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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

SAAISH INC.
89 RICHMOND ROAD

CITY OF OTTAWA

PROJECT NO.: 18-1068

AUGUST 2019 – REV 2

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1.0 INTRODUCTION

David Schaeffer Engineering Ltd. (DSEL) has been retained by Saaish Inc. to prepare a Functional Servicing and Stormwater Management Report in support of Site Plan Control Application (SPC) for the proposed development at 89 Richmond Road.

The subject property is located within the City of Ottawa urban boundary, in the Kitchissippi ward. As illustrated in ***Figure 1***, below, the subject property is bounded by Richmond Road to the south, an existing residential lot to the east and an existing 6-storey mixed use building to the west. The subject property measures approximately ***0.04 ha*** and is designated Traditional Mainstreet Zone (TM[83]H(15)) under the current City of Ottawa zoning by-law.

Figure 1: Site Location

The proposed development involves the construction of a 6-storey mixed-use building, consisting of a total of ***14 residential units***, and a proposed spa occupying the basement, ground level and second floor. There is no on-site designated parking proposed.

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

1.1 Existing Conditions

The subject site currently consists of an existing 2-storey house with commercial space on the ground floor and paved surface parking.

Sewer system and watermain distribution mapping collected from the City of Ottawa indicate that the following services exist across the property frontage, within the adjacent municipal road:

Richmond Road:

- 305 mm diameter ductile iron watermain;
- 250 mm diameter PVC sanitary sewer; and
- 600 mm diameter concrete storm sewer.

1.2 Required Permits / Approvals

Development of the site is subject to the City of Ottawa Planning and Development Approvals process. The City of Ottawa must approve detailed engineering designs, drawings and reports prepared to support the proposed development plan before the issuing of SPC.

1.3 Pre-consultation

Pre-consultation correspondence is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES AND REPORTS

2.1 Existing Studies, Guidelines and Reports

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

- **Ottawa Sewer Design Guidelines**,
  City of Ottawa, *SDG002,* October 2012.
  (City Standards)

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

- **Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems**
  National Fire Protection Association
  2016 Edition.
  (NFPA 25)

- **Drainage Management Manual**
  Ministry of Transportation of Ontario (MTO), 1997.
  (MTO Drainage Manual)

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, located in ***Appendix B.*** A 305 mm diameter watermain exists within Richmond Road right-of-way.

Table 1, below, estimates the water demand of the existing building, assuming the ground floor consists solely of commercial units, and is based on the ***Water Supply Guidelines*** shown in ***Table 2.*** See ***Appendix B*** for detailed calculations.

Table 1
Existing Water Demand

Design Parameter	Anticipated Demand[1] (L/min)
Average Daily Demand	0.9
Max Day	7.6
Peak Hour	11.5

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.

3.2 Water Supply Servicing Design

The subject property is proposed to be serviced via a 150 mm diameter lateral connected to the existing 305 mm municipal watermain located within Richmond Road.

Table 2, below, summarizes the ***Water Supply Guidelines*** employed in the preparation of the water demand estimate.

Table 2
Water Supply Design Criteria

Design Parameter	Value
Residential Demand	280 L/p/d
Residential Maximum Daily Demand	9.5 x Average Daily *
Residential Maximum Hourly	14.3 x Average Daily *
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure shall not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems, Table 3-3, for 0 to 500 persons.*
*** Table updated to reflect* ***ISDTB-2018-02***

Table 3, below, summarizes the anticipated water demand and boundary conditions for the proposed development and was calculated using the ***Water Supply Guidelines.***

Table 3
Proposed Water Demand

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Conditions[2] (m H_2O / kPa)	
Average Daily Demand	10.0	114.6	461.1
Max Day + Fire Flow (per OBC)	49.2 + 3,580 = 3,629.2	109.5	411.0
Peak Hour	76.5	108.5	401.2

2) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
3) Boundary conditions above for connection 1 to Richmond Road assumed ground elevation equal to 67.6 m

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand, as indicated in the boundary request correspondence included in ***Appendix B***.

Based on recommendations from the City of Ottawa Water Resources Department, as no watermains are being sized as part of this application, fire flow was determined using the ***OBC*** method. The required fire flow was estimated to be ***3,580 L/min***, refer to calculation in ***Appendix B.***

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow, as indicated by the correspondence in ***Appendix B***. The minimum and maximum pressures fall within the required range identified in ***Table 2.***

3.3 Water Supply Conclusion

It is proposed to service the private development via a 150 mm servicing connected to the existing 305 mm watermain located within Richmond Road.

The anticipated water demand was submitted to the City of Ottawa for establishing boundary conditions. The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow. As demonstrated by ***Table 3***, based on the City's model, the municipal system is capable of delivering water within the pressure range prescribed in the ***Water Supply Guidelines***. The available pressure during the fire flow scenario as per the ***OBC*** calculations exceeds the minimum required pressure of 140 kPa.

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

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject property lies within the West Nepean Collector Sewer Trunk catchment area, as shown by the ***Trunk Sanitary Sewers and Collection Areas Map,*** included in ***Appendix C***. An existing 250 mm sanitary sewer exists within Richmond Road.

In order to assess available capacity, a sanitary analysis was conducted for the existing local sanitary sewers from the site up to the West Nepean Trunk sewer within Scott Street, as shown by the sanitary drainage map in ***Appendix C.*** The catchment area serviced by the sanitary sewer system was identified and evaluated by reviewing existing development and zoning within the area. The most restrictive segment of the sanitary system was found to have a ***28.7 L/s*** residual capacity.

Table 4, below, summarizes the estimated wastewater flows for the existing building.

Table 4
Summary of Estimated Existing Peak Wastewater Flow

Design Parameter	Existing Flow (L/s)
Estimated Average Dry Weather Flow	0.02
Estimated Peak Dry Weather Flow	0.06
Estimated Peak Wet Weather Flow	0.07

The existing house is estimated to have a peak wastewater flow of **0.07L/s**, and is serviced by the existing 250 mm diameter sewer within Richmond Road.

4.2 Wastewater Design

The development is proposed to connect to the 250 mm sanitary sewer within Richmond Road via a 200 mm sanitary service, refer to ***SSP-1,*** included with this report. Wastewater flow from the development is proposed to ultimately discharge into the West Nepean Collector Sewer Trunk within Scott Street via the local sanitary sewer system. A monitoring port is proposed to be located within the building.

Table 5, below, summarizes the ***City Standards*** employed in the calculation of wastewater flow rates for the proposed development.

