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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

TRINITY DEVELOPMENT GROUP
151 CHAPEL STREET

CITY OF OTTAWA

PROJECT NO.: 19-1086

APRIL 2019 – REV 1

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

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TRINITY DEVELOPMENT GROUP
151 CHAPEL STREET

CITY OF OTTAWA
APRIL 2019 – REV 1

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1.0 INTRODUCTION

Trinity Development Group have retained David Schaeffer Engineering Ltd. (DSEL) to prepare a Functional Servicing and Stormwater Management Report in support of an amendment to 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***, the subject property is located at the northeast corner of the Chapel and Rideau intersection. Site access is gained though Chapel Street. The site also has

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frontage on Beausoleil Drive. Chapel currently terminates south of Beausoleil Drive. The subject property measures approximately ***0.76ha*** including a ***400m²*** 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 25 storey commercial/residential tower consisting of ***826m²*** 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 ***307*** residential units; a total of ***622*** 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 *FSR 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 application for SPA 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 ***0.76ha*** and is a school and place of worship. The majority of the site is occupied by a multi-storey building and asphalt parking.

A topographic survey was completed by Stantec Geomatics Ltd. on March 13, 2015. The site slopes from south to north with elevations varying from 69.09m to 63.95m. See reduced copy of the topographic survey in ***Drawings/Figures.***

The current occupants were contacted to confirm the existing building uses. The existing building was described as a school with complete physical education facilities and cafeteria, office space, and a Synagogue and ballroom.

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:

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

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Storm Sewers:

- 525mm diameter sewer within Rideau Street
- 525mm diameter sewer within Chapel Street
- 525mm diameter sewer within Beausoleil Drive

Sanitary Sewers:

- 300mm diameter local sewer located within Rideau Street
- 750mm diameter sewer located within Chapel Street

1.2 Required Permits / Approvals

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

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

1.3 Pre-consultation

A pre-consultation 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***.

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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)

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- **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 approved FSR)

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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 assumed the existing site is serviced from the 203mm watermain within Chapel Street***.*** Potable water is delivered to the subject area via an existing 610mm 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 50m^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 200mm diameter DI watermain on Chapel Street near Rideau Street to service phase 1;

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

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

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

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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	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
Desired pressure range during normal operating conditions (average day to maximum hour demand)	350kPa and 480kPa
Minimum pressure during normal operating conditions (average day to maximum hour demand)	275kPa
During normal operating conditions pressure shall not exceed	552 kPa
Minimum pressure during fire flow plus max day	140kPa

** - 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 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	106.4	213.9	251.0	481.5	504.8	507.3
Max Day + Fire Flow (OBC)	264.4 + 4150 = 4,414.4	533.2 + 4150 = 4,683.2	615.7 + 10,000 = 10,615.7	372.6	395.9	398.4
Peak Hour	580.8	1,172.2	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.***

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Fire flow was estimated per the Ontario Building Code (*OBC*) and in accordance with the City of Ottawa standards. Available pressure provided by the City of Ottawa at proposed fire flow demands exceed minimum required pressures as described in ***Water Supply Guidelines***. Detailed calculations are provided in ***Appendix B***.

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 a dual connection 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 OBC 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.

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4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The existing building is assumed to be serviced by the 750mm 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 is occupied by a multi-use building. 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

It was estimated that approximately ***35 ha*** of existing development area contribute wastewater to the existing 750mm diameter sanitary sewer fronting the development. The majority of the upstream area consists of lands zoned R4. Based on available City as-built drawings, and the ***Sewer Design Guidelines***, is was estimated that the existing 750mm diameter sanitary sewer has an available capacity of approximately ***1,242 L/s***.

Prior to discharge to the interceptor sewer the sanitary flow is conveyed through a leg of sewer measuring 525mm located at the intersection of Beausoleil and Old St. Patrick Street. Based on as-built information of this sewer and drainage areas determined from city sanitary sewer infrastructure maps, there is approximately ***128 L/s*** of available capacity.

See detailed capacity calculations and drainage area figure in ***Appendix C***.

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4.2 Wastewater Design

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

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

Table 4
Wastewater Design Criteria

Design Parameter	Value
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	200mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, November 2004.	

The ***Sewer Design Guidelines*** were utilized to estimate the proposed interim and ultimate average and peak wastewater rates, summarized in ***Table 5***. 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	1.80	3.59	4.78
Estimated Peak Dry Weather Flow	5.96	11.48	16.35
Estimated Peak Wet Weather Flow	6.20	11.71	16.55

The proposed development will result in ***10.48 L/s*** of additional sanitary discharge from the subject site. Based on available sewershed mapping, approximately ***128 L/s*** is available in the most restrictive leg of local sewer at the intersection of Beausoleil and Old

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St. Patrick Road, therefore there is sufficient capacity within the local sanitary sewers to accommodate the increase in flow.

4.3 Wastewater Servicing Conclusions

The estimated existing and proposed peak wastewater flow rates were estimated in accordance with ***City Guidelines***. The proposed development increases the peak wastewater flow from ***1.23 L/s*** to ***11.71 L/s***. Based on available sewershed mapping, approximately ***128 L/s*** is available in the most restrictive leg of local sewer at the intersection of Beausoleil and Old St. Patrick Road.

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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 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 Rideau Canal watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA).

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

As described in ***Section 1.1***, the existing site is predominantly roof area and asphalt parking area. 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***:

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

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.

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- "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 525mm diameter storm sewer within Chapel Street.

Table 7 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
Ultimate 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	9.8	0.0	21.0	0.0
Attenuated Areas	22.3	53.9	43.2	104.6
Total	**32.1**	**53.9**	**64.1**	**104.6**

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. Approximate ***104.6m³*** of cistern storage will be required at the ultimate conditions to attenuate runoff to the allowable release rate. Cistern is required to discharge at ***43.2 L/s*** to ensure that the allowable release rate is respected in the interim and ultimate phases.

