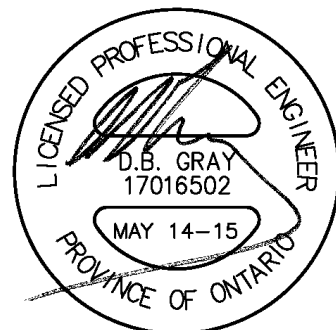


SERVICING BRIEF

Ladouceur Street & Merton Street
Townhouses
Ottawa, Ontario

Report No. 13029-SB

August 16, 2013
Revised August 29, 2013
Revised May 21, 2014
Revised May 14, 2015



NOT VALID UNLESS
SIGNED & DATED

D. B. GRAY ENGINEERING INC.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

700 Long Point Circle
Ottawa, Ontario K1T 4E9

613-425-8044
dbgray@rogers.com

SERVICING BRIEF

Ladouceur Street & Merton Street Townhouses Ottawa, Ontario

The following Servicing Brief is a description of the services of a proposed of a 6 unit townhouse residential development located on 698 sq.m. of land at the intersection of Ladouceur Street and Merton Street in Ottawa. It is proposed to be a freehold development with common element lands.

Refer to drawing SG-1, SG-2 & SG-3 prepared by D. B. Gray Engineering Inc.

Water Supply for Fire Fighting:

There is an existing fire hydrant in the municipal right-of-way at the north-west corner of the Ladouceur Street & Merton Street intersection approximately 65m from the front door of the furthest proposed townhouse unit.

A fire demand of 5,400 L/min (90 l/s) at 138 kPa is required as per "Required Minimum Water Supply Flow Rate" as calculated using the Ontario Building Code - Appendix A - Article A-3.2.5.7 "Water Supply For Fire Fighting". If fire walls are constructed between Units 3 & 4 and 6 & 8 the required fire demand can be reduced to 2,700 L/min (45 l/s) at 138 kPa.

The boundary conditions, based on the City of Ottawa computer simulation of the water distribution system in this area, are required to determine if an adequate water supply for firefighting is available.

Boundary conditions were requested for two Scenarios.

Scenario 1:

Fire Flow demand: 90 l/s

Fire Flow + Max Day: 90.6 l/s (see below for Maximum Daily Demand calculations)

Scenario 2:

Fire Flow demand: 45 l/s

Fire Flow + Max Day: 45.6 l/s

Based on computer model simulation of the boundary conditions received from the city, the HGL during 90 l/s fire flow conditions at Ladouceur Street and Merton Street is 107.4 m which calculates to be 445 kPa (65 psi). Since the pressure is above 138 kPa (20 psi) there is an adequate water supply for fire fighting. As such no fire walls are required to reduce the flow requirements. (The HGL during 45 l/s fire flow conditions at Ladouceur Street and Merton Street is 108.4 m which calculates to be 455 kPa (66 psi).)

Therefore the proposed water distribution system will provide an adequate supply of water for fire fighting.

Water Service:

Each townhouse unit will have a 19mm water service connection connecting to the existing 200mm municipal watermain in Ladouceur Street.

Based on the City of Ottawa and Ministry of the Environment Design Guidelines the daily average flow is 0.1 l/s with a maximum daily and maximum hourly demand of 0.6 and 0.9 l/s respectively. To determine water pressure under these demands, the boundary conditions, based on the City of Ottawa computer simulation of the water distribution system in this area, is required.

In summary, boundary conditions were requested for the Ladouceur Street / Merton Street area based on the following:

Average daily demand: 0.1 l/s.
Maximum daily demand: 0.6 l/s.
Maximum hourly daily demand: 0.9 l/s

Based on computer model simulation of the boundary conditions received from the city, the minimum HGL (hydraulic grade line) is 108.4 m and the maximum is 116.3 m. With these HGLs the water pressure at the water meter is calculated to vary from 469 kPa to 546 kPa (68 to 79 psi). This is an acceptable range of pressures for the proposed development. Since the maximum water pressure is close to 80 psi pressure reducing valves may be required to be installed immediately downstream of the water meter. A pressure check at during construction is recommended to determine if pressure control is required.