Table 5
Wastewater Design Criteria

Design Parameter	Value
Residential Demand	280 L/p/d
Peaking Factor	Harmon's Peaking Factor. Max 3.8, Min 2.0
Infiltration and Inflow Allowance	0.33L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sanitary Sewer Lateral	135mm 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

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

Table 6
Summary of Proposed Wastewater Flows

Design Parameter	Anticipated Sanitary Flow[1] (L/s)
Average Dry Weather Flow Rate	0.17
Peak Dry Weather Flow Rate	0.41
Peak Wet Weather Flow Rate	0.42
*1) Based on criteria shown in **Table 3***	

The estimated peak wet weather sanitary flow, based on the ***Site Plan,*** provided in ***Drawings/Figures,*** is ***0.42 L/s***. This results in a ***0.35 L/s*** increase to the flow from current conditions. Based on the existing sanitary analysis discussed in ***Section 4.1*** of this report, there is sufficient capacity in local sewers to accommodate the increase in wastewater flow from the proposed development.

4.3 Wastewater Servicing Conclusions

The site is tributary to the West Nepean Collector Sewer Trunk. The development is anticipated to generate a peak wet weather flow of ***0.42 L/s,*** to be directed to the 250 mm sanitary sewer within Richmond Road, and ultimately discharging into the West Nepean Collector Trunk. Sanitary analysis of municipal infrastructure determined that local sewers downstream of the site area have sufficient capacity to accommodate the flow from the proposed development.

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

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

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

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in ***Appendix A***. The existing stormwater runoff from the site area generally drains north onto the rear side of the lot. An existing 600 mm storm sewer exists within Richmond Road.

An estimate of the pre-development peak flow directed from the subject site has been completed. The time of concentration using the Federal Aviation Administration method has been calculated with the following parameters: 0.04 Ha; 0.50 RC; 30 m flow length; slope equal to 3.3%; and resulting in a time of concentration of ***2.4 minutes***. A time of concentration of ***10 minutes*** was used for calculations per ***City Standards.***

The estimated pre-development peak flows for the 2, 5, and 100-year storm events are summarized in ***Table 7,*** below:

Table 7
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	7.1
5-year	9.7
100-year	18.4

5.2 Post-development Stormwater Management Targets

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa and RVCA and are summarized below:

- Meet an allowable release rate based on the existing Rational Method Coefficient no greater than 0.50, employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration equal to or greater than 10 minutes;
- Attenuate all storms up to and including the City of Ottawa 100-year design event on site; and

- Based on coordination with the RVCA, no quality control will be required.

Refer to city pre-consultation correspondence in ***Appendix A.***

5.3 Proposed Stormwater Management System

The proposed development consists of mostly rooftop and podium level. It is proposed that flow from the roof area and podium be directed to drain to an internal stormwater cistern.

The stormwater cistern is proposed to be controlled to a maximum release rate of ***5.1 L/s*** and proposed to discharge to the 200mm storm lateral. The 200 mm service is proposed to connect to the 600 mm storm sewer within Richmond Road. An independent 150 mm diameter foundation drain is also proposed to service the building. Refer to drawing ***SSP-1*** included with this report***.***

To meet the stormwater objectives the proposed development will use cistern storage within the proposed building. ***Table 8,*** below***,*** estimates post-development flow rates.

Table 8
Stormwater Flow Rate Summary

Control Area	2-Year Release Rate	2-Year Storage	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	0.1	0.0	0.1	0.0	0.2	0.0
Attenuated Areas	1.9	3.4	2.6	4.6	5.1	12.3
Total	**2.0**	**3.4**	**2.7**	**4.6**	**5.3**	**12.3**

Summarized in the table above, the internal cistern will require approximately ***12.3 m^3*** of storage to respect the total allowable release rate of ***5.4 L/s.*** Due to the presence of uncontrolled area the cistern will be required to attenuate flow to a release rate of ***5.1 L/s*****.** It is proposed to utilize a *Tempest 60 LMF inlet control device (ICD)* within the cistern to respect the allowable release rate, see ***Appendix D*** for calculations and ICD detail.

The water level elevations in the cistern were calculated to be ***65.20 m***, ***65.43 m***, and ***66.93 m*** for the 2, 5 and 100-year storm respectively. The maximum available water level in the cistern is not to exceed ***66.97 m***. See ***Appendix D*** for calculations.

It is proposed to provide a subfloor drainage system, consisting of lines of perforated drainage pipe subdrains connected to a positive outlet as per geotechnical recommendations.

5.4 Stormwater Servicing Conclusions

A target release rate of ***5.4 L/s*** was established per correspondence with the City, refer to ***Appendix A*** for associated correspondence***.*** No quality control is required for the proposed development as per correspondence with RVCA, located in ***Appendix A.***

The development is proposed to be serviced by the existing 600 mm storm sewer within Richmond road via a 200 mm lateral storm service. It is proposed that ***12.3 m^3*** of cistern storage within the building is required to attenuate flow to the allowable release rate.

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

6.0 UTILITIES

Gas, Hydro, Streetlighting, Bell and Rogers services exist within Richmond Road right-of-way.

Utility servicing will 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 SILTSACKs 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; and
- 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; and
- Clean and change filter cloth at catch basins.

8.0 CONCLUSION AND RECOMMENDATIONS

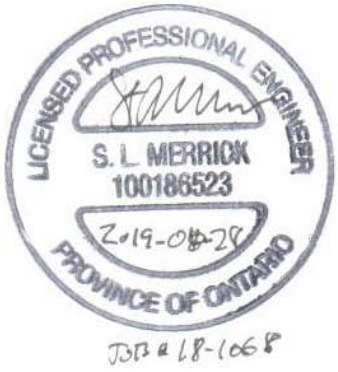
David Schaeffer Engineering Ltd. (DSEL) has been retained by Saaish Inc. to prepare a Functional Servicing and Stormwater Management Report in support of Site Plan Control for the proposed development at 89 Richmond Road. The preceding report outlines the following:

