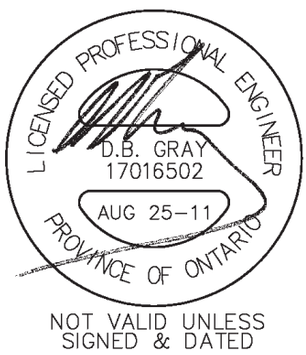
SERVICING BRIEF

288 Booth Street
Ottawa, Ontario

Report No. 10073-SB

August 25, 2011



D. B. GRAY ENGINEERING INC.

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

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SERVICING BRIEF

288 Booth Street
Ottawa, Ontario

This Servicing Brief is a description of the services of a proposed seven-storey 54 unit apartment condominium building with ground floor commercial and a partial basement located at 288 Booth Street at the corner of Somerset Street West in Ottawa.

Refer to drawings SG-1 and SG-2 (Revision 2: Aug 25-11), prepared by D. B. Gray Engineering Inc.

Somerset Street West is proposed to be re-constructed including a new 305mm municipal watermain, 300mm sanitary sewer and 600mm storm sewer. Some of the details of the city service are not yet known. We have been in contact with the engineers (Delcan), the contractor (Graydex) and the city's project manager (Max Ross). It is proposed that service connections be installed at the time of the road re-construction. It is anticipated that the connections will be installed around mid October of this year.

Water Supply for Fire Fighting:

There are three existing fire hydrants in the municipal right-of-way near the proposed development. One is west of the property on the north side of Somerset Street West approximately 36m from the fire department connection and Somerset Street entrance. A second hydrant is at the opposite corner of Somerset / Booth Street approximately 46m from the entrance. The third hydrant is north of the property on the west side of Booth Street approximately 40m from the Booth Street entrance.

A fire demand of 6,300 L/min (105 L/sec) 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".

Field measurements by the City of Ottawa have recorded the actual flow from each of these three hydrants. They varying from 2546 to 4319 L/min (560 to 950 ipgm) at a dynamic water pressure of 317 to 331 kPa (46 to 48 psi). The calculated the flow at 138 kPa (20 psi) ranges from 5737 to 10,665 L/min (1262 to 2346 ipgm).

The Somerset Street hydrant produced the lowest flow rate but it is currently supplied from an old 125mm watermain which will be replaced with a new 305mm watermain.

To determine if an adequate water supply for fire fighting is available, the boundary conditions, based on the City of Ottawa computer simulation of the water distribution system in this area, is required.

Water Service:

The proposed building will be sprinklered. To service the sprinklers a 150mm water service is proposed. The proposed water service will connect to a proposed 305mm municipal watermain in Somerset Street West.

Based on the AWWA water flow demand curve, an estimated water pressure at the meter of 386 kPa (56 psi), the peak demand is expected to be 403 L/min (107 USgpm). The AWWA method calculates the instantaneous demand and is used to size the water service. This peak demand will produce an a low velocity of 0.4m/s in the proposed 150mm water service connection.

Based on the City of Ottawa and Ministry of the Environment Design Guidelines the daily average flow is 0.34 L/min with a maximum daily and maximum hourly demand of 1.37 and 2.05 L/min 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, we request the boundary conditions for the Somerset Street West / Booth Street based on the following:

Average daily demand: 0.34 l/s.
Maximum daily demand: 1.37 l/s.
Maximum hourly daily demand: 2.05 l/s
Fire Flow demand: 105 l/s (6,300 l/min)

Field measurements by the City of Ottawa has recorded the static water pressure in the municipal watermain at 52 to 56 psi.

Sanitary Service:

Based on the City of Ottawa Sewer Design Guidelines for a residential property (54 one bedroom apartment units – 1.4 persons per unit – 350 l/person/day – 4.0 peaking factor) and 230 sq.m. of

commercial 50,000 l/ ha / day; 1.5 peaking factor); and a 0.24 l/s infiltration flow) the post development flow is calculated to be 1.27 l/s.

