FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT STUDY

FOR

MORGUARD
350 SPARKS STREET

CITY OF OTTAWA

PROJECT NO.: 15-779

JUNE 2015 – REV 1

FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT STUDY
FOR
MORGUARD
350 SPARKS STREET

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Functional Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 350 Sparks Street.

The subject property is located within the City of Ottawa urban boundary, in the Somerset ward. As illustrated in ***Figure 1***, the subject property is bounded by Sparks Street to the North, Queen Street to the South, Lyon Street to the East and Bay Street to the West.

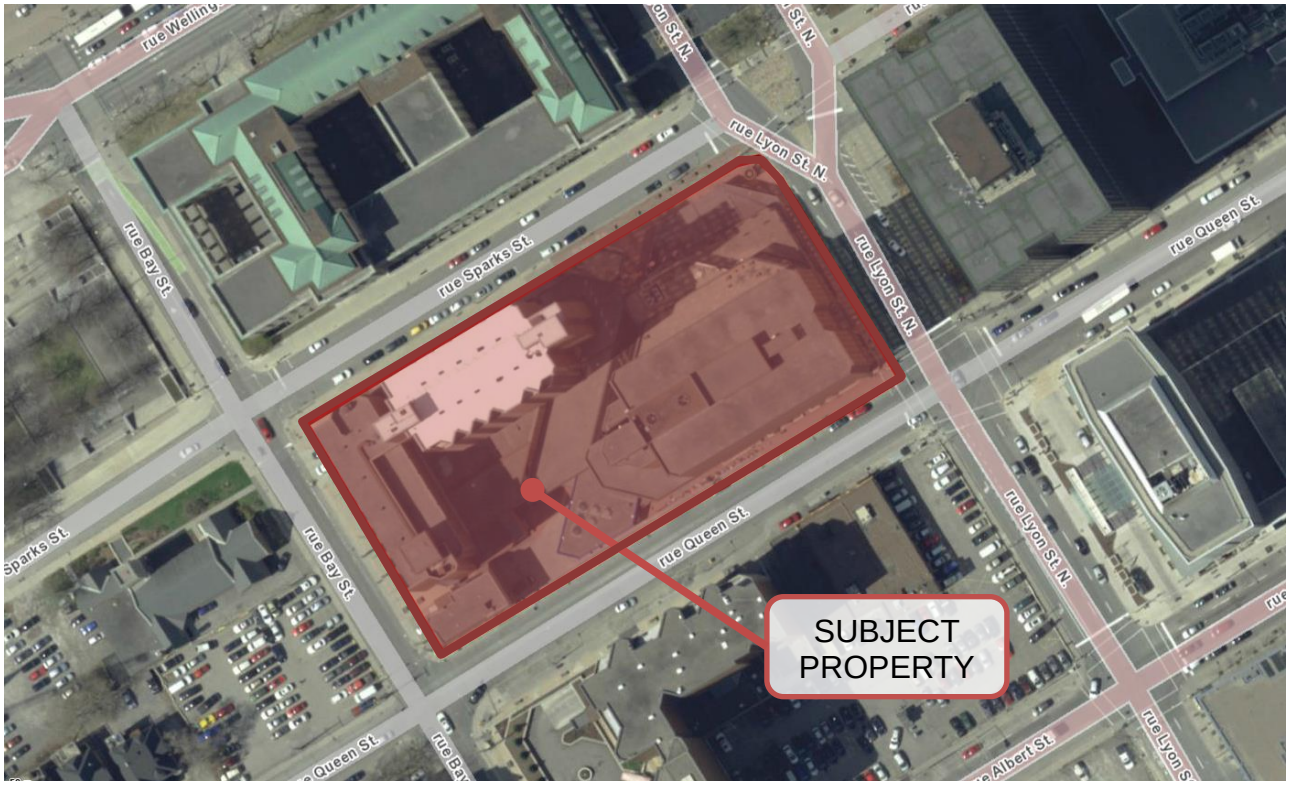

Figure 1: Site Location

The subject property currently contains an existing hotel tower and office tower connected via a podium level. The overall site measures approximately ***0.746 ha***. The proposed development will redevelop ***0.462 ha*** of the site. Under the City of Ottawa Zoning By-law the existing lands are currently designated Mixed-Use Downtown Zone (MD).

The proposed development involves the construction of a ***24-storey*** residential tower and a ***26-Storey*** hotel tower with ground level retail and underground parking. The existing 12-Storey Office tower located on the east side of the subject property will remain; a podium level will connect the towers. A site plan, prepared WZMH Architects, illustrating the proposed development layout is included in the ***Drawings/Figures*** section at the back of this report.

The objective of this report is to support the application for SPC by providing sufficient detail to demonstrate that the proposed development is supported by existing municipal servicing infrastructure and that the site design conforms to current City of Ottawa design standards.

1.1 Existing Conditions

Stantec Geomatics Ltd. prepared a topographic survey of the subject property on June 4th, 2015, a reduced copy of the survey is included in ***Drawings/Figures***.

Sewer and watermain mapping, along with as-recorded and UCC drawings collected from the City of Ottawa indicate that the following services and utilities exist across the property frontages within the respective adjacent municipal right-of-ways:

Watermains:

- 200 mm diameter ductile iron watermain within Bay Street
- 300 mm diameter unlined cast iron watermain within Bay Street
- 200 mm diameter PVC watermain within Sparks Street
- 200 mm diameter watermain within Lyon Street
- 300 mm diameter unlined cast iron watermain within Queen Street

Storm Sewers:

- 375 mm diameter PVC sewer located within Bay Street
- 375 mm diameter PVC sewer located within Sparks Street
- 450 mm diameter concrete sewer located within Lyon Street

Sanitary Sewers:

- 250 mm diameter concrete sewer located within Bay Street
- 250 mm diameter PVC sewer located within Sparks Street
- 375 mm diameter concrete sewer located within Lyon Street
- 300 mm diameter sewer located within Queen Street (to be confirmed)

Utilities:

- 404 mm underground hydro duct bank is located adjacent to the property within Spark Street, clearances in accordance with the utility having jurisdiction apply
- Overhead hydro lines run across the frontages of the subject property along the Bay Street
- Underground gas, hydro, and telecommunications lines are located along the frontages of Bay, Sparks, Lyon and Queen Streets, clearances in accordance with the utility having jurisdiction apply

1.2 Required Permits / Approvals

Development of the site is subject to the City of Ottawa Planning and development approvals process. The City of Ottawa must approve detailed engineering design drawings and reports prepared to support the proposed development plan, prior to the issuance of site plan control.

1.3 Pre-consultation

Pre-Consultation with the City of Ottawa and RVCA was conducted via email for the proposed development.

Pre-consultation correspondence, along with the servicing guidelines checklist, are 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, 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 ISDTD-2014-2**
    City of Ottawa, May 27, 2014.
    (*ISDTD-2014-2*)

- **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 1W pressure zone, as shown by the Pressure zone map included in ***Appendix B***.

The site is serviceable via either of the existing 200 mm diameter watermains on Sparks Street or Bay Street in addition to the 300 mm diameter watermain within Queen Street.

3.2 Water Supply Servicing Design

Each of the towers are proposed to be serviced via independent connections; redundant service connections will be provided due to an anticipated design flow of greater than 50 m^3/day in accordance with City of Ottawa technical bulletin ISDTB-2014-02.

The existing office tower to remain will maintain the existing service connections to Queen street as shown by ***EX-1***.

The residential tower is proposed to be serviced via 200 mm diameter service connections to the existing 200 mm diameter municipal watermains within Sparks Street and Bay Street, as shown by ***SSGP-1***.

The hotel tower is proposed to be serviced via 200 mm diameter service connections to the existing 200 mm diameter and 300 mm diameter municipal watermains within Bay Street and Queen Street respectively, as shown by ***SSGP-1***.