- Based on boundary conditions provided by the City, the existing municipal water infrastructure is capable of providing the proposed development with water within the City's required pressure range;
- The proposed development is anticipated to have a peak wet weather flow of ***0.42 L/s*** directed to the 250 mm sanitary sewer within Richmond Road, to be ultimately discharged into the West Nepean Collector Trunk. A sanitary analysis of external drainage areas was conducted and it was determined that municipal sanitary system downstream of the development has sufficient capacity to accommodate the increase in wastewater flow;
- Based on the consolation with the City, the proposed development is proposed to attenuate flow to a release rate of ***5.4 L/s***;
- It is proposed to attenuate flow through an internal cistern. It is anticipated that ***12.3 m^3*** of onsite cistern storage will be required to attenuate flow to the established release rate above; and
- No quality control measures are required, per correspondence with the RVCA.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Amr Salem

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Steven L. Merrick, P.Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

18-1068 14/08/2018

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☒	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	Drawings/Figures
☐	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.	N/A
☒	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	N/A

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

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

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	N/A
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	N/A

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☒	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 4.2
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

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

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

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☐	Analysis of available capacity in existing public infrastructure.	N/A
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.3
☒	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.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

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

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 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.	Section 5.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 8.0
☐	Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.	
☐	All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario	

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

Amr Salem

From: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Sent: November 1, 2018 10:50 AM
To: Amr Salem
Cc: Steve Merrick
Subject: RE: 1068- 89 Richmond Road Proposed Development

Confirmed.

Richard Buchanan, CET

Project Manager, Development Approvals
Planning, Infrastructure and Economic Development Department
Planning & Growth Management Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27801
ottawa.ca/planning / ottawa.ca/urbanisme

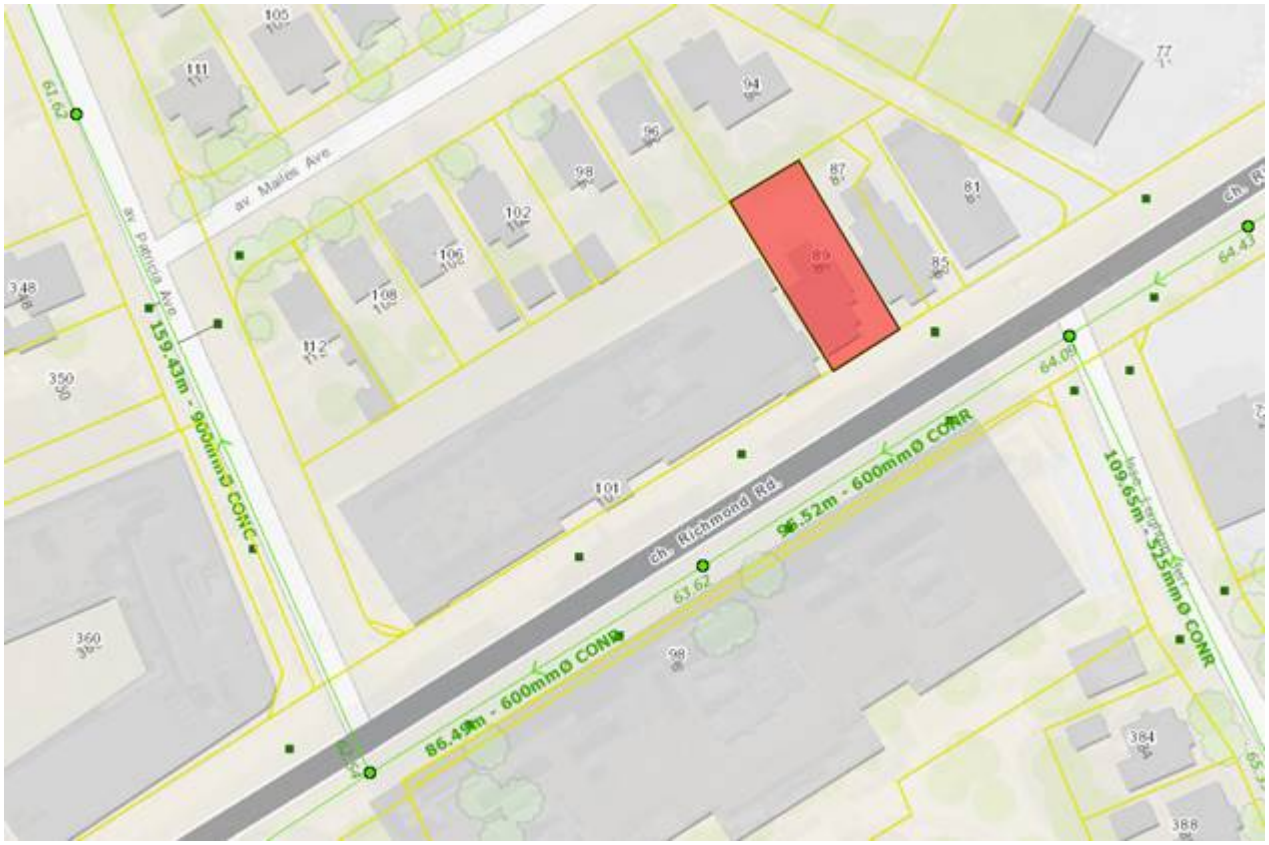
From: Amr Salem <ASalem@dsel.ca>
Sent: Thursday, November 01, 2018 10:13 AM
To: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 1068- 89 Richmond Road Proposed Development

Good morning Richard,

Can you please provide your input regarding Stormwater Management criteria for the subject property at 89 Richmond Road;

It is proposed that the development will discharge to the municipal infrastructure (600mm diameter Storm Sewer) within Richmond Road.

It is assumed that the site would need to meet an allowable release rate based on either a Rational Coefficient method of 0.5 or the calculated existing Rational Coefficient method (the lesser), employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration of 10 min. Can you please confirm that?



Please feel free to contact me with any questions.

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

Amr Salem

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: October 30, 2018 3:11 PM
To: Amr Salem
Cc: Jamie Batchelor
Subject: RE: 1068- 89 Richmond Road - RVCA Coordination

Hi Amr,

The RVCA will not require quality protection based on the project described below. We will still review the application when submitted through the City. Please ensure water quality is addressed in the servicing report when submitted.

Thanks,

Eric Lalande, MCIP, RPP
Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Amr Salem <ASalem@dsel.ca>
Sent: Tuesday, October 30, 2018 2:41 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>; Eric Lalande <eric.lalande@rvca.ca>
Subject: 1068- 89 Richmond Road - RVCA Coordination

Hello Jamie/Eric,

We wanted to consult with you regarding a mixed-use development we are working on located at 89 Richmond Road.

The existing stormwater on site discharges to the municipal infrastructure (600 mm Diameter Storm Sewer) within Richmond Road. The stormwater collected from the site travels approximately 2.5 km through municipal sewer to a direct outlet into the Ottawa River.

