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SITE SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

TRINITY DEVELOPMENT GROUP
151 CHAPEL STREET

CITY OF OTTAWA

PROJECT NO.: 19-1086

JULY 2019 – REV. 2

SITE SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
TRINITY DEVELOPMENT GROUP
151 CHAPEL STREET

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TRINITY DEVELOPMENT GROUP
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CITY OF OTTAWA
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1.0 INTRODUCTION

Trinity Development Group has retained David Schaeffer Engineering Ltd. (DSEL) to prepare a Site Servicing and Stormwater Management Report in support of an amendment to the previously approved Site Plan Control (SPC) at 151 Chapel Street.

Figure 1: Site Location

The subject property is located within the City of Ottawa urban boundary. As illustrated in ***Figure 1***, above, the subject property is located at the northeast corner of the Chapel Street and Rideau Street intersection. Site access is gained though Chapel Street. The

site also has frontage on Beausoleil Drive. Chapel Street currently terminates south of Beausoleil Drive. The subject property measures approximately ***0.76 ha,*** including a proposed ***400 m²*** Open Park Space at the north-west corner of the subject site.

The proposed development will be constructed in 2 phases. Phase 1 includes a 26 storey commercial/residential tower consisting of an ***855 m²*** retail area, ***315*** residential units, a temporary parking lot at the north end of the property and underground parking. Phase 2 includes a 25-storey commercial/residential tower with underground parking, consisting of ***318*** residential units. A total of ***633*** residential units are proposed in the ultimate condition.

Reduced copies of the interim and ultimate site plans, prepared by RLA Architecture including site statistics, are included in ***Drawings / Figures***.

Previously approved proposed site statistics per the approved *Functional Servicing Report for 151 Chapel Street*, prepared by DSEL, dated revision 3 March 2016, included ***586*** residential units and ***6,825m²*** of retail/commercial floorspace.

The objective of this report is to support the amendment 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

The site measures approximately ***0.76 ha*** and was previously a school and place of worship that has since been demolished. The site is currently unoccupied and is comprised of gravel, paved surface and landscaped areas.

A topographic survey was completed by Stantec Geomatics Ltd. on April 24th, 2019. The site slopes from south to north, with elevations varying from 69.10 m to 60.65 m. A localized low point exists as shown on the survey. See reduced copy of the topographic survey in ***Drawings/Figures.***

Sewer system and watermain distribution mapping, as-recorded drawings and detail design drawings of the Rideau Street Reconstruction collected from the City of Ottawa indicate that the following services exist across the property frontage within the adjacent municipal right-of-way:

Watermains:

- 203 mm diameter unlined cast iron local service within Chapel Street at the intersection of Rideau Street;
- 305 mm diameter local service located within Rideau Street; and
- 203 mm diameter unlined cast iron service located within Beausoleil Drive.

Storm Sewers:

- 525 mm diameter storm sewer within Rideau Street;
- 525 mm diameter storm sewer within Chapel Street; and
- 525 mm diameter storm sewer within Beausoleil Drive.

Sanitary Sewers:

- 300 mm diameter local sanitary sewer located within Rideau Street; and
- 750 mm diameter sanitary sewer located within Chapel Street.

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 the amended 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

A pre-consultation for the original SPC application with relevant parties, including the City of Ottawa, was conducted February 28, 2014.

Pre-consultation with RVCA was conducted to confirm stormwater management targets on March 27, 2019, see ***Appendix A***.

Pre-consultation with the City of Ottawa was conducted to coordinate water servicing on March 18, 2019, see ***Appendix A***.

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

2.0 GUIDELINES, PREVIOUS STUDIES, 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)

  - Technical Bulletin ISDTB-2014-01
    City of Ottawa, February 5, 2014.
    (ISTB-2014-01)

  - Technical Bulletin PIEDTB-2016-01
    City of Ottawa, September 6, 2016.
    (PIEDTB-2016-01)

  - Technical Bulletin ISTB-2018-01
    City of Ottawa, March 21, 2018.
    (ISTB-2018-01)

- Ottawa Design Guidelines – Water Distribution
  City of Ottawa, October 2012
  (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*)*

  - Technical Bulletin ISDTB-2018-02
    City of Ottawa, March 21, 2018
    *(*ISTB-2018-02*)*

- 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)

- Geotechnical Investigation 151 Chapel Street, Ottawa
  Paterson Group Inc.
  April 2, 2019
  (Geotechnical Report)

- Low Impact Development Stormwater Management Planning and Design Guide
  Credit Valley Conservation & Toronto and Region Conservation, 2010.
  (LID Guide)

- Functional Servicing and Stormwater Management Report for 151 Chapel Street
  David Schaeffer Engineering Ltd.
  3rd revision, dated March 2016.
  (2016 approved FSR)

- Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems
  National Fire Protection Association
  2016 Edition.
  (NFPA)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 1W pressure zone, as shown by the Pressure zone map included in ***Appendix B***. It is assumed that the existing site is serviced from the 203 mm watermain within Chapel Street**.** Potable water is delivered to the subject area via an existing 610 mm diameter transmission main within Nelson Street.

3.2 Water Supply Servicing Design

In order to meet City water supply objectives (basic day demands no greater than 50 m^3/d on a single feed) both phase 1 and phase 2 towers will be serviced by dual connections to the existing municipal system, summarized as follows:

1) Dual watermain connection to the existing 200 mm diameter DI watermain in Chapel Street near Rideau Street to service phase 1;

2) A single watermain connection to the existing 200 mm diameter DI watermain in Chapel Street near Beausoleil Street to service phase 2; and

3) A single watermain connection to the existing 200 mm diameter watermain in Beausoleil Street to service phase 2.

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

Table 1
Water Supply Design Criteria

Design Parameter	Value
Bachelor / 1 Bedroom Apartment	1.4 P/unit
2 Bedroom Apartment	2.1 P/unit
3 Bedroom Apartment	3.1 P/unit
Commercial Average Daily Demand	2.5 L/m^2/d
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	2.5 x Average Daily *
Residential Maximum Hourly	5.5 x Average Daily *
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
Desired pressure range during normal operating conditions (average day to maximum hour demand)	350 kPa and 480 kPa
Minimum pressure during normal operating conditions (average day to maximum hour demand)	275 kPa
During normal operating conditions pressure shall not exceed	552 kPa
Minimum pressure during fire flow plus max day	140 kPa

** - Residential Max. Daily and Max. Hourly peaking factors as per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*

Table 2, below, summarizes the anticipated water supply demand and boundary conditions for the interim and ultimate phases of the proposed development based on the ***Water Supply Guidelines***.

Table 2
Water Demand and Boundary Conditions
Proposed Interim/Ultimate Conditions – Phase 1/2

Design Parameter	Anticipated Interim Demands[1] Phase 1 (L/min)	Anticipated Ultimate Demands [1] Phase 1+2 (L/min)	Previously Approved Estimated Demands (L/min)	Boundary Condition[2] Chapel near Rideau (kPa)	Boundary Condition[3] Chapel near Beasoleil (kPa)	Boundary Condition[4] Beausoleil (kPa)
Average Daily Demand	106.5	217.9	251.0	481.5	504.8	507.3
Max Day + Fire Flow (NFPA)	264.5 + 4150 = 4,414.4	543.0 + 4150 = 4,693.0	615.7 + 10,000 = 10,615.7	372.6	395.9	398.4
Peak Hour	580.9	1,193.7	1,347.7	392.2	415.6	418.0

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 ***66.02m*** at the Chapel Street connection near Rideau Street. See ***Appendix B.***
3) Boundary conditions supplied by the City of Ottawa. Assumed ground elevation ***63.64m*** at the Chapel Street connection near Beausoleil Drive. See ***Appendix B.***
4) Boundary conditions supplied by the City of Ottawa. Assumed ground elevation ***63.39m*** at the Beausoleil Drive connection. See ***Appendix B***

Proposed ultimate total water demands are less than the previously estimated total demands per the ***2016 approved FSR*** due to revised residential average daily demand***.***

For the purpose of estimating fire flow, the short method within the National Fire Protection Association (NFPA) standards was utilized. As indicated by Section 11.2.2 from the ***NFPA Standards***, fire flow requirements are to be determined by combining the required flow rate for the sprinkler system, along with the anticipated hose stream. As indicated by Table 11.2.2.1 and Table 11.2.3.1.2 extracted from the ***NFPA Standards*** and included in ***Appendix B***, the anticipated fire flow requirements for the sprinkler system is ***3,200 L/min*** (850 gpm) and the anticipated internal and external total combined inside and outside hose stream demand is ***950 L/min*** (250 gpm).

As a result, the total fire flow is anticipated to be ***4,150 L/min*** (1,100 gpm), refer to supporting calculation in ***Appendix B***. Based on the boundary conditions provided by the City of Ottawa, sufficient supply is available for fire flow. A certified fire protection system specialist will need to be employed to design the building's fire suppression system and confirm the actual fire flow demand.

Total water demand in the ultimate conditions has increased by *1.9%* since the boundary conditions were requested. Boundary conditions supplied by the City of Ottawa indicate that pressures at both the Beausoleil Drive and Chapel Street connections fall within the allowable pressure range as described in the ***Water Supply Guidelines*** in the Average Day and Peak Hour scenarios.

3.3 Water Supply Conclusion

It is proposed that both phase 1 and phase 2 towers will be serviced by dual connections to the existing municipal system via connections to Chapel Street and Beausoleil Drive.

Anticipated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions. Boundary conditions indicate that maximum and minimum pressures as specified in the ***Water Supply Guidelines,*** are respected in all scenarios.

Fire flow demands were estimated using the ***NFPA*** method. Available pressures provided by the City of Ottawa at proposed fire flow demands exceed minimum required pressures as described in ***Water Supply Guidelines.***

The design of the water distribution system conforms to all relevant City Guidelines and Policies.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The existing building is assumed to be serviced by the 750 mm sanitary sewer within Chapel Street.

The Chapel Street sewer conveys wastewater to the Ottawa Outfall Sewer. The interceptor sewer conveys wastewater collected in the area to the ROPEC treatment facility. Based on available sewershed mapping data, it appears that the subject property is part of a ***~60ha*** sewershed consisting of mixed-use and residential contributions.

As indicated in ***Section 1.1 – Existing Conditions***, the subject property was occupied by two multi-use buildings. The ***Sewer Design Guidelines*** were utilized to estimate the existing average and peak wastewater rates and are summarized in ***Table 3***. See ***Appendix C*** for detailed calculations.

Table 3
Existing Wastewater Conditions

Design Parameter	Subject Properties Flow (L/s)
Estimated Average Dry Weather Flow	0.68
Estimated Peak Dry Weather Flow	1.02
Estimated Peak Wet Weather Flow	1.23

A sanitary analysis was previously conducted per the ***2016 approved FSR***, see detailed capacity calculations and drainage area figure in ***Appendix C***.

4.2 Wastewater Design

It is proposed that the development will be serviced by the existing 750 mm diameter sanitary sewer within Chapel Street.

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

Table 4
Wastewater Design Criteria

Design Parameter	Value
Bachelor / 1 Bedroom Apartment	1.4 P/unit
2 Bedroom Apartment	2.1 P/unit
3 Bedroom Apartment	3.1 P/unit
Commercial Average Daily Demand	2.8 L/m^2/d
Average Daily Demand	280 L/d/per
Residential Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial Peaking Factor	1.5
Infiltration and Inflow Allowance	0.33 L/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, November 2004.	

The ***Sewer Design Guidelines*** were utilized to estimate the proposed interim and ultimate average and peak wastewater rates, which are summarized in ***Table 5,*** below. See ***Appendix C*** for detailed calculations.

Table 5
Summary of Estimated Interim and Ultimate Peak Wastewater Flow

Design Parameter	Total Interim Flow Phase 1 (L/s)	Total Ultimate Flow Phase 1 + Phase 2 (L/s)	Previously Approved Estimated Total Flow (L/s)
Estimated Average Dry Weather Flow	1.85	3.70	4.78
Estimated Peak Dry Weather Flow	6.03	11.74	16.35
Estimated Peak Wet Weather Flow	6.26	11.97	16.55

The total proposed ultimate wastewater flow is ***4.58 L/s*** less than the previously estimated total wastewater flow per the ***2016 approved FSR.*** Based on the previously conducted sanitary analysis, there is sufficient capacity within the local sanitary sewers to accommodate the increase in flow from the existing conditions.

4.3 Wastewater Servicing Conclusions

The estimated existing and proposed peak wastewater flow rates were estimated in accordance with ***City Guidelines.*** The total proposed ultimate wastewater flow is ***4.58 L/s*** less than the previously estimated total wastewater flow per the ***2016 approved FSR.***

Based on the previously conducted sanitary analysis, there is sufficient capacity within the local sanitary sewers to accommodate the increase in flow from the existing conditions.

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa municipal storm sewer network and is 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 Lower Rideau River watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA).

The existing site is serviced by 525 mm diameter storm sewers within Chapel Street, Rideau Street and Beausoleil Drive. Overland flow is directed to catch basins within Chapel Street and Beausoleil Drive. Storm sewers convey runoff north within Beausoleil Drive and St. Patrick Street before discharging to the Rideau River, which is approximately 1000 m downstream of the subject site.

As described in ***Section 1.1***, the existing site is predominantly asphalt paved area, gravel and landscaping. Based on a site review the existing development contains no apparent stormwater management control for flow attenuation.

The estimated existing development peak flows for the 2, 5, and 100-year are summarized in ***Table 6,*** below:

Table 6
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	129.8
5-year	176.0
100-year	354.9

5.2 Post-development Stormwater Management Target

As per consultation with the City of Ottawa and Rideau Conservation Authority, the following stormwater management controls for re-development of the subject site are required:

- Establish allowable release rate based on a Rational Method Coefficient of 0.50, employing the City of Ottawa IDF parameters for a 5-year storm with a calculated existing time of concentration no less than 10 minutes;
- All storms up to and including the City of Ottawa 100-year design event are to be attenuated on site; and

- "Enhanced" equal to 80% Total Suspended Solids (TSS) removal is required per the ***SWM Design Guideline***, see RVCA correspondence in ***Appendix A***.

Based on the above, the allowable release rate for the proposed development is ***104.0L/s***. See ***Appendix D*** for detailed calculations.

5.3 Proposed Stormwater Management System

In order to achieve the allowable post-development stormwater runoff release rate established in ***Section 5.2,*** above, the proposed development will use an internal cistern to be designed by a mechanical engineer using the specified release rates determined in this analysis. The internal cistern will discharge to the existing 525 mm diameter storm sewer within Chapel Street.

Table 7, below, summarizes the Ultimate Phase 1 controlled release rate and storage requirements for the 5 and 100-year storm events.

Table 7
Stormwater Flow Rate Summary
Proposed Phase 1 Conditions

Control Area	5-Year		100-Year	
	Release Rate (L/s)	Storage (m^3)	Release Rate (L/s)	Storage (m^3)
Unattenuated Areas	10.3	0.0	22.2	0.0
Attenuated Areas	21.4	51.0	41.9	100.0
Total	**31.7**	**51.0**	**64.1**	**100.0**

Runoff from roof areas and ultimate surface parking lot in phase 1 are to be collected via area drains to be accommodated in the building's mechanical system. Approximately ***100.0 m^3*** of cistern storage will be required for the phase 1 conditions to attenuate runoff to the allowable release rate. The cistern is required to discharge at ***41.9 L/s*** to ensure that the allowable release rate is respected in the interim and ultimate phases.

To meet the stormwater quality criteria specified by the RVCA, any runoff from the surface parking area would need to provide an enhanced level of treatment (80% TSS removal). An Oil-Grit Separator (OGS) is proposed within the building to treat all runoff from the ultimate surface parking lot in phase 1 before it is directed to the building's internal cistern. Refer to ***Appendix D*** for OGS sizing details and calculations.

Table 8, below, summarizes the uncontrolled pre and post development peak flows in the interim conditions of the phase 2 lands, for the 5 and 100-year storm events.

Table 8
Stormwater Flow Rate Summary
Interim Conditions - Phase 2 Lands

Control Area	5-Year Peak Flow (L/s)	100-Year Peak Flow (L/s)
Pre-development Peak flow	70.1	141.4
Post-development Peak flow	53.6	114.9

The estimated runoff coefficient of the proposed interim parking lot in the phase 2 lands is less than the existing runoff coefficient, resulting in smaller proposed peak flows in the 5- year and 100-year storm events, as shown in ***Table 8***.