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

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Table 8
Stormwater Flow Rate Summary
Interim Conditions - Phase 2

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 phase 2 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 treat all runoff from the interim proposed surface parking area in phase 2. The enhanced swale is approximately 65 m long designed with a varying longitudinal slope of 0.5% is located adjacent to Beasouleil Drive. The swale was designed with a maximum design velocity of 0.5m/s to maximize water quality improvement per the ***LID Guide***. Refer to ***Appendix D*** for detailed calculations.

The flow spreader is located at the downstream end of the swale ahead of a vegetation filter strip of approximately 5.0 m designed to increase quality control. As per the TSS Removal rates found in the ***LID Guide*** it is anticipated that the enhanced swale and filter strip will provide the 80% TSS removal required.

It is proposed to utilize an Oil-Grit Separator (*OGS*) inside the building in phase 1 to treat the collected runoff from the roof and surface parking lot to the enhanced level of treatment.

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

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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	5.3	0.0	11.4	0.0
Attenuated Areas	13.1	24.6	28.0	52.5
Total	**18.4**	**24.6**	**39.4**	**52.5**

Approximate ***52.5m^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 ***28.0 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 1000m within the storm sewers prior to discharge to the Rideau River.

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.

Cistern storage is anticipated be used to meet the required ***104.6 m^3*** and ***52.5 m^3*** 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.

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6.0 UTILITIES

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

A 300mm Gas main is 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.

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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.

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

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

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

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8.0 CONCLUSION AND RECOMMENDATIONS

DSEL was retained to prepare a Functional Servicing and Stormwater Management Report in support of Trinity Development Group's application for Site Plan Control (SPA) at 151 Chapel Street.

Water

- Boundary conditions received from the City of Ottawa indicate sufficient pressure is available to service the proposed site;

Sanitary

- The proposed development results in an increase of approximately ***10.48 L/s*** of sanitary discharge from the subject site;
- The existing 750mm diameter sanitary sewer on Chapel Street has sufficient capacity to support the development;

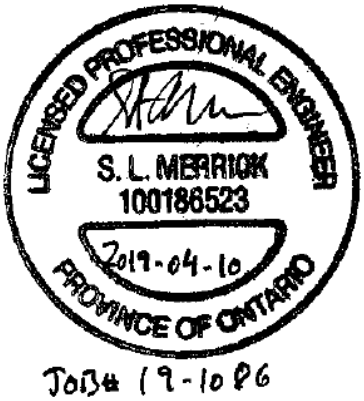
Storm

- The allowable post-development stormwater release rate for site has been calculated to be ***104.0 L/s*** based on consultation with the City of Ottawa. It is estimated that a total of approximately ***157.1 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 surface parking runoff provided by proposed *OGS* and an enhanced swale and filter strip;

Other

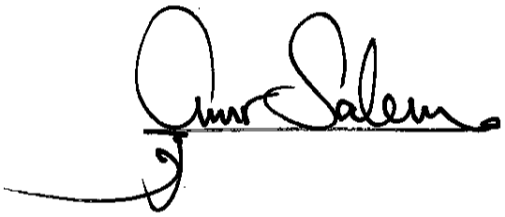
- Gas, Hydro and telecommunication services exist within the adjacent right-of-ways.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Steven Merrick, P.Eng

Prepared by,
David Schaeffer Engineering Ltd.



Per: Amr Salem

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

13-670 08/03/2016

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☒	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	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 1.4
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	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.	Section 4.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

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

☒	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	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

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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

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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

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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
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

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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

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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

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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
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shawn.wessel@ottawa.ca

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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

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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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Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

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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
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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:

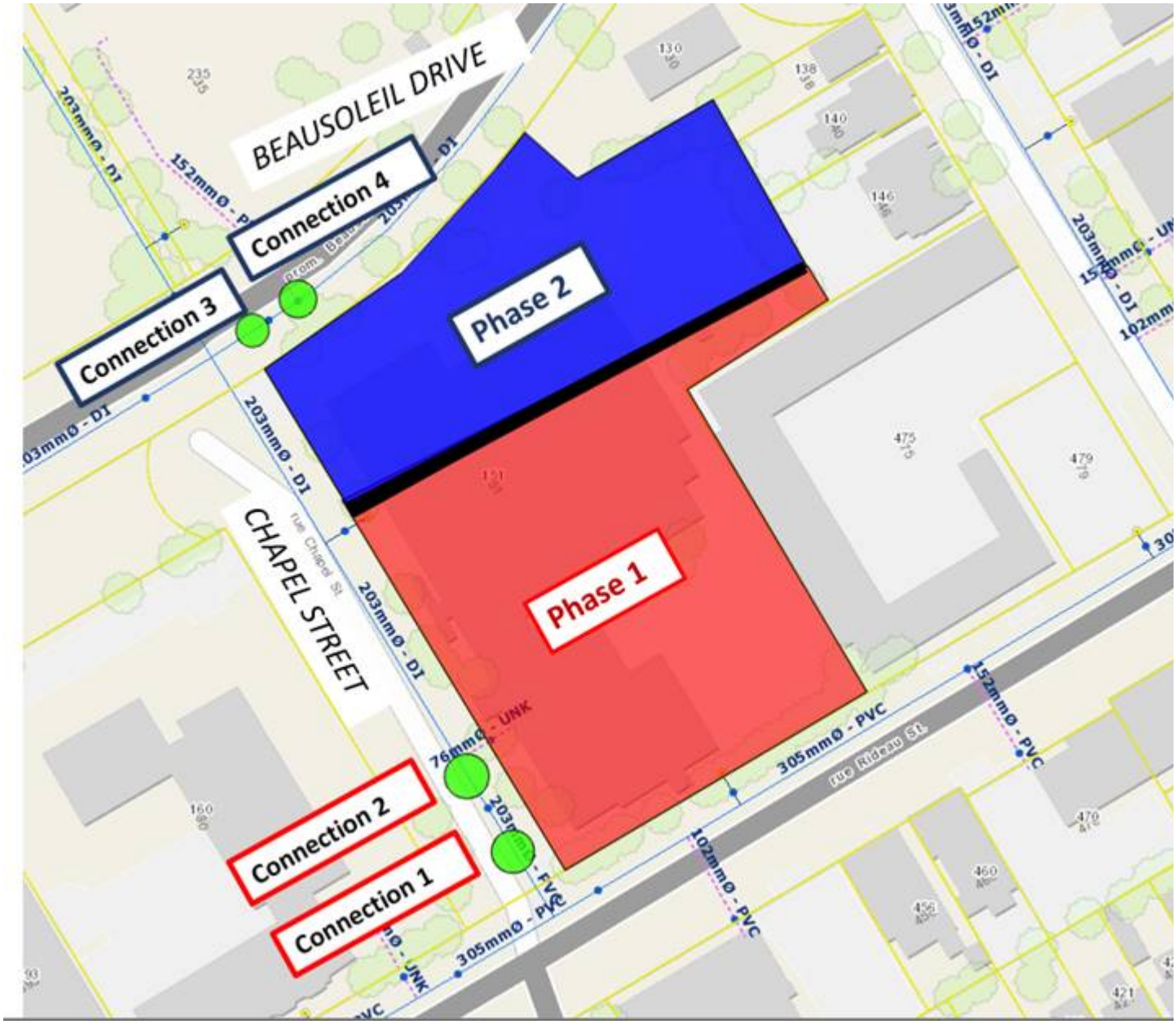
1. Location of Service / Street Number: **Rideau and Chapel Street**