The development proposes to construct a new 6-storey mixed use building (commercial/residential) . The site will be landscape with storm water primarily coming from the roof top collected from the building. **There is no surface parking on site.**

At present, the existing site area consists of mostly paved asphalt for surface parking and a 2-storey building.

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

Please feel free to contact me with any questions,

Thanks,

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

APPENDIX B

Water Supply

2015 Water Distribution System

Department of Infrastructure Services

This map was compiled from existing & collected engineering Information from the City of Ottawa Geographic Information System and is protected by copyright. The location of Infrastructure is approximate and should not be used for construction purposes.

Scale 1:2500

Ottawa

Legend

- Public Hydrant
- Private Hydrant
- Summer only Flusher Hydrant
- Flusher Hydrant
- Acoustic Fibre Optic
- Gate Valve
- Tapping Valve
- Butterfly Valve
- Buried Valve
- Drain Pipe
- Check Valve
- Closed Valve
- Drain-Out Valve
- Left Hand Valve
- Spot Elevation
- Pressure Reducing Valve
- Air Relief Valve
- Bypass Valve
- Feedermain Valve
- Inspection Plate
- Cap
- Reducer
- Jump
- Water Meter
- Water Service
- Backbone Pipe
- Watermain with Pipe Diameter, Material and Install Year
- Pipe Casing
- Pressure Zone Delineation and Identifier
- Well
- Elevated Tank
- Water Pumping Station
- Water Reservoir
- Water Treatment Plant

Pipe Equivalents

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2650	114
600	24	1650	66	3000	120

Pipe Materials

A - ASBESTOS
CI - CAST IRON
CO - COPPER
CO0 - AWWA C300
CO1 - AWWA C301
CO2 - AWWA C302
CO3 - AWWA C303
DI - DUCTILE IRON
PE - POLYETHYLENE (DR11 TO DR21)
PVC - POLYVINYL CHLORIDE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON
UNK - UNKNOWN MATERIAL

362-030	364-030	366-030
362-029	364-029	366-029
362-028	364-028	366-028
362-027	364-027	366-027
362-026	364-026	366-026

Amr Salem

From: Buchanan, Richard <Richard.Buchanan@ottawa.ca>
Sent: November 19, 2018 10:09 AM
To: Amr Salem
Subject: 1068-89 Richmond Boundary Conditions request
Attachments: 1068-89 Richmond Nov 2018.pdf

Good Morning Amr;

The following are boundary conditions, HGL, for hydraulic analysis at 1068-89 Richmond (zone 1W) assumed to be connected to the 305mm on Richmond (see attached PDF for location).

Minimum HGL = 108.5m

Maximum HGL = 114.6m

MaxDay + Fireflow (60 L/s) = 109.5m

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.

Richard Buchanan, CET

Project Manager, Development Approvals
Planning, Infrastructure and Economic Development Department
Planning & Growth Management Branch
City of Ottawa | Ville d'Ottawa
613.580.2424 ext./poste 27801
ottawa.ca/planning / ottawa.ca/urbanisme

From: Amr Salem <ASalem@dsel.ca>
Date: November 15, 2018 at 2:28:54 PM EST
To: "Buchanan, Richard" <Richard.Buchanan@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 1068-89 Richmond Boundary Conditions request

Hello Richard,

We would like to kindly request boundary conditions for the proposed development at **89 Richmond Road** using the following proposed development demands:

1. Location of Service / Street Number: **89 Richmond Road**

2. Type of development: **The proposed mixed-use development involves a 6-storey mixed-use building consisting of a total of 14 residential units. A spa occupying the basement,1st and 2nd floor is also proposed.** *Please find attached the Site Plan for reference*.

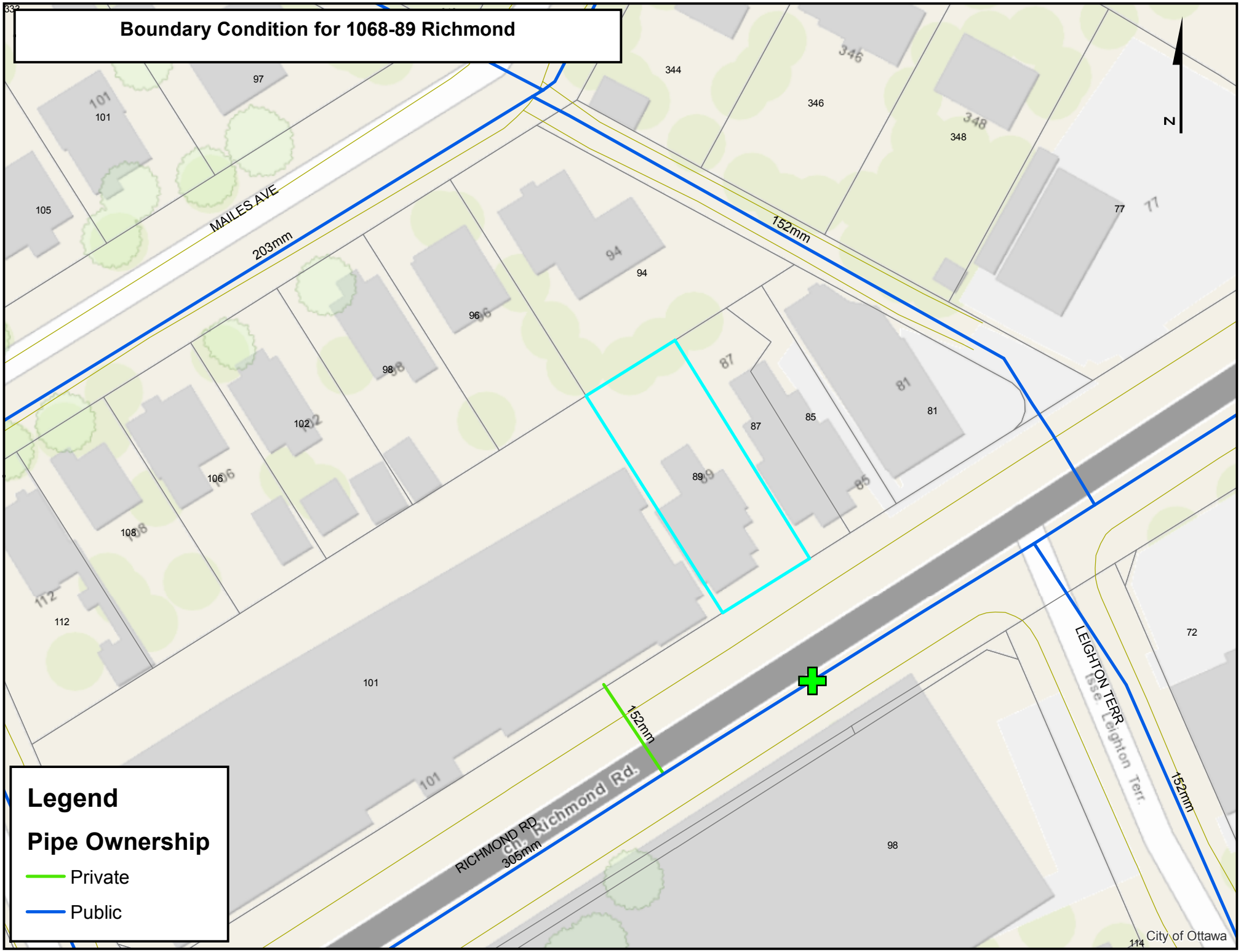
3. Proposed Connection point:
   - **Connection to existing 305 mm diameter watermain along Richmond Road.** *Please see the diagram below for reference.*