To meet the stormwater quality criteria specified by the RVCA, any runoff from the surface parking area would need to provide an enhanced level of treatment (80% TSS removal). An enhanced swale and filter strip are proposed to be designed per the ***LID Guide*** and to treat all runoff from the interim proposed surface parking area in phase 2. The enhanced swale is approximately 65 m in length and is designed with a varying longitudinal slope of 0.5%. It is proposed to be located adjacent to Beasouleil Drive. The swale was designed with a maximum design velocity of 0.5 m/s in order to maximize water quality improvement, per the ***LID Guide***. Refer to ***Appendix D*** for detailed calculations.

A flow spreader is proposed to be located at the downstream end of the swale, ahead of a vegetation filter strip of approximately 5.0 m, both designed to increase quality control**,** It is anticipated that the enhanced swale and filter strip will provide the 80% TSS removal required as per the ***LID Guide***.

Table 9, below, summarizes the ultimate phase 2 controlled release rate and storage requirements for the 5 and 100-year storm events.

Table 9
Stormwater Flow Rate Summary
Ultimate Conditions - Phase 2

Control Area	5-Year		100-Year	
	Release Rate (L/s)	Storage (m^3)	Release Rate (L/s)	Storage (m^3)
Unattenuated Areas	4.7	0.0	10.0	0.0
Attenuated Areas	13.7	24.2	29.3	51.7
Total	**18.4**	**24.2**	**39.4**	**51.7**

Approximate ***51.7 m^3*** of cistern storage will be required for the proposed building in phase 2 to attenuate runoff to the allowable release rate. The cistern is required to discharge at ***29.3 L/s*** to ensure that the allowable release rate is respected. Detailed calculations are contained within ***Appendix D***.

No quality control is required for the ultimate conditions in phase 2 as the discharge is clean roof runoff and landscaped areas that will travel 1000 m within the storm sewers prior to discharge to the Rideau River.

As per the ***Geotechnical Report***, a perimeter foundation drainage system is recommended to direct water to the sump pit(s) within the lower basement of the building. Drainage to the local 525 mm diameter storm sewer within Chapel Street is proposed via an independent foundation drain, see ***SSP-1*** for proposed servicing layout and connection points.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target for storm events up to and including the 100-year storm in accordance with the ***City Guidelines***.

Based on consultation with the RVCA, stormwater quality controls are required for any proposed surface parking runoff. The following measures are proposed to provide 80% TSS removal for surface parking runoff:

1. An OGS located within the building in phase 1 to treat all runoff from ultimate surface parking area in phase 1;

2. An enhanced swale and filter strip per ***LID Guide*** are proposed to treat all runoff from the interim proposed surface parking area within the phase 2 lands; and

3. No quality controls are required for the ultimate conditions in phase 2 since no surface parking is proposed.

Cistern storage is anticipated be used to meet the required ***100.0 m³*** and ***51.7 m³*** of storage for ultimate conditions of phases 1 and 2, respectively, in the 100-year storm event.

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

6.0 UTILITIES

Hydro and Telecommunications services currently exist within Rideau Street, Chapel Street and Beausoilel Road right-of-ways.

300 mm diameter gas mains are located adjacent to the site on Rideau Street and Chapel Street.

Utility servicing will need to be coordinated with the individual utility companies prior to site development.

7.0 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;andEstablish 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; and
- Clean and change filter cloth at catch basins.

8.0 CONCLUSION AND RECOMMENDATIONS

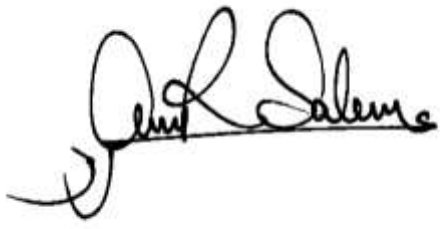
DSEL was retained to prepare a Site Servicing and Stormwater Management Report in support of Trinity Development Group's amendment to the previously approved Site Plan Control at 151 Chapel Street. The preceding report presents the following conclusions:

- Boundary conditions received from the City of Ottawa indicate there is sufficient pressure within the existing watermain network available to service the proposed site;
- The total proposed sanitary discharge is ***4.58 L/s*** less than the previously estimated total sanitary discharge per the ***2016 approved FSR***;
- The allowable post-development stormwater release rate for site has been calculated to be ***103.5 L/s,*** based on consultation with the City of Ottawa. It is estimated that a total of approximately ***151.7 m^3*** of stormwater retention volume will be required to meet the release criteria for the ultimate conditions;
- Based on consultation with the RVCA, stormwater quality controls are required for any proposed interim surface parking runoff from the phase 2 lands. It is proposed that stormwater quality controls will be provided by *OGS* and an enhanced swale and filter strip;
- No stormwater quality controls are required for ultimate conditions in phase 2 since no surface parking is proposed;
- Gas, Hydro and telecommunication services exist within the adjacent right-of-ways. Utility servicing will need to be coordinated with the individual utility companies prior to site development; and
- Erosion and sediment controls must be in place during construction. Recommendations to the contractor will be included in contract documents.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Robert D. Freel, P.Eng

Prepared by,
David Schaeffer Engineering Ltd.



Per: Amr Salem

APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

19-1086 16/07/2019

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 2.0
☒	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).	Section 5.0
☒	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.	GP-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 2.0
☒	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	SSP-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.	Section 3.2
☐	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.	Section 3.2
☐	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.	N/A
☐	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.	Section 4.0
☐	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.	N/A
☒	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.	N/A
☒	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Section 5.2
☒	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.	Appendix D
☐	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.	7.0
☐	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.	N/A
☐	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

Amr Salem

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: April 1, 2019 9:13 AM
To: Amr Salem
Cc: Brandon Chow; Steve Merrick
Subject: RE: 1086 - 151 Chapel Street

Good Morning Amr,

Based on the description below, it is our understanding there are 21 surface parking spaces being proposed. There is no municipal facility downstream which provides water quality treatment. Therefore, onsite water quality treatment of enhanced (80% TSS removal) would be required.

Jamie Batchelor, MCIP,RPP
Planner, ext. 1191
jamie.batchelor@rvca.ca

Rideau Valley Conservation Authority
3889 Rideau Valley Drive
PO Box 599, Manotick ON K4M 1A5
T 613-692-3571 | 1-800-267-3504 F 613-692-0831 | www.rvca.ca

From: Amr Salem <ASalem@dsel.ca>
Sent: Wednesday, March 27, 2019 1:37 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Brandon Chow <BChow@dsel.ca>; Steve Merrick <SMerrick@dsel.ca>
Subject: RE: 1086 - 151 Chapel Street

Hey Jamie,

I just wanted to follow up on my e-mail below. Can you please provide your input regarding quality controls that may be required for this site?

Thanks in advance,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

From: Amr Salem
Sent: March 21, 2019 4:53 PM
To: 'jamie.batchelor@rvca.ca' <jamie.batchelor@rvca.ca>
Cc: Brandon Chow <BChow@dsel.ca>; Steve Merrick <SMerrick@dsel.ca>
Subject: 1086 - 151 Chapel Street

Hello Jamie,

We wanted to consult with you regarding a mixed-use development we are working on located at 151 Chapel Street.

The existing stormwater on site discharges to the municipal infrastructure (550 mm diameter Storm Sewer) within Chapel Street. The stormwater collected from the site travels approximately 960 m through municipal sewer to a direct outlet into the Rideau River.

The development proposes to construct a 25-storey mixed use building (commercial/residential) as well as a 27-storey residential tower and underground parking . The site will be landscape with storm water primarily coming from the roof top and paved surface parking lot. There is approximately 21 surface parking spots on site.

Existing site area consisted mainly of paved surface area and an existing building that has been demolished.

Can you please provide your input regarding quality controls that maybe required for the site.

Thank you in advance,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

Brandon Chow

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: April 2, 2019 9:16 AM
To: Amr Salem
Cc: Brandon Chow
Subject: 1086-Rideau and Chapel Boundary Conditions Request
Attachments: 1086 Rideau March 2019.pdf; RE: 1086-Rideau and Chapel Boundary Conditions Request

Good morning Mr. Salem

Please find boundary conditions as requested as per OBC demand:

The following are boundary conditions, HGL, for hydraulic analysis at 1086 Rideau/Chapel (zone 1W)

Proposed Connection points (see attached PDF for location):

PHASE 1

- 2 Connections to opposite sides of existing water valve on existing 203 mm diameter watermain along Chapel Street

PHASE 2

- 2 Connections to opposite sides of existing water valve on existing 203 mm diameter watermain along Beausoleil Drive

Minimum HGL = 106.1m, same at all connections

Maximum HGL = 115.1m, same at all connections

Max Day + Fire Flow (450 L/s, FUS) = 87.0m, Chapel connection

Max Day + Fire Flow (350 L/s, FUS) = 91.0m, Beausoleil connection

Max Day + Fire Flow (69 L/s, OBC) = 104.0m, Chapel connection

Max Day + Fire Flow (69 L/s, OBC) = 104.0m, Beausoleil connection

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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
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(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

Please consider the environment before printing this email

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Brandon Chow

From: Amr Salem <ASalem@dsel.ca>
Sent: March 29, 2019 10:35 AM
To: Wessel, Shawn
Cc: Brandon Chow
Subject: RE: 1086-Rideau and Chapel Boundary Conditions Request

Hello Shawn,

Thank you for your prompt reply. However I would like to ask for pressures at OBC demand since we are *not* proposing any additional hydrants on site.

Thank you,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: March 25, 2019 12:50 PM
To: Amr Salem <ASalem@dsel.ca>
Subject: RE: 1086-Rideau and Chapel Boundary Conditions Request

Good afternoon Mr. Salem.

Further to your boundary conditions request, please find the comments from our Water Resource Dept. as follows:

We ran the FUS fireflow. Please let me know if they also require OBC. If they intend on having a hydrant(s) on their site ,then they should use the FUS

The following are boundary conditions, HGL, for hydraulic analysis at 1086 Rideau/Chapel (zone 1W)

Proposed Connection points (see attached PDF for location):

PHASE 1

- 2 Connections to opposite sides of existing water valve on existing 203 mm diameter watermain along Chapel Street

PHASE 2

- 2 Connections to opposite sides of existing water valve on existing 203 mm diameter watermain along Beausoleil Drive

Minimum HGL = 106.1m, same at all connections

Maximum HGL = 115.1m, same at all connections

Max Day + Fire Flow (450 L/s) = 87.0m, Chapel connection

Max Day + Fire Flow (350 L/s) = 91.0m, Beausoleil connection

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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

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(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

From: Amr Salem <ASalem@dsel.ca>
Sent: March 18, 2019 2:14 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Subject: RE: 1086-Rideau and Chapel Boundary Conditions Request

Thank you Shawn,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: March 18, 2019 2:05 PM
To: Amr Salem <ASalem@dsel.ca>
Subject: RE: 1086-Rideau and Chapel Boundary Conditions Request

Good afternoon Mr. Salem

I am in training today and tomorrow returning to my office on Wednesday and monitoring emails during this time away from my desk if you or your consultant require anything further.

I will forward your request to our Water Resources Dept. as soon as possible.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji

Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

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(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

From: Amr Salem <ASalem@dsel.ca>
Sent: March 18, 2019 1:46 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Wessel, Shawn <shawn.wessel@ottawa.ca>
Subject: RE: 1086-Rideau and Chapel Boundary Conditions Request

Thank you John,

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

From: Wu, John <John.Wu@ottawa.ca>
Sent: March 18, 2019 1:20 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Cc: Amr Salem <ASalem@dsel.ca>
Subject: FW: 1086-Rideau and Chapel Boundary Conditions Request

Hi, Shawn:

I think you did the pre-consultation with Erin.
Please follow up.

Amr, please check it with your own engineer before the request sent out next time.

Thanks.

John

From: Amr Salem <ASalem@dsel.ca>
Sent: March 18, 2019 12:17 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 1086-Rideau and Chapel Boundary Conditions Request

Hello John,

Please forward on this e-mail if you are not the right contact.

We would like to kindly request boundary conditions for the proposed development at **Rideau and Chapel Street** using the following proposed development demands:

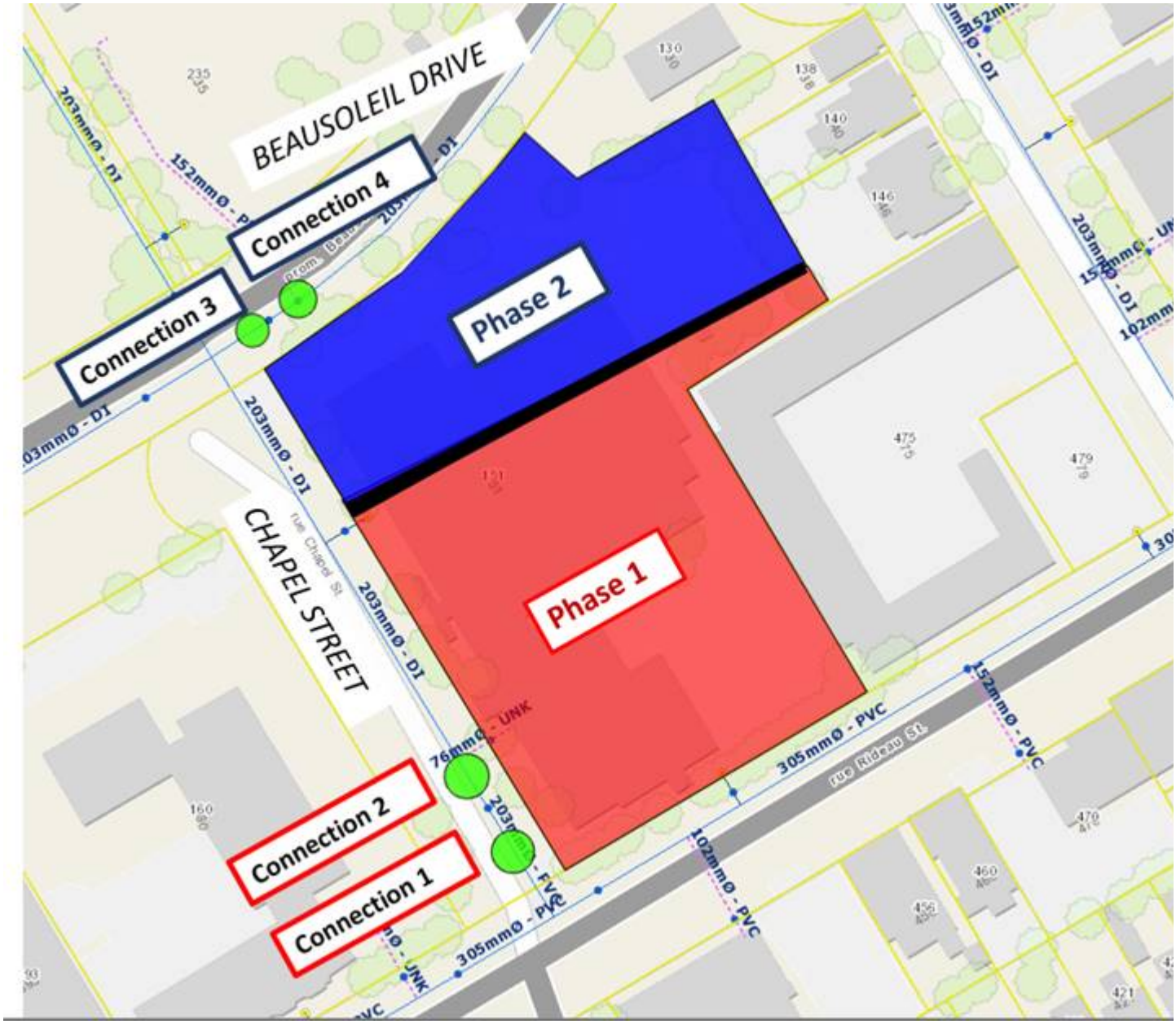
1. Location of Service / Street Number: **Rideau and Chapel Street**

2. Type of development: **2-phased mixed-use development with underground parking ;**
   Phase 1: involves a 25-storey mixed-use building and a consisting of *311 residential units*.
   Phase 2: involves a 27-storey residential building altogether consisting of a *371 residential units.*
   Please find attached the Site Plan for reference.