Sanitary Service:

Each townhouse unit will have a 135mm sanitary sewer service connection connecting to the existing 250mm municipal sanitary sewer in Ladouceur Street. Based on the City of Ottawa Sewer Design Guidelines for a residential development (six townhouse units – 2.7 persons per unit – 350 l/person/day – 4.0 peaking factor; and a 0.28 l/s/ha infiltration flow) the post development flow is calculated to be 0.27 l/s. The 0.27 l/s increase in sanitary flows contributing to the existing 250mm municipal sanitary sewer is expected to have a negligible impact given its capacity of 68.0 l/s.

The sanitary service connections must cross over a relatively shallow municipal watermain in Ladouceur Street such that the invert of the sanitary sewer connection at the foundation is above the basement floor level. As such a sump and pump for plumbing fixtures located in the basement will be required.

Stormwater:

Stormwater quantity control measures are based on the criteria that the release rate for post-development storm events is equal to or less than the flow produced by the existing development. See Stormwater Management Report No. 13029-SWM, prepared by D. B. Gray Engineering Inc.

Each of 12 roof drains will be flow control type. Unit 1 roof drains discharge to a storm sewer connection downstream of the inlet control devices (ICDs). Unit 2 to 4 roof drains discharge to a storm sewer connection upstream of the ICD in manhole MH-ST.5. Unit 5 & 6 roof drains discharge to a storm sewer connection upstream of the ICD in manhole CB/MH-ST.3.

There will also be two 100mm storm sewer connections serving the only the foundation drains connecting downstream of the inlet control devices ICDs.

The uncontrolled flow for the five-year event in the storm sewer connection to the existing 300mm municipal storm sewer in Merton Street is 10.6 l/s. However with proposed flow control roof drains and with the use of ICDs the flow will be restricted to 2.1 l/s during the 5-year event. Flows contributing to the existing municipal storm sewer are expected to have a negligible impact. The capacity of the 375mm municipal storm sewer (0.32% slope) is 103.5 l/s.

Ministry of Environment Environmental Compliance Approval:

Since the stormwater management facility is located on more than one property it is expected that a Ministry of Environment (MOE) Environmental Compliance Approval (ECA) will be required.

Conclusions:

1. There is an adequate water supply for fire fighting.
2. The existing water pressure is adequate for the proposed development.
3. The maximum water pressure may be above 80 psi. A pressure check at during construction is recommended to determine if pressure control is required.
4. The proposed water service connection is adequately sized to serve the development.
5. The expected sanitary sewage flow will be adequately handled by the proposed sanitary sewer service connection.
6. Units 1 to 6 will require a sump and pump for plumbing fixtures located in the basement.
7. The increase in sanitary flows contributing to the existing municipal sanitary sewers is expected to have a negligible impact.
8. The stormwater quantity control is based on the criteria that the release rate for post-development storm events is equal to or less than the flow produced by the existing conditions.
9. The restricted flowrate produced by a one in five year storm event will be adequately handled by a proposed storm sewer and existing municipal storm sewers.
10. A MOE ECA is expected to be required.

Ladouceur St & Merton St Townhouses Ottawa, Ontario

Water Supply for Fire-Fighting Calculations:

A fire demand of 5,400 L/min (90 l/s) is required as per "Required Minimum Water Supply Flow Rate" as calculated using the Ontario Building Code - Appendix A - Article A-3.2.5.7 "Water Supply For Fire Fighting".