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

	L/min	L/s
Avg. Daily	10	0.17
Max Day + OBC	49.2 + 3580.0 =3629.2	0.82 + 59.78 = 6
Peak Hour	76.5	1.28

'

'


Boundary Condition for 1068-89 Richmond
MAILES AVE
203mm
152mm
RICHMOND RD
305mm
152mm
LEIGHTON TERR
152mm
N
Legend
Pipe Ownership
Private
Public
City of Ottawa

Date: 2018-11-15

1068 -89 Richmond Road

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.

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 ***3,580 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 hose stream demand is ***380 L/min*** per Table 11.2.3.1.2. The lower demand was selected as the sprinkler system is proposed to be fully supervised per section 11.2.3.1.3. As a result, the total fire flow is anticipated to be ***3,580 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

89 Richmond
Saaish Inc
Existing Site Water Demand

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	1	4
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	4	1.1	0.8	10.6	7.4	16.0	11.1

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Office	75 L/9.3m^2/d		0.00	0.0	0.0	0.0	0.0	0.0
Commercial floor space**	2.8 L/m^2/d	80	0.22	0.2	0.3	0.2	0.6	0.4
Laundry	1,200 L/machine/d		0.00	0.0	0.0	0.0	0.0	0.0
			0.00	0.0	0.0	0.0	0.0	0.0
			0.00	0.0	0.0	0.0	0.0	0.0
			0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			0.2	0.2	0.3	0.2	0.6	0.4
Total Demand			**1.3**	**0.9**	**11.0**	**7.6**	**16.6**	**11.5**

***Assuming 12 hour operation*

89 Richmond
Saaish Inc
Proposed Site Water Demand

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	1	2
1 Bedroom	1.4	12	17
2 Bedroom	2.1	1	3
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	22	6.2	4.3	58.5	40.6	88.1	61.2

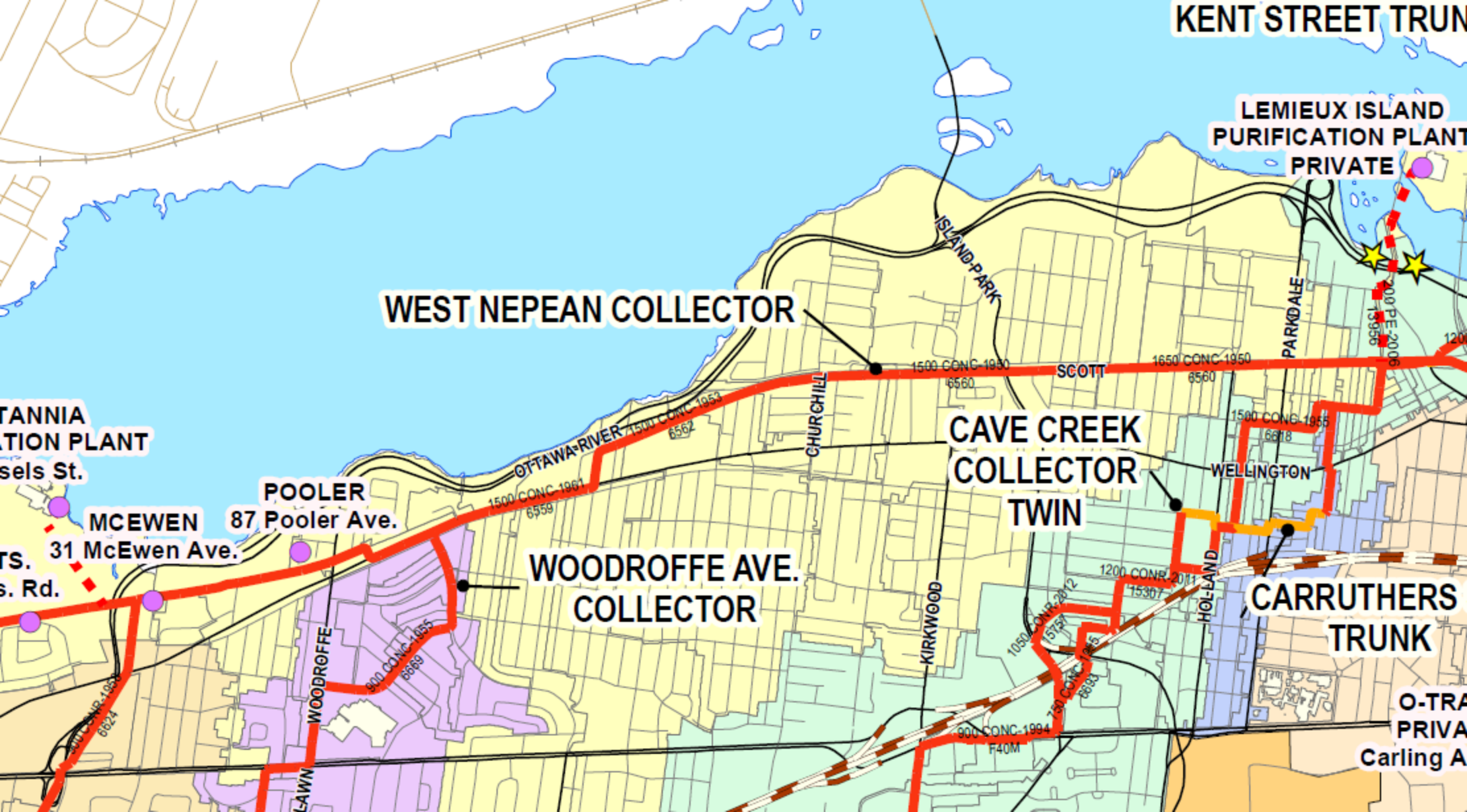
Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Office	75 L/9.3m^2/d		0.00	0.0	0.0	0.0	0.0	0.0
Commercial floor space	5.0 L/m^2/d		0.00	0.0	0.0	0.0	0.0	0.0
Laundry	1,200 L/machine/d		0.00	0.0	0.0	0.0	0.0	0.0
Spa*	90 L/person/d	91	8.19	5.7	12.3	8.5	22.1	15.4
			0.00	0.0	0.0	0.0	0.0	0.0
			0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			8.2	5.7	12.3	8.5	22.1	15.4
Total Demand			**14.4**	**10.0**	**70.8**	**49.2**	**110.2**	**76.5**