3. Proposed Connection points:
   PHASE 1
   - **2 Connections** *(Connections 1 and 2)* **to opposite sides of existing water valve on existing 305 mm diameter watermain along Chapel Street**

   PHASE 2
   - **2 Connections** *(Connections 3 and 4)* **to opposite sides of existing water valve on existing 203 mm diameter watermain along Beausoleil Drive**

   Please see the diagram below for reference.



4. **<u>Please provide pressures for the following water demand scenarios required for the proposed development</u>**:

PHASE 1 WATER DEMANDS – to be serviced by Connections 1 and 2 along Chapel Street

	L/min	L/s
Avg. Daily	105.1	1.8
Max Day + OBC	261.0 + 4150 = 4,411.0	4.35+ 69.17 = 73.5
Max Day + FUS	261.0 + 27000 = 27,261.0	4.35 + 450 = 454.4
Peak Hour	573.3	9.6

PHASE 2 WATER DEMANDS – to be serviced by Connections 3 and 4 along Beausoleil Drive

	L/min	L/s

Avg. Daily	131.5	2.2
Max Day + OBC	327.1 + 4150 = 4,477.1	5.45+ 69.17 = 74.6
Max Day + FUS	327.1 + 21000 = 21,327.1	5.45+ 350 = 355.5
Peak Hour	718.7	12.0

Amr Salem
Project Coordinator

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 512
email: asalem@DSEL.ca

Amr Salem

From: Wessel, Shawn <shawn.wessel@ottawa.ca>
Sent: April 2, 2019 9:16 AM
To: Amr Salem
Cc: Brandon Chow
Subject: 1086-Rideau and Chapel Boundary Conditions Request
Attachments: 1086 Rideau March 2019.pdf; RE: 1086-Rideau and Chapel Boundary Conditions Request

Good morning Mr. Salem

Please find boundary conditions as requested as per OBC demand:

The following are boundary conditions, HGL, for hydraulic analysis at 1086 Rideau/Chapel (zone 1W)

Proposed Connection points (see attached PDF for location):

PHASE 1

- 2 Connections to opposite sides of existing water valve on existing 203 mm diameter watermain along Chapel Street

PHASE 2

- 2 Connections to opposite sides of existing water valve on existing 203 mm diameter watermain along Beausoleil Drive

Minimum HGL = 106.1m, same at all connections

Maximum HGL = 115.1m, same at all connections

Max Day + Fire Flow (450 L/s, FUS) = 87.0m, Chapel connection

Max Day + Fire Flow (350 L/s, FUS) = 91.0m, Beausoleil connection

Max Day + Fire Flow (69 L/s, OBC) = 104.0m, Chapel connection

Max Day + Fire Flow (69 L/s, OBC) = 104.0m, Beausoleil connection

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.

If you require additional information or clarification, please do not hesitate to contact me anytime.

Thank you

Regards,

Shawn Wessel, A.Sc.T.,rcji
Project Manager - Infrastructure Approvals
Gestionnaire de projet – Approbation des demandes d'infrastructures

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
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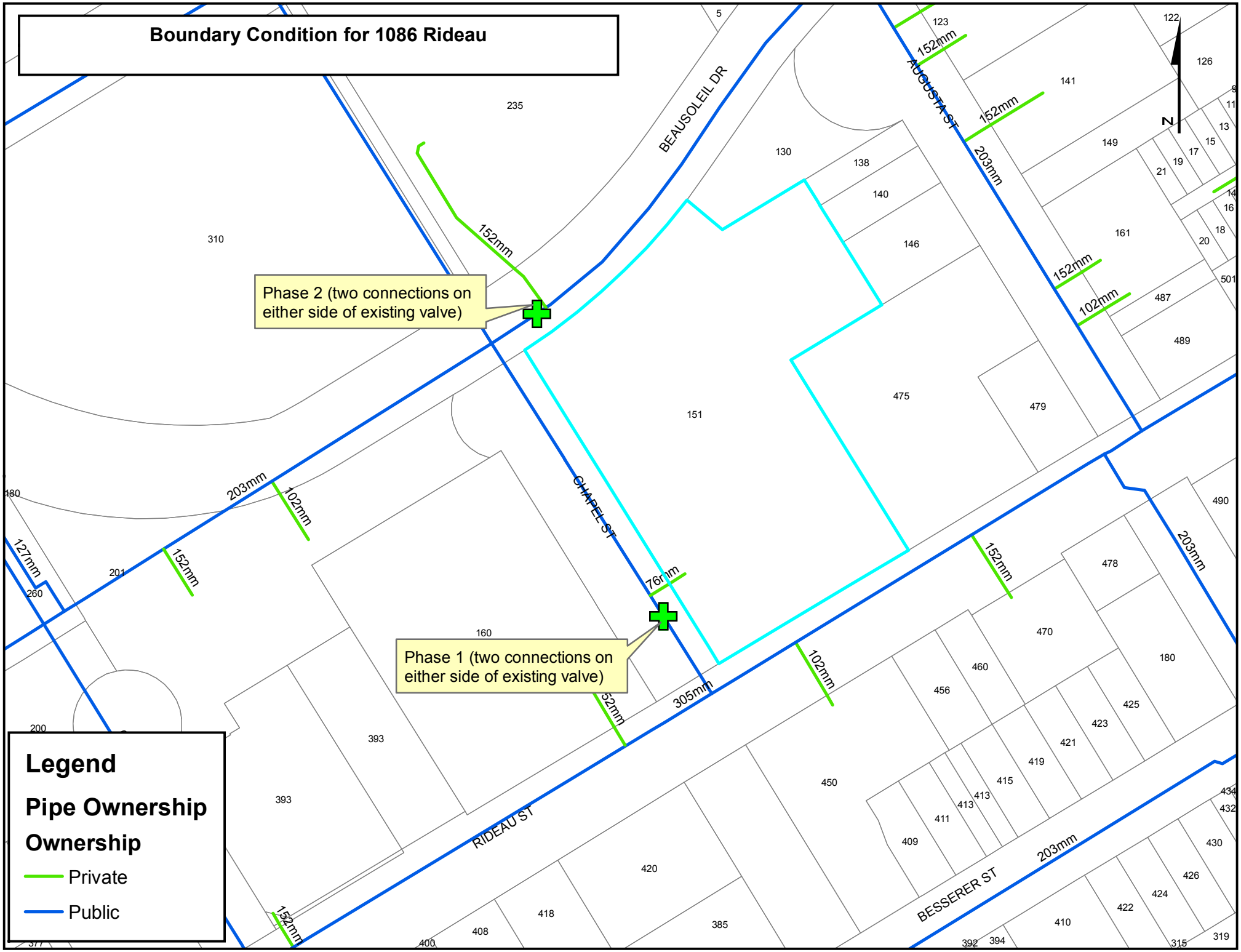
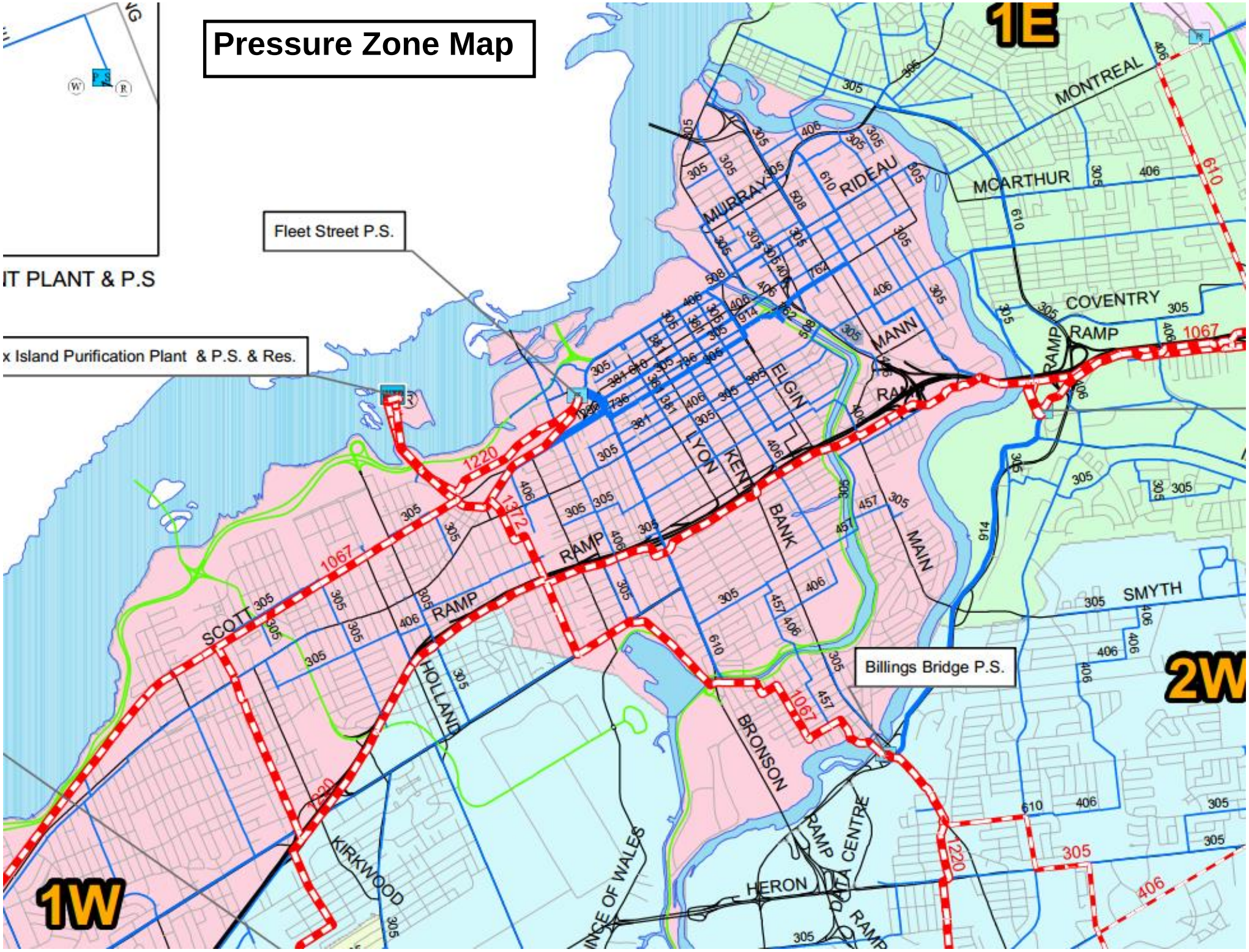

Boundary Condition for 1086 Rideau
Phase 2 (two connections on either side of existing valve)
Phase 1 (two connections on either side of existing valve)
BEAUSOLEIL DR
AUGUSTA ST
CHAPEL ST
RIDEAU ST
BESSERER ST
N
152mm
203mm
102mm
127mm
76mm
305mm
Legend
Pipe Ownership
Ownership
Private
Public

APPENDIX B

Water Supply

Pressure Zone Map



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	30	42
1 Bedroom	1.4	146	205
2 Bedroom	2.1	139	292
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	539	150.9	104.8	377.3	262.0	830.1	576.4

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	2.8 $L/m^2/d$	855	2.39	1.7	3.6	2.5	6.5	4.5
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			2.4	1.7	3.6	2.5	6.5	4.5
Total Demand			**153.3**	**106.5**	**380.9**	**264.5**	**836.5**	**580.9**

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	30	42
1 Bedroom	1.4	146	205
2 Bedroom	2.1	139	292
3 Bedroom	3.1		0
Average	1.8	318	573

	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	1112	311.4	216.2	778.4	540.6	1712.5	1189.2

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	2.8 $L/m^2/d$	855	2.39	1.7	3.6	2.5	6.5	4.5
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			2.4	1.7	3.6	2.5	6.5	4.5
Total Demand			**313.8**	**217.9**	**782.0**	**543.0**	**1718.9**	**1193.7**

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: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	31148.8	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	31062.3	L/min	
	31000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**26350.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%		**AREA**
Reduction	**-13175**	**L/min**	

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Non-Combustible	10.1m-20m	8.5	27	230	15%	
S	Non-Combustible	20.1m-30m	58	4	232	10%	
E	Non-Combustible	0m-3m	27	2	54	23%	
W	Non-Combustible	30.1m-45m	50	25	1250	5%	
		% Increase				**53%**	*value not to exceed 75%*

Increase	**13965.5**	**L/min**	

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	27140.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	27000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by Q4 Architects Inc. on July 7th, 2018.
-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

$F = 220C\sqrt{A}$ L/min *Where **F** is the fire flow, **C** is the Type of construction and **A** 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	24878.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	27760.1	L/min	
	28000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**23800.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%	
Reduction	**-11900**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Non-Combustible	30.1m-45m	65	1	65	5%	
S	Non-Combustible	10.1m-20m	10	25	250	15%	
E	Non-Combustible	10.1m-20m	23	2	46	13%	
W	Non-Combustible	>45m	27	15	405	0%	
		% Increase				**33%**	*value not to exceed 75%*

Increase	**7854.0**	**L/min**	

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	19754.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	20000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by Q4 Architects Inc. on July 7th, 2018.
-Calculations based on Fire Underwriters Survey - Part II

Boundary Conditions Unit Conversion

Phase 1

	Height (m)	Elevation (m)	m H_2O	PSI	kPa		L/s
Avg. DD	115.1	66.02	49.1	69.8	481.5	Fire Flow @ 140kPa	150
MAX+OBC	104.0	66.02	38.0	54.0	372.6		
Peak Hour	106.0	66.02	40.0	56.9	392.2		

Phase 2 Baeausoleil

	Height (m)	Elevation (m)	m H_2O	PSI	kPa		L/s
Avg. DD	115.1	63.39	51.7	73.6	507.3	Fire Flow @ 140kPa	150
MAX+OBC	104.0	63.39	40.6	57.8	398.4		
Peak Hour	106.0	63.39	42.6	60.6	418.0		

Chapel

	Height (m)	Elevation (m)	m H_2O	PSI	kPa
Avg. DD	115.1	63.64	51.5	73.2	504.8
MAX+OBC	104.0	63.64	40.4	57.4	395.9
Peak Hour	106.0	63.64	42.4	60.3	415.6

Rideau and Chapel

NFPA Calculations

As indicated by Section 11.2.2 from the ***NFPA***, fire flow requirements are to be determined by combining the required flow rate for the sprinkler system along with the anticipated hose stream As indicated by Table 11.2.2.1 and Table 11.2.3.1.2 extracted from the ***NFPA***, the anticipated fire flow requirements for the sprinkler system is ***4,150 L/min***. Since the sprinkler system is proposed to be fully supervised/monitored per section 11.2.2.5 of the ***NFPA,*** the lower flow of ***3,200 L/min*** was selected from Table 11.2.2.1. The anticipated internal and external total combined inside and outside hose stream demand is ***950 L/min*** per Table 11.2.3.1.2. As a result, the total fire flow is anticipated to be ***4,150 L/min*** .