Fire Protection Water Supply $Q = KVS_{Tot}$

$$S_{Tot} = 1.0 + S_{Side1} + S_{Side2} + S_{Side3} + S_{Side4}$$

Spatial Coefficient	Exposure Distance		
		m	
S_{Side1}	0.5	3.8	(to north property line)
S_{Side2}	0.5	0.0	(to east property line)
S_{Side3}	0.09	9.1	(to center line of road)
S_{Side4}	0.29	7.1	(to center line of road)
<hr style="width: 20%; margin-left: 0;"/>			
S_{Tot}	2.38		
Maximum S_{tot}	2.0		

K (Water Supply Coefficient)

23 As per A-3.2.5.7. Table 1 (Group C Occupancy / Combustible construction with fire separations but no fire resistance ratings as per OBC 3.2.2.)

V (Building Volume)

	Area	Average	Volume
	sq.m.	Height	cu.m.
		m	
4th Floor	62	2.52	156
3rd Floor	379	3.05	1,156
2nd Floor	404	3.05	1,232
Ground Floor	218	3.05	665
Units 1 to 6 Basement	160	2.79	446
Units 7 & 8 Basement	21	2.50	53
<hr style="width: 20%; margin-left: 0;"/>			
		3,708	cu.m.

$$Q = KVS_{Tot}$$

$$Q = 170,577 \text{ L}$$

Required Minimum Water Supply Flow Rate 5,400 L/min 90 L/sec
 (As per A-3.2.5.7. Table 2)

Elevation at Fire Hydrant: 62.00 m ASL

Static Pressure at Fire Hydrant

90 l/s FIRE FLOW: 107.4 m ASL 65 psi 445 kPa

Ladouceur St & Merton St Townhouses Ottawa, Ontario

Water Supply for Fire-Fighting Calculations:

Fire Walls between Units 3 & 4 and Units 6 & 7

A fire demand of 2,700 L/min (45 l/s) is required as per "Required Minimum Water Supply Flow Rate" as calculated using the Ontario Building Code - Appendix A - Article A-3.2.5.7 "Water Supply For Fire Fighting".

Units 1 to 3

Fire Protection Water Supply $Q = KVS_{Tot}$

$$S_{Tot} = 1.0 + S_{Side1} + S_{Side2} + S_{Side3} + S_{Side4}$$

Spatial Coefficient	Exposure Distance		
		m	
S_{Side1}	0.50	5.0	(to north property line)
S_{Side2}	0.50	0.0	(to Unit 4)
S_{Side3}	0.09	9.1	(to center line of road)
S_{Side4}	0.29	7.1	(to center line of road)
S_{Tot}	2.38		
Maximum S_{Tot}	2.0		

K (Water Supply Coefficient)

23 As per A-3.2.5.7. Table 1 (Group C Occupancy / Combustible construction with fire separations but no fire resistance ratings as per OBC 3.2.2.)

V (Building Volume)

	Area	Average	Volume
	sq.m.	Height	cu.m.
		m	
4th Floor	29	2.52	73
3rd Floor	151	3.05	461
2nd Floor	155	3.05	473
Ground Floor	99	3.05	302
Basement	89	2.79	248
			1,557

$$Q = KVS_{Tot}$$

$$Q = 71,605 \text{ L}$$

Required Minimum Water Supply Flow Rate 2,700 L/min 45 L/sec
 (As per A-3.2.5.7. Table 2)

Fire Walls between Units 3 & 4 and Units 6 & 7 (continued)

Units 4 to 6

Fire Protection Water Supply $Q = KVS_{Tot}$

$$S_{Tot} = 1.0 + S_{Side1} + S_{Side2} + S_{Side3} + S_{Side1} + S_{Side4}$$

Spatial Coefficient	Exposure Distance		
		m	
S_{Side1}	0.5	5.0	(to north property line)
S_{Side2}	0.5	0.0	(to east property line)
S_{Side3}	0.5	0.0	(to Unit 3)
S_{Side4}	0.5	0.0	(to west property line)
<hr style="width: 20%; margin-left: 0;"/>			
S_{Tot}	3.00		
Maximum S_{Tot}	2.0		

K (Water Supply Coefficient)

23 As per A-3.2.5.7. Table 1 (Group C Occupancy / Combustible construction with fire separations but no fire resistance ratings as per OBC 3.2.2.)