**Spa demand based on demand for School with gym and showers from Appendix A-4 of the Ottawa Sewer Design Guidelines*

APPENDIX C

Wastewater Collection


KENT STREET TRUN
LEMIEUX ISLAND
PURIFICATION PLANT
PRIVATE
WEST NEPEAN COLLECTOR
ISLAND PARK
PARKDALE
1200 PE-2009
13956
1500 CONC-1930
6560
SCOTT
1650 CONC-1950
6560
1500 CONC-1955
6618
WELLINGTON
CAVE CREEK
COLLECTOR
TWIN
CHURCHILL
OTTAWA RIVER
1500 CONC-1953
6562
1500 CONC-1961
6559
TANNIA
TION PLANT
sels St.
MCEWEN
31 McEwen Ave.
POOLER
87 Pooler Ave.
TS.
s. Rd.
WOODROFFE AVE.
COLLECTOR
WOODROFFE
900 CONC-1955
6669
900 CONC-1953
6624
KIRKWOOD
1200 CONC-2011
15307
HOLLAND
1050 CONC-2012
15757
750 CONC-1965
6693
900 CONC-1994
F40M
CARRUTHERS
TRUNK
O-TRA
PRIVA
Carling A

2008
SANITARY & STORM COLLECTION SYSTEM

Department of Infrastructure Services and Community Sustainability

This map was compiled from existing & collected engineering Information from the City of Ottawa Geographic Information System and is protected by copyright. The location of Infrastructure is approximate and should not be used for construction purposes.

0 25 50 100 150 200 250 Meters

Scale 1 : 2500 approx.

Ottawa ©

Legend

- Regulator
- Storm Pump Station
- Sanitary Pump Station
- Wastewater Treatment Plant
- Storm Outlet
- Storm Manhole
- Storm Pipe
- Sanitary Trunk Sewer
- Sanitary Manhole
- Sanitary Pipe
- Combined Manhole
- Combined Pipe

PIPE EQUIVALENTS

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

PIPE MATERIALS

ABS - ACRYL BUTADENE STYRENE
AC - ASBESTOS CEMENT
BRICK - BRICK
CLAY - CLAY
CONC - CONCRETE
CONPP - CONCRETE PRESSURE PIPE
CONR - REINFORCED CONCRETE PIPE
CONX - EXTRA STRENGTH CONCRETE PIPE
CORI - CORRUGATED IRON PIPE
CSP - CORRUGATED STEEL PIPE
CSPA - ASPHALT COATED CSP
DI - DUCTILE IRON PIPE
FRP - FIBERGLASS REINFORCED PLASTIC PIPE
GALV - GALVANIZED PIPE
KI - KITEC PIPE
PE - POLYETHYLENE PIPE (DR17)
PP - POLYPROPYLENE PIPE
PVC - POLYVINYL CHLORIDE PIPE
ST - STEEL PIPE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON PIPE
UNK - UNKNOWN MATERIAL

	362-030	364-030
360-029	362-029	364-029
360-028	362-028	364-028
360-027	362-027	364-027
360-026	362-026	364-026

2008
SANITARY & STORM COLLECTION SYSTEM

Department of Infrastructure Services and Community Sustainability

0 25 50 100 150 200 250 Meters

Scale 1 : 2500 approx.

Ottawa ©

Legend

- Regulator
- Storm Pump Station
- Sanitary Pump Station
- Wastewater Treatment Plant
- Storm Outlet
- Storm Manhole
- Storm Pipe
- Sanitary Trunk Sewer
- Sanitary Manhole
- Sanitary Pipe
- Combined Manhole
- Combined Pipe

PIPE EQUIVALENTS

nominal (mm)	actual (inches)	nominal (mm)	actual (inches)	nominal (mm)	actual (inches)
100	4	675	27	1800	72
150	6	750	30	1950	78
200	8	825	33	2025	80
250	10	900	36	2100	84
300	12	975	39	2250	90
375	15	1050	42	2400	96
400	16	1200	48	2550	102
450	18	1350	54	2700	108
525	21	1500	60	2850	114
600	24	1650	66	3000	120

PIPE MATERIALS

ABS - ACRYL BUTADENE STYRENE
AC - ASBESTOS CEMENT
BRICK - BRICK
CLAY - CLAY
CONC - CONCRETE
CONPP - CONCRETE PRESSURE PIPE
CONR - REINFORCED CONCRETE PIPE
CONX - EXTRA STRENGTH CONCRETE PIPE
CORI - CORRUGATED IRON PIPE
CSP - CORRUGATED STEEL PIPE
CSPA - ASPHALT COATED CSP
DI - DUCTILE IRON PIPE
FRP - FIBERGLASS REINFORCED PLASTIC PIPE
GALV - GALVANIZED PIPE
KI - KITEC PIPE
PE - POLYETHYLENE PIPE (DR17)
PP - POLYPROPYLENE PIPE
PVC - POLYVINYL CHLORIDE PIPE
ST - STEEL PIPE
STC - CONCRETE LINED STEEL PIPE
UCI - UNLINED CAST IRON PIPE
UNK - UNKNOWN MATERIAL

364-030	366-030	368-030
364-029	366-029	368-029
364-028	366-028	368-028
364-027	366-027	368-027
364-026	366-026	368-026