Table 11.2.2.1 Water Supply Requirements for Pipe Schedule Sprinkler Systems

Occupancy Classification	Minimum Residual Pressure Required		Acceptable Flow at Base of Riser (Including Hose Stream Allowance)		Duration (minutes)
	psi	bar	gpm	L/min	
Light hazard	15	1	500–750	1900-2850	30–60
Ordinary hazard	20	1.4	850–1500	3200-5700	60–90

Table 11.2.3.1.2 Hose Stream Allowance and Water Supply Duration Requirements for Hydraulically Calculated Systems

Occupancy	Inside Hose		Total Combined Inside and Outside Hose		Duration (minutes)
	gpm	L/min	gpm	L/min	
Light hazard	0, 50, or 100	0, 190, or 380	100	380	30
Ordinary hazard	0, 50, or 100	0, 190, or 380	250	950	60–90
Extra hazard	0, 50, or 100	0, 190, or 380	500	1900	90–120

APPENDIX C

Wastewater Collection

151 Chapel Street
Existing Conditions

Existing Wastewater Design Flows per Unit Count
City of Ottawa Sewer Design Guidelines, 2012

Site Area 0.757 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.21 L/s**

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Office Space	75	per person	3	0.00
School[2]	90	L/student/d	250	0.26
Synagogue	30	per seat	730	0.25
Chapel	30	per seat	50	0.02
Assembly Hall	36	per person	350	0.15

Total Estimated Average Dry Weather Flow Rate	**0.68 L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.02 L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.23 L/s**

Trinity
151 Chapel Street
Proposed Site Conditions
Interim (Phase 1)

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

Site Area	0.72	**ha**	**Excluding Park Land*

Extraneous Flow Allowances

Infiltration / Inflow	**0.24**	**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 (Duplex)	2.3		0
Apartment			
Bachelor	1.4	30	42
1 Bedroom	1.4	146	205
2 Bedroom	2.1	139	292
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**539**	
Average Domestic Flow	**1.75**	**L/s**
Peaking Factor	**3.37**	
Peak Domestic Flow	**5.88**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5.0	$L/m^2/d$	855	0.10
Laundry*	1,200	L/machine/d		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/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*

Total Estimated Average Dry Weather Flow Rate	**1.85 L/s**
Total Estimated Peak Dry Weather Flow Rate	**6.03 L/s**
Total Estimated Peak Wet Weather Flow Rate	**6.26 L/s**

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines

Trinity
151 Chapel Street
Proposed Site Conditions
Ultimate (Phase 1 + 2)

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

Site Area 0.72 **ha** **Excluding Park Land*

Extraneous Flow Allowances

Infiltration / Inflow **0.24 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 (Duplex)	2.3		0
Apartment			
Bachelor	1.4	30	42
1 Bedroom	1.4	146	205
2 Bedroom	2.1	139	292
3 Bedroom	3.1		0
Average	1.8	318	573

Total Pop **1112**

Average Domestic Flow **3.60 L/s**

Peaking Factor **3.22**

Peak Domestic Flow **11.59 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5.0 $L/m^2/d$	855	0.10
Laundry*	1,200 L/machine/d		0.00
Hospitals	900 L/bed/d		0.00
School	70 L/student/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*

Total Estimated Average Dry Weather Flow Rate	**3.70 L/s**
Total Estimated Peak Dry Weather Flow Rate	**11.74 L/s**
Total Estimated Peak Wet Weather Flow Rate	**11.97 L/s**

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines

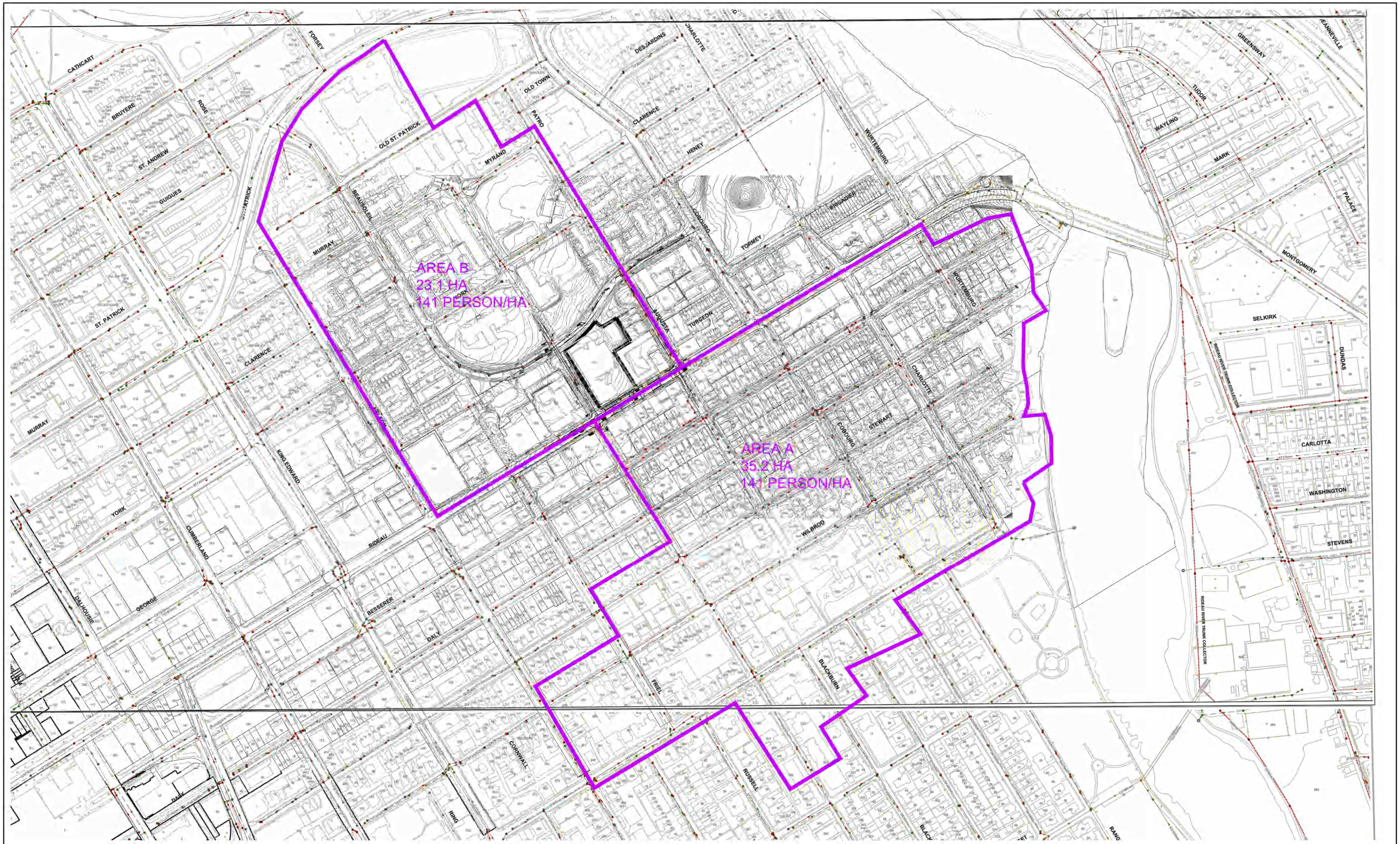
SANITARY SEWER CALCULATION SHEET

PROJECT: **Trinty Development Group**
LOCATION: **151 Chapel Street**
FILE REF: **13-670**
DATE: **26-Jun-14**

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 Comn	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	Estimated Pop	Pop.	Cumulative		Peak.	Q_{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q_{C+I+I}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
				Per Gross Ha		Area	Pop.	Fact.			Area		Area		Area		Area	Area	Flow	Flow								
			(ha)	(p/ha)		(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)	(-)
Area A			35.200	141	4963.2	35.200	4963.2	3.25	65.30	0.00	0.00	0.00	0.00	0.00	0.00	0.0	35.200	35.200	9.856	75.16	750	1.40		0.442	0.188	2.98	1317.2	0.06
Area B			23.100	141	3257.1	58.300	8220.3	3.04	101.19	0.00	0.00	0.00	0.00	0.00	0.00	0.0	23.100	23.100	6.468	107.66	525	0.30		0.216	0.131	1.09	235.6	0.46



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EXISTING SANITARY DRAINAGE AREA

PROJ NO.:	13-670
DRAWN BY:	SLM
DATE:	2014-06-26
SCALE:	NTS
FIGURE NO.:	SAN-1

z:\projects\13-670 trinity - rideau-chapel\b_design\b2_drawings\b2-2_main (dsel)\2014-04-02_prelim\2014-05-05_670_prelim.dwg

HA
R5B[1046] H(18)
YORK ST
BEAUSOLEIL DR
NELSON ST
R5L[1340] H(18) F(2.0)
LITTLE LONDON PRIV
R5B H(18) F(2.0)
TM6 F(5.0) H(19)
R5B[864] S132
TM6 F(4.5) H(19)
RIDEAU ST
CHAPEL ST
FRIEL ST
TM6 F(3.5) H(19)
TM6[158] F(3.5) H(19)
R5B[483] H(19)
R4T
R4T[481]
R4S[480]
DALY AVE
BESSERER ST
AUGUSTA ST
COBOURG ST
THORBURN PRIV
PRUDHOMME PRIV
TM6[158] F(3.0) H(19)
TM6[146] F(4.25) S141 h
TM6[158] F(3.5) H(19)
TM6 F(3.5) H(19)
TM6[832] F(3.0) H(19)
TM6[158] F(3.0) H(19)
R4T
R4T[492]
R4T[1509]
R4T[1500]
R4T[896]
R4T[934]
R4T[942]
LC1
LC3[1504]
LC3[122]
I1 S71
I1A S70
LC4 S70
R5F S70
R5F[1680] S70
R5B[483] H(37)
R5B[483] H(21)
TM6[100] F(3.5) H(37)
TM6[1603] H(19)
TM6[145] F(2.0) H(19)
MD S63
O1P
O1
R4S
R4S[492]
R4S[480]
R5B H(37)
R5B H(18)
R5B[408] H(19)
R4M
R4M[891]
R4M[1927]
R4M[481]
R4M[982] S225
R4M[904]
R5B[480] H(33)
R5G[480] H(33)
R4P[480]
R4F[1307]
R4F[492]
R4F[976]
R4F[480]
I1A
GM1[96] H(11)
GM11[175]
R5D[1147]
WURTEMBURG ST
WILBROD ST
LAURIER AVE E
OSGOODE ST
BLACKBURN AVE
COULBURN AVE
MARLBOROUGH AVE
RANGER RD
NORTH RIVER RD
SELKIRK ST
MCARTHUR AVE
CARLOTTA ST
DONALD ST
RUSSELL AVE
SWEETLAND AVE
GUMBERLAND ST
KING EDWARD AVE
RIDEAU ST
YORK ST
NELSON ST
FRIEL ST
CHAPEL ST
CHARLOTTE ST
SITEWART ST
GOULBURN AVE

APPENDIX D

Stormwater Management

Trinity Development Group
151 Chapel Street
Existing Conditions

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

Existing Drainage Charateristics From Internal Site

Area	0.72	ha	**Area excluding Park land*
C	0.85	Rational Method runoff coefficient	
L	148	m	
Up Elev	68.75	m	
Dn Elev	63.50	m	
Slope	3.5	%	
Tc	6.5	min	<-- Use 10 mins Tc as minimum

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	76.8	104.2	178.6	mm/hr
Q	129.8	176.0	354.9	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, 2012

Target Flow Rate

Area*	0.44	ha
C	0.5	Rational Method runoff coefficient
t_c	10.0	min

**Phase 1 development area*

	5-year	
i	104.2	mm/hr
Q	64.1	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID	U1	
Total Area	0.055	ha
C	0.65	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)
10.0	104.2	10.3	10.3	0.0	0.0	178.6	22.2	22.2	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

Area ID	A1-BLDG, A1-PRKG	
Total Area	0.376	ha **Ultimate drainage area of Phase 1 from Ultimate Stormwater Management Plan drawing SWM-1*
C	0.87	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)
10	104.2	94.7	21.3	73.4	44.0	178.6	186.5	41.9	144.6	86.7
15	83.6	75.9	21.3	54.6	49.1	142.9	149.2	41.9	107.3	96.6
20	70.3	63.8	21.4	42.5	51.0	120.0	125.3	41.9	83.3	100.0
25	60.9	55.3	21.4	33.9	50.9	103.8	108.5	41.9	66.5	99.8
30	53.9	49.0	21.4	27.6	49.6	91.9	96.0	41.9	54.0	97.2
35	48.5	44.1	21.4	22.6	47.6	82.6	86.2	41.9	44.3	93.0
40	44.2	40.1	21.5	18.7	44.9	75.1	78.5	41.9	36.5	87.7
45	40.6	36.9	21.5	15.4	41.7	69.1	72.1	41.9	30.2	81.5
50	37.7	34.2	21.5	12.7	38.2	64.0	66.8	41.9	24.9	74.6
55	35.1	31.9	21.5	10.4	34.4	59.6	62.3	41.9	20.3	67.1
60	32.9	29.9	21.5	8.4	30.3	55.9	58.4	41.9	16.4	59.2
65	31.0	28.2	21.5	6.7	26.1	52.6	55.0	41.9	13.0	50.9
70	29.4	26.7	21.5	5.2	21.7	49.8	52.0	41.9	10.1	42.3
75	27.9	25.3	21.5	3.8	17.1	47.3	49.4	41.9	7.4	33.4
80	26.6	24.1	21.5	2.6	12.4	45.0	47.0	41.9	5.0	24.2
85	25.4	23.1	21.6	1.5	7.7	43.0	44.9	41.9	2.9	14.9
90	24.3	22.1	21.6	0.5	2.8	41.1	42.9	41.9	1.0	5.4
95	23.3	21.2	21.6	0.0	0.0	39.4	41.2	41.9	0.0	0.0
100	22.4	20.4	21.6	0.0	0.0	37.9	39.6	41.9	0.0	0.0
105	21.6	19.6	21.6	0.0	0.0	36.5	38.1	41.9	0.0	0.0
110	20.8	18.9	21.6	0.0	0.0	35.2	36.8	41.9	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)

5-year $Q_{attenuated}$	**21.37 L/s**	**100-year $Q_{attenuated}$**	**41.94 L/s**
5-year Max. Storage Required	**51.0 m^3**	**100-year Max. Storage Required**	**100.0 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	10.3	0.0	22.2	0.0
Attenutated Areas	21.4	51.0	41.9	100.0
Total	**31.7**	**51.0**	**64.1**	**100.0**

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

Estimated Pre Development Peak Flow from Phase 2 Site Area

Total Area 0.285 ha
C 0.85 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)
10.0	104.2	70.1	70.1	0.0	0.0	178.6	141.4	141.4	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 Interim Development Peak Flow from Phase 2 Site Area

Total Area 0.285 ha
C 0.65 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)
10.0	104.2	53.6	53.6	0.0	0.0	178.6	114.9	114.9	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)

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

Target Flow Rate

Area	0.27	ha	**Area Excluding Park Land*
C	0.50	Rational Method runoff coefficient	
t_c	10.0	min	

	5-year	
i	104.2	mm/hr
Q	39.4	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID	U2	
Total Area	0.030	ha
C	0.54	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)**
10.0	104.2	4.7	4.7	0.0	0.0	178.6	10.0	10.0	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

Area ID	A2	
Total Area	0.238	ha
C	0.73	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)**
10	104.2	50.3	13.7	36.6	22.0	178.6	107.7	29.3	78.4	47.0
15	83.6	40.3	13.7	26.6	23.9	142.9	86.2	29.3	56.9	51.2
20	70.3	33.9	13.7	20.2	24.2	120.0	72.4	29.3	43.0	51.7
25	60.9	29.4	13.8	15.6	23.5	103.8	62.6	29.3	33.3	50.0
30	53.9	26.0	13.8	12.3	22.1	91.9	55.4	29.3	26.1	47.0
35	48.5	23.4	13.8	9.6	20.2	82.6	49.8	29.3	20.5	43.0
40	44.2	21.3	13.8	7.5	18.1	75.1	45.3	29.3	16.0	38.4
45	40.6	19.6	13.8	5.8	15.7	69.1	41.7	29.3	12.3	33.3
50	37.7	18.2	13.8	4.4	13.1	64.0	38.6	29.3	9.3	27.8
55	35.1	17.0	13.8	3.1	10.3	59.6	36.0	29.3	6.7	21.9
60	32.9	15.9	13.8	2.1	7.5	55.9	33.7	29.3	4.4	15.8
65	31.0	15.0	13.8	1.2	4.5	52.6	31.8	29.3	2.4	9.5
70	29.4	14.2	13.8	0.3	1.4	49.8	30.0	29.3	0.7	3.0
75	27.9	13.5	13.8	0.0	0.0	47.3	28.5	29.3	0.0	0.0
80	26.6	12.8	13.8	0.0	0.0	45.0	27.1	29.3	0.0	0.0
85	25.4	12.2	13.9	0.0	0.0	43.0	25.9	29.3	0.0	0.0
90	24.3	11.7	13.9	0.0	0.0	41.1	24.8	29.3	0.0	0.0
95	23.3	11.2	13.9	0.0	0.0	39.4	23.8	29.3	0.0	0.0
100	22.4	10.8	13.9	0.0	0.0	37.9	22.9	29.3	0.0	0.0
105	21.6	10.4	13.9	0.0	0.0	36.5	22.0	29.3	0.0	0.0
110	20.8	10.0	13.9	0.0	0.0	35.2	21.2	29.3	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)

5-year $Q_{attenuated}$	**13.74 L/s**	**100-year $Q_{attenuated}$**	**29.32 L/s**
5-year Max. Storage Required	**24.2 m^3**	**100-year Max. Storage Required**	**51.7 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	4.7	0.0	10.0	0.0
Attenutated Areas	13.7	24.2	29.3	51.7
Total	**18.4**	**24.2**	**39.4**	**51.7**

Trinity Development Group
151 Chapel Street
Enhanced Swale Design

									Ditch Data												
Up	Down	Area	C	Indiv AxC	Acc AxC	T_C	I	Q	depth	Side Slope	Bot. Width	Mannings	Slope	Length	A_{flow}	Wet. Per.	R	Velocity	Qcap	Time Flow	Q / Q full
		(ha)	(-)			(min)	(mm/hr)	(L/s)	(mm)	(X:1)	(m)	n	(%)	(m)	(m^2)	(m)	(m)	(m/s)	(L/s)	(min)	(-)
		0.285	0.65	0.19	0.19		33.9	17.4	150	3	0.5	0.03	0.50	65	0.143	1.449	0.10	0.50	71.6	2.2	0.24

Detailed Stormceptor Sizing Report – 151 Chapel St.