V (Building Volume)

	Area sq.m.	Average Height m	Volume cu.m.
4th Floor	33	2.52	83
3rd Floor	141	3.05	430
2nd Floor	152	3.05	464
Ground Floor	86	3.05	262
Basement	71	2.79	198
<hr style="width: 20%; margin-left: 0;"/>			
			1,437 cu.m.

$$Q = KVS_{Tot}$$

$$Q = 66,111 \text{ L}$$

Required Minimum Water Supply Flow Rate 2,700 L/min
(As per A-3.2.5.7. Table 2)

45 L/sec

Fire Walls between Units 3 & 4 and Units 6 & 7 (continued)

Units 7 & 8

Fire Protection Water Supply $Q = KVS_{Tot}$

$$S_{Tot} = 1.0 + S_{Side1} + S_{Side2} + S_{Side3} + S_{Side1} + S_{Side4}$$

Spatial Coefficient	Exposure Distance		
		m	
S_{Side1}	0.50	0.0	(to Unit 7)
S_{Side2}	0.50	0.0	(to east property line)
S_{Side3}	0.09	9.1	(to center line of road)
S_{Side4}	0.50	0.0	(to Unit 3)
<hr style="width: 20%; margin-left: 0;"/>			
S_{Tot}	2.59		
Maximum S_{Tot}	2.0		

K (Water Supply Coefficient)

23 As per A-3.2.5.7. Table 1 (Group C Occupancy / Combustible construction with fire separations but no fire resistance ratings as per OBC 3.2.2.)

V (Building Volume)

	Area sq.m.	Average Height m	Volume cu.m.
3rd Floor	87	3.05	265
2nd Floor	97	3.05	296
Ground Floor	33	3.05	101
Basement	21	2.50	53
<hr style="width: 20%; margin-left: 0;"/>			
			714 cu.m.

$$Q = KVS_{Tot}$$

$$Q = 32,860 \text{ L}$$

Required Minimum Water Supply Flow Rate 2,700 L/min
(As per A-3.2.5.7. Table 2)

45 L/sec

Elevation at Fire Hydrant: 62.00 m ASL

Static Pressure at Fire Hydrant

45 l/s FIRE FLOW: 108.4 m ASL 766 psi 455 kPa

Subject: RE: Ladouceur St & Merton St

From: White, Joshua (Joshua.White@ottawa.ca)

To: dbgray@rogers.com;

Cc: samantha@csarchitect.com; gabe@csarchitect.com;

Date: Wednesday, August 28, 2013 1:32:24 PM

Hello Doug,

I have received the boundary conditions for the project at Ladouceur St & Merton St. If you have any questions regarding the boundary conditions please let me know.

Joshua White

Project Manager, Infrastructure Approvals

Development Review, Urban Services, City of Ottawa

Phone: (613) 580-2424 ext 15843

Email: joshua.white@ottawa.ca

Please consider the environment before printing this e-mail.

******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 Ladouceur and Merton (zone 1W) assumed to be connected to the 203mm on Ladouceur and the 305mm on Merton (see attached PDF for locations).

Note: HGL is the same at both connection points

Minimum HGL = 108.4m

Maximum HGL = 116.3m

Max Day + FF (45 L/s) = 108.4m

Max Day + FF (90 L/s) = 107.4m

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.

From: White, Joshua
Sent: August 28, 2013 9:05 AM
To: 'DOUGLAS GRAY'
Cc: Samantha Schneider; Gabe Prost
Subject: RE: Ladouceur St & Merton St

Hi Doug,

I will send them to you as soon as I receive them.

Cheers

Josh

Joshua White

Project Manager, Infrastructure Approvals

Development Review, Urban Services, City of Ottawa

Phone: (613) 580-2424 ext 15843

Email: joshua.white@ottawa.ca

Please consider the environment before printing this e-mail.