This flow will be adequately handled by the proposed sanitary sewer service (150mm @ 1% - 15.9 l/s capacity). The proposed sanitary service will connect to a proposed 300mm municipal sanitary sewer in Somerset Street West. The slope of the proposed municipal sanitary sewer, and therefore the capacity, is not yet known but it is expected that the increase in sanitary flows contributing to the proposed 300mm municipal sanitary sewer is will have a negligible impact.

Stormwater:

Infrastructure Approvals staff advised that the following stormwater management criteria are to be used: The stormwater quantity control measure are based on the criteria that the release rate for post-development storm events is equal to or less than the flow produced by a five year storm using a runoff coefficient of 0.50 and a 20 minute time of concentration. (See Stormwater Management Report No. 10073-SB, dated August 25, 2010, prepared by D. B. Gray Engineering Inc.)

The flowrate resulting from a one in five year storm event will produce a peak flow of 22.2 l/s which will be adequately handled by a proposed storm sewer (250mm @ 1% - 62.0 l/s capacity).

However an inlet control device (ICD) located at the outlet pipe of a on-site manhole The ICD will restrict the flow and force the stormwater to back up into the upstream sewer pipes, catch basin and manholes and into a cistern located under an outdoor bicycle storage. Stormwater released through the (ICD) will be restricted to the maximum flow of 6.60 l/s during the one in one hundred storm event which will also be adequately handled by a proposed storm sewer.

The increase in sanitary flows contributing to the proposed 600mm municipal storm sewer is expected to have a negligible impact.

Conclusions:

1. We require the boundary conditions to determine if there is an adequate water supply for fire fighting.
2. We require the boundary conditions to determine if the existing water pressure is adequate for the proposed development.
3. We require the boundary conditions to determine if the water pressure can be above 80 psi and if a pressure reducing valve 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. The increase in sanitary flows contributing to the proposed 300mm municipal sanitary sewer is expected to have a negligible impact.
7. The unrestricted flowrate produced by a one in five year storm event and restricted flow rate produced by a one in one hundred-year storm event the will be adequately handled by a proposed storm sewer.
8. The increase in sanitary flows contributing to the proposed 600mm municipal storm sewer is expected to have a negligible impact.
9. It is expected that a Ministry of Environment Certificate of Approval will not be required.

Water Supply for Fire-Fighting Calculations:

288 Booth Street, Ottawa

20-Aug-11

A fire demand of 6,300 L/min 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 $Q = KVS_{Tot}$

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

	Spatial Coefficient	Exposure Distance m	
S_{Side1}	0.00	10.30	(south - to center line of Somerset St W)
S_{Side2}	0.11	8.90	(east - to center line of Booth St)
S_{Side3}	0.50	1.50	(to north property line)
S_{Side4}	0.50	0.00	(to west property line)
S_{Tot}	2.11		

Residential:

K (Water Supply Coefficient)

10 As per A-3.2.5.7. Table 1 (Group C Occupancy / Non-combustible construction with fire resistance ratings)

V (Building Volume)

	Area sq.m.	Average Height m	Volume cu.m.
Basement	350	2.84	994
1st Floor Residential	207	3.28	679
2nd Floor Residential	650	2.69	1,749
3rd Floor Residential	667	2.69	1,794
4th Floor Residential	667	2.69	1,794
5th Floor Residential	572	2.69	1,539
6th Floor Residential	452	2.69	1,216
7th Floor Residential	452	2.69	1,216
			10,980 cu.m.