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

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 Peaking Factor	3.0 x Average Daily **
Residential Peak Hour Peaking Factor	4.5 x Average Daily **
Hotel	225 L/bed-space/d
Restaurant	125 L/seat/d
Commercial Floor Space	2.5 L/m^2/d
Commercial Maximum Daily Demand	1.5 x Average Daily
Commercial Maximum Hourly	1.8 x Maximum Daily
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa

During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa

Daily average based on Appendix 4-A from **City Standards*
*** 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
Water Demand and Boundary Conditions
Proposed Conditions – Hotel Tower

Design Parameter	Anticipated Demand[1] (L/min)	Sparks Street - Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	128.5	47.2 / 463.0
Max Day + Fire Flow	192.7 + 17,000= 17,192.7	29,100 @ 140 kPa
Peak Hour	346.9	35.1 / 344.3

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa. Assumed ground elevation 71.9m. See ***Appendix B.***

Table 3
Water Demand and Boundary Conditions
Proposed Conditions – Residential Tower

Design Parameter	Anticipated Demand[1] (L/min)	Bay Street - Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	105.5	46.9 / 460.1
Max Day + Fire Flow	316.5 + 17,000 = 17,316.5	29,160 @ 140 kPa
Peak Hour	474.7	34.8 / 341.4

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa. Assumed ground elevation 72.2m. See ***Appendix B.***

Table 2 and ***Table 3*** summarize the anticipated water supply, demand and boundary conditions for the proposed development based on the ***Water Supply Guidelines*** and site boundary conditions supplied by the City of Ottawa. Refer to ***Appendix B*** for correspondence and calculations.

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 - Ordinary Construction
- Occupancy type –Combustible
- 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. A certified fire protection system specialist will 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 for the demands as indicated in the correspondence in ***Appendix A***. During periods of average daily demand water pressures fall within the City's desired pressure range (between 350 kPa and 480 kPa) at the ground floor level. During periods of peak hour demand water pressures is above the City's normal operating pressure (275 kPa) at the ground floor level.

Based on calculations using the ***FUS*** method ***17,000 L/min*** is estimated to be required for fire protection, as illustrated by ***Table 2*** and ***Table 3*** sufficient water is available to supply the system.

3.3 Water Supply Conclusion

The City of Ottawa was contacted to obtain boundary conditions for the demands as indicated in the correspondence in ***Appendix A***; sufficient supply within the desired operating range is available to supply the proposed development.

The proposed design conforms to the relevant City of Ottawa ***Water Supply Guidelines***.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

Wastewater generated from the site is tributary to the Interceptor Sewer located at the west end of Sparks Street, as shown by the trunk sewer map included in ***Appendix C***. Sanitary flow is conveyed via either the 250 mm diameter sanitary sewer within Sparks Street or the 250 mm diameter sanitary sewer with in Bay Street.

A sanitary analysis was conducted for the local municipal sanitary sewers located within Bay Street across the frontage of the subject property in order to assess the available capacity. The analysis was conducted from the intersection of Bay Street and Queen Street to the Interceptor Sewer located at approximately the intersection of Sparks Street and Bronson Avenue, as shown by the sanitary drainage plan in ***Appendix C***.

Based on the sanitary analysis, the most restrictive leg of the sanitary network has ***18.2 L/s*** of residual capacity available. Detailed calculations are included in ***Appendix C***. The analysis contemplated design flows & peaking factors; actual contributions may be lower per *Section 4.4.2* of the ***City Standards***.

4.2 Wastewater Design

Each of the towers is proposed to be serviced via independent connections. The existing office tower to remain will maintain the existing service connections to Queen Street and Sparks Street as shown by ***EX-1***.

The residential tower is proposed to be serviced via a 250 mm diameter service connections to the existing 250 mm diameter municipal sanitary sewer within and Bay Street, as shown by ***SSGP-1***.

The proposed hotel tower is proposed to be serviced via a 250 mm diameter service connection to the existing 250 mm diameter municipal sanitary sewer within and Bay Street, as shown by ***SSGP-1***.

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

Table 4
Wastewater Design Criteria

Design Parameter	Value
Hotel	225 L/bed-space/d
Restaurant	125 L/seat/d
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 Peaking Factor	1.5 x Average Daily
Infiltration and Inflow Allowance	0.28L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 5 and ***Table 6*** demonstrate the estimated wastewater flow generation from the proposed site development. Refer to ***Appendix C*** for associated calculations.

Table 5
Summary of Estimated Peak Wastewater Flow – Hotel Tower

Design Parameter	Flow (L/s)
Average Dry Weather Flow Rate	2.72
Peak Dry Weather Flow Rate	4.08
Peak Wet Weather Flow Rate	4.19

Table 6
Summary of Estimated Peak Wastewater Flow – Residential Tower

Design Parameter	Flow (L/s)
Average Dry Weather Flow Rate	0.98
Peak Dry Weather Flow Rate	3.91
Peak Wet Weather Flow Rate	4.01

As indicated in ***Section 4.1*** the local sanitary sewers network was evaluated to determine its ability to support the proposed site development. Applicable ***City Standards*** including Figure 4.3 '*Peak Flow Design Parameters*' where utilized to generate a conservative estimate of the existing conditions within the local sanitary sewer network based on existing development. It is estimated that the local sanitary sewer system downstream of the site is currently operating at a maximum of 60% of the full flowing capacity. This results in a residual capacity in the most restrictive leg of ***18.2 L/s*** with sufficient capacity to accommodate the estimated ***8.2 L/s*** peak wastewater flow generated by the proposed development. Refer to ***Appendix C*** for a sanitary drainage plan and sanitary sewer calculation sheet.

4.3 Wastewater Servicing Conclusions

Based on a capacity analysis of the local sanitary sewer network there is sufficient capacity to accommodate the proposed development.

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

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

The site currently flows overland to existing catchbasins, which are part of the local municipally owned sewers within Sparks Street, Lyon Street, Queen Street and Bay Street, as such, approvals for the proposed development are under the approval authority of the City of Ottawa.

The subject lands are tributary to the Ottawa River within the Ottawa Central sub-watershed.

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).

The existing development does not appear to contained 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	88.7
5-year	120.3
100-year	257.8

Detailed calculations are included in ***Appendix D***.

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development are based on relevant ***City Standards*** and consultation with the City and the RVCA. It has been established that the following criteria apply:

- Allowable release rate of ***45.1 L/s*** for the site based on a Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 5-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.
- Correspondence with the RVCA indicates that an enhanced level of quality control is required for any travelled paved areas for the proposed development, correspondence is included in ***Appendix A***.

5.3 Proposed Stormwater Management System

The proposed redevelopment will affect ***0.462 ha*** of the site, in order to achieve the allowable post-development stormwater runoff release rate established in ***Section 5.2*** above, the proposed development will attenuate stormwater runoff collected from the roof and podium levels using a cistern. The cistern will be located below the P2 level ramp and outlet via pump to the storm sewer within Bay Street. Servicing details are illustrated by ***SSGP-1***.

The existing roof areas not affected by the redevelopment will maintain the existing connections to the municipal sewers.

The sizing and design of the cistern will be coordinated with the mechanical consultant at detailed design.

Table 8 shows the anticipated storage required to attenuate the site to the established release rate taking into account that a portion of the site will be release uncontrolled. Stormwater drainage areas are illustrated by ***SWM-1*** along with detailed calculations included in ***Appendix D***.

Table 8
Stormwater Flow Rate Summary

Design Storm Event	Pre-development Release Rate	Target Release Rate	Post-Dev Peak Rate	Total Required Storage
	(L/s)	(L/s)	(L/s)	(m^3)
5-year	120.3	45.1	23.8	71.0
100-year	257.8	45.1	45.1	134.3

Table 9 summarizes anticipated release rates and storage volumes.

Table 9
Stormwater Release Rate and Storage Volume 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 Area	4.0	0.0	7.7	0.0
Attenuated Area	19.8	71.0	37.4	134.3
Total	**23.8**	**71.0**	**45.1**	**134.3**

Detailed stormwater management calculations are provided in ***Appendix D***. Figure ***SWM-1*** illustrates the site drainage characteristics.

As required by the RVCA, surface runoff from the drop-off area will be directed to an oil/grit separator prior to discharge to the municipal storm sewer system. Correspondence is included in ***Appendix A***.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be restricted to the allowable target for storm events up to and including the 1:100 year storm in accordance with the City of Ottawa ***Sewer Design Guidelines***. To attenuate stormwater runoff from the 100-year storm to the 5-year release rate of ***45.1 L/s*** approximately ***170 m^3*** of storage will be provided.

The proposed stormwater design conforms to all relevant ***City Standards*** and Policies and meets the design objectives.

6.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have filter fabric installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents.