From: DOUGLAS GRAY [<mailto:dbgray@rogers.com>]
Sent: August 28, 2013 8:14 AM
To: White, Joshua
Cc: Samantha Schneider; Gabe Prost
Subject: Fw: Ladouceur St & Merton St

Hi Josh

When do you expect that I will receive the boundary conditions?

Regards, Doug

D. B. GRAY ENGINEERING INC.
Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

1052 Karsh Drive
Ottawa, Ontario
K1G 4N1

Tel: 613-249-8044
Fax: 613-249-9815
dbgray@rogers.com

----- Forwarded Message -----

From: DOUGLAS GRAY <dbgray@rogers.com>
To: "White, Joshua" <Joshua.White@ottawa.ca>
Sent: Thursday, August 22, 2013 11:38:02 AM
Subject: Re: Ladouceur St & Merton St

Hi Josh

Is this new? Drawing W33 is for a 40mm service and in the approved products list there are 38mm stops, couplings and services posts.

If city does not carry a 38mm water service I would prefer the 52mm.

Regards, Doug

D. B. GRAY ENGINEERING INC.
Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

1052 Karsh Drive
 Ottawa, Ontario
 K1G 4N1

Tel: 613-249-8044
 Fax: 613-249-9815
dbgray@rogers.com

From: "White, Joshua" <Joshua.White@ottawa.ca>
To: 'DOUGLAS GRAY' <dbgray@rogers.com>
Sent: Thursday, August 22, 2013 11:19:58 AM
Subject: RE: Ladouceur St & Merton St

The City does not carry 38 mm water service, it will either be sized at 25 mm or 52 mm. I will assume that you would prefer 52 mm water service. If you would rather use the 25 mm let me know.

Josh

From: DOUGLAS GRAY [<mailto:dbgray@rogers.com>]
Sent: August 22, 2013 9:01 AM
To: White, Joshua
Subject: Re: Ladouceur St & Merton St

Hi Josh

There will be 6 x 19mm connections to the watermain on Ladouceur St and one 38mm connection (serving two units) to the watermain on Merton St. (I understand that the watermain on Merrton St is being replaced.)

Doug

D. B. GRAY ENGINEERING INC.
Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

1052 Karsh Drive
 Ottawa, Ontario
 K1G 4N1

Tel: 613-249-8044
 Fax: 613-249-9815
dbgray@rogers.com

From: "White, Joshua" <Joshua.White@ottawa.ca>
To: 'DOUGLAS GRAY' <dbgray@rogers.com>
Sent: Wednesday, August 21, 2013 1:57:08 PM
Subject: RE: Ladouceur St & Merton St

Were will the water connection(s) be?

From: DOUGLAS GRAY [<mailto:dbgray@rogers.com>]
Sent: August 19, 2013 12:01 PM
To: White, Joshua
Subject: Ladouceur St & Merton St

Hi Josh

Please provide the boundary conditions at the corner of Ladouceur St & Merton St.

I have calculated the following expected demands for the based on an 8 unit residential townhouse development.

Average daily demand: 0.1 l/s.
 Maximum daily demand: 0.8 l/s.
 Maximum hourly daily demand: 1.3 l/s

Please provide boundary conditions for two Scenarios.

Scenario 1:

Fire Flow demand: 90 l/s
 Fire Flow + Max Day: 90.8 l/s

Scenario 2:

Fire Flow demand: 45 l/s
Fire Flow + Max Day: 45.8 l/s

Thanks, Doug

D. B. GRAY ENGINEERING INC.
Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermains

1052 Karsh Drive
Ottawa, Ontario
K1G 4N1

Tel: 613-249-8044
Fax: 613-249-9815
dbgray@rogers.com

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Boundary Condition for Ladouceur and Merton