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

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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

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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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shawn.wessel@ottawa.ca

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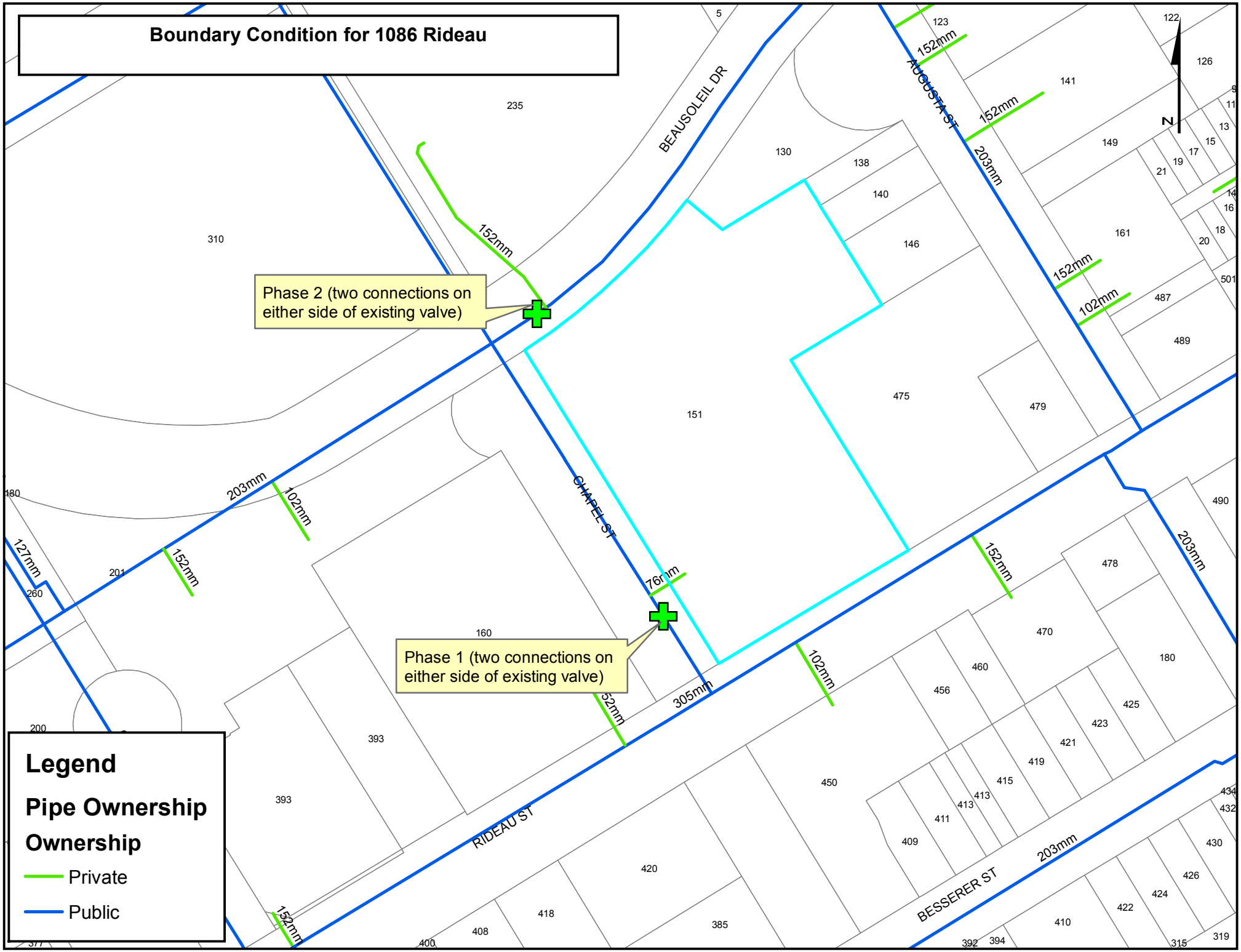
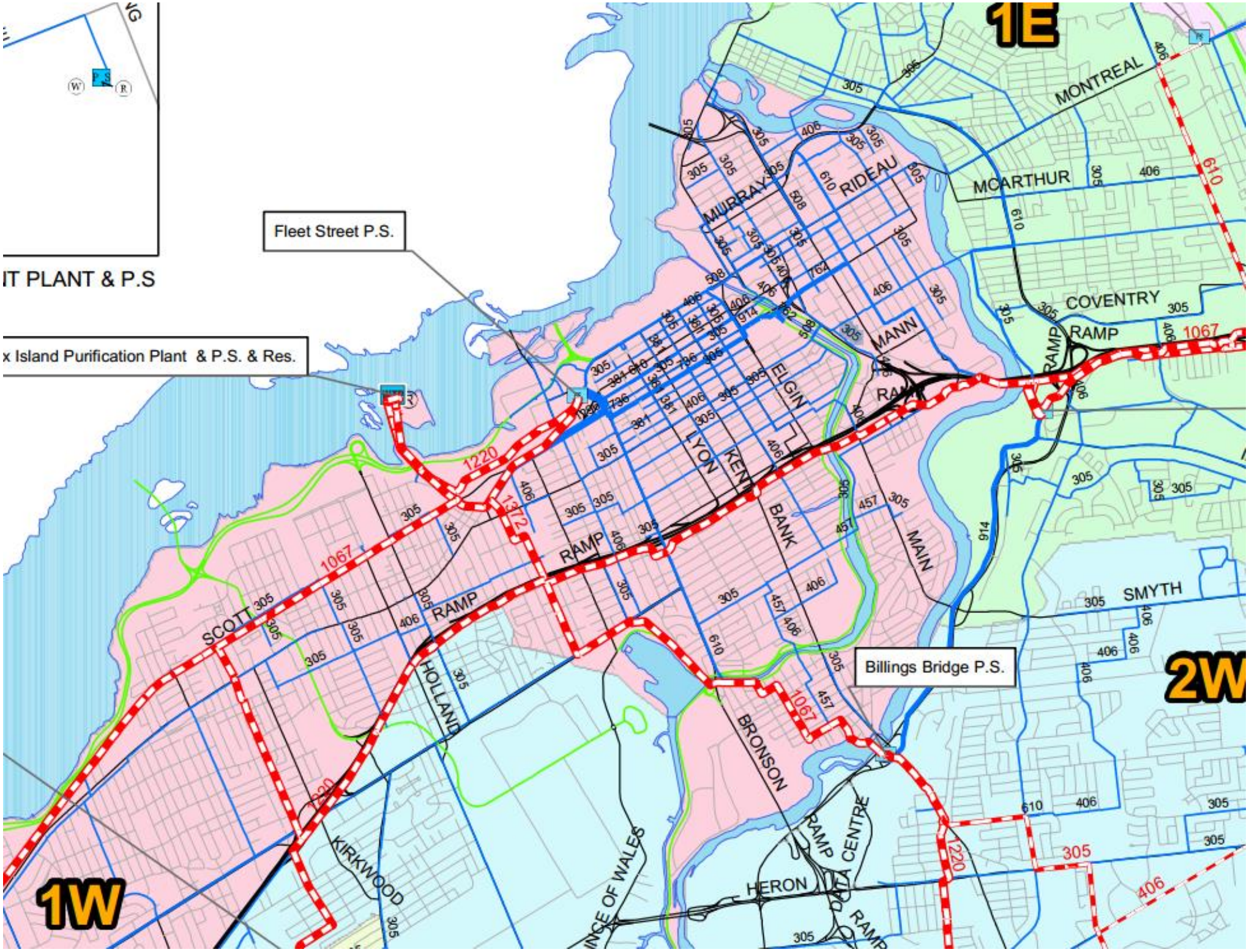