- Limit extent of exposed soils at any given time.
- Re-vegetate exposed areas as soon as possible.
- Minimize the area to be cleared and grubbed.
- Protect exposed slopes with plastic or synthetic mulches.
- Install silt fence to prevent sediment from entering existing ditches.
- No refueling or cleaning of equipment near existing watercourses.
- Provide sediment traps and basins during dewatering.
- Install filter cloth between catch basins and frames.
- Plan construction at proper time to avoid flooding.

Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

The contractor will, at every rainfall, complete inspections and guarantee proper performance. The inspection is to include:

- Verification that water is not flowing under silt barriers.
- Clean and change filter cloth at catch basins.

7.0 UTILITIES

Existing overhead hydro lines run across the frontages of the subject property along the Bay Street right-of-way.

Additionally 404mm and 100mm underground hydro duct banks are located adjacent to the property within Sparks Street and Bay Street respectively. Proposed services will cross the existing duct banks, as indicated by ***SSGP-1***; the duct banks will need to be supported in accordance with Hydro Ottawa standards.

Telecommunications and gas servicing are located within the adjacent right-of-ways. Utility service connections to the redeveloped site will need to be coordinated with the appropriate utility companies prior to construction.

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Limited (DSEL) has been retained to prepare a Functional Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 350 Sparks Street. The preceding report outlines the following:

- The City of Ottawa was contacted to obtain boundary conditions for the demands as indicated in the correspondence in ***Appendix B***, sufficient supply within the desired operating range is available to supply the proposed development;
- The existing 250mm diameter sanitary sewer on Bay Street, which outlets to the Interceptor Sewer, has adequate capacity to convey the estimated wastewater generated from the proposed development;
- To attenuate the stormwater to the established release rate of ***45.1 L/s*** it is proposed that ***170 m^3*** of cistern storage will be provided;
- Consultation with the conservation authority quality indicates that an enhanced level of quality control will be required for travelled paved areas;
- Hydro, telecommunications and gas servicing are available from the surrounding municipal rights-of-way;
- Erosion and sediment controls will be implemented prior to commencing earthworks operations onsite, and will be maintained throughout construction.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Robert D. Freel, P.Eng.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Adam D. Fobert , P.Eng

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

15-779 18/06/2015

4.1 General Content

☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	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
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	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.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	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
☒	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.	SSGP-1
☐	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
☐	Proposed phasing of the development, if applicable.	N/A
☒	Reference to geotechnical studies and recommendations concerning servicing.	Section 1.4
☒	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	SSGP-1

4.2 Development Servicing Report: Water

☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2
☒	Confirmation of adequate domestic supply and pressure	Section 3.3

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	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
☐	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
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	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
☐	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
☐	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.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	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

☒	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
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
☐	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
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	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
☒	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
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	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

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	N/A
☐	Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.	N/A
☐	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
☐	Special considerations such as contamination, corrosive environment etc.	N/A

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	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
☒	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
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
☒	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
☐	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
☒	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
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	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
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	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
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 6.0
☐	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
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	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 ct. 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
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 8.0
☐	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	

*Extracted from the City of Ottawa-Servicing Study Guidelines for Development Applications

Robert Freel

From: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Sent: April-22-15 2:13 PM
To: 'Robert Freel'
Cc: O'Connell, Erin; Mottalib, Abdul
Subject: RE: 350 Sparks Street
Attachments: ServicingGuidelines_ final_Dec2009.pdf

Hi Bobby,

Yes , Please see our requirements below:

Capacity issues for sewers

Please find the Servicing Study Guidelines" in the attachment and prepare the study accordingly. For capacity issue, please see section 3.2.1 page 3-3 and follow this section to address the capacity issue on your "Servicing Study". **A filled out checklist with corresponding references from the study is mandatory for the completeness of the serviceability study. Please add a completed checklist with the report.**

Confederation Line
Proximity Guidelines.PDF

Required information for Water boundary conditions

Please use Table 3-3 of the MOE Design Guidelines for Drinking-Water System to determine Maximum Day and Maximum Hour peaking factors for 0 to 500 persons and use Table 4.2 of the Ottawa Design Guidelines, Water Distribution for 501 to 3,000 persons.

1. Location of Service
2. Street Number
3. Type of development and units
4. The amount of fire flow required for the proposed development
5. Average daily demand:-l/s
6. Maximum daily demand:-l/s
7. Maximum hourly daily demand :-l/s

Please note Service areas with a basic day demand greater than 50m^3/day shall be connected with a minimum of two feedermains to avoid the creation of a vulnerable service area.

Utility conflict with the proposed servicing

- It is the consultant's sole responsibility to investigate the existing utilities in the proposed servicing area while preparing the Servicing and Grading Plans to avoid any conflict with the proposed services and will require a note stating this on the servicing plan.

SWM Criteria for the Catchment Area of the site being redeveloped: (Quantity control criteria)

Stormwater Management criteria for the City separated storm sewer system (please note if the separated storm sewer ultimately drains into combined sewer then please use combined sewer criteria as draining to the combined sewer would require MOE application)

- Allowable release rate will be 5 year pre-development rate.
- C Coefficient of runoff will need to be determined **as per existing conditions** but in no case more than 0.5
- TC =20 minutes or can be calculated ,
- TC should not be less than 10 minute, since the IDF curves become unrealistic less than 10min.
- Any storm events greater than 5 year, up to 100 year, and including 100 year storm events need to be stored on site.

In addition

If a receiving creek/stream has specific SWM criteria that will supersede the SWM criteria for separated sewer system.

Stormwater management criteria (Quality Control Issues)
It is consultant's responsibility to check with the Rideau Valley Conservation Authority (RVCA) for quality control issues. Please contact Jocelyn Chandler at the RVCA for further information.

Jocelyn Chandler M.Pl. MCIP, RPP.
Planner, RVCA
613.692.3571 x1137
jocelyn.chandler@rvca.ca

Underground and above ground building footprints
All underground and above ground building footprints and permanent walls need to be shown on the plan to confirm that any permanent structure does not extend either above or below into the existing property lines, sight triangles and/or future road widening protection limits.

Grade limitations for underground ramps
Underground ramps should be limited to a 12% grade and must contain a subsurface melting device when exceeding 6%. Ramp grades greater than 15% can be psychological barriers to some drivers. If the ramp's break over slope exceeds 8%, a vertical-curve transition or a transition slope of half the ramp slope should be used.

Monitoring MHs

Onsite Monitoring MHs are required for sewers (sanitary and storm) if there will be commercial component with the residential development.

Sight Triangle and Road widening requirement (By Transportation Project Manager Mr. Wally Dubyk)

MOECC SWM Requirement:

- Multiple parcels require an MOE application

MOECC Other Requirements:

- If the propose land use generate stationary noise from heating, ventilating and air conditioning (HVAC) equipment, rotating machinery, generator, etc

Sidewalk Condition/Requirement: By Transportation Project Manager Mr. Wally Dubyk

Fire Route and Existing Fire hydrant

Please show proposed fire route and existing fire hydrant on the plan.

Relevant information

1. The following documents are available for purchase from the City of Ottawa (Contact Charmaine Drouin at (613) 580-2424 x.13521 Charmaine.Drouin@ottawa.ca)
   - ⇨ Sewer Design Guidelines
   - ⇨ Water Distribution Design Guidelines
   - ⇨ Standard Tender Documents (Includes the City Standard Drawings & Specifications)

2. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or by phone at (613) 580-2424 x.44455).

Thanks,

Abdul Mottalib, P. Eng.

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: April 22, 2015 11:30 AM
To: Mottalib, Abdul
Subject: RE: 350 Sparks Street

Thanks Abdul,

Does the City have any specific quantity requirements for the site in terms of stormwater. From our investigation it appears that the storm is separated to the outlet.

We have discussed quality with RVCA, they indicated that due to distance to the outlet quality control will be required for any parking lot runoff.

Thanks,

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

From: Mottalib, Abdul [mailto:Abdul.Mottalib@ottawa.ca]
Sent: April-17-15 11:11 AM

To: 'Robert Freel'
Cc: O'Connell, Erin; Mottalib, Abdul
Subject: RE: 350 Sparks Street

Hi Bobby,

Yes, I am the Project Manager for this site. I did a look at your email below. Bullet number 1, 2 and 3 are good.

For storm connection
I would request you that you investigate the capacity of the storm sewer system form the proposed development up to the outlet.

For sanitary connection
Please investigate the sanitary sewer capacity up to the collector and also connection details into the collector.

For water

Lyon Street, Sparks Street and Bay Street all have 200mm water main but Queen Street has 400mm water main. I believe the water demand for this site will be more than 50cm/day and in that case you need to have two connections for this site. You can consider one connection into Queen Street water main.