REVISÉD 16-Aug-13
 REVISÉD 29-Aug-13
 REVISÉD 14-May-15

Ladouceur St & Merton St Townhouses Ottawa, Ontario Water Demand

	Number of Units	Persons Per Unit	Population
UNIT TYPE:			
Single Family:	0	3.4	0
Semi- detached:	0	2.7	0
Duplex:	0	2.3	0
Townhouse:	6	2.7	16
APARTMENTS:			
Bachelor	0	1.4	0
1 Bedroom:	0	1.4	0
2 Bedroom:	0	2.1	0
3 Bedroom:	0	3.1	0
Average Apartment:	0	1.8	0
TOTAL:			16

DAILY AVERAGE

350	litres / person / day			
3.9	l / min	0.1	l / sec	1.0
				Usgpm

MAXIMUM DAILY DEMAND

9.5	(Peaking Factor for a equivalent population of 30: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)			
37.4	l / min	0.6	l / sec	9.9
				Usgpm

MAXIMUM HOURLY DEMAND

14.3	(Peaking Factor for a equivalent population of 30: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)			
56.3	l / min	0.9	l / sec	14.9
				Usgpm

Finish Floor Elevation: 59.7 m ASL
 Elevation of Water Meter: 60.6 m ASL

Static Pressure at Water Meter

MINIMUM HGL:	108.4	m ASL	68	psi	469	kPa
MAXIMUM HGL:	116.3	m ASL	79	psi	546	kPa

D.B. GRAY ENGINEERING INC.

Stormwater Management - Grading & Drainage - Storm & Sanitary Sewers - Watermain

700 Long Point Circle
Ottawa, Ontario K1T 4E9

STORM SEWER COMPUTATION FORM

PROJECT: Ladouceur St & Merton St Townhouses, Ottawa

Designed By: DBG

n = 0.013

RATIONAL METHOD Q = 2.78 A I R FIVE YEAR EVENT

REVISED 14-May-15

STREET	LOCATION		Hard Surface		Landscape		Roof		Individual 2.78 A R	Accum. 2.78 A R	Time of Conc. (min)	Rainfall Intensity I (mm/hr)	Peak Flow Q (l/s)	Type of Pipe	Dia. Actual (mm)	Dia. Nom (mm)	Slope (%)	Length (m)	SEWER DATA			COMMENTS
	FROM	TO	R = 0.9	R = 0.70	R = 0.2	R = 0.9	Slope (%)	Capacity (l/s)											Velocity (m/s)	Time of Flow (min)	Ratio O/C/Ull	
	CB/MH-4	CB/MH-3	0.0127	0.0001	0.0093	0.055	0.055	10.0	104	5.7	PVC SDR 35	254.0	250	0.43	5.4	40.7	0.80	0.1	0.14			
	MH-7	MH-5			0.0140	0.035	0.035	10.0	104	3.6	PVC SDR 35	457.2	450	0.43	8.6	195.5	1.19	0.1	0.02			
	MH-6	MH-2			0.000	0.090	0.090	10.1	104	9.3	PVC SDR 35	254.0	250	0.43	22.1	40.7	0.80	0.5	0.23			
	MH-2	MH-1			0.0059	0.105	0.105	10.6	101	10.6	PVC SDR 35	254.0	250	0.43	10.1	40.7	0.80	0.2	0.26			
	EXISTING 375 ST - MERTON STREET																					
															381.0	375	0.320		103.5	0.91		

City of Ottawa Servicing Study Checklist

General Content

Executive Summary (for large reports only): not applicable

Date and revision number of the report: see page 1 of Servicing Brief

Location map and plan showing municipal address, boundary, and layout of proposed development: see drawings SG-1, SG-2 and SG-3

Plan showing the site and location of all existing services: see drawings SG-1, SG-2 and SG-3

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: not applicable

Summary of Pre-consultation Meetings with City and other approval agencies: not available

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 defensible design criteria: not applicable

Statement of objectives and servicing criteria: see page 1 of Servicing Brief

Identification of existing and proposed infrastructure available in the immediate area: see drawings SG-1, SG-2 and SG-3