$Q_1 = KVS_{Tot}$

$Q_1 = 231,686$ L

Commercial:

K (Water Supply Coefficient)

17 As per A-3.2.5.7. Table 1 (Group E Occupancy / Non-combustible construction with fire resistance ratings)

V (Building Volume)

	Area sq.m.	Average Height m	Volume cu.m.
1st Floor Commercial	227	3.28	745

$Q_2 = KVS_{Tot}$

$Q_2 = 26,707$ L

$Q = Q_1 + Q_2$

$Q = 258,393$ L

Required Minimum Water Supply Flow Rate 6,300 L/min 105 L/sec
(As per A-3.2.5.7. Table 2)

City of Ottawa Field Measurments

Hydrant 041	Actual Flow:	560	igpm	at	48	psi
		2546	L/min	at	331	kPa
	Calculated Flow:	1262	igpm	at	20	psi
		5737	L/min	at	138	kPa
Hydrant 239	Actual Flow:	929	igpm	at	48	psi
		4223	L/min	at	331	kPa
	Calculated Flow:	2093	igpm	at	20	psi
		9515	L/min	at	138	kPa
Hydrant 040	Actual Flow:	950	igpm	at	46	psi
		4319	L/min	at	317	kPa
	Calculated Flow:	2346	igpm	at	20	psi
		10665	L/min	at	138	kPa

ROGERS | YAHOO! MAIL Classic

RE: 288 Booth St Wednesday, June 15, 2011 11:50 AM

From: "Crowder, Murray" <Murray.Crowder@ottawa.ca>
To: "DOUGLAS GRAY" <dbgray@rogers.com>
1 File (223KB)

Booth & ...

Note: the computed flows are approximate and performed for hydrant colour coding purposes, thus these values are not intended for design purposes.

5982

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	Douglas Gray
Company:	**D. B. GRAY ENGINEERING INC.**
Tel:	**(613) 249-8044**
Fax:	**(613) 249-9815**
Location:	**Booth @ Somerset W**
Request_dt:	**11-06-15-11:37:19**
Email:	**dbgray@rogers.com**

Inspection Date	Flow Hydrant	Residual Hydrant	Pressure (psi) Static	Dynamic	Pitot	Flow (igpm) actual	@ 20 psi
2009/08/05	6630040	6630041	52	>46	46	950	2346
2009/08/05	6630041	6630040	56	48	16	560	1262
2009/08/05	6630239	6630040	56	>48	44	929	2093
2009/08/04	6629177	6629178	58	>50	38	863	2003

Murray Crowder
Technical Support
Drinking Water Operations Branch
Environmental Services Department
City of Ottawa
951 Clyde Avenue, Ottawa, On K1Z 5A6
Mail Code 06-65
Tel: (613) 580-2424 x 22231
Fax: (613) 728-4183
e-mail: murray.crowder@ottawa.ca

From: DOUGLAS GRAY [mailto:dbgray@rogers.com]
Sent: June 15, 2011 11:34 AM
To: Crowder, Murray
Subject: 288 Booth St

Hi Murray

I am working on a project at 288 Booth St at the corner of Somerset St W (see attached map).

Please send me water supply / pressure information in this area.