Queen Street

As per Arc Explorer Map, I do not see any storm sewer on Queen Street. I do not have futher information regarding Queen Street reconstruction now.

For LRT, I would request you please send me the specific information that you are looking from the LRT, so that I can be able to send your request to the concerned unit.

Thanks,

Abdul Mottalib, P. Eng.

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: April 16, 2015 10:54 AM
To: Mottalib, Abdul
Subject: FW: 350 Sparks Street

Hi Abdul,

Can you assist with the project at 350 Sparks Street Erin O`Connell mentioned that John might be working on this project however he mentioned that you would be the likely contact.

The email below summarizes the information we are looking to get City feedback on.

Please let me know if you have any questions.

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

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: April-08-15 3:46 PM
To: John Wu (John.Wu@ottawa.ca)
Subject: 350 Sparks Street

Good afternoon John,

Erin indicated you would be working on the project at 350 Sparks Street.

We have requested background information from the information centre to determine what services are available to service the development. Below is a summary of the information we have gathered, if you have additional information please feel free to let us know.

- Sanitary sewers within Bay and Sparks Streets are tributary to the Interceptor Sewer within Wellington (As built drawings seem to indicate the local sewers are connected to the Interceptor sewer at Sparks Street via Wellington);
- Storm Sewers within Sparks and Bay Streets outlet to the Ottawa River (approximately 550m downstream of the site);
- Sanitary sewer within Lyon Street is tributary to the Kent Street Pull Back sewer via Slater Street.
- Storm Sewers within Lyon and Queen Street are tributary to the storm outfall within Kent street via Albert Street (approximately 790m downstream of the site).
- We will contact the RVCA to coordinated quality controls.

Unfortunately we have not been able to get as built drawings for Queen Street due to LRT work, if there is any information you could direct us to it would be appreciated.

We were not a part of the preconsultation so we are not sure if any concerns or specific criteria was discussed with regards to sanitary and storm servicing. If you could let us know if any specific criteria for the area that would be appreciated. Please feel free to contact Adam or me if you would like to discuss.

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

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Robert Freel

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: April-10-15 2:53 PM
To: Robert Freel
Subject: RE: 350 Sparks Street

Hello Bobby, I'm glad I asked to see the site plan…that is a big paved area for a downtown lot. Given the proximity of the Ottawa River (less than 600m), the RAVC will advise that enhanced quality treatment for stormwater from the travelled paved area should be implemented. As usual, quality control for roof tops is not necessary.
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

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: Thursday, April 09, 2015 5:04 PM
To: Jocelyn Chandler
Subject: 350 Sparks Street

Hi Jocelyn,

As discussed please find attached the proposed site plan for 350 Sparks Street. The existing office building on the east side of the property will remain. The west side will be redeveloped into a residential tower and hotel tower with an interconnected podium. The site will be primarily roof top area with the exception of the drop off plaza which will be for vehicular access.

Can you provide any criteria that maybe required with regards to quality.

If you would like to discuss please feel free to contact me.

Thanks,

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

APPENDIX B

Water Supply

350 Sparks Street
Proposed Site Conditions - Hotel Tower

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		0

	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	0	0.0	0.0	0.0	0.0	0.0	0.0

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5 $L/m^2/d$	267	0.67	0.5	1.0	0.7	1.8	1.3
Office	75 $L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Hotel†	225 L/bed-space/d)	303	136.35	94.7	204.5	142.0	368.1	255.7
Restaurant	125 L/seat/d	384	48.00	33.3	72.0	50.0	129.6	90.0
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	185.0	128.5	277.5	192.7	499.5	346.9
		Total Demand	**185.0**	**128.5**	**277.5**	**192.7**	**499.5**	**346.9**

†Assumed double occupancy per room
*Unit statistics and occupancy information provided by WZMH Architects

350 Sparks Street
Proposed Site Conditions - Hotel Tower

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	241	434

	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	434	151.9	105.5	455.7	316.5	683.6	474.7

Institutional / Commercial / Industrial Demand

			Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**	**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5 $L/m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Office	75 $L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Hotel†	225 L/bed-space/d)		0.00	0.0	0.0	0.0	0.0	0.0
Restaurant	125 L/seat/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	0.0	0.0	0.0	0.0	0.0	0.0
		Total Demand	**151.9**	**105.5**	**455.7**	**316.5**	**683.6**	**474.7**

†Assumed double occupancy per room
*Unit statistics and occupancy information provided by WZMH Architects

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	7272.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	18760.7	L/min	
	19000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Combustible	0%
Fire Flow	**19000.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%
Reduction	**-9500 L/min**

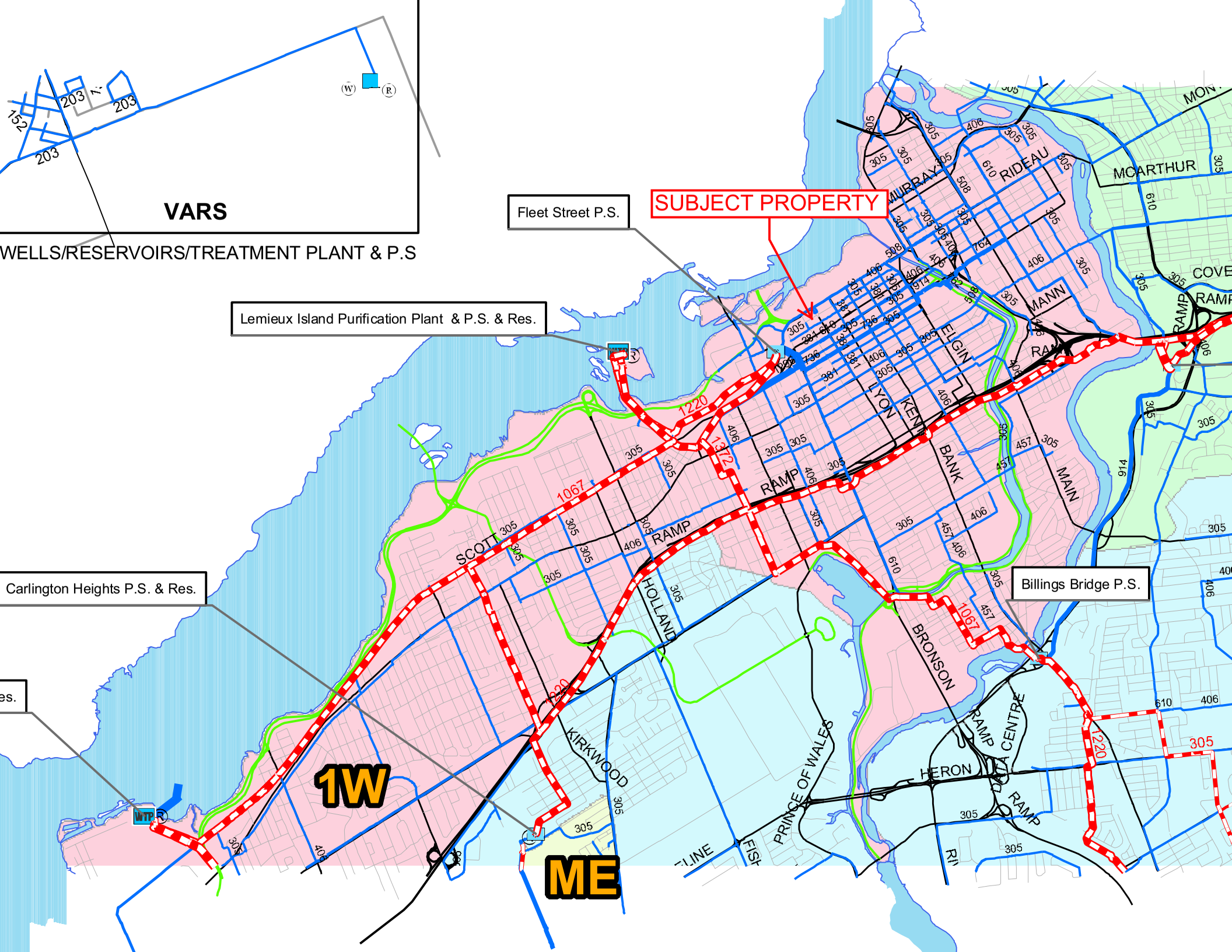
4. Increase for Separation Distance

N	20.1m-30m	10%	
S	10.1m-20m	15%	
E	30.1m-45m	5%	
W	20.1m-30m	10%	
	% Increase	**40%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**7600.0 L/min**	

Total Fire Flow

Fire Flow	17100.0	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


VARS
WELLS/RESERVOIRS/TREATMENT PLANT & P.S
SUBJECT PROPERTY
Fleet Street P.S.
Lemieux Island Purification Plant & P.S. & Res.
Carlington Heights P.S. & Res.
Billings Bridge P.S.
1W
ME
SCOTT
RAMP
HOLLAND
KIRKWOOD
BRONSON
PRINCE OF WALES
HERON
DATA CENTRE
MURRAY
RIDEAU
MCARTHUR
MANN
LYON
KENT
BANK
MAIN
1067
1220
1372

Robert Freel

From: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Sent: June-17-15 9:03 AM
To: 'Robert Freel'
Cc: Mottalib, Abdul
Subject: FW: 350 Sparks Street - Boundary condition request
Attachments: 350 Sparks June 2015.pdf

Please see below as requested.