Boundary Condition for 1086 Rideau
Phase 2 (two connections on either side of existing valve)
Phase 1 (two connections on either side of existing valve)
BEAUSOLEIL DR
AUGUSTA ST
CHAPEL ST
RIDEAU ST
BESSERER ST
N
152mm
203mm
102mm
127mm
76mm
305mm
Legend
Pipe Ownership
Ownership
Private
Public

APPENDIX B

Water Supply


IT PLANT & P.S
x Island Purification Plant & P.S. & Res.
Fleet Street P.S.
Billings Bridge P.S.
1E
1W
2W
MONTREAL
MCARTHUR
RIDEAU
MURRAY
COVENTRY
RAMP
MANN
ELGIN
LYON
KENT
BANK
MAIN
SMYTH
SCOTT
HOLLAND
KIRKWOOD
BRONSON
HERON
CENTRE
PRINCE OF WALES
610
1067
1220
1312

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

			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 $L/m^2/d$	826	2.31	1.6	3.5	2.4	6.2	4.3
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		2.3	1.6	3.5	2.4	6.2	4.3
	Total Demand		**153.2**	**106.4**	**380.8**	**264.4**	**836.3**	**580.8**

Trinity Development Group
151 Chapel St
Proposed Site Conditions - Ultimate (Phase 1 + Phase 2)

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	307	553

	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	1092	305.8	212.3	764.4	530.8	1681.7	1167.8

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 $L/m^2/d$	826	2.31	1.6	3.5	2.4	6.2	4.3
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		2.3	1.6	3.5	2.4	6.2	4.3
	Total Demand		**308.1**	**213.9**	**767.9**	**533.2**	**1687.9**	**1172.2**

Rideau and Chapel

NFPA Calculations

We are utilizing National Fire Protection Association 13 – Standard for the installation of Sprinkler Systems (**NFPA**) standards for the purpose of estimating fire flow per direction we have received from the water resources group on other similar projects not requiring the sizing of watermains or requiring internal hydrants. The proposed development contemplates a parking garage extending the footprint of the site, only water services will extend to the site.

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**

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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*	2.8	$L/m^2/d$	826	0.05
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	**0.05**
Peak Institutional / Commercial Flow	0.08
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**0.08**

** assuming a 12 hour commercial operation*

Total Estimated Average Dry Weather Flow Rate	**1.80 L/s**
Total Estimated Peak Dry Weather Flow Rate	**5.96 L/s**
Total Estimated Peak Wet Weather Flow Rate	**6.20 L/s**

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

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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	307	553

Total Pop **1092**

Average Domestic Flow **3.54 L/s**

Peaking Factor **3.22**

Peak Domestic Flow **11.40 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	2.8 $L/m^2/d$	826	0.05
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 **0.05**

Peak Institutional / Commercial Flow 0.08
Peak Industrial Flow** 0.00
Peak I/C/I Flow **0.08**

** assuming a 12 hour commercial operation*

Total Estimated Average Dry Weather Flow Rate	**3.59 L/s**
Total Estimated Peak Dry Weather Flow Rate	**11.48 L/s**
Total Estimated Peak Wet Weather Flow Rate	**11.71 L/s**

