

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES

FOR

**914168 ONTARIO INC
320 MCRAE AVENUE**

CITY OF OTTAWA

PROJECT NO.: 14-752

**DECEMBER 2015 – REV 2
© DSEL**

**ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
FOR
914168 ONTARIO INC**

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Existing Conditions	2
1.2	Required Permits / Approvals	3
1.3	Pre-consultation.....	3
2.0	GUIDELINES, PREVIOUS STUDIES, AND REPORTS.....	4
2.1	Existing Studies, Guidelines, and Reports.....	4
3.0	WATER SUPPLY SERVICING	5
3.1	Existing Water Supply Services.....	5
3.2	Water Supply Servicing Design	5
3.3	Water Supply Conclusion	7
4.0	WASTEWATER SERVICING.....	8
4.1	Existing Wastewater Services	8
4.2	Wastewater Design	8
4.3	Wastewater Servicing Conclusions	10
5.0	STORMWATER MANAGEMENT	11
5.1	Existing Stormwater Services	11
5.2	Post-development Stormwater Management Target	11
5.3	Proposed Stormwater Management System	11
5.4	Stormwater Servicing Conclusions	12
6.0	UTILITIES.....	13
8.0	CONCLUSION AND RECOMMENDATIONS	14

FIGURES

Figure 1	Site Location
----------	---------------

TABLES

Table 1	Water Supply Design Criteria
Table 2	Water Demand and Boundary Conditions Scott Street Tower Proposed Conditions
Table 3	Water Demand and Boundary Conditions McRae Avenue Tower Proposed Conditions
Table 4	Wastewater Design Criteria
Table 5	Summary of Estimated Existing Peak Wastewater Flow
Table 6	Summary of Estimated Peak Wastewater Flow
Table 7	Summary of Existing Peak Storm Flow Rates
Table 8	Stormwater Flow Rate Summary

APPENDICES

Appendix A	Pre-consultation Notes
Appendix B	Water Supply
Appendix C	Wastewater Collection
Appendix D	Stormwater Management
Drawings / Figures	Proposed Site Plan

**ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
FOR
320 MCRAE AVENUE
914168 ONTARIO INC
DECEMBER 2015 – REV 2**

CITY OF OTTAWA

PROJECT NO.: 14-752

1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-law Amendment (ZBLA) at 320 McRae Avenue and 1975 Scott Street.

The subject property is located within the City of Ottawa urban boundary, in the Rideau-Rockcliffe ward. As illustrated in **Figure 1**, the subject property is located south of the intersection of McRae Avenue and Scott Street. Comprised of nine parcels the subject property measures approximately **0.526ha** and is zoned Traditional Main Street (TM[103]) along the Scott Street frontage and General Mixed Use (GM[1576]H(15)) along the McRae Avenue frontage.



Figure 1: Site Location

The proposed ZBLA would allow for the development of two mixed-use towers connected via a common parking garage. One, 19-storey residential /commercial tower is proposed to front onto both Scott Street and McRae Avenue, and a 4-Storey residential/commercial tower is proposed to front McRae Avenue. The contemplated development would include approximately 2,055 m² of ground level retail and 1,041 m² of commercial office. Underground parking access is proposed from McRae Avenue. The residential component is comprised of approximately 242 residential units. A copy of the conceptual site plan is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail to demonstrate that the proposed re-zoning and contemplated development is supported by existing municipal services.

1.1 Existing Conditions

The existing site includes two residential properties along Tweedsmuir Avenue and multiple commercial properties along McRae Avenue. The existing commercial property is currently an automotive garage consisting mainly of asphalt parking lot areas. Two existing catchbasins are located at the northeast corner of the existing 1-storey automotive garage. No stormwater management controls have been observed on site.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal right-of-ways:

McRae Avenue

- 1067 mm diameter unlined cast iron feedermain
- 152 mm diameter unlined cast iron watermain (work is currently being completed to upgrade to a 203 mm diameter main)
- 1250 mm x 750 mm CSP storm sewer tributary to Ottawa Central sub-watershed (work is currently being completed to upgrade to a 825 mm diameter concrete sewer)
- 225 mm diameter concrete sanitary sewer

Scott Street

- 203 mm diameter watermain
- 1220 mm diameter concrete pressure pipe watermain
- 1050 mm diameter concrete storm sewer tributary to Ottawa Central sub-watershed
- 1200 mm diameter concrete storm sewer tributary to Ottawa Central sub-watershed
- 225 mm diameter concrete sanitary sewer tributary to the West Nepean Collector

-
- 1500 mm diameter concrete sanitary West Nepean Collector

Tweedsmuir Avenue

- 152 mm diameter PVC watermain
- 375 mm diameter concrete sanitary sewer tributary to the West Nepean Collector
- 1200 mm diameter concrete storm sewer tributary to Ottawa Central sub-watershed

1.2 Required Permits / Approvals

The proposed development is subject to the site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

The subject property contains existing trees, and re-grading the site to accommodate the proposed development may impact or require removal of existing trees. Trees requiring removal will be subject to the City of Ottawa Urban Tree Conservation By-law No. 2009-200.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in **Appendix A**.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

The following studies were utilized in the preparation of this report.

- **Ottawa Sewer Design Guidelines,**
City of Ottawa, *SDG002*, October 2012
(City Standards)
- **Ottawa Design Guidelines – Water Distribution**
City of Ottawa, July 2010.
(Water Supply Guidelines)
 - **Technical Bulletin ISD-2010-2**
City of Ottawa, December 15, 2010.
(ISD-2010-2)
 - **Technical Bulletin ISDTB-2014-02**
City of Ottawa, May 27, 2014.
(ISDTB-2014-02)
- **Design Guidelines for Sewage Works,**
Ministry of the Environment, 2008.
(MOE Design Guidelines)
- **Stormwater Planning and Design Manual,**
Ministry of the Environment, March 2003.
(SWMP Design Manual)
- **Ontario Building Code Compendium**
Ministry of Municipal Affairs and Housing Building Development Branch,
January 1, 2010 Update
(OBC)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 1W pressure zone; 152mm diameter and 203 mm diameter watermain exists within the McRae Avenue and Scott Street rights-of-way respectively. In addition to the local services, 1067mm diameter and 1220 mm transmission mains exist within the McRae Avenue and Scott Street rights-of-way respectively, as shown by the Pressure Zone map in **Appendix B**.