Thanks,

Abdul Mottalib, P. Eng.

From: .....
Sent: June 16, 2015 4:09 PM
To: Mottalib, Abdul
Subject: RE: 350 Sparks Street - Boundary condition request

The following are boundary conditions, HGL, for hydraulic analysis at 350 Sparks (zone 1W) assumed to be connected to the 203mm on Sparks and the 203mm on Bay (see attached PDF for locations).

Minimum HGL = 107.0m for both location

Maximum HGL = 119.1m for both location

Available Flow (Sparks St) = 415 L/s assuming a residual of 20 psi and a ground elevation of 71.9m

Available Flow (Bay St) = 485 L/s assuming a residual of 20 psi and a ground elevation of 72.2m

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: June 10, 2015 4:10 PM
To: Mottalib, Abdul
Subject: RE: 350 Sparks Street - Boundary condition request

Here is the map referenced in my first email.

Regards,

Bobby Freel, P.Eng.

Intermediate Designer / Intermediate Project Manager

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

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: June-10-15 4:09 PM
To: Abdul Mottalib (Abdul.Mottalib@ottawa.ca)
Subject: 350 Sparks Street - Boundary condition request

Good afternoon Abdul,

We would like to request water boundary conditions for 350 Sparks Street using the following proposed development demands:

1. Location of Service / Street Number: 350 Sparks Street

2. Type of development and the amount of fire flow required for the proposed development:

- Proposed development is a mixed use development including a hotel tower and a residential tower connected via a podium level. 241 residential units and 303 beds are proposed.
- It is anticipated that the development will have a dual connection to be services from the existing 200mm diameter watermains within Sparks Street and Bay Street, as shown by the attached map.
- 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	200.2	3.34
Max Day	458.5	7.64
Peak Hour	730.3	12.17

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

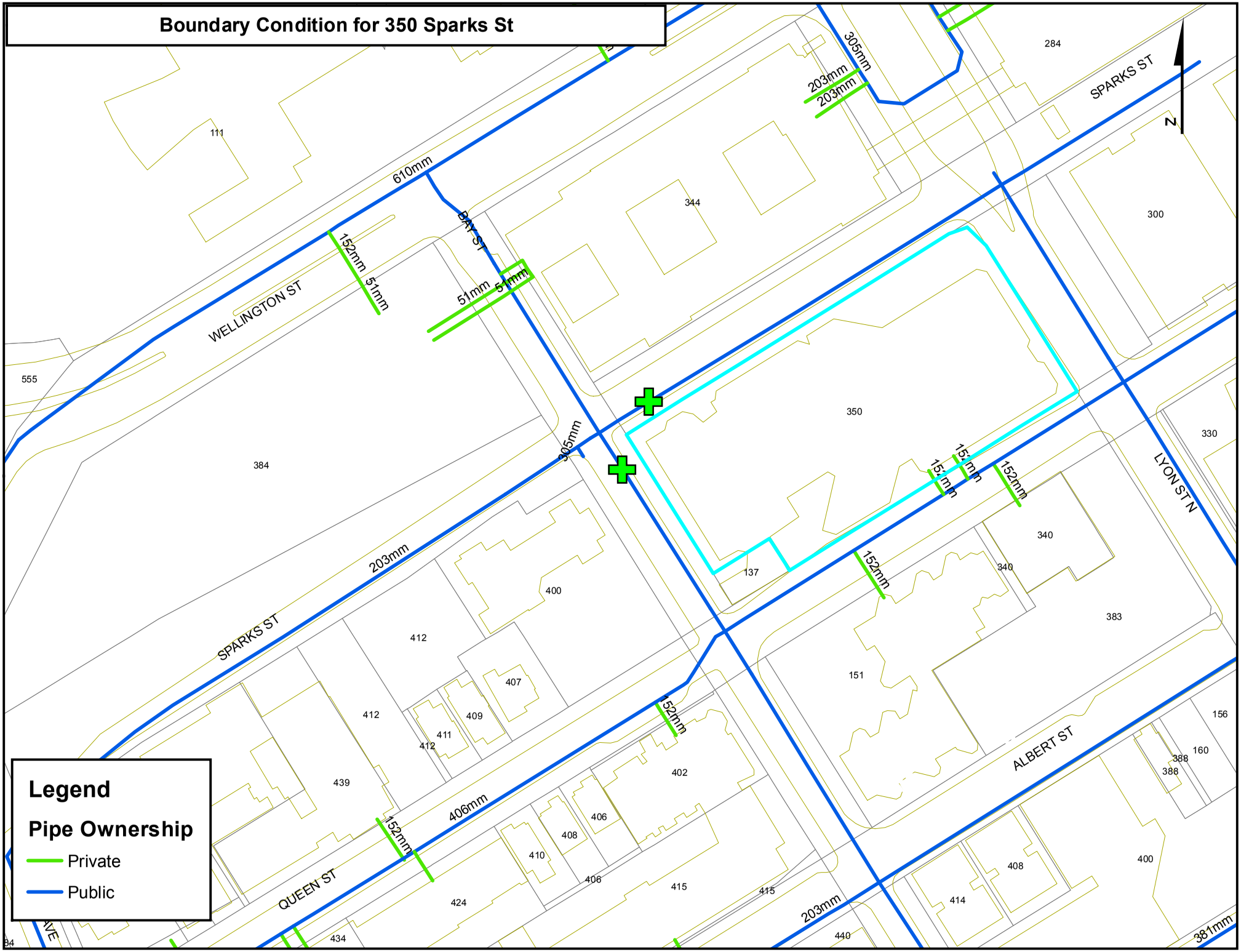
Thank you,

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


Boundary Condition for 350 Sparks St
Legend
Pipe Ownership
Private
Public
SPARKS ST
WELLINGTON ST
BAY ST
QUEEN ST
ALBERT ST
LYON ST N
610mm
305mm
203mm
406mm
381mm
152mm
51mm
N
111
344
284
300
555
384
350
330
340
137
383
151
400
412
407
409
411
439
402
406
408
410
415
424
434
440
414
156
160
388

APPENDIX C

Wastewater Collection

Morguard
350 Sparks Street
Proposed Development - Hotel Tower

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

Site Area 0.378 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.11**	**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		0
		Total Pop	**0**

Average Domestic Flow	**0.00**	**L/s**
Peaking Factor	**4.00**	
Peak Domestic Flow	**0.00**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5	$L/m^2/d$	267	0.03
Hospitals	900	L/bed/d		0.00
Restaurant	125	L/seat/d	384	1.11
Hotel†	225	L/bed-space/d)	303	1.58
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	**2.72**
Peak Institutional / Commercial Flow	4.08
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**4.08**

** 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	**2.72**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**4.08**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**4.19**	**L/s**

†Assumed double occupency per room

Morguard
350 Sparks Street
Proposed Development - Residential Tower

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

Site Area 0.378 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.11**	**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		241

Total Pop	**241**	
Average Domestic Flow	**0.98**	**L/s**
Peaking Factor	**4.00**	
Peak Domestic Flow	**3.91**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5	$L/m^2/d$		0.00
Hospitals	900	L/bed/d		0.00
Hotel†	225	L/bed-space/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	**0.00**
Peak Institutional / Commercial Flow	0.00
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.00**

** 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	**0.98**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**3.91**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**4.01**	**L/s**