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

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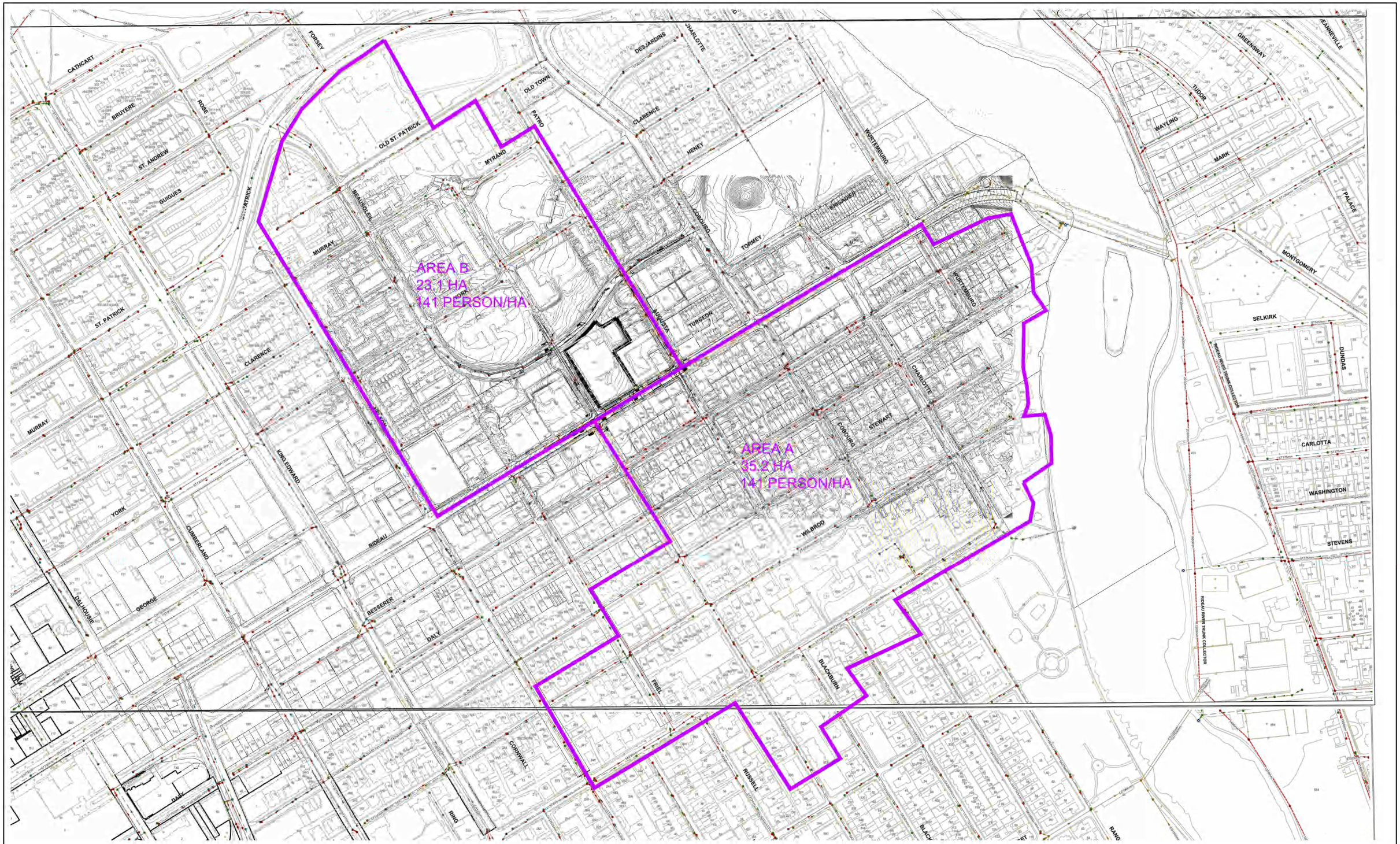
SANITARY SEWER CALCULATION SHEET

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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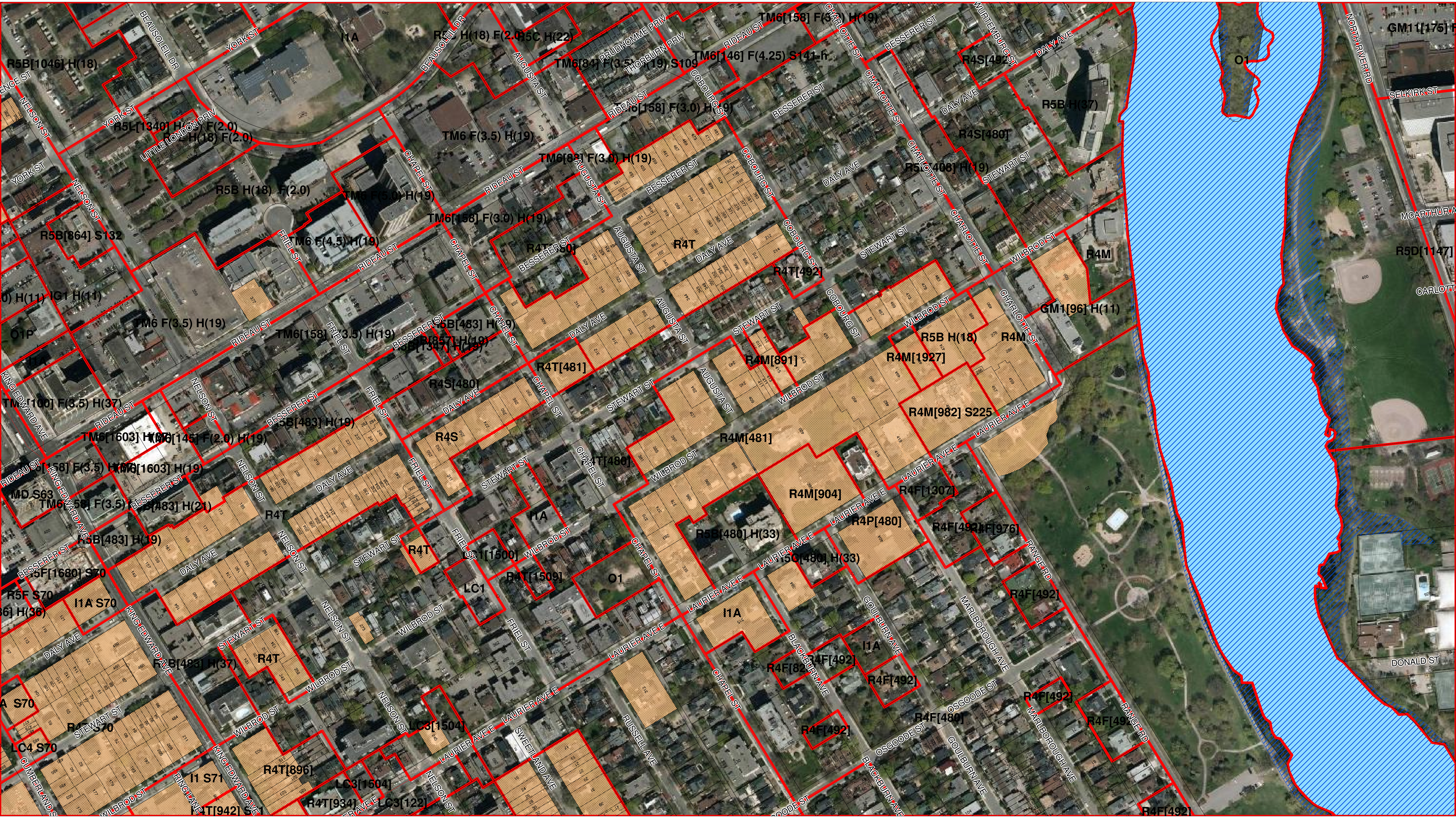
Stittsville, Ontario, K2S 1E9
Tel. (613) 836-0856
Fax. (613) 836-7183
www.DSEL.ca