Thanks, Doug

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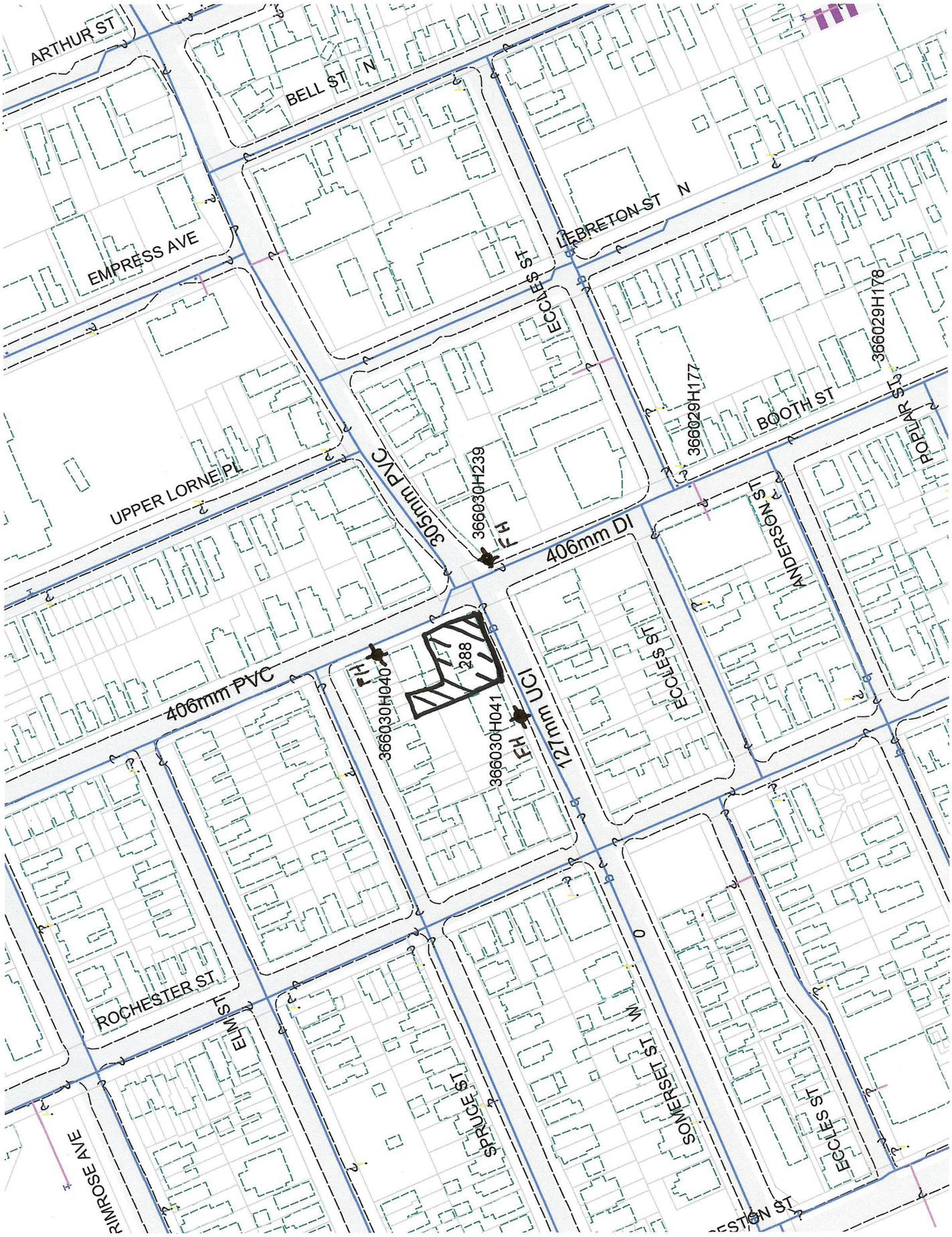
ARTHUR ST
BELL ST N
EMPRESS AVE
LEBRETON ST N
ECCLES ST
366029H178
366029H177
BOOTH ST
POPLAR ST
ANDERSON ST
UPPER LORNE PL
305mm PVC
366030H239
FH
406mm DI
288
406mm PVC
366030H040
366030H041
127mm UCI
ROCHESTER ST
ELM ST
SPRUCE ST
SOMERSET ST
RIMROSE AVE

Water Demand

288 Booth Street, Ottawa

20-Aug-11

WATER FIXTURE VALUE

	No.	F.V.	Total		54	Residental Units
Bathtub	54	8	432			
Tiolet - tank	54	4	216			
Tiolet - flush valve	0	35	0			
Lavs.	54	1.5	81			
Urinal - pedestal flush valve	0	35	0			
Urinal - wall flush valve	0	16	0			
Shower	0	2.5	0			
K. Sink	54	2.2	118.8			
Dishwasher	54	2	108			
Clothes Washer	0	6	0			
Commercial Sink	0	4	0			
J. Sink	0	4	0			
Commercial Dishwasher	0	4	0			
Commercial Washer	0	0	0			
Hose 1/2 in	0	5	0			
			955.8			