†Assumed double occupency per room

SANITARY SEWER CALCULATION SHEET

PROJECT: **350 Sparks Street**
LOCATION: **Ottawa**
FILE REF: **15-779**
DATE: **05-Jun-15**

DESIGN PARAMETERS

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

Location			Residential Area and Population									Commercial		Institutional		Industrial			Infiltration				Pipe Data							
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+H}	Total Area	Accu. Area	Infiltration Flow	Total 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)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
A	10A	10	0.420				420	756.0	0.420	756.0	3.88	11.87		0.00		0.00		0.00	0.0	0.420	0.420	0.118	11.98	250	3.47	71.5	0.049	0.063	2.26	110.8	0.11
B,D	10	9	0.000			10	140	279.0	0.420	1035.0	3.79	15.89	1.14	1.14	3.60	3.60		0.00	4.1	4.740	5.160	1.445	21.45	250	2.37	43.5	0.049	0.063	1.87	91.5	0.23
C	9	8	0.000					0.0	0.420	1035.0	3.79	15.89		1.14		3.60		0.00	4.1	0.000	5.160	1.445	21.45	250	2.03	27.3	0.049	0.063	1.73	84.7	0.25
	8	7	0.000					0.0	0.420	1035.0	3.79	15.89		1.14		3.60		0.00	4.1	0.000	5.160	1.445	21.45	250	0.48	7.6	0.049	0.063	0.84	41.2	0.52
E	7	6	0.000					0.0	0.420	1035.0	3.79	15.89	4.95	6.09		3.60		0.00	8.4	4.950	10.110	2.831	27.13	250	0.58	6.0	0.049	0.063	0.92	45.3	0.60
	6	5	0.000					0.0	0.420	1035.0	3.79	15.89		6.09		3.60		0.00	8.4	0.000	10.110	2.831	27.13	250	1.99	66.3	0.049	0.063	1.71	83.9	0.32
G	5	4	0.000					0.0	0.420	1035.0	3.79	15.89		6.09		3.60		0.00	8.4	0.000	10.110	2.831	27.13	250	1.94	49.7	0.049	0.063	1.69	82.8	0.33
	4	3	0.000					0.0	0.420	1035.0	3.79	15.89		6.09		3.60		0.00	8.4	0.000	10.110	2.831	27.13	250	1.91	68.1	0.049	0.063	1.67	82.2	0.33
	3	2	0.000					0.0	0.420	1035.0	3.79	15.89		6.09		3.60		0.00	8.4	0.000	10.110	2.831	27.13	250	1.52	42.8	0.049	0.063	1.49	73.3	0.37
	2	1	0.000					0.0	0.420	1035.0	3.79	15.89		6.09		3.60		0.00	8.4	0.000	10.110	2.831	27.13	250	2.96	3.0	0.049	0.063	2.08	102.3	0.27

Note: residential densities assume 1000 units per net hectare

LEGEND

1 NODE

SANITARY SEWER

DRAINAGE AREA BOUNDARY

C — AREA ID

2.45Ha — AREA

MIXED — ZONING DESIGNATION

E
4.95Ha
MIXED

C
2.45Ha
MIXED

D
1.15Ha
MIXED

B
1.14Ha
MIXED

A
0.42Ha
RES

EX. 49.7m-250mmØ SAN @ 1.94%

EX. 66.3m-250mmØ SAN @ 1.99%

EX. 6.1m-250mmØ SAN @ 0.58%

EX. 7.6m-250mmØ SAN @ 0.48%

EX. 27.3m-250mmØ SAN @ 2.0%

EX. 43.5m-250mmØ SAN @ 2.17%

EX. 11.0m-250mmØ SAN @ 4.3%

EX. 68.1m-250mmØ SAN @ 3.7%

EX. 42.9m-250mmØ SAN @ 1.92%

EX. 15.0m-250mmØ SAN @ 2.56%

EX. 13.3m-250mmØ SAN @ 2.4%

EX. 6.0m-250mmØ SAN @ 1.06%

EX. 59.2m-250mmØ SAN @ 1.02%

1 2 3 4 5 6 7 8 9 10 10A 10B 10C 10D

SPARKS STREET

BAY STREET

LYON STREET

QUEEN STREET

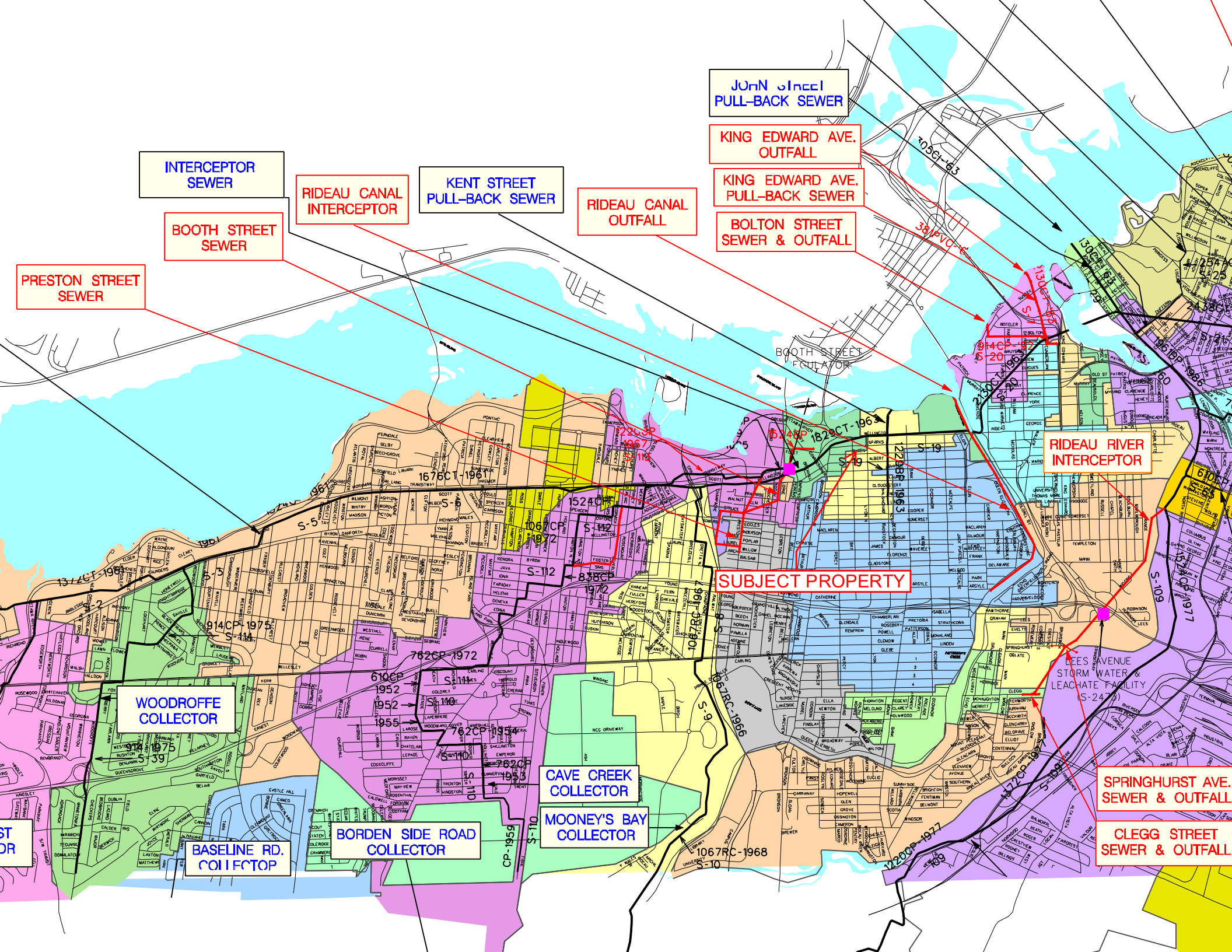
SUBJECT PROPERTY

DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™
120 Iber Road Unit 203
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

SANITARY DRAINAGE PLAN

PROJ NO.:	15-779
DRAWN BY:	B.N.C.
DATE:	2015-06-05
SCALE:	1:2000
FIGURE NO.:	SAN-1

z:\projects\15-779_350_sparks-st\b_design\b2_drawings\b2-2_main (dsel)\2015-03-23_base\cad\2015-06-09_779_base.dwg