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



TM6[158] F(3.0) H(19)
TM6[146] F(4.25) S141-h
TM6 F(3.5) H(19)
TM6 F(4.5) H(19)
TM6[158] F(3.0) H(19)
R5B[1046] H(18)
R5B H(18) F(2.0)
R5B[864] S132
R5B H(37)
R5B H(18)
R5B[483] H(19)
R5B[480] H(33)
R5C 408] H(19)
R4S[492]
R4S[480]
R4S
R4T
R4T[492]
R4T[481]
R4T[896]
R4T[934]
R4M
R4M[891]
R4M[1927]
R4M[982] S225
R4M[481]
R4M[904]
R4P[480]
R4F[1302]
R4F[976]
R4F[492]
R4F[480]
GM1[96] H(11)
GM11[175]
R5D[1147]
I1A
I1A S70
I1 S71
O1
O1P
LC1
LC3[1504]
LC3[122]
LC4 S70
YORK ST
BEAUSOLEIL DR
RIDEAU ST
BESSERER ST
DALY AVE
STEWART ST
WILBROD ST
LAURIER AVE E
OSGOODE ST
KING EDWARD AVE
NELSON ST
FRIEL ST
CHAPEL ST
AUGUSTA ST
COBOURG ST
CHARLOTTE ST
RANGE RD
MARLBOROUGH AVE
COLBURN AVE
BLACKBURN AVE
RUSSELL AVE
SWEETLAND AVE
CUMBERLAND ST
WURTEMBURG ST
NORTH RIVER RD
SELKIRK ST
MCARTHUR AVE
DONALD ST
LITTLE LONDON PRIV

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)

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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

Total Area	0.05	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	9.8	9.8	0.0	0.0	178.6	21.0	21.0	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

Total Area	0.39	ha
C	0.88	Rational Method runoff coefficient

**Ultimate drainage area of Phase 1 from Ultimate Stormwater Management Plan drawing SWM-2*

	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	99.6	22.2	77.4	46.5	178.6	193.9	43.2	150.8	90.5
15	83.6	79.9	22.2	57.7	51.9	142.9	155.2	43.2	112.0	100.8
20	70.3	67.1	22.2	44.9	53.9	120.0	130.3	43.2	87.1	104.6
25	60.9	58.2	22.3	35.9	53.9	103.8	112.8	43.2	69.6	104.5
30	53.9	51.5	22.3	29.3	52.7	91.9	99.8	43.2	56.6	101.9
35	48.5	46.4	22.3	24.1	50.5	82.6	89.7	43.2	46.5	97.7
40	44.2	42.2	22.3	19.9	47.8	75.1	81.6	43.2	38.5	92.3
45	40.6	38.8	22.3	16.5	44.5	69.1	75.0	43.2	31.8	86.0
50	37.7	36.0	22.4	13.6	40.9	64.0	69.5	43.2	26.3	78.9
55	35.1	33.6	22.4	11.2	37.0	59.6	64.8	43.2	21.6	71.3
60	32.9	31.5	22.4	9.1	32.8	55.9	60.7	43.2	17.6	63.2
65	31.0	29.7	22.4	7.3	28.4	52.6	57.2	43.2	14.0	54.7
70	29.4	28.1	22.4	5.7	23.8	49.8	54.1	43.2	10.9	45.9
75	27.9	26.7	22.4	4.2	19.1	47.3	51.3	43.2	8.2	36.8
80	26.6	25.4	22.4	3.0	14.2	45.0	48.9	43.2	5.7	27.4
85	25.4	24.2	22.4	1.8	9.3	43.0	46.7	43.2	3.5	17.9
90	24.3	23.2	22.4	0.8	4.2	41.1	44.7	43.2	1.5	8.1
95	23.3	22.3	22.4	0.0	0.0	39.4	42.8	43.2	0.0	0.0
100	22.4	21.4	22.4	0.0	0.0	37.9	41.2	43.2	0.0	0.0
105	21.6	20.6	22.5	0.0	0.0	36.5	39.6	43.2	0.0	0.0
110	20.8	19.9	22.5	0.0	0.0	35.2	38.2	43.2	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)

5-year $Q_{attenuated}$	**22.27 L/s**	**100-year $Q_{attenuated}$**	**43.15 L/s**
5-year Max. Storage Required	**53.9 m^3**	**100-year Max. Storage Required**	**104.6 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	9.8	0.0	21.0	0.0
Attenutated Areas	22.3	53.9	43.2	104.6
Total	**32.1**	**53.9**	**64.1**	**104.6**