Peak Demand (fig 4-2 or 4-3) 52 Usgpm

	No.	F.V.	Total		4	Commercial Units
Bathtub	0	8	0			
Tiolet - tank	6	4	24			
Tiolet - flush valve	0	35	0			
Lavs.	6	1.5	9			
Urinal - pedestal flush valve	0	35	0			
Urinal - wall flush valve	2	16	32			
Shower	0	2.5	0			
K. Sink	2	2.2	4.4			
Dishwasher	0	2	0			
Clothes Washer	0	6	0			
Commercial Sink	4	4	16			
J. Sink	2	4	8			
Commercial Dishwasher	2	4	8			
Commercial Washer	0	0	0			
Hose 1/2 in	0	5	0			
			101.4			

Peak Demand (fig 4-2 or 4-3) 53 Usgpm

TOTAL Peak Demand 105 Usgpm

Pressure @ Meter 386 kPa 56 psi
Pressure Factor (table 4-1) 0.96

Peak Demand 101 Usgpm

Irrigation - hose 1/2 in 1 6 Usgpm (includes pressure factor)
(assume one hose bibs operating)

TOTAL PEAK DEMAND 403 l/min 107 Usgpm
6.72 l / sec

Nominal Size 5.9 in 150 mm (Sprinklers)
1.3 ft/s 0.4 m/s

DAILY AVERAGE

Residential 350 litres / person / day
76 persons (based on 54 units and 1.4 persons per unit)
18.4 l / min 0.31 l / sec 4.9 Usgpm

5.0 litres / sq.m.
Assume 1/2 Comercial is Retail 114 sq.m.
0.4 l / min 0.01 l / sec 0.1 Usgpm

20.5 litres / sq.m.
Assume 1/2 Comercial is a Food Outlet 114 sq.m.
1.6 l / min 0.03 l / sec 0.4 Usgpm

TOTAL DAILY AVERAGE 20.4 l / min 0.34 l / sec 5.4 Usgpm
29,359 l /day
84 equivalent persons (350 l / day)

MAXIMUM DAILY DEMAND 4.0 (Peaking Factor for a equivalent population: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)
81.9 l / min 1.37 l / sec 21.6 Usgpm

MAXIMUM HOURLY DEMAND 6.0 (Peaking Factor for a equivalent population: Table 3-3 MOE Design Guidelines for Drinking-Water Systems)
123.2 l / min 2.05 l / sec 32.6 Usgpm

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SANITARY SEWER DESIGN FORM

Average Daily Flows:
Residential: 350 l / capita / day
Commercial: 50,000 l / ha / day
Institutional: 50,000 l / ha / day
Light Industrial: 35,000 l / ha / day
Heavy Industrial: 55,000 l / ha / day

Peaking Factor:
Residential (Harmon Equation): $P.F. = 1 + \frac{14}{4 + P^{0.5}}$
P = Population / 1000

Infiltration Allowance: 0.28 l / s / ha

PROJECT: 288 Booth Street, Ottawa

Designed By: DBG

24-Aug-11

LOCATION			Section								Cumulative Residential		Section Non-Residential			Cumulative				SEWER DATA n = 0.013								COMMENTS
			Single Family	Semi / Townhouse	Duplex / Triplex	Apartments (average)	Apartments (1 Bed.)	Apartments (2 Bed.)	Apartments (3 Bed.)	Residential Area						Area	Sewage Flow	Infiltration Flow	Total Flow								
STREET	FROM	TO	ppu = 3.4	ppu = 2.7	ppu = 2.3	ppu = 1.8	ppu = 1.4	ppu = 2.1	ppu = 3.1		Pop.	Peaking Factor	Area	Flow	Peaking Factor					Type of Pipe	Dia. Actual (mm)	Dia. Nom. (mm)	Slope (%)	Length (m)	Capacity (l/s)	Velocity (m/s)	Ratio Q/Qfull	
			No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	No. of Units	ha			ha	l/ha/day		ha	l/s	l/s	l/s								
	Building	Booth St					54			0.069	76	4.0	0.023	50,000	1.5000	0.092	1.24	0.03	1.27	PVC SDR 28	152.4	150	1.000	1.0	15.9	0.87	0.08	
																												PROPOSED MUNICPAL SEWER IN BOOTH STREET
																					304.8	300						