Project Information & Location			
Project Name	151 Chapel St.	**Project Number**	-
City	Ottawa	**State/ Province**	Ontario
Country	Canada	**Date**	6/15/2019
Designer Information		**EOR Information (optional)**	
Name	Brandon O'Leary	**Name**	Brandon Chow
Company	Forterra	**Company**	David Schaeffer Engineering Ltd.
Phone #	905-630-0359	**Phone #**	
Email	brandon.oleary@forterrabp.com	**Email**	

Stormwater Treatment Recommendation

The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Site Name	151 Chapel St.
Recommended Stormceptor Model	EFO4
TSS Removal (%) Provided	82
Particle Size Distribution (PSD)	Fine Distribution
Rainfall Station	OTTAWA MACDONALD-CARTIER INT'L A

The recommended Stormceptor model achieves the water quality objectives based on the selected inputs, historical rainfall records and selected particle size distribution.

EFO Sizing Summary			
EFO Model	**% TSS Removal Provided**	**% Runoff Volume Captured Provided**	**Standard EFO Hydrocarbon Storage Capacity**
EFO4	82	98	265 L (70 gal)
EFO6	90	100	610 L (160 gal)
EFO8	93	100	1070 L (280 gal)
EFO10	95	100	1670 L (440 gal)
EFO12	96	100	2475 L (655 gal)
Parallel Units / MAX	Custom	Custom	Custom

For Stormceptor Specifications and Drawings Please Visit:
http://www.imbriumsystems.com/technical-specifications

OVERVIEW

Stormceptor ® EF is a continuation and evolution of the most globally recognized oil-grit separator (OGS) stormwater treatment technology - **Stormceptor ®.** Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil-grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at higher flow rates as compared to the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention technology and internal bypass ensures sediment is retained during all rainfall events.

Design Methodology

Stormceptor is sized using PCSWMM for Stormceptor, a continuous simulation model based on US EPA SWMM. The program calculates hydrology using local historical rainfall data and specified site parameters. With US EPA SWMM's precision, every Stormceptor unit is designed to achieve a defined water quality objective. The TSS removal data presented follows US EPA guidelines to reduce the average annual TSS load. The Stormceptor's unit process for TSS removal is settling. The settling model calculates TSS removal by analyzing:

- Site parameters
- Continuous historical rainfall data, including duration, distribution, peaks & inter-event dry periods
- Particle size distribution, and associated settling velocities (Stokes Law, corrected for drag)
- TSS load
- Detention time of the system

Hydrology Analysis
PCSWMM for Stormceptor calculates annual hydrology with the US EPA SWMM and local continuous historical rainfall data. Performance calculations of Stormceptor are based on the average annual removal of TSS for the selected site parameters. The Stormceptor is engineered to capture sediment particles by treating the required average annual runoff volume, ensuring positive removal efficiency is maintained during each rainfall event, and preventing negative removal efficiency (scour). Smaller recurring storms account for the majority of rainfall events and average annual runoff volume, as observed in the historical rainfall data analyses presented in this section.

Rainfall Station			
State/Province	Ontario	**Total Number of Rainfall Events**	4093
Rainfall Station Name	OTTAWA MACDONALD-CARTIER INT'L A	**Total Rainfall (mm)**	20978.1
Station ID #	6000	**Average Annual Rainfall (mm)**	567.0
Coordinates	45°19'N, 75°40'W	**Total Evaporation (mm)**	1815.7
Elevation (ft)	370	**Total Infiltration (mm)**	619.4
Years of Rainfall Data	37	**Total Rainfall that is Runoff (mm)**	18543.0

Notes
• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules. • Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed. • For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

ONLINE APPLICATION

Stormceptor EF's internal bypass and patent-pending scour prevention technology has demonstrated very effective retention of pollutants in third-party testing and verification following the Canadian ETV's **Procedure for Laboratory Testing of Oil-Grit Separators.** Sediment scour prevention demonstrated an effluent concentration of less than 10 mg/L for sediment particles ranging from 1 to 1,000 microns, even during peak influent flow rates associated with infrequent high intensity storm events. While Stormceptor EF will capture oil, only the Stormceptor EFO configuration has been third-party tested and verified to retain greater than 99% of captured oil. Based on these verified performance attributes, the most efficient and widely accepted application of Stormceptor EF is an online configuration, which allows all upstream conveyance flows to enter and exit the unit. The online application eliminates the need for costly additional bypass structures, piping and installation expense.

FLOW ENTRANCE OPTIONS

Single Inlet Pipe – A common design which includes one inlet pipe and one outlet pipe. A 90-degree (maximum) bend is also accepted with this configuration.

Inlet Grate – Allows surface runoff to enter the unit from grade. The inlet grate option can also be used in conjunction with one inlet pipe or multiple inlet pipes. A removable flow deflector is added in the Stormceptor EF4/EFO4.

Maximum Pipe Diameter		
Model	Inlet (in/mm)	Outlet (in/mm)
EF4 / EFO4	24 / 610	24 / 610
EF6 / EFO6	36 / 915	36 / 915
EF8 / EFO8	48 / 1220	48 / 1220
EF10 / EFO10	72 / 1828	72 / 1828
EF12 / EFO12	72 / 1828	72 / 1828

Multiple Inlet Pipe – Allows for multiple inlet pipes of various diameters to enter the unit.

Maximum Pipe Diameter		
Model	Inlet (in/mm)	Outlet (in/mm)
EF4 / EFO4	18 / 457	24 / 610
EF6 / EFO6	30 / 762	36 / 915
EF8 / EFO8	42 / 1067	48 / 1220
EF10 / EFO10	60 / 1524	72 / 1828
EF12 / EFO12	60 / 1524	72 / 1828

Drainage Area	
Total Area (ha)	0.175
Imperviousness %	97

Up Stream Storage	
Storage (ha-m)	Discharge (cms)
0.000	0.000

Up Stream Flow Diversion	
Max. Flow to Stormceptor (cms)	

Water Quality Objective	
TSS Removal (%)	80.0
Runoff Volume Capture (%)	90.00
Oil Spill Capture Volume (L)	
Peak Conveyed Flow Rate (L/s)	
Water Quality Flow Rate (L/s)	

Design Details	
Stormceptor Inlet Invert Elev (m)	
Stormceptor Outlet Invert Elev (m)	
Stormceptor Rim Elev (m)	
Normal Water Level Elevation (m)	
Pipe Diameter (mm)	
Pipe Material	
Multiple Inlets (Y/N)	No
Grate Inlet (Y/N)	No

Particle Size Distribution (PSD)

Removing the smallest fraction of particulates from runoff ensures the majority of pollutants, such as metals, hydrocarbons and nutrients are captured. The table below identifies the Particle Size Distribution (PSD) that was selected to define TSS removal for the Stormceptor design.

Fine Distribution		
Particle Diameter (microns)	Distribution %	Specific Gravity
20.0	20.0	1.30
60.0	20.0	1.80
150.0	20.0	2.20
400.0	20.0	2.65
2000.0	20.0	2.65

Site Name	151 Chapel St.

Site Details

Drainage Area

Total Area (ha)	0.175
Imperviousness %	97
Oil Spill Capture Volume (L)	

Infiltration Parameters

Horton's equation is used to estimate infiltration

Max. Infiltration Rate (mm/hr)	61.98
Min. Infiltration Rate (mm/hr)	10.16
Decay Rate (1/sec)	0.00055
Regeneration Rate (1/sec)	0.01

Surface Characteristics

Width (m)	84.00
Slope %	2
Impervious Depression Storage (mm)	0.508
Pervious Depression Storage (mm)	5.08
Impervious Manning's n	0.015
Pervious Manning's n	0.25

Evaporation

Daily Evaporation Rate (mm/day)	2.54

Dry Weather Flow

Dry Weather Flow (L/s)	0

Maintenance Frequency

Maintenance Frequency (months) >	12

Winter Months

Winter Infiltration	0

TSS Loading Parameters

TSS Loading Function	Build Up/ Wash-off

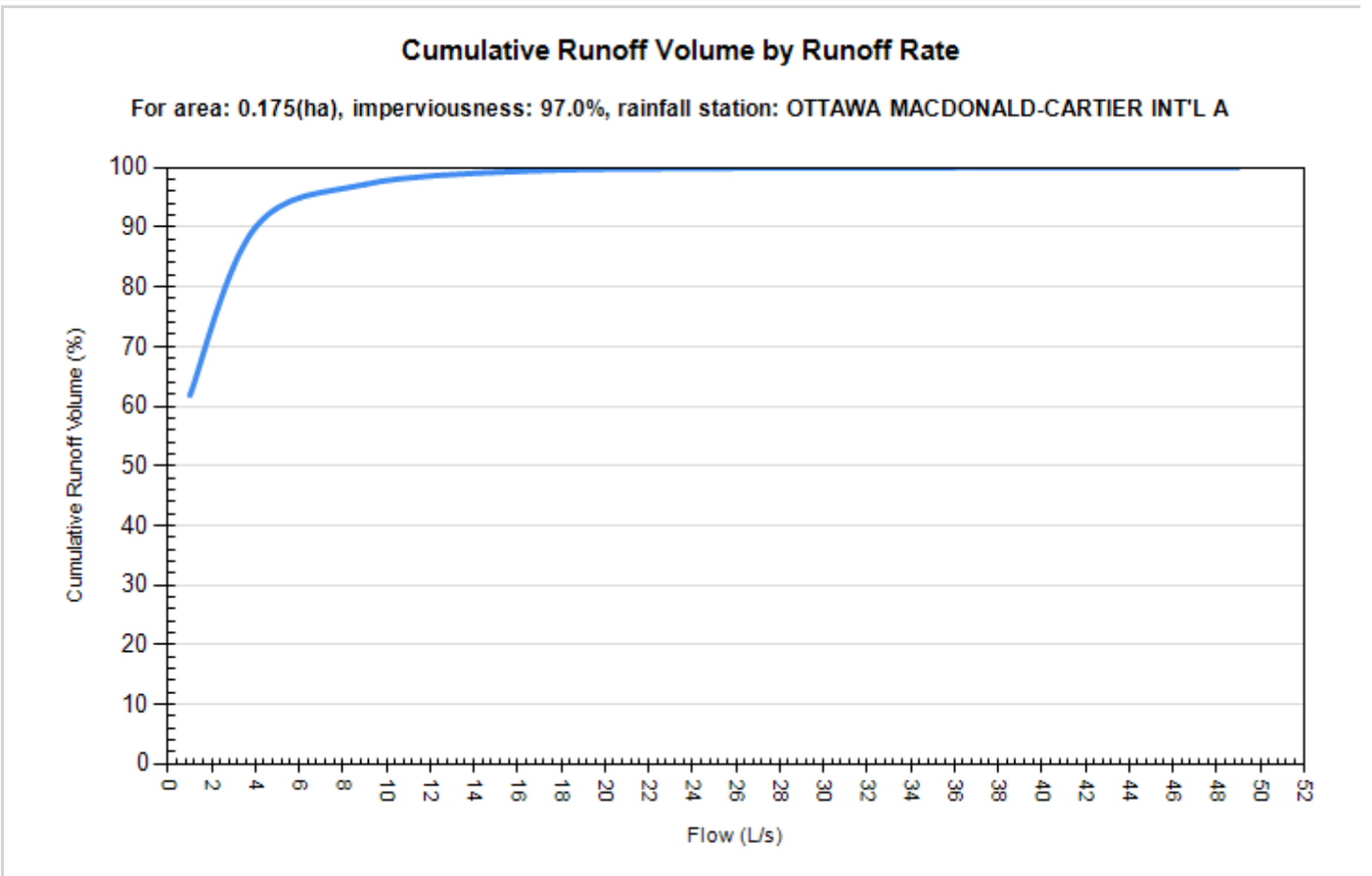
Buildup/Wash-off Parameters

Target Event Mean Conc. (EMC) mg/L	125
Exponential Buildup Power	0.40
Exponential Washoff Exponent	0.20

