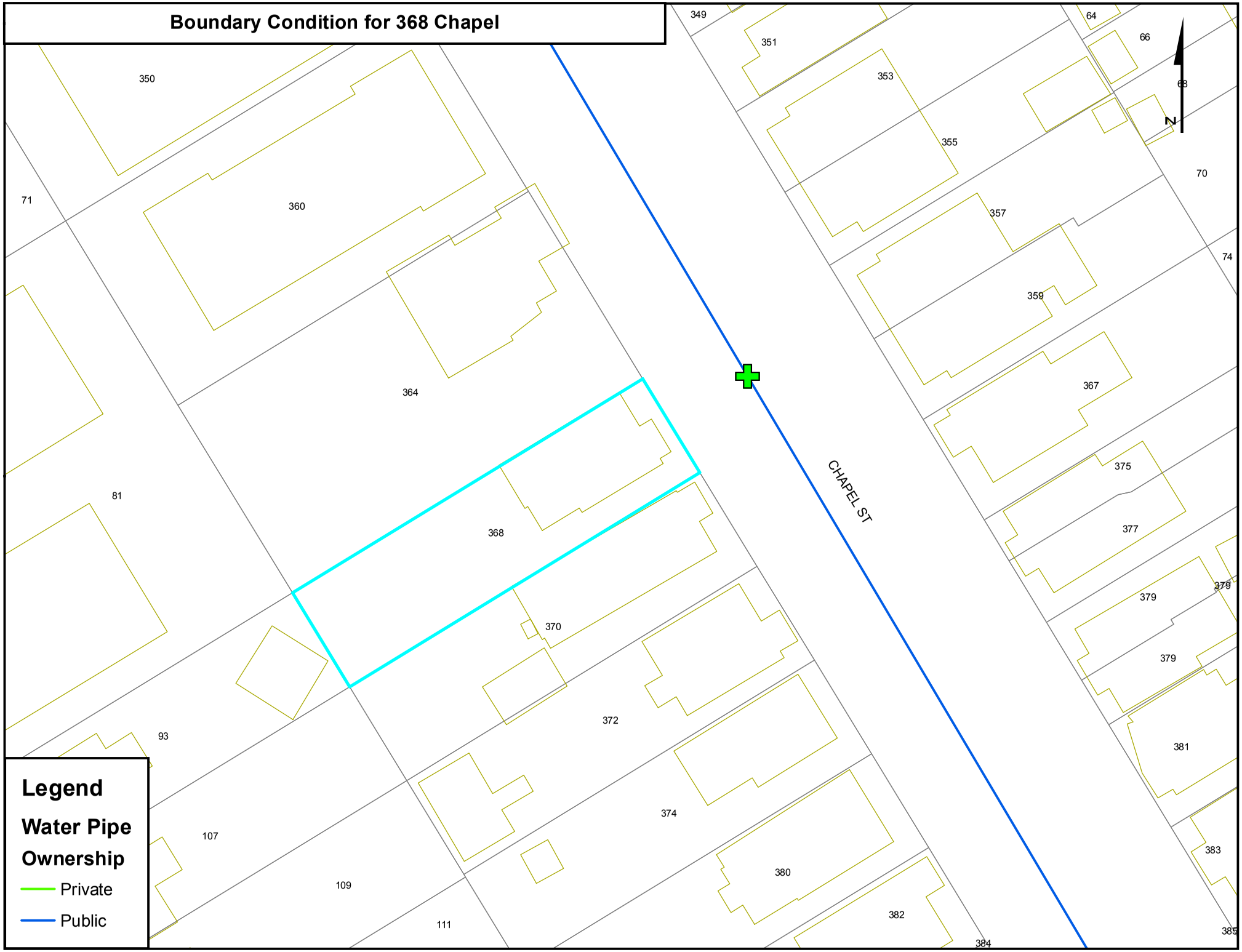
The City is requested to provide boundary conditions for the Average Day, Maximum Day, Peak Hour and Fire Flow conditions indicated above.

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

Tony Mak
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

'

'


Boundary Condition for 368 Chapel
349
351
353
355
357
359
361
363
64
66
68
70
74
N
350
360
364
368
370
372
374
380
382
384
71
81
93
107
109
111
CHAPEL ST
367
375
377
379
379
379
381
383
385
Legend
Water Pipe
Ownership
Private
Public

PROPOSED THREE-STOREY

LOW-RISE APARTMENT BUILDING SITE

NORTH HALF OF LOT 17

R-PLAN 58319

368 CHAPEL STREET

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
2 BEDROOM APT. = 2.1 ppu
3 BEDROOM APT. = 3.1 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	PROPOSED SEWER							
STREET	FROM	TO		Area A hectares		Area A (hectares)		flow Q(p) (L/s)	Peak extraneous flow Q(I) (L/s)	Peak design flow Q(d) (L/s)	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													
368 CHAPEL STREET	SITE	EX. 300Ø SAN SWR.	(	1 X 2.1 ppu) + (	6	X 3.1 ppu)											
			20.7	0.038	20.7	0.038	4	0.34	0.01	0.35	13.5	150	PVC	1.0 (min.)	19.8	1.12	

LICENSED PROFESSIONAL ENGINEER
03/12/18
TONY L-M MAK
PROVINCE OF ONTARIO

(FILE# 817-61)

DESIGN	TLM
CHECKED	TLM
DATE	NOV. 2017

PROJECT 368 CHAPEL STREET
PROPOSED THREE STOREY LOW RISE APARTMENT BUILDING SITE - OTTAWA

SHEET No. 1 of 1

PROPOSED THREE-STOREY

LOW-RISE APARTMENT BUILDING SITE

NORTH HALF OF LOT 17

R-PLAN 58319

368 CHAPEL STREET

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