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Fax: (613) 249-9815
email: dbgray@rogers.com

STORM SEWER COMPUTATION FORM

RATIONAL METHOD Q = 2.78 A I R FIVE YEAR EVENT

n = 0.013

PROJECT: 288 Booth Street, Ottawa

Designed By: DBG

Date: 24-Aug-11

LOCATION			AREA (ha)				Individual 2.78 A R	Accum. 2.78 A R	Time of Conc. (min)	Rainfall Intensity I (mm/hr)	Peak Flow Q (l/s)	SEWER DATA									COMMENTS
STREET	FROM	TO	R = 0.9	R = 0.70	R = 0.2	R = 0.9						Type of Pipe	Dia. Actual (mm)	Dia. Nom. (mm)	Slope (%)	Length (m)	Capacity (l/s)	Velocity (m/s)	Time of Flow (min)	Ratio Q/Qfull	
	CB-1	Cistern	0.0004		0.0080		0.005	0.005	10.0	104	0.6	PVC SDR 35	254.0	250	1.000	8.4	62.0	1.22	0.1	0.01	
	Cistern	CB/MH-2	0.0057			0.0723	0.195	0.201	10.1	104	20.8	PVC SDR 35	254.0	250	1.000	6.3	62.0	1.22	0.1	0.33	
	CB/MH-2	CB/MH-3					0.000	0.201	10.2	103	20.7	PVC SDR 35	254.0	250	1.000	5.2	62.0	1.22	0.1	0.33	
	Trench Drain	CB/MH-3	0.0057		0.0017		0.015	0.015	10.0	104	1.6	PVC SDR 35	254.0	250	3.000	20.9	107.5	2.12	0.2	0.01	
	CB/MH-3	Booth St					0.000	0.216	10.3	103	22.2	PVC SDR 35	254.0	250	1.000	22.6	62.0	1.22	0.3	0.36	
														PROPOSED MUNICPAL SEWER IN BOOTH STREET							
														609.6	600						

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 and SG-2

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

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 defendable 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 and SG-2

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). see drawings SG-1 and SG-2

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: see note 1.5 on drawing SG-2

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: see note 1.8 on drawing SG-2

- **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 & 3 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 & 4 to 11 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 3 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 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: not applicable

Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines: see page 2 and 3 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 2 and 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 2 and 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 8 of Servicing Brief

Description of proposed sewer network including sewers, pumping stations, and forcemains: see page 2 and 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: see drawing SG-1

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 No. 10073-SWM, dated August 25, 2011, prepared by D. B. Gray Engineering Inc.

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 No. 10073-SWM, dated August 25, 2011, prepared by D. B. Gray Engineering Inc.

Descriptions of the references and supporting information.

Set-back from private sewage disposal systems. not applicable

Watercourse and hazard lands setbacks: see drawing SG-1

Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed: The pre-application consultation record is not yet been issued

Confirm consistency with sub-waterched 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 and Stormwater Management Report No. 10073-SWM, dated August 25, 2011, prepared by D. B. Gray Engineering Inc.

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 and Stormwater Management Report No. 10073-SWM, dated August 25, 2011, prepared by D. B. Gray Engineering Inc.

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 No. 10073-SWM, dated August 25, 2011, prepared by D. B. Gray Engineering Inc.

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 Stormwater Management Report 10073-SWM, dated August 25, 2011, prepared by D. B. Gray Engineering Inc.

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 2.2 on drawing SG-2

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: the Rideau Conservation Authority has been contacted but no comments have been received

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