At the time of publication, correspondence with the City indicates work is being completed to upgrade the 152 mm watermain within McRae Avenue to a 203 mm diameter watermain.

3.2 Water Supply Servicing Design

It is anticipated that the proposed development will be serviced via service connections in the vicinity of the Scott Street and McRae Avenue intersection. In accordance with City of Ottawa technical bulletin ISDTB-2014-02, redundant service connections will be required due to an anticipated design flow of greater than 50 m³/day.

Table 1 summarizes the **Water Supply Guidelines** employed in the preparation of the preliminary water demand estimate.

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	3.0 x Average Daily * for Scott Street 4.9 x Average Daily * for McRae Avenue
Residential Maximum Hourly	4.5 x Average Daily * for Scott Street 7.4 x Average Daily * for McRae Avenue
Commercial Retail	2.5 L/m ² /d
Commercial Office	75 L/9.3m ² /d
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa
*Daily average based on Appendix 4-A from Water Supply Guidelines	
** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.	

-Table updated to reflect ISD-2010-2

Table 2 and **3** summarizes the anticipated water supply demand and boundary conditions for the proposed development based on the **Water Supply Guidelines**.

Table 2
Water Demand and Boundary Conditions
Scott Street Tower Proposed Conditions

Design Parameter	Anticipated Demand ¹ (L/min)	Boundary Condition ² (m H ₂ O / kPa)	
Average Daily Demand	90.3	117.4	527.8
Max Day + Fire Flow	259.1 + 17,000 = 17,259.1	27,420 L/min @ 140 kPa	
Peak Hour	392.2	108.3	438.5
1) Water demand calculation per Water Supply Guidelines . See Appendix B for detailed calculations. 2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation __m. See Appendix B .			

Table 3
Water Demand and Boundary Conditions
McRae Avenue Tower Proposed Conditions

Design Parameter	Anticipated Demand ¹ (L/min)	Boundary Condition ² For Connection 1 (m H ₂ O / kPa)		Boundary Condition ² For Connection 2 (m H ₂ O / kPa)	
Average Daily Demand	25.3	117.4	530.7	117.4	530.7
Max Day + Fire Flow	118.9 + 7,000 = 7,118.9	27,000 L/min @ 140 kPa		23,700 L/min @ 140 kPa	
Peak Hour	180.2	108.3	441.45	108.3	441.45
1) Water demand calculation per Water Supply Guidelines . See Appendix B for detailed calculations. 2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation __m. See Appendix B .					

Fire flow requirements are to be determined in accordance with Local Guidelines (**FUS**), City of Ottawa **Water Supply Guidelines**, and the Ontario Building Code.

Using the **FUS** method a conservative estimation of fire flow had been established. The following assumptions were assumed:

- Type of construction – Non-Combustible
- Occupancy type – Limited Combustibility
- Sprinkler Protection – Supervised Sprinkler System

The above assumptions result in an estimated fire flow of approximately **17,000 L/min**, actual building materials selected will affect the estimated flow; FUS estimates are included in **Appendix B**. A certified fire protection system specialist would need to be

employed to design the building fire suppression system and confirm the actual fire flow demand.

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in **Table 2 and 3**. Boundary conditions have been included in **Appendix A**.

The City provided both the anticipated minimum and maximum water pressures, as well as the estimated available fire flow at 140 kPa (20 psi) for the demands as indicated by the correspondence in **Appendix A**. The minimum and maximum pressures fall within the required range identified in **Table 1**. The available fire flow exceeds the estimated fire flow as calculated using FUS.

Initial boundary conditions obtained indicate residual pressures at the high end of the recommended pressure range as specified in **Table 1** and the **Water Supply Guidelines**; it is therefore recommended that a pressure check be conducted at the completion of construction to determine if pressure controls are required.

3.3 Water Supply Conclusion

Anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. Boundary conditions indicate that maximum pressures as specified in the **Water Supply Guidelines**, are respected in Average Day and Peak Hour scenarios. The available fire flow exceeds the estimated fire flow as calculated using FUS.

The proposed water supply design conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the West Nepean Collector Sewer catchment area, as shown by the City sewer mapping included in **Appendix C**. Existing 225 mm diameter sanitary sewers are located within McRae Avenue and Scott Street to service the contemplated development.

The existing site consists of residential and industrial uses contributing wastewater to the local McRae Avenue sewer system. The McRae Avenue sanitary sewer is tributary to the West Nepean Trunk Collector sewer approximately 60m downstream of the McRae Avenue and Scott Street intersection.

4.2 Wastewater Design

It is anticipated that the contemplated development will connection to either of the 225 mm the sanitary sewers within McRae Avenue or Scott Street.

Table 4 summarizes the **City Standards** employed in the design of the proposed wastewater sewer system.

Table 4
Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Average Daily Demand	350 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial Floor Space	5 L/m ² /d
Commercial Office Space	75 L/9.3m ² /d
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
Minimum Sewer Size	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 5 demonstrates the estimated peak flow from the existing development. See **Appendix C** for associated calculations.

Table 5
Summary of Estimated Existing Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	0.21
Estimated Peak Dry Weather Flow	0.38
Estimated Peak Wet Weather Flow	0.54

The estimated peak wet weather flow from the existing development to the West Nepean Collector sewer is **0.54 L/s**.

Table 6 demonstrates the anticipated peak flow from the proposed development. See **Appendix C** for associated calculations.

Table 6
Summary of Estimated Peak Wastewater Flow

Design Parameter	Scott Street Building (L/s)	McRae Avenue Building (L/s)	Total Flow (L/s)
Estimated Average Dry Weather Flow	2.42	0.49	2.91
Estimated Peak Dry Weather Flow	7.06	1.73	8.79
Estimated Peak Wet Weather Flow	7.14	1.81	8.95

The estimated sanitary flow based on the concept plan provide in **Drawings/Figures** anticipates a peak wet weather flow of **8.95 L/s**.