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). not applicable

Concept level master grading plan to confirm existing and proposed grades in the development 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: not applicable

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: not applicable

Proposed phasing of the development, if applicable: not applicable

Reference to geotechnical studies and recommendations concerning servicing: not available see note 1.5 on drawing SG-3

All preliminary and formal site plan submissions should have the following information:

- **Metric scale:** included
- **North arrow:** included
 - **(including construction North):** not included
- **Key Plan:** included
- **Name and contact information of applicant and property owner:** not available
- **Property limits:** included
 - **including bearings and dimensions:** not included
- **Existing and proposed structures and parking areas:** included
- **Easements, road widening and rights-of-way:** included
- **Adjacent street names:** included

Development Servicing Report: Water

Confirm consistency with Master Servicing Study, if available: not applicable

Availability of public infrastructure to service proposed development: see page 2 of Servicing Brief

Identification of system constraints: see page 2 of Servicing Brief

Confirmation of adequate domestic supply and pressure: see page 2 of Servicing Brief

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 locations throughout the development: see page 2 and 5 to 12 of Servicing Brief

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: see page 2 of Servicing Brief

Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design: not applicable

Address reliability requirements such as appropriate location of shut-off valves: not applicable

Check on the necessity of a pressure zone boundary modification:. not applicable

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: not applicable

Description of the proposed water distribution network, including locations of proposed connections to the existing systems, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions: not applicable

Description of off-site required feeder mains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation: not applicable

Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines: see page 2 of Servicing Brief

Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference: not applicable

Development Servicing Report: Wastewater

Summary of proposed design criteria: see page 3 of Servicing Brief

(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): not applicable

Confirm consistency with Master Servicing Study and /or justification for deviations: not applicable

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 conditions of sewers: not applicable

Descriptions of existing sanitary sewer available for discharge of wastewater from proposed development: see page 3 of Servicing Brief

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): not applicable

Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix C) format. see page 9 of Servicing Brief

Description of proposed sewer network including sewers, pumping stations, and forcemains: see page 3 of Servicing Brief

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): not applicable

Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development: not applicable

Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity: not applicable

Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding: not applicable

Special considerations such as contamination, corrosive environment etc: not applicable

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): see page 3 of Servicing Brief

Analysis of available capacity in existing public infrastructure. not applicable

A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern: not applicable

Water quality 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: see Stormwater Management Report

Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements: see Stormwater Management Report

Descriptions of the references and supporting information.

Set-back from private sewage disposal systems. not applicable

Watercourse and hazard lands setbacks: not applicable

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed: not available

Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists: not applicable

Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period). see drawing SG-1, SG-2 & SG-3 and Stormwater Management Report

Identification of watercourses within the proposed development and how watercourses will be protected, or , if necessary, altered by the proposed development with applicable approvals. see drawing SG-1, SG-2 & SG-3 and Stormwater Management Report

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: see Stormwater Management Report

Any proposed diversion of drainage catchment areas from one outlet to another. : not applicable

Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities. : not applicable

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: not applicable

Identification of potential impacts to receiving watercourses: see page 3 of Servicing Brief

Identification of municipal drains and related approval requirements. : not applicable

Descriptions of how the conveyance and storage capacity will be achieved for the development: see page 3 of Servicing Brief

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. : not applicable

Description of approach to erosion and sediment control during construction for the protection of receiving watercourses of drainage corridors: see notes 2.1 to 2.5 on drawing SG-3

Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplains elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current: not applicable

Identification of fill constraints related to floodplain and geotechnical investigation. : not applicable

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 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: not available

Application for Certificate of Approval (CofA) under the Ontario Water Resources Act:

Changes to Municipal Drains. : not applicable

Other permits (National Capital commission, Parks Canada, public Works and Government Services Canada, Ministry of transportation etc.) : not applicable

Conclusion Checklist

Clearly stated conclusions and recommendations: see page 3 of Servicing Brief

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: included