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

Estimated Pre Development Peak Flow from Phase 2 Site Area

Total Area 0.29 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 0.29 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)

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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

Total Area 0.04 ha
C 0.51 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	5.3	5.3	0.0	0.0	178.6	11.4	11.4	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 Post Development Peak Flow from Attenuated Areas

Total Area 0.24 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	49.9	13.1	36.8	22.1	178.6	106.8	28.0	78.8	47.3
15	83.6	40.0	13.1	26.9	24.2	142.9	85.5	28.0	57.5	51.7
20	70.3	33.6	13.1	20.5	24.6	120.0	71.8	28.0	43.8	52.5
25	60.9	29.1	13.1	16.0	24.0	103.8	62.1	28.0	34.1	51.2
30	53.9	25.8	13.1	12.7	22.8	91.9	55.0	28.0	27.0	48.6
35	48.5	23.2	13.2	10.1	21.1	82.6	49.4	28.0	21.4	45.0
40	44.2	21.1	13.2	8.0	19.2	75.1	45.0	28.0	17.0	40.7
45	40.6	19.4	13.2	6.3	16.9	69.1	41.3	28.0	13.3	36.0
50	37.7	18.0	13.2	4.8	14.5	64.0	38.3	28.0	10.3	30.8
55	35.1	16.8	13.2	3.6	12.0	59.6	35.7	28.0	7.7	25.4
60	32.9	15.8	13.2	2.6	9.3	55.9	33.4	28.0	5.5	19.6
65	31.0	14.9	13.2	1.7	6.5	52.6	31.5	28.0	3.5	13.7
70	29.4	14.1	13.2	0.9	3.6	49.8	29.8	28.0	1.8	7.6
75	27.9	13.3	13.2	0.1	0.6	47.3	28.3	28.0	0.3	1.3
80	26.6	12.7	13.2	0.0	0.0	45.0	26.9	28.0	0.0	0.0
85	25.4	12.1	13.2	0.0	0.0	43.0	25.7	28.0	0.0	0.0
90	24.3	11.6	13.2	0.0	0.0	41.1	24.6	28.0	0.0	0.0
95	23.3	11.2	13.2	0.0	0.0	39.4	23.6	28.0	0.0	0.0
100	22.4	10.7	13.2	0.0	0.0	37.9	22.7	28.0	0.0	0.0
105	21.6	10.3	13.2	0.0	0.0	36.5	21.8	28.0	0.0	0.0
110	20.8	10.0	13.2	0.0	0.0	35.2	21.1	28.0	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)

5-year $Q_{attenuated}$ **13.11 L/s** **100-year $Q_{attenuated}$** **27.98 L/s**
5-year Max. Storage Required **24.6 m^3** **100-year Max. Storage Required** **52.5 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	5.3	0.0	11.4	0.0
Attenutated Areas	13.1	24.6	28.0	52.5
Total	**18.4**	**24.6**	**39.4**	**52.5**

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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

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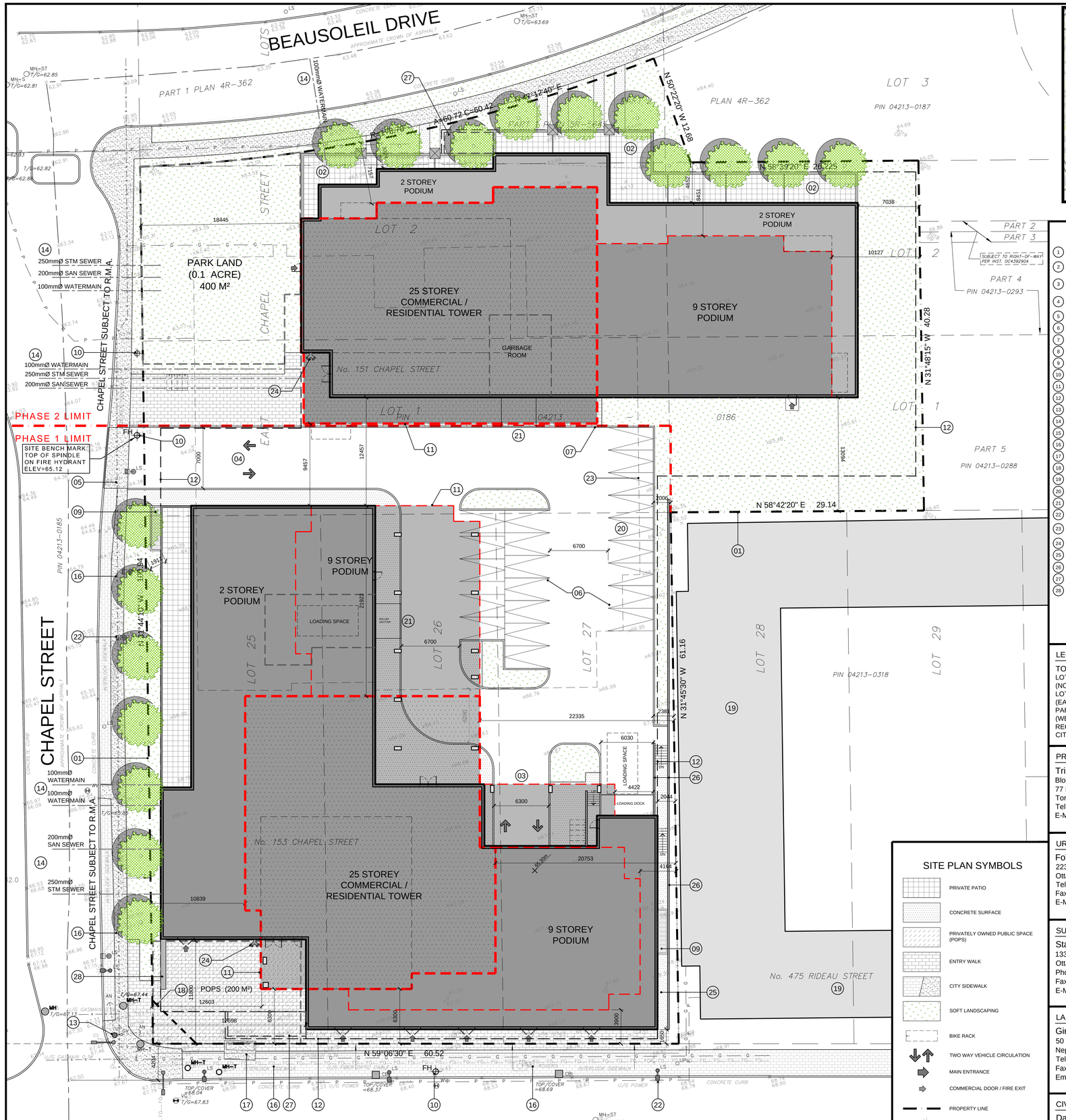
DRAWINGS / FIGURES