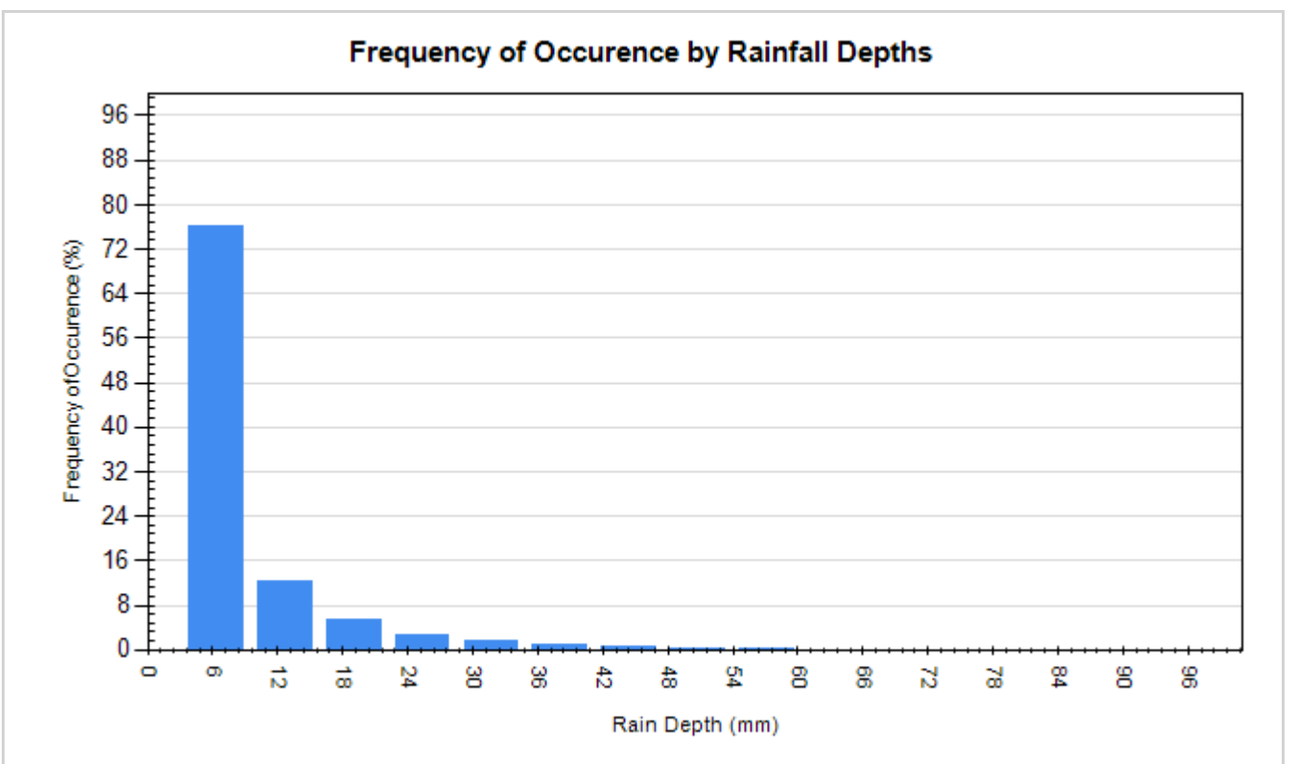
TSS Availability Parameters

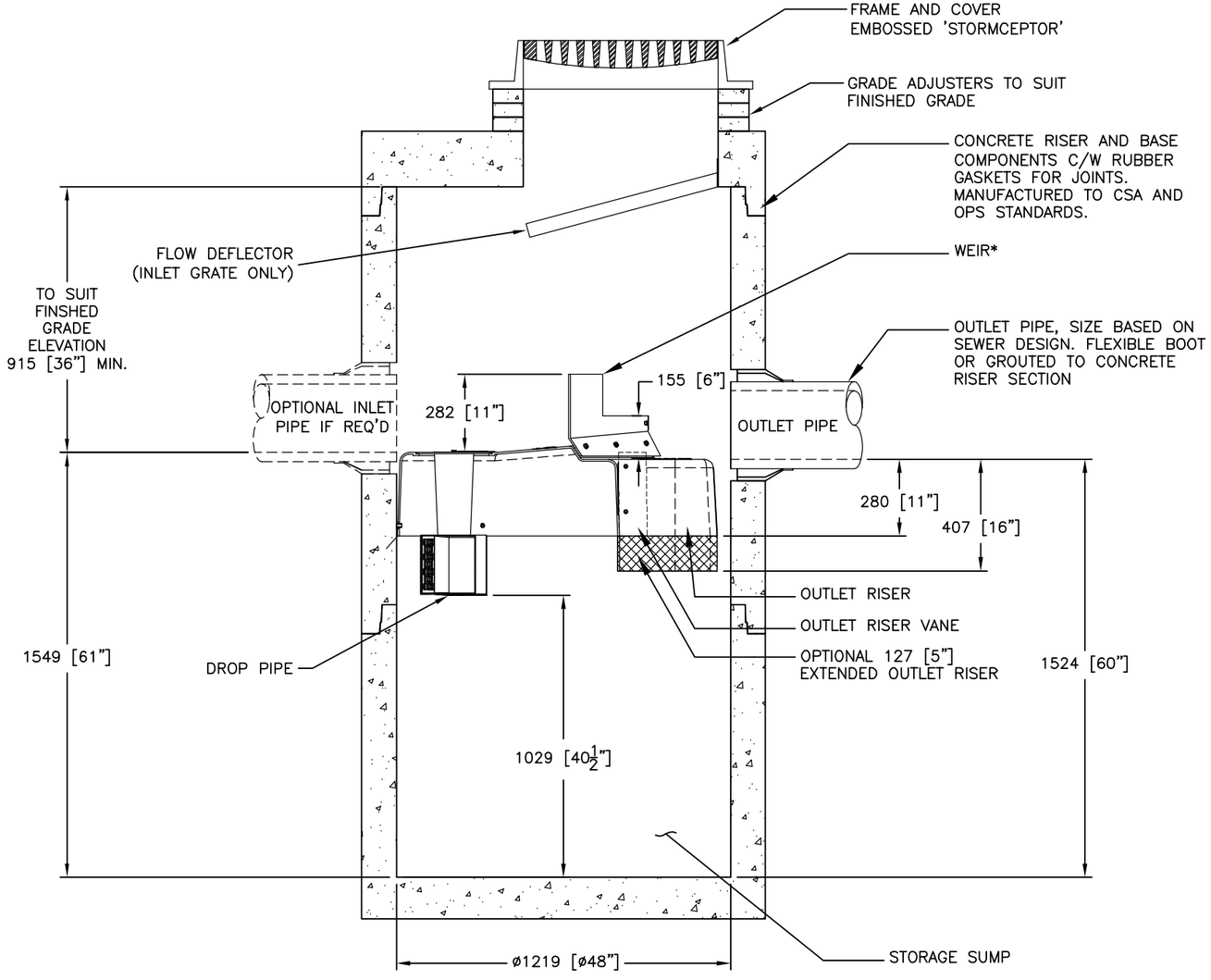
Availability Constant A	0.057
Availability Factor B	0.04
Availability Exponent C	1.10
Min. Particle Size Affected by Availability (micron)	400

Cumulative Runoff Volume by Runoff Rate			
Runoff Rate (L/s)	**Runoff Volume (m³)**	**Volume Over (m³)**	**Cumulative Runoff Volume (%)**
1	20199	12492	61.8
4	29439	3256	90.0
9	31770	924	97.2
16	32495	200	99.4
25	32670	25	99.9
36	32695	0	100.0
49	32695	0	100.0

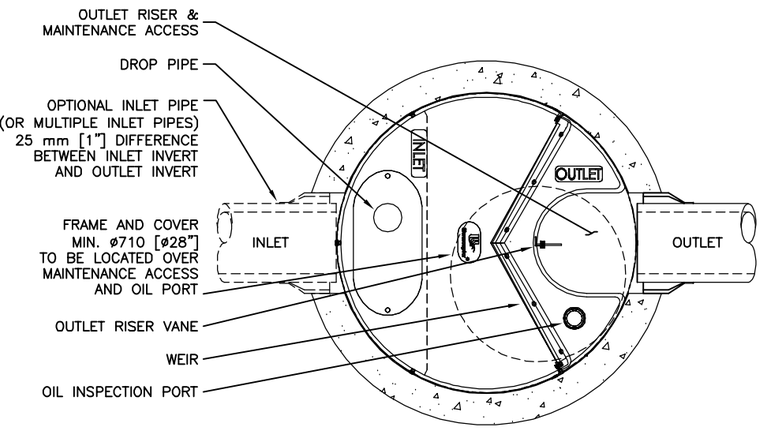


Rainfall Event Analysis				
Rainfall Depth (mm)	**No. of Events**	**Percentage of Total Events (%)**	**Total Volume (mm)**	**Percentage of Annual Volume (%)**
6.35	3113	76.1	5230	24.9
12.70	501	12.2	4497	21.4
19.05	225	5.5	3469	16.5
25.40	105	2.6	2317	11.0
31.75	62	1.5	1765	8.4
38.10	35	0.9	1206	5.8
44.45	28	0.7	1163	5.5
50.80	12	0.3	557	2.7
57.15	7	0.2	378	1.8
63.50	1	0.0	63	0.3
69.85	1	0.0	64	0.3
76.20	1	0.0	76	0.4
82.55	0	0.0	0	0.0
88.90	1	0.0	84	0.4
95.25	0	0.0	0	0.0
101.60	0	0.0	0	0.0

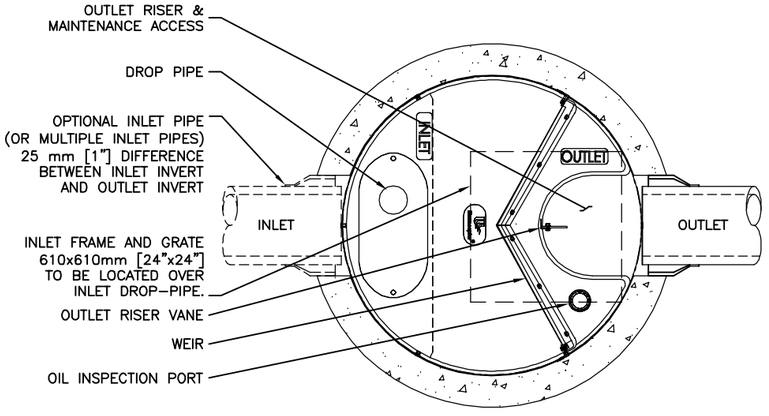




SECTION VIEW



PLAN VIEW (STANDARD)



PLAN VIEW (INLET TOP)

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF4 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO4 (OIL CAPTURE CONFIGURATION). WEIR HEIGHT IS 150 mm (6 INCH) FOR EF04.

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO4
STRUCTURE ID	*
HYDROCARBON STORAGE REQ'D (L)	*
WATER QUALITY FLOW RATE (L/s)	*
PEAK FLOW RATE (L/s)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
DRAINAGE AREA (HA)	*
DRAINAGE AREA IMPERVIOUSNESS (%)	*

PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	UPDATES	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON, L1N 9A9
TF 800-565-4501 CA 416-800-9000 INTL +1-416-800-9000

DATE: 10/13/2017

DESIGNED:	DRAWN:
JSK	JSK
CHECKED:	APPROVED:
BSF	SP
PROJECT No.:	SEQUENCE No.:
EFO4	*

SHEET: 1 OF 1

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

Proposed Drainage Charateristics From Internal Site

Area	0.114	ha
C	0.81	Rational Method runoff coefficient
Tc	10.0	min

1) Time of Concentration per Federal Aviation Administration

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

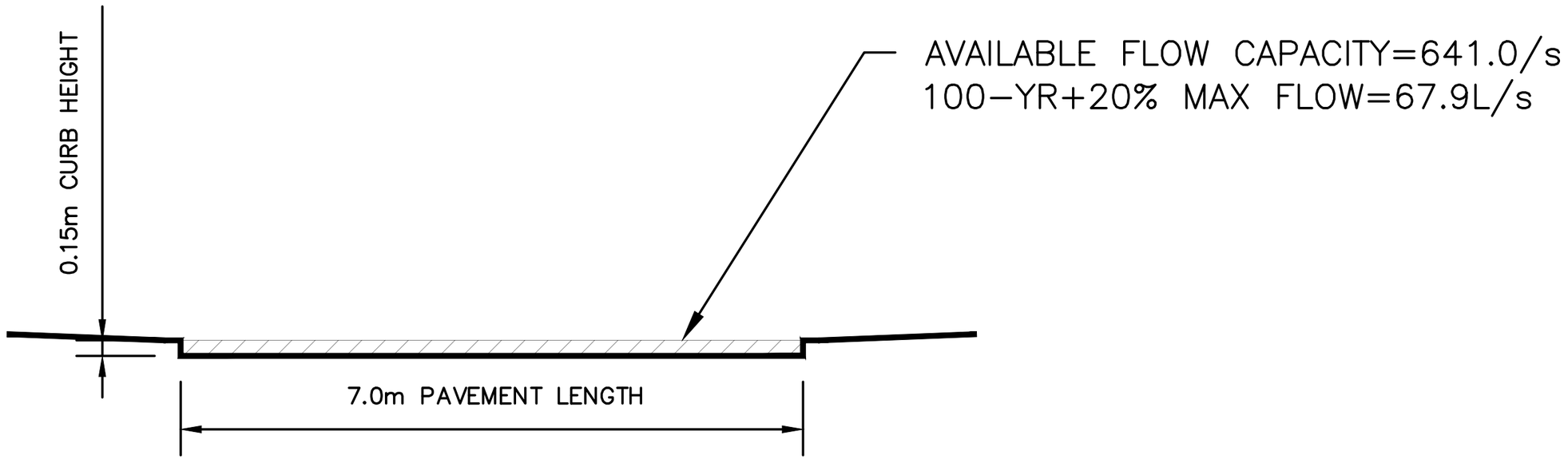
tc, in minutes
C, rational method coefficient, (-)
L, length in ft
S, average watershed slope in %

Estimated Peak Flow

	100-year	**100-year+20%**	
i	178.6	214.3	mm/hr
Q	56.5	67.9	L/s

Proposed Weir Calculations

	Emergency Weir*
Invert (m)	65.00
Bottom Width (m)	7
Weir Coefficient	1.58
Max Head (m)	0.15
Max Flow (L/s)	641
* Side slopes not considered	0.72



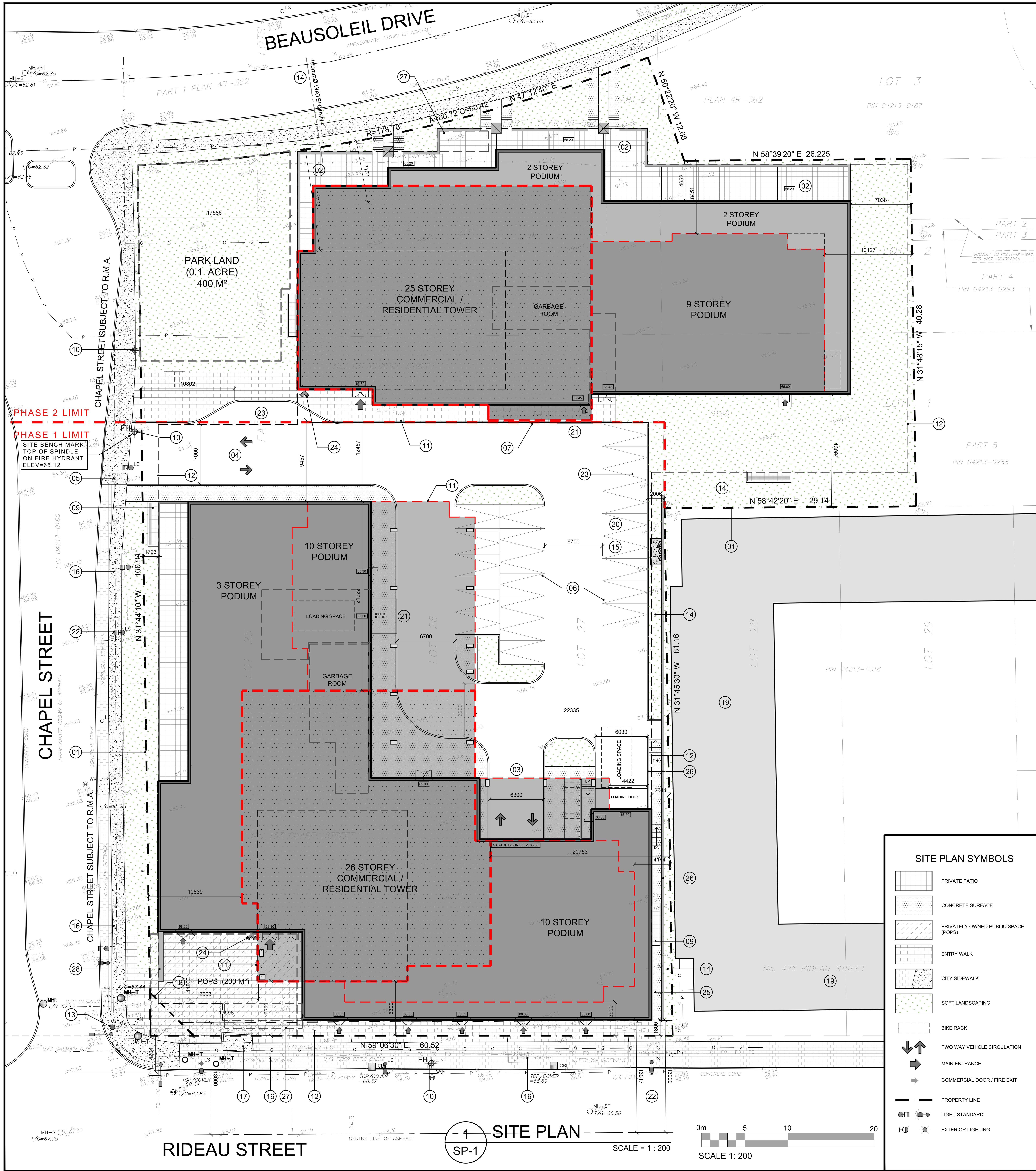
CROSS-SECTION A-A

N.T.S

NOTE

REFER TO SWM-1 & SWM-2 FOR LOCATION OF CROSS-SECTION A-A

DRAWINGS / FIGURES



KEY MAP

DRAWING NOTES

1. PROPERTY LINE
2. RAISED PATIO AT GROUND LEVEL, SEE LANDSCAPE PLAN FOR PATTERN AND TYPE
3. PARKING GARAGE ENTRY DRIVEWAY / RAMP WITH TRENCH DRAIN
4. 2 WAY DRIVEWAY TO EXTERIOR PARKING LOT / GARBAGE LOADING AREA
5. DEPRESSED CURB / SIDEWALK TO CITY STANDARDS
6. COMMERCIAL / VISITOR ASPHALT PARKING LOT
7. 150mm BARRIER CURB
8. BICYCLE PARKING SPACES (0.6 x 1.8M) WITH RACK
9. AIR INTAKE / EXHAUST GRILL
10. EXISTING FIRE HYDRANT RELOCATED IF REQUIRED
11. OUTLINE OF BUILDING ABOVE
12. OUTLINE OF UNDERGROUND PARKING LEVELS
13. EXISTING UTILITY POLE
14. SOFT LANDSCAPING - SEE LANDSCAPE PLAN
15. GAS REGULATOR / METER EQUIPMENT AREA
16. EXISTING SIDEWALK WITH STREET CURB
17. EXISTING BUS STOP
18. 5.0 x 5.0 M SITE TRIANGLE
19. EX. 2 STOREY BUILDING ON ADJACENT PROPERTY
20. STANDARD PARKING SPACE 2.6 x 5.2 M
21. DEPRESSED CURB AND WALK
22. EXISTING STREET LIGHT
23. PASSENGER DROP OFF / PICK UP
24. SIAMESE CONNECTION
25. WALKWAY WITH STEPS, HANDRAIL AS REQUIRED
26. CAST IN PLACE CONCRETE RETAINING WALL
27. CISTERN LOCATION IN PARKING LEVELS
28. RAISED RETAINING WALL AS SEAT HEIGHT