JOHN STREET PULL-BACK SEWER
KING EDWARD AVE. OUTFALL
KING EDWARD AVE. PULL-BACK SEWER
BOLTON STREET SEWER & OUTFALL
INTERCEPTOR SEWER
RIDEAU CANAL INTERCEPTOR
KENT STREET PULL-BACK SEWER
RIDEAU CANAL OUTFALL
BOOTH STREET SEWER
PRESTON STREET SEWER
RIDEAU RIVER INTERCEPTOR
SUBJECT PROPERTY
WOODROFFE COLLECTOR
CAVE CREEK COLLECTOR
MOONEY'S BAY COLLECTOR
BORDEN SIDE ROAD COLLECTOR
BASELINE RD. COLLECTOR
SPRINGHURST AVE. SEWER & OUTFALL
CLEGG STREET SEWER & OUTFALL
LEES AVENUE STORM WATER & LEACHATE FACILITY
BOOTH STREET REGULATOR

APPENDIX D

Stormwater Management

Morguard
350 Sparks Street
Existing Conditions

Estimated Peak Stormwater Flow Rate
City of Ottawa Sewer Design Guidelines, 2004

Existing Drainage Area Charateristics

Area	0.462	ha
C	0.90	Rational Method runoff coefficient
t_c	10.0	min

Estimated Peak Flow

	2-year	**5-year**	**100-year**	
i	76.8	104.2	178.6	mm/hr
Q	88.7	120.3	257.8	L/s

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)

Stormwater - Proposed Development
City of Ottawa Sewer Design Guidelines, 2004

Target Flow Rate

Area 0.462 ha
C 0.50 Rational Method runoff coefficient
t_c 20.0 min

5-year
i 70.3 mm/hr
Q 45.1 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.02 ha
C 0.90 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	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)
20.0	70.3	4.0	4.0	0.0	0.0	120.0	7.7	7.7	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 0.44 ha
C 0.90 Rational Method runoff coefficient

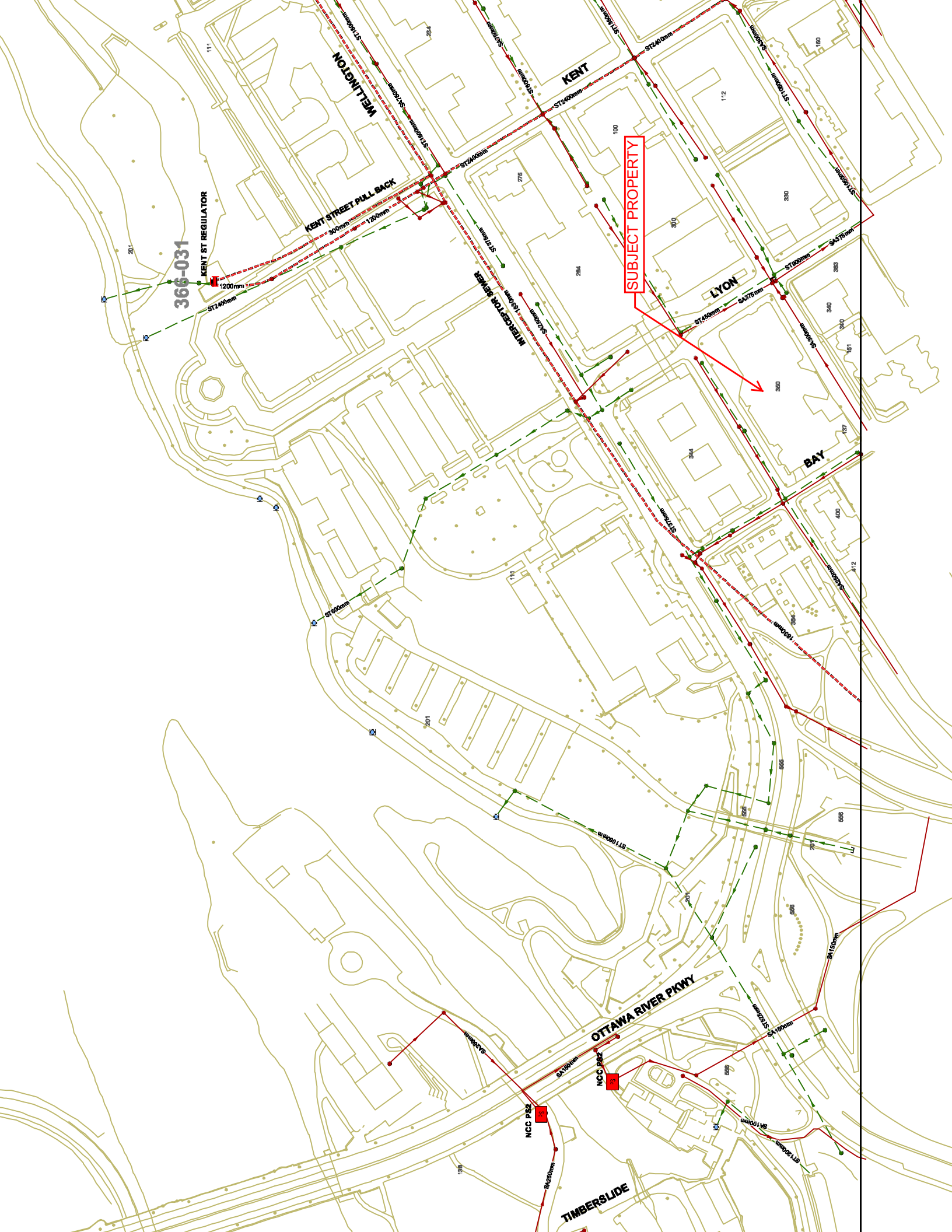
	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
20	70.3	77.1	19.7	57.4	68.9	120.0	146.3	37.4	108.9	130.6
25	60.9	66.8	19.7	47.1	70.6	103.8	126.6	37.4	89.2	133.8
30	53.9	59.2	19.8	39.4	71.0	91.9	112.0	37.4	74.6	134.3
35	48.5	53.2	19.8	33.5	70.3	82.6	100.7	37.4	63.3	132.9
40	44.2	48.5	19.8	28.7	68.9	75.1	91.6	37.4	54.2	130.1
45	40.6	44.6	19.8	24.8	66.9	69.1	84.2	37.4	46.8	126.3
50	37.7	41.3	19.8	21.5	64.5	64.0	78.0	37.4	40.6	121.7
55	35.1	38.5	19.8	18.7	61.7	59.6	72.7	37.4	35.3	116.5
60	32.9	36.2	19.8	16.3	58.7	55.9	68.2	37.4	30.7	110.7
65	31.0	34.1	19.9	14.2	55.4	52.6	64.2	37.4	26.8	104.5
70	29.4	32.2	19.9	12.4	52.0	49.8	60.7	37.4	23.3	97.9
75	27.9	30.6	19.9	10.7	48.3	47.3	57.6	37.4	20.2	91.0
80	26.6	29.2	19.9	9.3	44.5	45.0	54.9	37.4	17.4	83.8
85	25.4	27.8	19.9	8.0	40.6	43.0	52.4	37.4	15.0	76.3
90	24.3	26.7	19.9	6.8	36.5	41.1	50.1	37.4	12.7	68.7
95	23.3	25.6	19.9	5.7	32.4	39.4	48.1	37.4	10.7	60.8
100	22.4	24.6	19.9	4.7	28.1	37.9	46.2	37.4	8.8	52.8
105	21.6	23.7	19.9	3.8	23.8	36.5	44.5	37.4	7.1	44.7
110	20.8	22.9	19.9	2.9	19.4	35.2	42.9	37.4	5.5	36.4
115	20.1	22.1	19.9	2.2	14.9	34.0	41.5	37.4	4.1	28.0
120	19.5	21.4	19.9	1.4	10.4	32.9	40.1	37.4	2.7	19.4

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 $Q_{attenuated}$ **19.77 L/s** **100-year $Q_{attenuated}$** **37.41 L/s**
5-year Max. Storage Required **71.0 m^3** **100-year Max. Storage Required** **134.3 m^3**

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	4.0	0.0	7.7	0.0
Attenutated Areas	19.8	71.0	37.4	134.3
Total	**23.8**	**71.0**	**45.1**	**134.3**


SUBJECT PROPERTY
KENT
WELLINGTON
KENT STREET PULL BACK
KENT ST REGULATOR
366-031
INTERCEPTOR SEWER
LYON
BAY
OTTAWA RIVER PKWY
TIMBERSLIDE
NCC PS2
NCC PS1