A sanitary analysis was conducted for the local municipal sanitary sewers located across the frontage of the subject property in order to assess the available capacity. The catchment area serviced by the McRae Avenue sanitary sewer was identified and evaluated by reviewing existing development and zoning within the area. The analysis was conducted from the site to the upstream extents of the drainage area located near the intersection of Tweedsmuir Avenue and Dovercourt Avenue, as shown by the sanitary drainage map in **Appendix C**.

City of Ottawa Sewer Design Guidelines (2004) Figure 4.3 'Peak Flow Design Parameters' were employed to generate a conservative estimate of the existing wastewater flow conditions within the sewer.

Based on the sanitary analysis, the controlling section of the local sewer system is located at the intersection of Scott Street and McRae Avenues (section 4-1) with an available residual capacity of **15.5L/s**; detailed calculations are included in **Appendix C**.

As shown by **Table 5** and **6** above the development proposes a **8.41 L/s** increase over the estimated existing sanitary flow; the analysis indicates that sufficient capacity is available in the local sewers to accommodate the contemplated development.

4.3 Wastewater Servicing Conclusions

The site is tributary to the West Nepean Trunk Collector sewer; based on the sanitary analysis sufficient capacity is available to accommodate the anticipated **8.41 L/s** peak wet weather flow increase proposed by the contemplated development.

The proposed wastewater design conforms to all relevant **City Standards**.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system located within the Ottawa Central sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in **Appendix A**.

It was determined that the existing development contained no stormwater management controls for flow attenuation. The estimated pre-development peak flows for the 2, 5, and 100-year are summarized in **Table 7**:

Table 7
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	81.1
5-year	110.6
100-year	223.7

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development have been established using **City Standards**, where the proposed development has the following requirements:

- Allowable release rate based on a Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 2-year storm with a time of concentration equal to 20 minutes.
- All storms up to and including the City of Ottawa 100-year design event are to be attenuated on site.
- Quality controls are not required for the proposed development due to the site's distance from the outlet; correspondence with the RVCA is included in **Appendix A**.

Based on the above the allowable release rate for the proposed development is **38.0 L/s**.

5.3 Proposed Stormwater Management System

It is contemplated that the stormwater outlet from the proposed development will be to either the 825 mm diameter or 1050 mm diameter storm sewers within McRae Avenue and Scott Street respectively.

To meet the stormwater objectives the proposed development may contain a combination of roof top flow attenuation along with surface and subsurface storage.

Table 8 summarizes post-development flow rates. The following storage requirement estimate assumes that approximately 10% of the development area will be directed to the outlet without flow attenuation. These areas will be compensated for in areas with flow attenuation controls.

Table 8
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m ³)	(L/s)	(m ³)
Unattenuated Areas	9.13	0.0	19.57	0.0
Attenuated Areas	9.78	105.1	18.44	198.2
Total	18.9	105.14	38.01	198.2

It is anticipated that approximately **200 m³** of storage will be required on site to attenuate flow to the established release rate of **38.0 L/s**; storage calculations are contained within **Appendix D**.

Actual storage volumes will need to be confirmed at the detailed design stage based on a number of factors including grading constraints.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate, calculated as **38.0 L/s**, for storm events up to and including the 100-year storm in accordance with **City Standards**. It is estimated that **200 m³** will be required to meet the release rate above.

Based on consultation with the RVCA, stormwater quality controls are not required.

The proposed stormwater design conforms to all relevant **City Standards** and Policies for approval

6.0 UTILITIES

Gas, Hydro services currently exist within the McRae Avenue right-of-way. Utility servicing will be coordinated with the individual utility companies prior to site development.

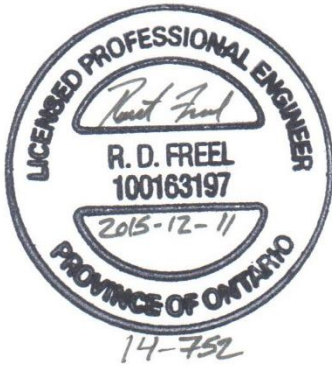
An existing overhead hydro line is located across the McRae Street frontage. The proposed development will need to respect clearances as required by the utility company having jurisdiction.

7.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-law Amendment (ZBLA) at 320 McRae Avenue and 1275 Scott Street. The preceding report outlines the following:

- The FUS method for estimating fire flow indicated **17,000 L/min** is required for the contemplated development,
- The watermain boundary conditions have been requested from the City of Ottawa, however they were unavailable at the time of this publication;
- The contemplated development is anticipated to have a peak wet weather flow increase of **8.41 L/s**; Based on the sanitary analysis conducted the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Based on **City Standards** the contemplated development will be required to attenuate post development flows to an equivalent release rate of **38.0 L/s** for all storms up to and including the 100-year storm event;
- It is contemplated that stormwater objectives may be met through storm water retention via roof top, surface and subsurface storage, it is anticipated that **200 m³** of onsite storage will be required to attenuate flow to the established release rate above;
- Based on consultation with the RVCA, stormwater quality controls are not required;
- Any development on the subject property may require Ontario Water Resources Act (OWRA) s.53 approval from the Ministry of the Environment (MOE) for sanitary and stormwater discharge.

Prepared by,
David Schaeffer Engineering Ltd.



Per: Robert D. Freel, P. Eng.

APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

14-752

09/10/2015

4.1 General Content		
<input type="checkbox"/>	Executive Summary (for larger reports only).	N/A
<input checked="" type="checkbox"/>	Date and revision number of the report.	Report Cover Sheet
<input checked="" type="checkbox"/>	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
<input checked="" type="checkbox"/>	Plan showing the site and location of all existing services.	Figure 1
<input checked="" type="checkbox"/>	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
<input checked="" type="checkbox"/>	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
<input checked="" type="checkbox"/>	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.	Section 2.1
<input checked="" type="checkbox"/>	Statement of objectives and servicing criteria.	Section 1.0
<input checked="" type="checkbox"/>	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
<input type="checkbox"/>	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).	N/A
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	Proposed phasing of the development, if applicable.	N/A
<input checked="" type="checkbox"/>	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
<input type="checkbox"/>	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	N/A
4.2 Development Servicing Report: Water		
<input type="checkbox"/>	Confirm consistency with Master Servicing Study, if available	N/A
<input checked="" type="checkbox"/>	Availability of public infrastructure to service proposed development	Section 3.1
<input checked="" type="checkbox"/>	Identification of system constraints	Section 3.1
<input checked="" type="checkbox"/>	Identify boundary conditions	Section 3.1, 3.2
<input checked="" type="checkbox"/>	Confirmation of adequate domestic supply and pressure	Section 3.3

<input checked="" type="checkbox"/>	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.	Section 3.2
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
<input type="checkbox"/>	Address reliability requirements such as appropriate location of shut-off valves	N/A
<input type="checkbox"/>	Check on the necessity of a pressure zone boundary modification	N/A
<input checked="" type="checkbox"/>	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	Section 3.2, 3.3
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	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.	N/A
<input checked="" type="checkbox"/>	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
<input type="checkbox"/>	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

<input checked="" type="checkbox"/>	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).	Section 4.2
<input type="checkbox"/>	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
<input type="checkbox"/>	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.	N/A
<input checked="" type="checkbox"/>	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
<input checked="" type="checkbox"/>	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)	Section 4.2
<input checked="" type="checkbox"/>	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
<input checked="" type="checkbox"/>	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
<input type="checkbox"/>	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).	N/A

<input type="checkbox"/>	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
<input type="checkbox"/>	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
<input type="checkbox"/>	Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.	N/A
<input type="checkbox"/>	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

<input checked="" type="checkbox"/>	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
<input checked="" type="checkbox"/>	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
<input type="checkbox"/>	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	N/A
<input checked="" type="checkbox"/>	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.	Section 5.2
<input checked="" type="checkbox"/>	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
<input checked="" type="checkbox"/>	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
<input type="checkbox"/>	Set-back from private sewage disposal systems.	N/A
<input type="checkbox"/>	Watercourse and hazard lands setbacks.	N/A
<input checked="" type="checkbox"/>	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
<input type="checkbox"/>	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
<input checked="" type="checkbox"/>	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
<input type="checkbox"/>	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
<input checked="" type="checkbox"/>	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.	Section 5.1, 5.3
<input type="checkbox"/>	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
<input type="checkbox"/>	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	Identification of potential impacts to receiving watercourses	N/A
<input type="checkbox"/>	Identification of municipal drains and related approval requirements.	N/A

<input checked="" type="checkbox"/>	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
<input type="checkbox"/>	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
<input type="checkbox"/>	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
<input type="checkbox"/>	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	N/A
<input type="checkbox"/>	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.	N/A
<input type="checkbox"/>	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

<input checked="" type="checkbox"/>	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.	Section 1.2
<input type="checkbox"/>	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
<input type="checkbox"/>	Changes to Municipal Drains.	N/A
<input type="checkbox"/>	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

<input checked="" type="checkbox"/>	Clearly stated conclusions and recommendations	Section 7.0
<input type="checkbox"/>	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.	
<input type="checkbox"/>	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

Robert Freel

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: October-08-15 3:39 PM
To: Robert Freel
Subject: RE: 320 McRae Ave - RVCA

Hello Bobby, Our mapping shows that the stormsewer from McRae Avenue connects with the transit way sewer, travelling south-east for 200 metres then turning and travelling back north-west until turning north up Northwestern where it eventually outlets to the Ottawa River. Given the distance and the nature of the site (mainly rooftops and landscaping area), the RVCA does not advise additional quality controls are required for the protection of surface water quality in the receiving watercourse. Thanks for contacting me, Jocelyn

Jocelyn Chandler M.Pl. MCIP, RPP

Planner, RVCA

t) 613-692-3571 x1137

f) 613-692-0831

jocelyn.chandler@rvca.ca

www.rvca.ca

mail: Box 599 3889 Rideau Valley Dr., Manotick, ON K4M 1A5

courier: 3889 Rideau Valley Dr., Nepean, ON K2C 3H1

This message may contain information that is privileged or confidential and is intended for the use of the individual(s) or entity named above. This material may contain confidential or personal information which may be subject to the provisions of the Municipal Freedom of Information & Protection of Privacy Act. If you are not the intended recipient of this email, any use, review, revision, retransmission, distribution, dissemination, copying, printing or otherwise use of, or taking any action in reliance upon this email, is strictly prohibited. If you have received this email in error, please contact the sender and delete the original and any copy of the email and any print out thereof, immediately. Your cooperation is appreciated.

From: Robert Freel [<mailto:rffreel@dsel.ca>]
Sent: Thursday, October 08, 2015 10:35 AM
To: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Subject: 320 McRae Ave - RVCA

Hi Jocelyn,

As discussed we are working on a project at 320 McRae Avenue. Please find attached a conceptual site plan, the runoff directed to the sewer system will be predominately roof area. Can you provide any quality criteria required for the site.

Please feel free to give me a call if you have any questions.

Thank you,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

Alison Gosling

From: Robert Freel <rfreel@dsel.ca>
Sent: December-08-15 10:09 AM
To: agosling@dsel.ca
Subject: FW: 320 McRae - Boundary condition request
Attachments: 320 McRae Oct 2015.pdf

Follow Up Flag: Follow up
Flag Status: Completed

We will also need to incorporate these boundary conditions into our report.

Thanks,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.558
cell: (613) 314-7675
email: rfreel@DSEL.ca

This email, including any attachments, is for the sole use of the intended recipient(s) and may contain private, confidential, and privileged information. Any unauthorized review, use, disclosure, or distribution is prohibited. If you are not the intended recipient, or if this information has been inappropriately forwarded to you, please contact the sender by reply email and destroy all copies of the original.

From: White, Joshua [mailto:Joshua.White@ottawa.ca]
Sent: November-02-15 9:39 AM
To: 'Robert Freel'
Subject: RE: 320 McRae - Boundary condition request

Hi Bobby,

Please find the boundary conditions below. If you have any questions please don't hesitate to ask

Josh

The following are boundary conditions, HGL, for hydraulic analysis at 320 McRae (zone 1W) assumed to be connected to the 203mm on Scott and 203mm on Mcrae (see attached PDF for locations).