89 Richmond Road - Sanitary Analysis

AREA ID	Total Area (Ha)	Residential Area (Ha)	Commercial Area (Ha)
Area A	1.10	0.88	0.76
Area B	1.45	1.34	0.11
Area C	1.22	1.02	0.2
Area D	0.71	0.17	0
Area E	0.03	0.03	0
Area F	1.57	1.57	0
Area G	0.09	0.09	0
Area H	0.07	0.07	0

SANITARY SEWER CALCULATION SHEET - EXISTING SANITARY ANALYSIS

PROJECT: **SAIISH INC.**
LOCATION: **89 Richmond Road**
FILE REF: **18-1068**
DATE: **22-Nov-18**

DESIGN PARAMETERS

Avg. Daily Flow Res.	280	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =3.8			Infiltration / Inflow	0.33 L/s/ha
Avg. Daily Flow Comm.	28,000	L/ha/d	Peak Fact. Comm. If (Q_I/Q_{TOTAL}>20%)	1.5	Peak Fact. Comm.	1 Min. Pipe Velocity	0.60 m/s full flowing
Avg. Daily Flow Instit.	28,000	L/ha/d	Peak Fact. Instit. If (Q_I/Q_{TOTAL}>20%)	1.5	Peak Fact. Instit.	1 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
			Correction Factor K	0.8			

Location			Residential Area and Population									Commercial		Institutional		Industrial		Infiltration				Pipe Data									
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative Area	Cumulative Pop.	Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full	Qresidual
			(ha)	Singles	Semi's	Town's	Apt's**		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)	(L/s)
A	**1**	**2**	0.880	1	1		420	762.0	0.9	762.0	3.30	8.15	0.76	0.76					0.4	1.110	1.110	0.366	8.88	250	0.47	112.7	0.049	0.063	0.83	40.6	0.22	31.8
B	**2**	**3**	1.450	23				78.0	2.3	840.0	3.28	8.92	0.10	0.86					0.42	1.4	2.54	0.838	10.18	250	0.91	18.6	0.049	0.063	1.16	56.9	0.18	46.7
C	**3**	**4**	1.02	15				51.0	3.4	891.0	3.27	9.43	0.20	1.06					0.51	1.220	3.760	1.241	11.18	225	2.00	91.4	0.040	0.056	1.60	63.5	0.18	52.3
D	**4**	**5**	0.710	11				37.0	4.1	928.0	3.26	9.79	0.00	1.06					0.51	0.71	4.47	1.475	11.78	225	0.90	90.5	0.040	0.056	1.07	42.5	0.28	30.7
E	**5**	**6**	0.030					0.0	4.1	928.0	3.26	9.79	0.00	1.06					0.51	0.030	4.50	1.485	11.79	225	0.84	58.5	0.040	0.056	1.03	41.1	0.29	29.3
F	**6**	**7**	1.570	33				112.0	5.7	1040.0	3.23	10.89	0.00	1.06					0.51	1.570	6.07	2.003	13.41	250	0.90	130.5	0.049	0.063	1.15	56.3	0.24	42.9
G	**7**	**8**	0.090					0.0	5.8	1040.0	3.23	10.89	0.00	1.06					0.51	0.090	6.16	2.033	13.44	300	0.38	42.5	0.071	0.075	0.84	59.4	0.23	45.9
H	**8**	**9**	0.070	1				3.0	5.8	1043.0	3.23	10.92	0.00	1.06					0.51	0.070	6.23	2.056	13.49	300	0.19	21.3	0.071	0.075	0.60	42.2	0.32	28.7

Saaish Inc
89 Richmond Road
Existing Sanitary Flow

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

Site Area 0.04 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.01**	**L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4	1	4
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4		0
2 Bedroom	2.1		0
3 Bedroom	3.1		0
Average	1.8		0
Total Pop			**4**

Average Domestic Flow	**0.01**	**L/s**
Peaking Factor	**3.76**	
Peak Domestic Flow	**0.05**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial Space*	2.8 L/m2/d	80	0.005
Average I/C/I Flow			**0.005**
Peak Institutional / Commercial Flow			0.008
Peak Industrial Flow**			0.000
Peak I/C/I Flow			**0.008**

** Assuming 12 hour operation*

Total Estimated Average Dry Weather Flow Rate	**0.02 L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.06 L/s**
Total Estimated Peak Wet Weather Flow Rate	**0.07 L/s**

Saaish Inc
89 Richmond Road
Proposed Sanitary Flow

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

Site Area 0.04 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.01 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	1	2
1 Bedroom	1.4	12	17
2 Bedroom	2.1	1	3
3 Bedroom	3.1		0
Average	1.8		0

Total Pop **22**

Average Domestic Flow **0.07 L/s**

Peaking Factor **3.70**

Peak Domestic Flow **0.26 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial Space*	90 L/person/d	91	0.09

Average I/C/I Flow **0.09**

Peak Institutional / Commercial Flow 0.14
Peak Industrial Flow** 0.00
Peak I/C/I Flow **0.14**

** Athletic Center demand based on demand for School with gym and showers from Appendix A-4 of the Ottawa Sewer Design Guidelines*

Total Estimated Average Dry Weather Flow Rate	**0.17 L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.41 L/s**
Total Estimated Peak Wet Weather Flow Rate	**0.42 L/s**

APPENDIX D

Stormwater Management

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

Existing Drainage Charateristics From Internal Site

Area	0.04	ha	
C	0.90	Rational Method runoff coefficient	
L	30	m	
Up Elev	68	m	
Dn Elev	67	m	
Slope	3.3	%	
Tc	2.4	min	**Minimum Tc=10*

.

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	7.1	9.7	18.4	L/s

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

Target Flow Rate

Area	0.0372	ha
C	0.50	Rational Method runoff coefficient
t_c	10.0	min
	5-year	
i	104.2	mm/hr
Q	5.4	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.0005	ha
C	0.90	Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	0.1	0.1	0.0	0.0	178.6	0.2	0.2	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

Total Subsurface Storage (m^3) 12.5

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage	**Ponding**	**h_o**	**delta d**	**V***	**V_{acc}****	**$Q_{release}$†**	**$V_{drawdown}$**
	(m)	**(m^2)**	**(m)**	**(m)**	**(m^3)**	**(m^3)**	**(L/s)**	**(hr)**
ICD INV	64.53		0.00			0.0	0.0	0.00
Storage SL	65.75		1.22	1.22	6.3	6.3	3.5	0.50
Storage OBV	66.97		2.44	1.22	6.3	12.5	5.1	0.68