DRAWINGS / FIGURES

Sparks Street Development

SITE STATISTICS		NUMBER OF PARKING STALLS:	340 (TOTAL)
		RESIDENCE	88
RESIDENTIAL UNITS:	**241**	HOTEL (0.5/100m²)	110
TOTAL HOTEL KEYS:	**303**	OFFICE (0.75/100m²)	142
HILTON GARDEN INN	208	**EASEMENTS & SETBACKS**	
HOMEWOOD SUITES	95	ZONE MD H(64)	NO MINIMUM
PROPOSED BUILDING HEIGHT (STOREYS):		ZONE MD	NO MINIMUM
NORTH TOWER (RESIDENCE)	24 [145.02M ASL]	**HEIGHT RESTRICTIONS**	
SOUTH TOWER (HOSPITALITY)	26 [157.71M ASL]	ZONE MD H(64)	153.93M-159.80M ASL
PODIUM	3 / 6	ZONE MD	

SECTION C

SECTION B

ZONE MD H(64)

ZONE MD

EL -1.220

SPARKS STREET

MAX. HEIGHT 158.07M ASL

PARKING ENTRANCE

RESIDENTIAL MOVE IN

RESIDENTIAL ENTRY

EXPAND GROUND FLOOR AT OFFICE BUILDING

RECLAD EXISTING GROUND FLOOR FACADE

MAX. HEIGHT 153.93M ASL

7.00

36.00
118'-1"

OFFICE ENTRY

POPS

6-LEVEL PODIUM AMENITY & RESIDENTIAL

18.30
60'-0"

RESIDENTIAL TOWER
(24 STOREY TOWER WITH 6 STOREY PODIUM)
TOTAL HEIGHT 145.02 ASL

6 STOREY PODIUM

EXISTING OFFICE PODIUM

RESIDENTIAL ENTRY

3-LEVEL PODIUM AMENITY:
- SWIMMING POOL & SPA
- CONFERENCE FACILITIES
- RETAIL
- RESTAURANT

19.00
62'-4"

20.80
68'-3"

HOTEL ENTRY

DROP-OFF PLAZA

OFFICE ENTRY

SHIPPING/ RECEIVING & GARBAGE

HILTON GARDEN INN & HOMEWOOD SUITES TOWER
(26 STOREY TOWER WITH 3 STOREY PODIUM)
TOTAL HEIGHT 157.71 ASL

EXISTING OFFICE TOWER
(12 STOREYS)

SECTION A

BAY STREET

21.60
70'-9"

4.60

4.65

LYON STREET NORTH

3.25

36.55
119'-10"

MAX. HEIGHT 159.80M ASL

NEW CURB

OFFICE ENTRY

MAX. HEIGHT 155.70M ASL

5.05

INFILL EXISTING GARAGE ENTRANCE & AIR SHAFT AREA ON GROUND FLOOR

EXISTING HVAC VENT (APPROX. LOCATION)

OUTLINE OF LRT BELOW (TBD)

EL 0.000

QUEEN STREET

Morguard | WZMH ARCHITECTS | Scale 1 : 400 | 19 MARCH 2015

GROUND FLOOR PLAN

LEGEND

Symbol		Description
■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS
IB	"	IRON BAR
IBø	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
BM	"	BENCHMARK
CM	"	CONCRETE MONUMENT
HCM	"	HORIZONTAL CONTROL MONUMENT
NW	"	NAIL AND WASHER
PKN	"	PK NAIL
VCM	"	VERTICAL CONTROL MONUMENT
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
STANTEC	"	STANTEC GEOMATICS LTD.

LEGEND

Symbol		Description
ACU	"	AIR CONDITIONING UNIT
AN	"	ANCHOR
AP	"	AIR PUMP
ANT	"	ANTENNA
BH	"	BOREHOLE
BIB	"	HOSE BIB
BKR	"	BIKE RACK
BENCH	"	BENCH
BOL	"	BOLLARD
BOUL	"	BOULDER
CB	"	CATCH BASIN
DCB	"	DOUBLE CB
CBMH	"	CB MANHOLE
DCBMH	"	DOUBLE CB MANHOLE
SICB	"	SIDE INLET CB
CHM	"	CHIMNEY
CSV	"	CURB STOP VALVE
CO	"	CLEAN OUT
DRN	"	DRAIN
EPOST	"	ELECTRICAL OUTLET
FP	"	FLAG POLE

LEGEND

Symbol		Description
FL	"	FLOOD LIGHT
FTF	"	FUEL TANK FILLER CAP
GC	"	GARBAGE CAN
GFL	"	PIPE FLANGE (GAS)
GFP	"	GAS FUEL PUMP
GP	"	POLE GUYWIRE
GSR	"	GAS SERVICE REGULATOR
GV	"	GAS VALVE
HIC	"	HICKENBOTTOM
HDS	"	HEADSTONE
HLS	"	HYDRO LIGHT STANDARD
HM	"	HYDRO METER
HTN	"	HYDRO TRANSFORMER
HW	"	HAND WELL
HYD	"	FIRE HYDRANT
JBX	"	JUNCTION BOX
LS	"	LIGHT STANDARD
MB	"	MAILBOX
MH	"	MAINTENANCE HOLE UNIDENTIFIED
MHB	"	MAINTENANCE HOLE BELL
MHF	"	MAINTENANCE HOLE FIBRE OPTIC

LEGEND

Symbol		Description
MHH	"	MAINTENANCE HOLE HYDRO
MHSA	"	MAINTENANCE HOLE SANITARY
MHST	"	MAINTENANCE HOLE STORM
MHT	"	MAINTENANCE HOLE TRAFFIC
MW	"	MONITORING WELL
NPB	"	NEWS PAPER BOX
OLS	"	LIGHT STANDARD ORNAMENTAL
OW	"	OBSERVATION WELL
PKM	"	PARKING METER
PLBX	"	PULL BOX
PLQ	"	PLAQUE
PLR	"	PILLAR
PZ	"	PIEZIOMETER
RLC	"	RED LIGHT CAMERA
RWSL	"	RAILWAY SIGNAL LIGHT
RWSS	"	RAILWAY SWITCH STAND
SAT	"	SATELLITE DISH
SCLP	"	SCULPTURE
SCP	"	SUMP/CATCH PIT
SCV	"	SPRINKLER CONTROL VALVE
SH	"	SPRINKLER HEAD

LEGEND

Symbol		Description
SIA	"	SIAMESE CONNECTION
SN	"	SIGN
SPAN	"	SOLAR PANEL
SPT	"	SEPTIC TANK LID
TBL	"	TABLE
TB BELL	"	TERMINAL BOX - BELL
TB CATV	"	TERMINAL BOX - CABLE
TCB	"	TRAFFIC CONTROL BOX
TPIT	"	TEST PIT
TSL	"	TRAFFIC SIGNAL LIGHT
UMB	"	MARKER BELL UNDERGROUND
UMC	"	MARKER CABLE UNDERGROUND
UMG	"	MARKER GAS UNDERGROUND
UMO	"	MARKER OIL UNDERGROUND
UP	"	UTILITY POLE
VB	"	VALVE BOX
VC	"	VALVE CHAMBER
WV	"	WATER VALVE
	"	TREE STUMP
	"	TREE CONIFEROUS
	"	TREE DECIDUOUS

Stantec Geomatics Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613.722.4420
www.stantec.com

METRIC CONVERSION
DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

DRAFT

VERTICAL DATUM NOTE
ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978)

HORIZONTAL DATUM NOTE
PROJECTION: UNIVERSAL TRANSVERSE MERCATOR (MTM, ZONE 9, CM76°30'W)
DATUM: NAD 83 (ORIG)

DISTANCES ON THIS PLAN MAY BE CONVERTED TO GROUND DISTANCES BY DIVIDING BY A COMBINED SCALE FACTOR OF *.

TOPOGRAPHIC SKETCH of
LOTS 13, 14 & 15 & PART OF LOT 12
(SOUTH OF SPARKS STREET)
LOTS 12, 13 & 14 & PART OF LOT 15
(NORTH OF QUEEN STREET)
REGISTERED PLAN No. 3922

CITY OF OTTAWA

Scale 1:200
5 0 5 15 METRES

Stantec Geomatics Ltd.
ONTARIO LAND SURVEYORS

DRAWN: BL DATE: June 4, 2015 PROJECT No.: 161613323