Minimum HGL = 108.3m (same for all three connections)

Maximum HGL = 117.4m (same for all three connections)

Connection 1

Available Flow assuming a residual of 20 psi and a ground elevation of 63.6m = 457 L/s

Connection 2

Available Flow assuming a residual of 20 psi and a ground elevation of 63.3m = 450 L/s

Connection 3

Available Flow assuming a residual of 20 psi and a ground elevation of 63.3m = 395 L/s

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: Robert Freel [<mailto:rfreel@dsel.ca>]
Sent: Wednesday, October 28, 2015 2:54 PM
To: White, Joshua
Subject: RE: 320 McRae - Boundary condition request

Hi Josh,

Just wanted to follow up on the boundary request below.

Thanks,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.558
cell: (613) 314-7675
email: rfreel@DSEL.ca

This email, including any attachments, is for the sole use of the intended recipient(s) and may contain private, confidential, and privileged information. Any unauthorized review, use, disclosure, or distribution is prohibited. If you are not the intended recipient, or if this information has been inappropriately forwarded to you, please contact the sender by reply email and destroy all copies of the original.

From: Robert Freel [<mailto:rfreel@dsel.ca>]
Sent: September-14-15 5:04 PM
To: 'White, Joshua'
Subject: 320 McRae - Boundary condition request

Good afternoon Josh,

We would like to request water boundary conditions for 320 McRae using the following proposed development demands:

1. Location of Service / Street Number: 320 McRae Avenue
2. Type of development and the amount of fire flow required for the proposed development:
 - Proposed development is a mixed use residential/commercial. 280 residential units and 3030 m² of commercial space is proposed.
 - It is anticipated that the development will have a dual connection to be services from the existing 200mm diameter watermain within Scott Street and McRae Ave, as shown by the attached map a combination of connections would likely be used.
 - Fire demand based on FUS will be used to calculate fire demand, sufficient information is unavailable at this time to complete a calculation we would request that the available fire flow at 140 kPa be provided for later comparison.

3.

	L/min	L/s
Avg. Daily	131.8	2.20
Max Day	320.2	5.34
Peak Hour	698.8	11.65

It you have any questions please feel free to contact me.



Thank you,

Bobby Freel, P.Eng.

DSEL

david schaeffer engineering ltd.

120 Iber Road, Unit 203
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.258

cell: (613) 314-7675

email: rfreel@DSEL.ca

This email, including any attachments, is for the sole use of the intended recipient(s) and may contain private, confidential, and privileged information. Any unauthorized review, use, disclosure, or distribution is prohibited. If you are not the intended recipient, or if this information has been inappropriately forwarded to you, please contact the sender by reply email and destroy all copies of the original.

This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

Le présent courriel a été expédié par le système de courriels de la Ville d'Ottawa. Toute distribution, utilisation ou reproduction du courriel ou des renseignements qui s'y trouvent par une personne autre que son destinataire prévu est interdite. Je vous remercie de votre collaboration.

APPENDIX B

Water Supply

1979 Scott Street | 320 McRae Avenue
 Scott Street Building
 Proposed Site Conditions

Water Demand Design Flows per Unit Count
 City of Ottawa - Water Distribution Guidelines, July 2010



Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	188	339

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	339	118.7	82.4	356.0	247.2	533.9	370.8

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	1,209	3.02	2.1	4.5	3.1	8.2	5.7
Office	75 L/9.3m ² /d	1,041	8.40	5.8	12.6	8.7	22.7	15.7
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			11.4	7.9	17.1	11.9	30.8	21.4
Total Demand			130.1	90.3	373.1	259.1	564.8	392.2

1979 Scott Street | 320 McRae Avenue
McRae Avenue Building
Proposed Site Conditions

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010



Domestic Demand

Type of Housing	Per / Unit	Units	Pop							
Single Family	3.4		0							
Semi-detached	2.7		0							
Townhouse	2.7		0							
Apartment			0							
Bachelor	1.4		0							
1 Bedroom	1.4		0							
2 Bedroom	2.1		0							
3 Bedroom	3.1		0							
Average	1.8	54	98							
				Pop	Avg. Daily		Max Day		Peak Hour	
					m³/d	L/min	m³/d	L/min	m³/d	L/min
Total Domestic Demand				98	34.3	23.8	168.1	116.7	253.8	176.3

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	846	2.12	1.5	3.2	2.2	5.7	4.0
Office	75 L/9.3m ² /d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000 L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			2.1	1.5	3.2	2.2	5.7	4.0
Total Demand			36.4	25.3	171.2	118.9	259.5	180.2

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

**Fire Flow Required****1. Base Requirement**

$$F = 220C\sqrt{A} \text{ L/min} \quad \text{Where } F \text{ is the fire flow, } C \text{ is the Type of construction and } A \text{ is the Total floor area}$$

Type of Construction: **Non-Combustible Construction**

C 0.8 Type of Construction Coefficient per FUS Part II, Section 1
A 15307.4 m² Total floor area based on FUS Part II section 1

Fire Flow	21775.3 L/min
	22000.0 L/min rounded to the nearest 1,000 L/min

Adjustments**2. Reduction for Occupancy Type****Limited Combustible** -15%

Fire Flow	18700.0 L/min
------------------	----------------------

3. Reduction for Sprinkler Protection**Sprinklered** -50%

Reduction	-9350 L/min
------------------	--------------------

4. Increase for Separation Distance

N 30.1m-45m 5%
S 0m-3m 25%
E 20.1m-30m 10%
W >45m 0%

% Increase	40%	value not to exceed 75% per FUS Part II, Section 4
-------------------	------------	--

Increase	7480.0 L/min
-----------------	---------------------

Total Fire Flow

Fire Flow	16830.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	17000.0 L/min	rounded to the nearest 1,000 L/min

Notes:

- Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
- Calculations based on Fire Underwriters Survey - Part II

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

**Fire Flow Required****1. Base Requirement**

$$F = 220C\sqrt{A} \text{ L/min} \quad \text{Where } F \text{ is the fire flow, } C \text{ is the Type of construction and } A \text{ is the Total floor area}$$