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
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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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Email: smerrick@dsel.ca

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 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.
2nd FLOOR		1,040.8 sq. m. (11,202) sq. ft.
3rd to 9th FLOOR	7 x 1,397.5 sq. m. 7 x (15,043) sq. ft.	9,782.8 sq. m. (105,301) sq. ft.
10th FLOOR		604.0 sq. m. (6,502) sq. ft.
11th to 25th 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	6
UNDERGROUND PARKING LEVEL	160
TOTAL	166

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%

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- DETAIL CROSS REFERENCE PAGE

No.	DESCRIPTION	DATE
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

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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	

D00-00-00-0000

1 SP-1 SITE PLAN
SCALE = 1 : 200

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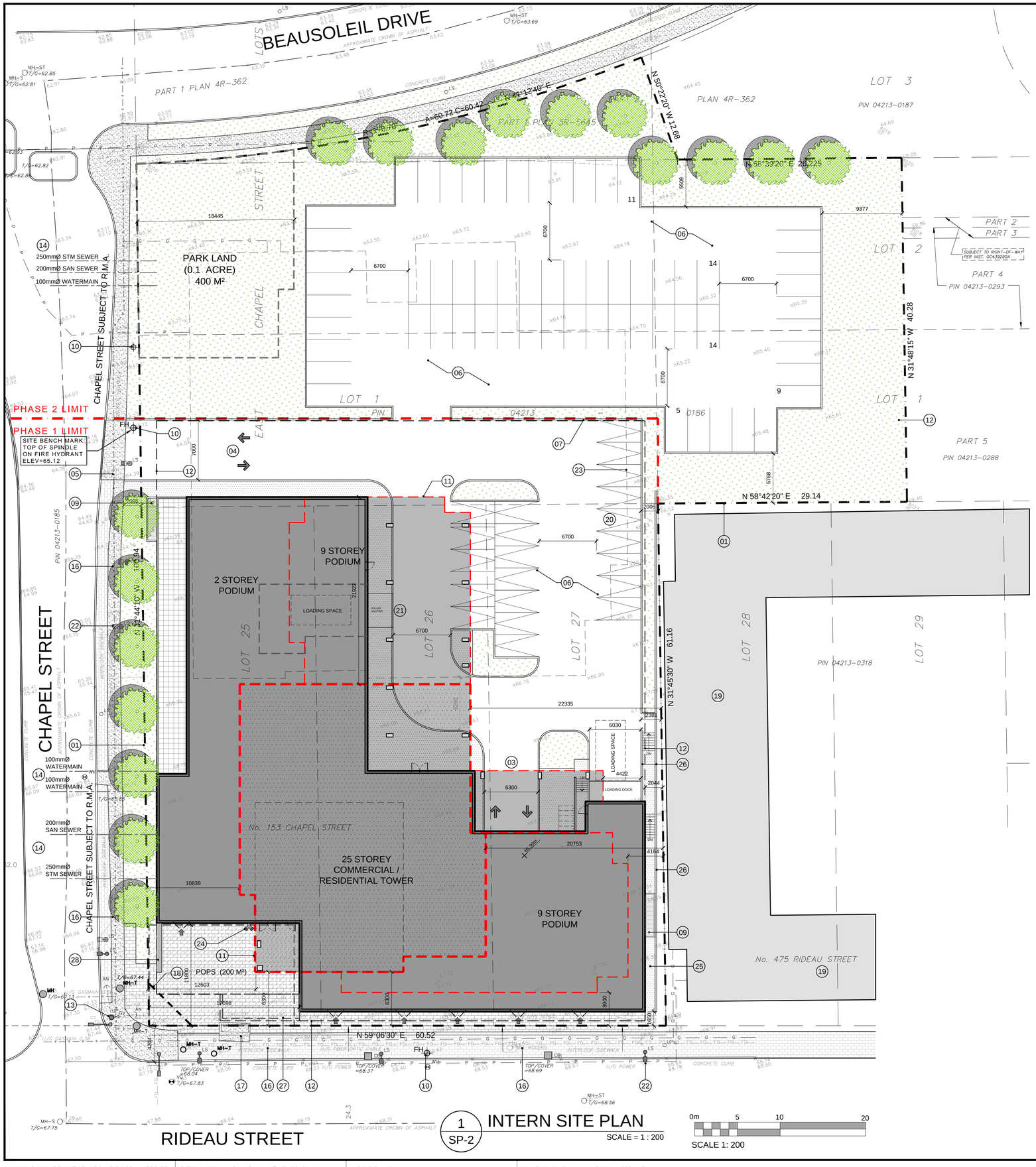
SCALE 1: 200



1 SP-2 INTERN SITE PLAN

SCALE = 1 : 200

SCALE 1: 200

KEY MAP

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- SOFT LANDSCAPING
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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%

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LOTS 1, 2 AND PART OF LOT 3
(EAST CHAPEL STREET)
PART OF LOTS 1, 2 AND 3
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REGISTERED PLAN 43586
CITY OF OTTAWA

PROJECT DEVELOPER

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NORTH ARROW:

CLIENT: TRINITY DEVELOPMENT GROUP — DESIGN. DEVELOP. BUILD.

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PROJECT TITLE:

151 CHAPEL STREET
RIDEAU @ CHAPEL
OTTAWA ONTARIO

SHEET TITLE:

SITE PLAN
PHASE 1 - INTERN

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

D00-00-00-0000