LEGAL DESCRIPTION

TOPOGRAPHIC PLAN of
LOTS 25, 26 AND 27
(NORTH RIDEAU STREET)
LOTS 1, 2 AND PART OF LOT 3
(EAST CHAPEL STREET)
PART OF LOTS 1, 2 AND 3
(WEST AUGUSTA STREET)
REGISTERED PLAN 43586
CITY OF OTTAWA

PROJECT DEVELOPER

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Tel: (613) 836-0856
Fax: (613) 836-7183
Email: smerrick@dsel.ca

PROJECT STATISTICS - PHASE 1

BUILDING HEIGHT		94.0 M
AVERAGE MEAN GRADE		(GEO. ELEV.) 66.70

GROSS BUILDING - AREAS
(CITY OF OTTAWA'S DEFINITION)

P2 PARKING LEVEL		N/A
P1 PARKING LEVEL		N/A
LOWER - GROUND FLOOR (COURTYARD)		N/A
UPPER - GROUND FLOOR (STREET)		1,465.4 sq. m. (15,774) sq. ft.
MEZZANINE LEVEL		797.1 sq. m. (8,580) sq. ft.
3rd FLOOR		1,040.8 sq. m. (11,202) sq. ft.
4th to 10th FLOOR	7 x 1,397.5 sq. m. 7 x (15,043) sq. ft.	9,782.8 sq. m. (105,301) sq. ft.
11th FLOOR		604.0 sq. m. (6,502) sq. ft.
12th to 26th FLOOR	15 x 751.4 sq. m. 15 x (8,088) sq. ft.	11,271.0 sq. m. (121,320) sq. ft.
MECHANICAL FLOOR		N/A
TOTAL AREA		24,961.1 sq. m. (268,679) sq. ft.

UNIT STATISTICS

STUDIO UNIT	30
1 BEDROOM UNIT	100
1 BEDROOM + DEN UNIT	46
2 BEDROOM UNIT	102
2 BEDROOM + DEN UNIT	37
TOTAL	315
COMMERCIAL RETAIL	855.0 sq. m. (9,203) sq. ft.

AMENITY AREA

2nd FLOOR AMENITY ROOM - COMMUNAL	346.5 sq. m.
2nd FLOOR EXTERIOR DECK - COMMUNAL	414.6 sq. m.
10th FLOOR EXTERIOR DECK - COMMUNAL	495.7 sq. m.
DECKS - PRIVATE	266.0 sq. m.
BALCONIES - PRIVATE	649.7 sq. m.
TOTAL	2,172.5 sq. m.
TOTAL COMMUNAL	1,256.8 sq. m.

REQUIRED (315 UNITS X 6 m²) = 1,890 sq. m.
REQUIRED COMMUNAL @ 50% = 945 sq. m.

CAR PARKING

REQUIRED by ZONING BY-LAW

RESIDENCE	- 0.5 PER UNIT (316 UNITS) (AFTER 12 UNITS)	152
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	30
COMMERCIAL RETAIL (RETAIL FOOD, BANK & CONVENIENCE STORE)	- NOT REQUIRED FOR UNITS UNDER 500m² G.F.A.	0
TOTAL		182

PROVIDED

RESIDENCE	- 0.57 PER UNIT	240
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	30
COMMERCIAL RETAIL (RETAIL FOOD, BANK & CONVENIENCE STORE)	- 2.5 PER 100m² OF G.F.A. AFTER 150m²	9
TOTAL		279

BICYCLE PARKING

REQUIRED

RESIDENCE	- 0.5 PER UNIT (316 UNITS)	158
COMMERCIAL RETAIL	- 1.0 PER 250m² OF G.F.A.	3
TOTAL		161

PROVIDED

EXTERIOR	12
UNDERGROUND PARKING LEVEL	160
TOTAL	172

PROJECT INFORMATION

ZONING	TM[2339] F(6.0) S354
SITE AREA	7,568.9 sq. m. (81,471) sq. ft.
SITE AREA - PHASE 1	4,301.8 sq. m. (46,304) sq. ft.
SITE AREA - PHASE 2	3,267.1 sq. m. (35,167) sq. ft.
BUILDING HEIGHT AS PER SCHEDULE S354	94.0 M
DENSITY = 6.0	45,413.4 sq. m. (488,826) sq. ft.
AMENITY SPACE (6.0m² PER UNIT) 633	3,798 sq. m. (40,560) sq. ft.

PROJECT STATISTICS - PHASE 2

BUILDING HEIGHT		94.0 M
AVERAGE MEAN GRADE		(GEO. ELEV.) 64.50

GROSS BUILDING - AREAS
(CITY OF OTTAWA'S DEFINITION)

PARKING LEVELS		N/A
GROUND FLOOR		606.1 sq. m. (6,524) sq. ft.
2nd FLOOR		1,080.9 sq. m. (11,635) sq. ft.
3rd to 9th FLOOR	7 x 1,076.3 sq. m. 7 x (11,586) sq. ft.	7,534.1 sq. m. (81,096) sq. ft.
10th FLOOR		594.6 sq. m. (6,400) sq. ft.
11th to 25th FLOOR	15 x 707.0 sq. m. 15 x (7,610) sq. ft.	10,605.0 sq. m. (114,151) sq. ft.
MECHANICAL FLOOR		N/A
TOTAL AREA		20,420.6 sq. m. (219,806) sq. ft.

UNIT STATISTICS

STUDIO UNIT	
1 BEDROOM UNIT	
1 BEDROOM + DEN UNIT	
2 BEDROOM UNIT	
2 BEDROOM + DEN UNIT	
TOTAL	318

AMENITY AREA

AT GARDE EXTERIOR - COMMUNAL	300.0 sq. m.
1st FLOOR AMENITY ROOM - COMMUNAL	356.0 sq. m.
10th FLOOR AMENITY ROOM - COMMUNAL	95.0 sq. m.
10th FLOOR EXTERIOR DECK - COMMUNAL	540.0 sq. m.
DECKS - PRIVATE	494.0 sq. m.
BALCONIES - PRIVATE	652.0 sq. m.
TOTAL	2,437.0 sq. m.
TOTAL COMMUNAL	1,291.0 sq. m.

REQUIRED (318 UNITS X 6 m²) = 1,908 sq. m.
REQUIRED COMMUNAL @ 50% = 954 sq. m.

CAR PARKING

REQUIRED by ZONING BY-LAW

RESIDENCE	- 0.5 PER UNIT (318 UNITS) (AFTER 12 UNITS)	159
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	30
TOTAL		189

PROVIDED

RESIDENCE	- 0.57 PER UNIT	168
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	30
TOTAL		198

BICYCLE PARKING

REQUIRED

RESIDENCE	- 0.5 PER UNIT (318 UNITS)	159
TOTAL		159

PROVIDED

EXTERIOR	4
UNDERGROUND PARKING LEVEL	160
TOTAL	164

LOT COVERAGE

PAVED SURFACE =	1,363.2 sq. m.	18.01%
PH 1 BUILDING FOOTPRINT =	2,001.9 sq. m.	26.45%
PH 2 BUILDING FOOTPRINT =	1,557.7 sq. m.	20.58%
LANDSCAPE OPEN SPACE =	2,046.2 sq. m.	27.04%
PARK LAND SPACE =	400.0 sq. m.	5.28%
POPS =	200.0 sq. m.	2.64%
TOTAL =	7,568.9 sq. m.	100.0%

NOTATION SYMBOLS:

- 00 — INDICATES DRAWING NOTES, LISTED ON EACH SHEET.
- 00 — INDICATES ASSEMBLIE TYPE; REFER TO TYPICAL ASSEMBLIES SCHEDULE.
- 00 — INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A900 SERIES.
- 000 — INDICATES DOOR TYPE; REFER TO DOOR SCHEDULE AND DETAILS ON A900 SERIES.
- DETAIL NUMBER / TITLE / SCALE / DETAIL REFERENCE PAGE / DETAIL CROSS REFERENCE PAGE

No.	DESCRIPTION	DATE
3	ISSUED FOR SPC ROUND #1 COMMENTS	July 11, 19
2	ISSUED FOR REVISED SPC	Apr. 11, 19
1	ISSUED FOR CLIENT REVIEW	Apr. 04, 19

REVISIONS:

ARCHITECT SEAL: ONTARIO ASSOCIATION OF ARCHITECTS RODERICK I. LAHEY LICENCE 4375
SEAL DATE: STAMP DATE

NORTH ARROW:

CLIENT: TRINITY DESIGN. DEVELOP. BUILD.

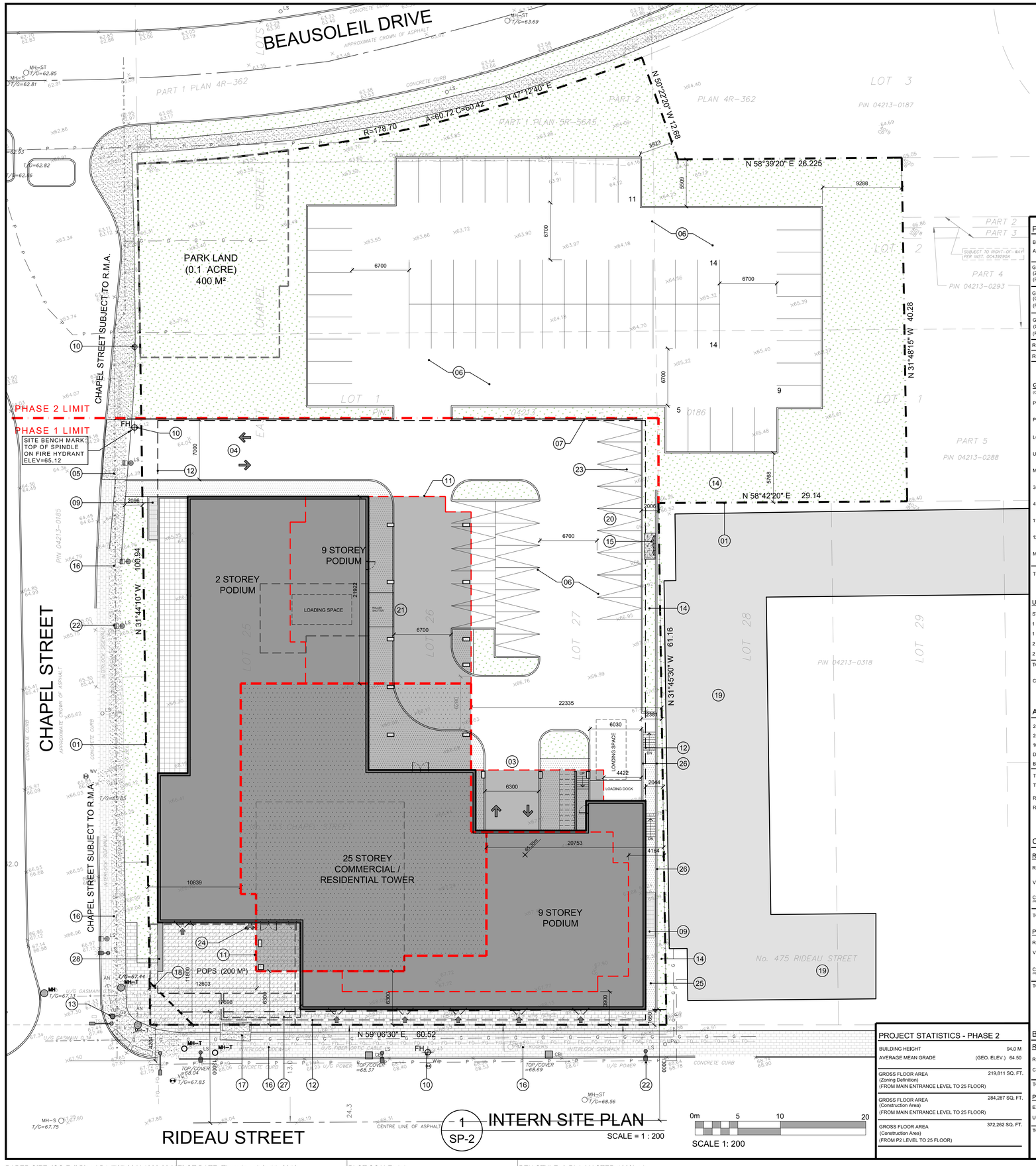
ARCHITECT: rla/architecture roderick lahey architect inc.
56 beech street, ottawa, ontario K1S 3J6
t.613.724.9932 f.613.724.1209 rlaarchitecture.ca

PROJECT TITLE:
151 CHAPEL STREET
RIDEAU @ CHAPEL
OTTAWA ONTARIO

SHEET TITLE:
SITE PLAN

DRAWN: RV	CHECKED: J.S.
SCALE: 1:200	SHEET No. SP-1
PROJECT No. 1833	

D07-12-19-0064



1 SP-2 INTERN SITE PLAN

SCALE = 1 : 200

KEY MAP

PROJECT STATISTICS - PHASE 1

BUILDING HEIGHT		94.0 M
AVERAGE MEAN GRADE	(GEO. ELEV.)	66.70
GROSS FLOOR AREA (Zoning Definition) (FROM MAIN ENTRANCE LEVEL TO 25 FLOOR)		24960 SQ. M. 268680 SQ. FT.
GROSS FLOOR AREA (Construction Area) (FROM MAIN ENTRANCE LEVEL TO 25 FLOOR)		31148.8 SQ. M. 335294 SQ. FT.
GROSS FLOOR AREA (Construction Area) (FROM P2 LEVEL TO 25 FLOOR)		41370.4 SQ. M. 445322 SQ. FT.
RESIDENTIAL AREA		270,926 SQ. FT.
RETAIL AREA		8889 SQ. FT.

GROSS BUILDING - AREAS
(CITY OF OTTAWA'S DEFINITION)

P2 PARKING LEVEL		N/A
P1 PARKING LEVEL		N/A
LOWER - GROUND FLOOR (COURTYARD)		N/A
UPPER - GROUND FLOOR (STREET)		1,465.4 sq. m. (15,774) sq. ft.
MEZZANINE LEVEL		797,1 sq. m. (8,580) sq. ft.
3rd FLOOR		1,040.8 sq. m. (11,202) sq. ft.
4th to 10th FLOOR	7 x 1,397.5 sq. m. 7 x (15,043) sq. ft.	9,782.8 sq. m. (105,301) sq. ft.
11th FLOOR		604,0 sq. m. (6,502) sq. ft.
12th to 26th FLOOR	15 x 751.4 sq. m. 15 x (8,088) sq. ft.	11,271,0 sq. m. (121,320) sq. ft.
MECHANICAL FLOOR		N/A
TOTAL AREA		24,961,1 sq. m. (268,679) sq. ft.

UNIT STATISTICS

STUDIO UNIT	30
1 BEDROOM UNIT	100
1 BEDROOM + DEN UNIT	46
2 BEDROOM UNIT	102
2 BEDROOM + DEN UNIT	37
TOTAL	315
COMMERCIAL RETAIL	855,0 sq. m. (9,203) sq. ft.

AMENITY AREA

2nd FLOOR AMENITY ROOM - COMMUNAL	346,5 sq. m.
2nd FLOOR EXTERIOR DECK - COMMUNAL	414,6 sq. m.
10th FLOOR EXTERIOR DECK - COMMUNAL	495,7 sq. m.
DECKS - PRIVATE	266,0 sq. m.
BALCONIES - PRIVATE	649,7 sq. m.
TOTAL	2,172,5 sq. m.
TOTAL COMMUNAL	1,256.8 sq. m.