Type of Construction: **Non-Combustible Construction**

C 0.8 Type of Construction Coefficient per FUS Part II, Section 1
A 2122.5 m² Total floor area based on FUS Part II section 1

Fire Flow	8108.4 L/min
	8000.0 L/min rounded to the nearest 1,000 L/min

Adjustments**2. Reduction for Occupancy Type****Limited Combustible** -15%

Fire Flow	6800.0 L/min
------------------	---------------------

3. Reduction for Sprinkler Protection**Sprinklered** -50%

Reduction	-3400 L/min
------------------	--------------------

4. Increase for Separation Distance

N 10.1m-20m 15%
S 3.1m-10m 20%
E 30.1m-45m 5%
W 3.1m-10m 20%

% Increase	60%	value not to exceed 75% per FUS Part II, Section 4
-------------------	------------	--

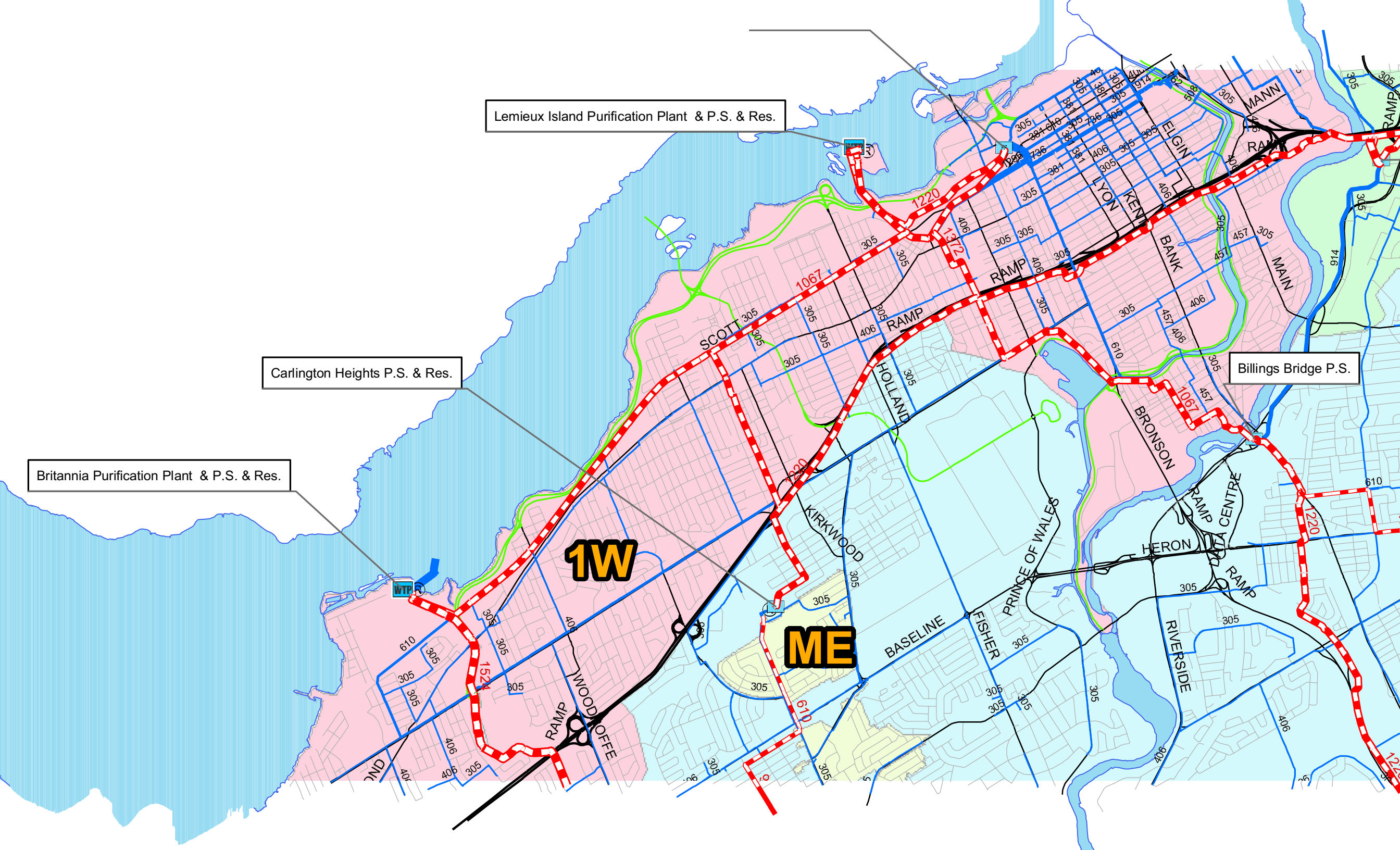
Increase	4080.0 L/min
-----------------	---------------------

Total Fire Flow

Fire Flow	7480.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4
	7000.0 L/min	rounded to the nearest 1,000 L/min

Notes:

- Type of construction, Occupancy Type and Sprinkler Protection information provided by _____.
- Calculations based on Fire Underwriters Survey - Part II



Lemieux Island Purification Plant & P.S. & Res.

Carlington Heights P.S. & Res.

Britannia Purification Plant & P.S. & Res.

Billings Bridge P.S.

1W

ME

APPENDIX C

Wastewater Collection

**Existing Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004**



Site Area 0.553 ha

Extraneous Flow Allowances

Infiltration / Inflow 0.15 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4	2	7
Semi-detached and duplex	2.7		0
Duplex	2.3		0
Townhouse	2.7		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0
Total Pop			7
Average Domestic Flow			0.03 L/s
Peaking Factor			4
Peak Domestic Flow			0.11 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	1,563	0.18
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00
Average I/C/I Flow			0.18
Peak Institutional / Commercial Flow			0.27
Peak Industrial Flow**			0.00
Peak I/C/I Flow			0.27

* assuming a 12 hour commercial operation

** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B

Total Estimated Average Dry Weather Flow Rate	0.21 L/s
Total Estimated Peak Dry Weather Flow Rate	0.38 L/s
Total Estimated Peak Wet Weather Flow Rate	0.54 L/s

**Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004**



Site Area 0.276 ha

Extraneous Flow Allowances

Infiltration / Inflow 0.08 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	188	339
Total Pop			339
Average Domestic Flow			1.37 L/s
Peaking Factor			4.00
Peak Domestic Flow			5.49 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	1,209	0.14
Office	75 L/9.3m ² /d	1,041	0.90
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00
Average I/C/I Flow			1.04
Peak Institutional / Commercial Flow			1.57
Peak Industrial Flow**			0.00
Peak I/C/I Flow			1.57

* assuming a 12 hour commercial operation

** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B

Total Estimated Average Dry Weather Flow Rate	2.42 L/s
Total Estimated Peak Dry Weather Flow Rate	7.06 L/s
Total Estimated Peak Wet Weather Flow Rate	7.14 L/s

**Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2004**



Site Area 0.276 ha

Extraneous Flow Allowances

Infiltration / Inflow 0.08 L/s

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8	54	98
Total Pop			98
Average Domestic Flow			0.40 L/s
Peaking Factor			4.00
Peak Domestic Flow			1.59 L/s

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 L/m ² /d	846	0.10
Office	75 L/9.3m ² /d		0.00
School	70 L/student/d		0.00
Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Heavy**	55,000 L/gross ha/d		0.00
Average I/C/I Flow			0.10
Peak Institutional / Commercial Flow			0.15
Peak Industrial Flow**			0.00
Peak I/C/I Flow			0.15

* assuming a 12 hour commercial operation

** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B

Total Estimated Average Dry Weather Flow Rate	0.49 L/s
Total Estimated Peak Dry Weather Flow Rate	1.73 L/s
Total Estimated Peak Wet Weather Flow Rate	1.81 L/s

SANITARY SEWER CALCULATION SHEET

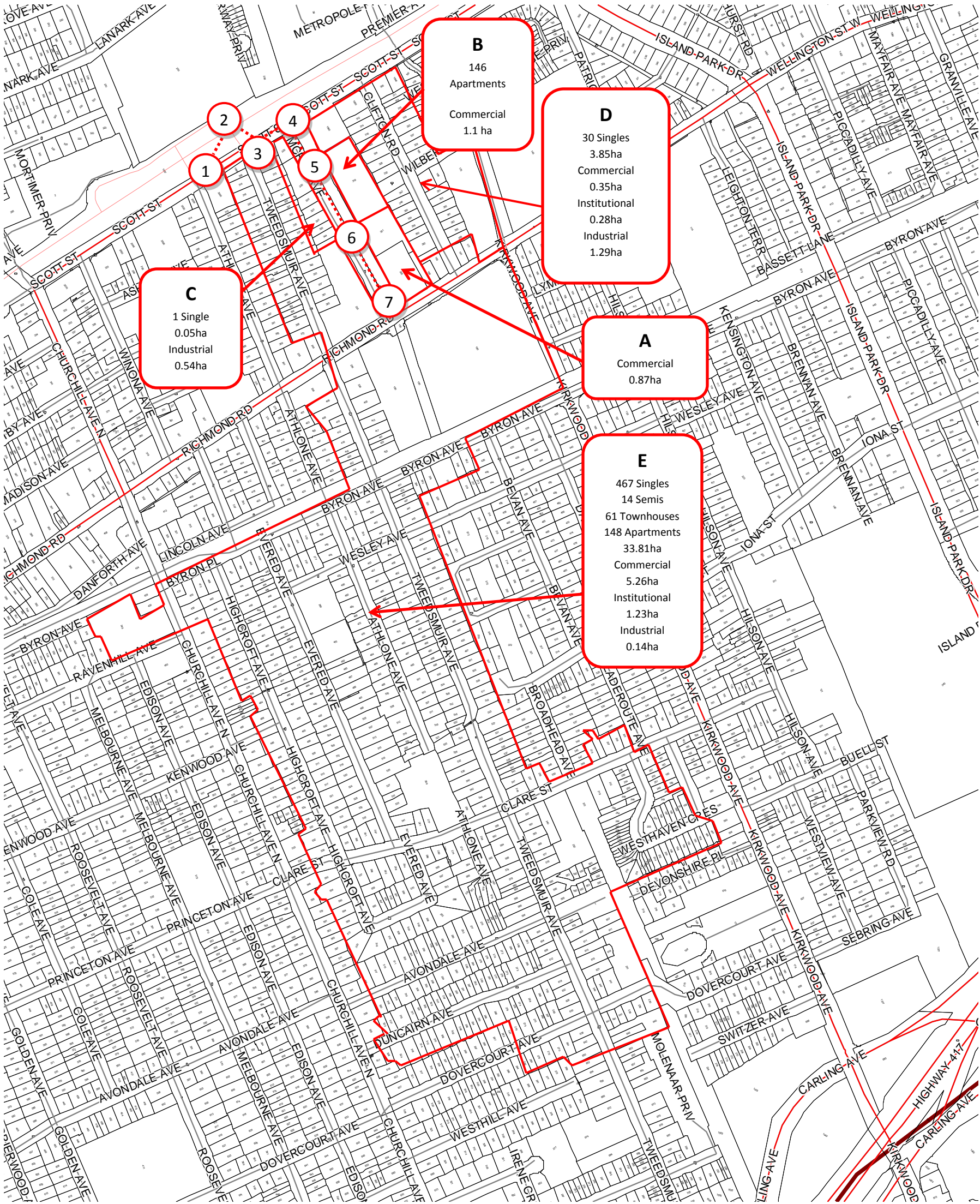
PROJECT: MaCrae Road
LOCATION: MaCrae Road - Ottawa
FILE REF: 14-752
DATE: 02-Oct-15

DESIGN PARAMETERS
Avg. Daily Flow Res. 350 L/p/d
Avg. Daily Flow Comm 50,000 L/ha/d
Avg. Daily Flow Instit. 50,000 L/ha/d
Avg. Daily Flow Indus 35,000 L/ha/d
Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0
Peak Fact. Comm. 1.5
Peak Fact. Instit. 1.5
Peak Fact. Indust. per MOE graph
Infiltration / Inflow 0.28 L/s/ha
Min. Pipe Velocity 0.60 m/s full flowing
Max. Pipe Velocity 3.00 m/s full flowing
Mannings N 0.013



Location			Residential Area and Population										Commercial		Institutional		Industrial		Q _{C+I+I}	Infiltration			Total Flow	Pipe Data							
Area ID	Up	Down	Area	Number of Units by type				Pop.	Area	Pop.	Peak Fact.	Q _{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area		Total Area	Accu. Area	Infiltration Flow		DIA	Slope	Length	A _{hydraulic}	R	Velocity	Q _{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(mm)	(%)	(m)	(m ²)	(m)	(m/s)	(L/s)	(-)	
A								0.0	0.000	0.0	4.00	0.00	0.99	0.99		0.00		0.00	0.9	0.990	0.990	0.277									
B	5	4	0.000				146	263.0	0.000	263.0	4.00	4.26	1.10	2.09		0.00		0.00	1.8	1.102	2.092	0.586	225	0.28	88.5	0.040	0.056	0.60	23.8	0.28	
C			0.600	7				24.0	0.600	287.0	4.00	4.65		2.09		0.00		0.00	1.8	0.600	2.692	0.754									
D			0.000					0.0	0.600	287.0	4.00	4.65	0.60	2.69		0.00		0.00	2.3	0.600	3.292	0.922									
E	4	3	0.000					0.0	0.600	287.0	4.00	4.65	0.33	3.02		0.00		0.00	2.6	0.330	3.622	1.014	225	0.28	82.5	0.040	0.056	0.60	23.8	0.35	
	3	2	0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014	225	0.28	92.0	0.040	0.056	0.60	23.8	0.35	
	2	1	0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014	225	0.28	48.5	0.040	0.056	0.60	23.8	0.35	
			0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014									
			0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014									
			0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014									
			0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014									
			0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014									
			0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014									
Subject Lands			0.000					0.0	0.600	287.0	4.00	4.65		3.02		0.00		0.00	2.6	0.000	3.622	1.014									
																			2.6	0.000	3.622	1.014									

McRae Road – Sanitary Map



WEST NEPEAN
COLLECTOR

PRESTON STREET
SEWER

WOODROFFE
COLLECTOR

APPENDIX D

Stormwater Management

Existing Conditions
1976 Scott Street | 320 McRae Avenue

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2012



Existing Drainage Characteristics From Internal Site

Area	0.3300 ha
C	0.85 Rational Method runoff coefficient
L	72.5 m
Up Elev	65.05 m
Dn Elev	63.02 m
Slope	2.8 %
Tc	4.9 min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1 - C)L^{0.5}}{S^{0.333}}$$

tc, in minutes

C, rational method coefficient, (-)

L, length in ft

S, average watershed slope in %

Estimated Peak Flow

	2-year	5-year	100-year
i	104.1	142.0	244.1 mm/hr
Q	81.1	110.6	223.7 L/s

Proposed Conditions
1976 Scott Street | 320 McRae Avenue

Stormwater - Proposed Development
 City of Ottawa Sewer Design Guidelines, 2012



Target Flow Rate

Area 0.53 ha
 C 0.50 Rational Method runoff coefficient
 t_c 20.0 min

2-year

i 52.0 mm/hr
 Q 38.0 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.05 ha
 C 0.60 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
10.0	104.2	9.1	9.1	0.0	0.0	178.6	19.6	19.6	0.0	0.0

Note:

C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Total Area 0.47 ha
 C 0.90 Rational Method runoff coefficient

t _c (min)	5-year					100-year				
	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
10	104.2	123.3	9.7	113.6	68.2	178.6	234.8	18.4	216.4	129.8
15	83.6	98.9	9.7	89.2	80.3	142.9	187.9	18.4	169.5	152.5
20	70.3	83.1	9.7	73.4	88.1	120.0	157.7	18.4	139.3	167.1
25	60.9	72.1	9.7	62.3	93.5	103.8	136.6	18.4	118.1	177.2
30	53.9	63.8	9.7	54.1	97.3	91.9	120.8	18.4	102.4	184.3
35	48.5	57.4	9.8	47.7	100.1	82.6	108.6	18.4	90.1	189.3
40	44.2	52.3	9.8	42.5	102.1	75.1	98.8	18.4	80.4	192.9
45	40.6	48.1	9.8	38.3	103.5	69.1	90.8	18.4	72.4	195.4
50	37.7	44.6	9.8	34.8	104.4	64.0	84.1	18.4	65.7	197.0
55	35.1	41.6	9.8	31.8	104.9	59.6	78.4	18.4	60.0	197.9
60	32.9	39.0	9.8	29.2	105.1	55.9	73.5	18.4	55.1	198.2
65	31.0	36.7	9.8	27.0	105.1	52.6	69.2	18.4	50.8	198.1
70	29.4	34.8	9.8	25.0	104.9	49.8	65.5	18.4	47.0	197.5
75	27.9	33.0	9.8	23.2	104.4	47.3	62.1	18.4	43.7	196.6
80	26.6	31.4	9.8	21.6	103.9	45.0	59.2	18.4	40.7	195.4
85	25.4	30.0	9.8	20.2	103.1	43.0	56.5	18.4	38.0	194.0
90	24.3	28.7	9.8	18.9	102.3	41.1	54.1	18.4	35.6	192.3
95	23.3	27.6	9.8	17.8	101.3	39.4	51.9	18.4	33.4	190.4
100	22.4	26.5	9.8	16.7	100.2	37.9	49.8	18.4	31.4	188.4
105	21.6	25.5	9.8	15.7	99.1	36.5	48.0	18.4	29.5	186.2
110	20.8	24.6	9.8	14.8	97.8	35.2	46.3	18.4	27.8	183.8

Note:

C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

5-year Q_{attenuated}	9.78 L/s	100-year Q_{attenuated}	18.44 L/s
5-year Max. Storage Required	105.1 m³	100-year Max. Storage Required	198.2 m³

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m ³)	100-Year Release Rate (L/s)	100-Year Storage (m ³)
Unattenuated Areas	9.13	0.0	19.57	0.0
Attenuated Areas	9.78	105.1	18.44	198.2
Total	18.9	105.14	38.01	198.2

DRAWINGS / FIGURES