REQUIRED (315 UNITS X 6 m²) = 1,890 sq. m.
REQUIRED COMMUNAL @ 50% = 945 sq. m.

CAR PARKING

REQUIRED by ZONING BY-LAW

RESIDENCE	- 0.5 PER UNIT (316 UNITS) (AFTER 12 UNITS)	152
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	30
COMMERCIAL RETAIL (RETAIL FOOD, BANK & CONVENIENCE STORE)	- NOT REQUIRED FOR UNITS UNDER 500m² G.F.A.	0
TOTAL		182

PROVIDED

RESIDENCE	- 0.57 PER UNIT	240
VISITOR	- 0.1 PER DWELLING UNIT (AFTER 12 UNITS)	30
COMMERCIAL RETAIL (RETAIL FOOD, BANK & CONVENIENCE STORE)	- 2.5 PER 100m² OF G.F.A. AFTER 150m²	9
TOTAL		279

BICYCLE PARKING

REQUIRED

RESIDENCE	- 0.5 PER UNIT (316 UNITS)	158
COMMERCIAL RETAIL	- 1,0 PER 250m² OF G.F.A,	3
TOTAL		161

PROVIDED

EXTERIOR	12
UNDERGROUND PARKING LEVEL	160
TOTAL	172

PROJECT STATISTICS - PHASE 2

BUILDING HEIGHT		94.0 M
AVERAGE MEAN GRADE	(GEO. ELEV.)	64.50
GROSS FLOOR AREA (Zoning Definition) (FROM MAIN ENTRANCE LEVEL TO 25 FLOOR)		219,811 SQ. FT.
GROSS FLOOR AREA (Construction Area) (FROM MAIN ENTRANCE LEVEL TO 25 FLOOR)		284,287 SQ. FT.
GROSS FLOOR AREA (Construction Area) (FROM P2 LEVEL TO 25 FLOOR)		372,262 SQ. FT.

DRAWING NOTES

1. PROPERTY LINE
2. RAISED PATIO AT GROUND LEVEL, SEE LANDSCAPE PLAN FOR PATTERN AND TYPE
3. PARKING GARAGE ENTRY DRIVEWAY / RAMP WITH TRENCH DRAIN
4. 2 WAY DRIVEWAY TO EXTERIOR PARKING LOT / GARBAGE LOADING AREA
5. DEPRESSED CURB / SIDEWALK TO CITY STANDARDS
6. COMMERCIAL / VISITOR ASPHALT PARKING LOT
7. 150mm BARRIER CURB
8. BICYCLE PARKING SPACES (0.6 x 1.8M) WITH RACK
9. AIR INTAKE / EXHAUST GRILL
10. EXISTING FIRE HYDRANT RELOCATED IF REQUIRED
11. OUTLINE OF BUILDING ABOVE
12. OUTLINE OF UNDERGROUND PARKING LEVELS
13. EXISTING UTILITY POLE
14. --
15. GAS REGULATOR / METER EQUIPMENT AREA
16. EXISTING SIDEWALK WITH STREET CURB
17. EXISTING BUS STOP
18. 5.0 x 5.0 M SITE TRIANGLE
19. EX. 2 STOREY BUILDING ON ADJACENT PROPERTY
20. STANDARD PARKING SPACE 2.6 x 5.2 M
21. DEPRESSED CURB AND WALK
22. EXISTING STREET LIGHT
23. --
24. SIAMESE CONNECTION
25. WALKWAY WITH STEPS, HANDRAIL AS REQUIRED
26. CAST IN PLACE CONCRETE RETAINING WALL
27. CISTERN LOCATION IN PARKING LEVELS
28. RAISED RETAINING WALL AS SEAT HEIGHT

SITE PLAN SYMBOLS

- PRIVATE PATIO
- CONCRETE SURFACE
- PRIVATELY OWNED PUBLIC SPACE (POPS)
- ENTRY WALK
- CITY SIDEWALK
- SOFT LANDSCAPING
- BIKE RACK
- TWO WAY VEHICLE CIRCULATION
- MAIN ENTRANCE
- COMMERCIAL DOOR / FIRE EXIT
- PROPERTY LINE
- LIGHT STANDARD
- EXTERIOR LIGHTING

PROJECT INFORMATION

ZONING		TM[2339] F(6.0) S354
SITE AREA		7,568,9 sq. m. (81,471) sq. ft.
SITE AREA - PHASE 1		4,301,8 sq. m. (46,304) sq. ft.
SITE AREA - PHASE 2		3,267,1 sq. m. (35,167) sq. ft.
BUILDING HEIGHT	AS PER SCHEDULE S354	94.0 M
DENSITY = 6.0		45,413,4 sq. m. (488,826) sq. ft.
AMENITY SPACE (6.0m² PER UNIT) 633		3,798 sq. m. (40,560) sq. ft.

LOT COVERAGE

PAVED SURFACE =	1,363.2 sq. m.	18.01%
PH 1 BUILDING FOOTPRINT =	2,001.9 sq. m.	26.45%
PH2 INTERN PARKING LOT =	1,673,6 sq. m.	22.11%
LANDSCAPE OPEN SPACE =	1,930.2 sq. m.	25.51%
PARK LAND SPACE =	400.0 sq. m.	5.28%
POPS =	200.0 sq. m.	2.64%
TOTAL =	7,568.9 sq. m.	100.0%

LEGAL DESCRIPTION

TOPOGRAPHIC PLAN of
LOTS 25, 26 AND 27
(NORTH RIDEAU STREET)
LOTS 1, 2 AND PART OF LOT 3
(EAST CHAPEL STREET)
PART OF LOTS 1, 2 AND 3
(WEST AUGUSTA STREET)
REGISTERED PLAN 43586
CITY OF OTTAWA

PROJECT DEVELOPER

Trinity Development Group Inc.
Bloor Islington Place, East Tower
77 Bloor Street West, Suite 1601
Toronto, Ontario, M5S 1M2
Tel.: (416) 255-8800
E-Mail: apremji@trinity-group.com

URBAN PLANNER

FoTenn Consultants Inc.
223 McLeod Street
Ottawa, ON Canada, K2P 0Z8
Tel.: (613) 730-5709
Fax: (613) 730-1136
E-Mail: black@fotenn.com

SURVEYOR

Stantec
1331 Clyde Avenue, Suite 400
Ottawa ON K2C 3G4
Phone: (613) 724-4096
Fax: (613) 724-____
E-Mail: BWebster@stantec.com

LANDSCAPE ARCHITECT

Gino J. Aiello Landscape Architect
50 Camelot Drive,
Nepean Ontario K2G 5X8
Tel: (613) 852-1343
Fax: (613) 692-4672
Email: gino@giala.com

CIVIL ENGINEER

David Schaeffer Engineering ltd.
120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
Tel: (613) 836-0856
Fax: (613) 836-7183
Email: smerrick@dsel.ca

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT.

ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS.

THIS DRAWING MAY NOT BE USED FOR CONSTRUCTION UNTIL SIGNED BY THE ARCHITECT.

DO NOT SCALE DRAWINGS.

NOTATION SYMBOLS:

- 00 — INDICATES DRAWING NOTES, LISTED ON EACH SHEET,
- 00 — INDICATES ASSEMBLIE TYPE; REFER TO TYPICAL ASSEMBLIES SCHEDULE.
- 00 — INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A900 SERIES.
- 000 — INDICATES DOOR TYPE; REFER TO DOOR SCHEDULE AND DETAILS ON A900 SERIES.
- DETAIL NUMBER
- 00 SHEET NO. / TITLE / SCALE — DETAIL REFERENCE PAGE
- DETAIL CROSS REFERENCE PAGE

No.	DESCRIPTION	DATE
3	ISSUED FOR SPC ROUND #1 COMMENTS	July 11, 19
2	ISSUED FOR REVISED SPC	Apr. 11, 19
1	ISSUED FOR CLIENT REVIEW	Apr. 04, 19

REVISIONS:

ARCHITECT SEAL: ONTARIO ASSOCIATION OF ARCHITECTS — RODERICK LAHEY — LICENCE 4375 — SEAL DATE: STAMP DATE

NORTH ARROW:

CLIENT: TRINITY DEVELOPMENT GROUP

ARCHITECT: rla/architecture — roderick lahey architect inc. — 56 beech street, ottawa, ontario K1S 3J6 — t. 613.724.9932 f. 613.724.1209 rlaarchitecture.ca

PROJECT TITLE:

151 CHAPEL STREET
RIDEAU @ CHAPEL
OTTAWA ONTARIO

SHEET TITLE:

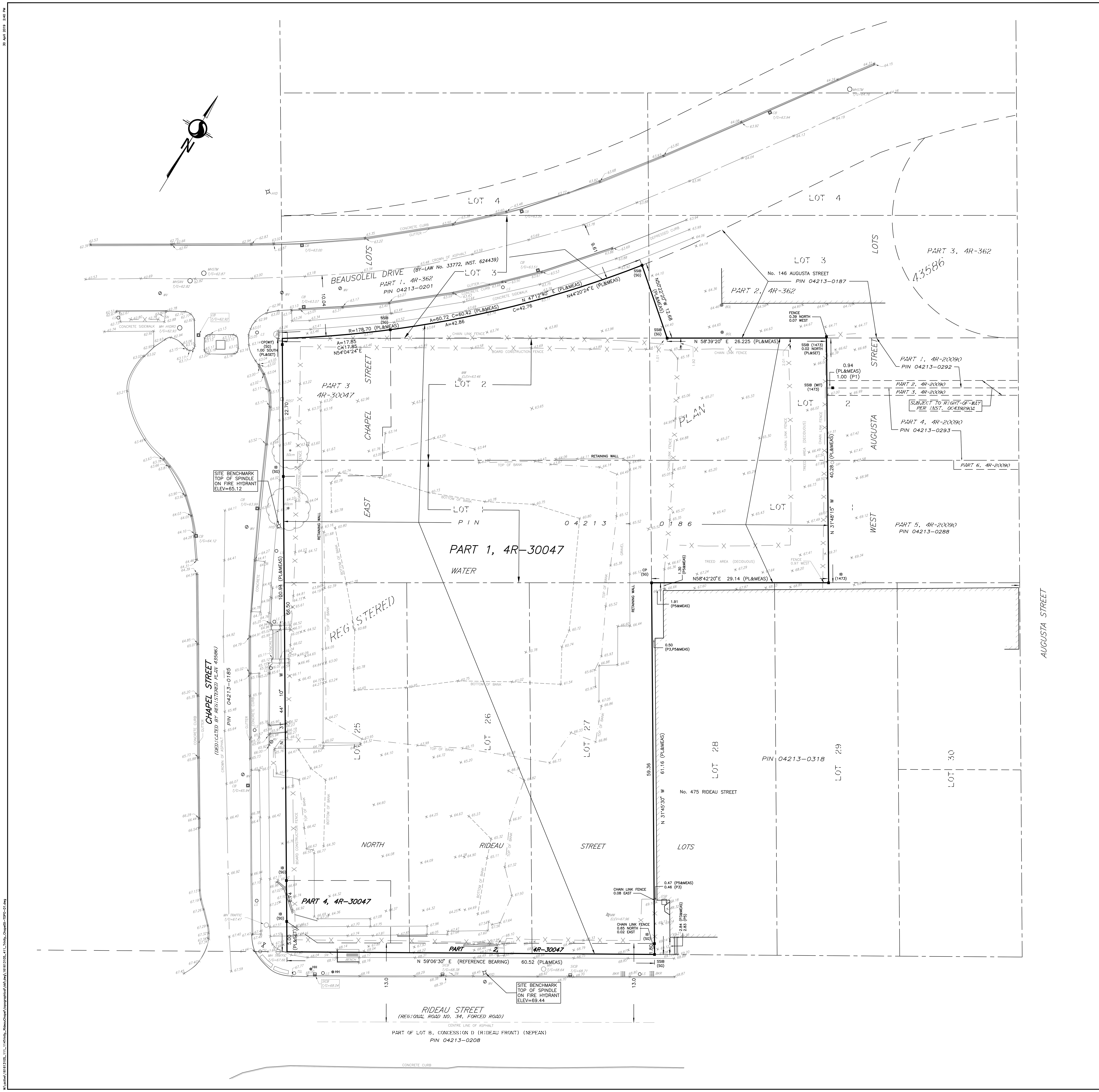
SITE PLAN PHASE 1 - INTERIM

DRAWN:	CHECKED:
RV	J.S.
SCALE: 1:200	SHEET No. SP-2
PROJECT No. 1833	

D07-12-19-0064

PAPER SIZE: ISO Full Bleed B1 (707.00 X 1000.00 MM) | PLOT DATE: Thursday, July 11, 2019 | PLOT SCALE: 1:1 | PEN STYLE: 0-RLA-MASTER-100%.ctb

F:\2018\1833 - Rideau & Chapel St - Trinity\01_Design Development\1833 SP-1 Site Plan 2019 06 20.dwg



Stantec

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

TOPOGRAPHIC PLAN of
LOTS 25, 26 AND 27
(NORTH RIDEAU STREET),
LOTS 1, 2 AND PART OF LOT 3
(EAST CHAPEL STREET) AND
PART OF LOTS 1, 2 AND 3
(WEST AUGUSTA STREET)
REGISTERED PLAN 43586
CITY OF OTTAWA

Scale 1:250

5 0 5 10 15 METRES

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

GRID SCALE CONVERSION
DISTANCES ARE GROUND AND CAN BE CONVERTED TO GRID BY MULTIPLYING BY THE COMBINED SCALE FACTOR OF 0.99993.

BEARING NOTE
BEARINGS ARE ASTRONOMIC AND ARE REFERRED TO THE NORTHERLY LIMIT OF RIDEAU STREET AS SHOWN ON PLAN 4R-30047, HAVING A BEARING OF N 59°06'30" E.

VERTICAL DATUM NOTE
ELEVATIONS ARE REFERRED TO THE CANADIAN GEODETIC VERTICAL DATUM (CGVD-1928:1978) AND ARE DERIVED FROM THE CAN-NET VRS NETWORK MONUMENT; OTTAWA ELEV=95.205.

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

LEGEND

■	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
N&W	"	NAIL & WASHER
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
SG	"	STANTEC GEOMATICS LTD.
ORP	"	OBSERVED REFERENCE POINT
PL	"	PLAN 4R-30047
P1	"	PLAN 4R-20090
P2	"	PLAN 5R-5645
P3	"	PLAN BY 1719 DATED SEPTEMBER 3, 2004
P4	"	PLAN 4R-362
P5	"	PLAN BY 647 DATED JANUARY 31, 1979
C/P	"	CALCULATED PER
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
DICB	"	DITCH CB
CBMH	"	CB MANHOLE
DCBMH	"	DOUBLE CB MANHOLE
CBSI	"	SIDE INLET CB
CHM	"	CHIMNEY
CSV	"	VALVE CURB STOP
DRN	"	DRAIN
EPOST	"	ELECTRICAL OUTLET
FP	"	FLAG POLE
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
HH	"	HAND HOLE
HDS	"	HEADSTONE
HLS	"	LIGHT STANDARD HYDRO
HM	"	HYDRO METER
HTN	"	HYDRO TRANSFORMER
HW	"	HAND WELL
HYD	"	FIRE HYDRANT
JBX	"	JUNCTION BOX
MB	"	MAILBOX
MP	"	MONITORING PIN
MH	"	MAINTENANCE HOLE UNIDENTIFIED
MHBELL	"	MAINTENANCE HOLE BELL
MHF	"	MAINTENANCE HOLE FIBRE OPTIC
MHH	"	MAINTENANCE HOLE HYDRO
MHI	"	MAINTENANCE HOLE INVERT
MHSAN	"	MAINTENANCE HOLE SANITARY
MHSTM	"	MAINTENANCE HOLE STORM
MHT	"	MAINTENANCE HOLE TRAFFIC
MW	"	MONITORING WELL
NPB	"	NEWS PAPER BOX
OLP	"	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
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

SURVEYOR'S CERTIFICATE
THE SURVEY REPRESENTED BY THIS PLAN WAS COMPLETED ON THE 24tH DAY OF APRIL, 2019.

DATE

BRIAN J. WEBSTER
ONTARIO LAND SURVEYOR

DRAWN: NJ CHECKED: BW PM: BW FIELD: ES PROJECT No.: 161613105-411