* V=Incremental storage volume

**V_{acc}=Total surface and sub-surface

† $Q_{release}$ = Release rate calculated from Tempest LMF Flow Curves for LMF60

Orifice Location **CISTERN Tempest LMF 60**
Total Area 0.0367 ha
C 0.90 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	5-year					**100-year**				
t_c	**i**	**Q_{actual}‡**	**$Q_{release}$**	**Q_{stored}**	**V_{stored}**	**i**	**Q_{actual}‡**	**$Q_{release}$**	**Q_{stored}**	**V_{stored}**
(min)	**(mm/hr)**	**(L/s)**	**(L/s)**	**(L/s)**	**(m^3)**	**(mm/hr)**	**(L/s)**	**(L/s)**	**(L/s)**	**(m^3)**
10	104.2	9.5	2.6	7.0	4.2	178.6	18.2	2.6	15.6	9.4
15	83.6	7.7	2.6	5.1	4.6	142.9	14.5	2.6	12.0	10.8
20	70.3	6.4	2.6	3.8	4.6	120.0	12.2	2.6	9.7	11.6
25	60.9	5.6	2.6	3.0	4.5	103.8	10.6	2.6	8.0	12.0
30	53.9	4.9	2.6	2.4	4.2	91.9	9.4	2.6	6.8	12.2
35	48.5	4.4	2.6	1.9	3.9	82.6	8.4	2.6	5.9	12.3
40	44.2	4.0	2.6	1.5	3.5	75.1	7.7	2.6	5.1	12.2
45	40.6	3.7	2.6	1.1	3.1	69.1	7.0	2.6	4.5	12.1
50	37.7	3.4	2.6	0.9	2.6	64.0	6.5	2.6	4.0	11.9
55	35.1	3.2	2.6	0.6	2.1	59.6	6.1	2.6	3.5	11.6
60	32.9	3.0	2.6	0.4	1.6	55.9	5.7	2.6	3.1	11.3
65	31.0	2.8	2.6	0.3	1.0	52.6	5.4	2.6	2.8	11.0
70	29.4	2.7	2.6	0.1	0.4	49.8	5.1	2.6	2.5	10.6
75	27.9	2.6	2.6	0.0	0.0	47.3	4.8	2.6	2.3	10.2
80	26.6	2.4	2.4	0.0	0.0	45.0	4.6	2.6	2.0	9.7
85	25.4	2.3	2.3	0.0	0.0	43.0	4.4	2.6	1.8	9.3
90	24.3	2.2	2.2	0.0	0.0	41.1	4.2	2.6	1.6	8.8
95	23.3	2.1	2.1	0.0	0.0	39.4	4.0	2.6	1.5	8.3
100	22.4	2.1	2.1	0.0	0.0	37.9	3.9	2.6	1.3	7.9
105	21.6	2.0	2.0	0.0	0.0	36.5	3.7	2.6	1.2	7.3
110	20.8	1.9	1.9	0.0	0.0	35.2	3.6	2.6	1.0	6.8

5-year $Q_{attenuated}$ **2.59 L/s** **Average 100-year $Q_{attenuated}$** **2.55 L/s**
5-year Max. Storage Required **4.6 m^3** **100-year Max. Storage Required** **12.3 m^3**
Est. 5-year Storage Elevation **65.43 m** **Est. 100-year Storage Elevation** **66.93 m**

Summary of Release Rates and Storage Volumes

Control Area	**5-Year Release Rate (L/s)**	**5-Year Required Storage (m^3)**	**100-Year Release Rate (L/s)**	**100-Year Required Storage (m^3)**	**100-Year Available Storage (m^3)**
Unattenuated Areas	0.1	0.0	0.2	0.0	0.0
Attenutated Areas	2.6	4.6	5.1	12.3	12.5
Total	**2.7**	**4.6**	**5.3**	**12.3**	**12.5**

89 Richmond Road
Proposed Conditions
2-Year Storm Required Storage Check

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

Target Flow Rate

Area	0.0372	ha
C	0.50	Rational Method runoff coefficient
t_c	10.0	min
	5-year	
i	104.2	mm/hr
Q	5.4	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.0005	ha
C	0.90	Rational Method runoff coefficient

	2-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	76.8	0.1	0.1	0.0	0.0	178.6	0.2	0.2	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)

89 Richmond Road
Proposed Conditions
2-Year Storm Required Storage Check

Estimated Post Development Peak Flow from Attenuated Areas

Total Subsurface Storage (m^3) 12.5

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage	Ponding	h_o	delta d	V*	V_{acc}**	$Q_{release}$†	$V_{drawdown}$
	(m)	(m^2)	(m)	(m)	(m^3)	(m^3)	(L/s)	(hr)
ICD INV	64.53		0.00			0.0	0.0	0.00
Storage INV	64.53		0.00	0.00	0.0	0.0	0.0	0.00
Storage SL	65.75		1.22	1.22	6.3	6.3	3.5	0.50
Storage OBV	66.97		2.44	1.22	6.3	12.5	5.1	0.68

* V=Incremental storage volume

**V_{acc}=Total surface and sub-surface

† $Q_{release}$ = Release rate calculated from Tempest LMF Flow Curves for LMF60

Orifice Location **CISTERN Tempest LMF 60**

Total Area 0.0367 ha

C 0.90 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	2-year				
t_c	i	Q_{actual}‡	$Q_{release}$	Q_{stored}	V_{stored}
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
10	76.8	7.0	1.9	5.1	3.1
15	61.7	5.7	1.9	3.7	3.4
20	52.0	4.8	1.9	2.8	3.4
25	45.1	4.1	1.9	2.2	3.3
30	40.0	3.7	1.9	1.8	3.2
35	36.0	3.3	1.9	1.4	2.9
40	32.8	3.0	1.9	1.1	2.6
45	30.2	2.8	1.9	0.9	2.3
50	28.0	2.6	1.9	0.7	2.0
55	26.2	2.4	1.9	0.5	1.6
60	24.5	2.2	1.9	0.3	1.2
65	23.1	2.1	1.9	0.2	0.8
70	21.9	2.0	1.9	0.1	0.4
75	20.8	1.9	1.9	0.0	0.0
80	19.8	1.8	1.8	0.0	0.0
85	18.9	1.7	1.7	0.0	0.0
90	18.1	1.7	1.7	0.0	0.0
95	17.4	1.6	1.6	0.0	0.0
100	16.7	1.5	1.5	0.0	0.0
105	16.1	1.5	1.5	0.0	0.0
110	15.6	1.4	1.4	0.0	0.0

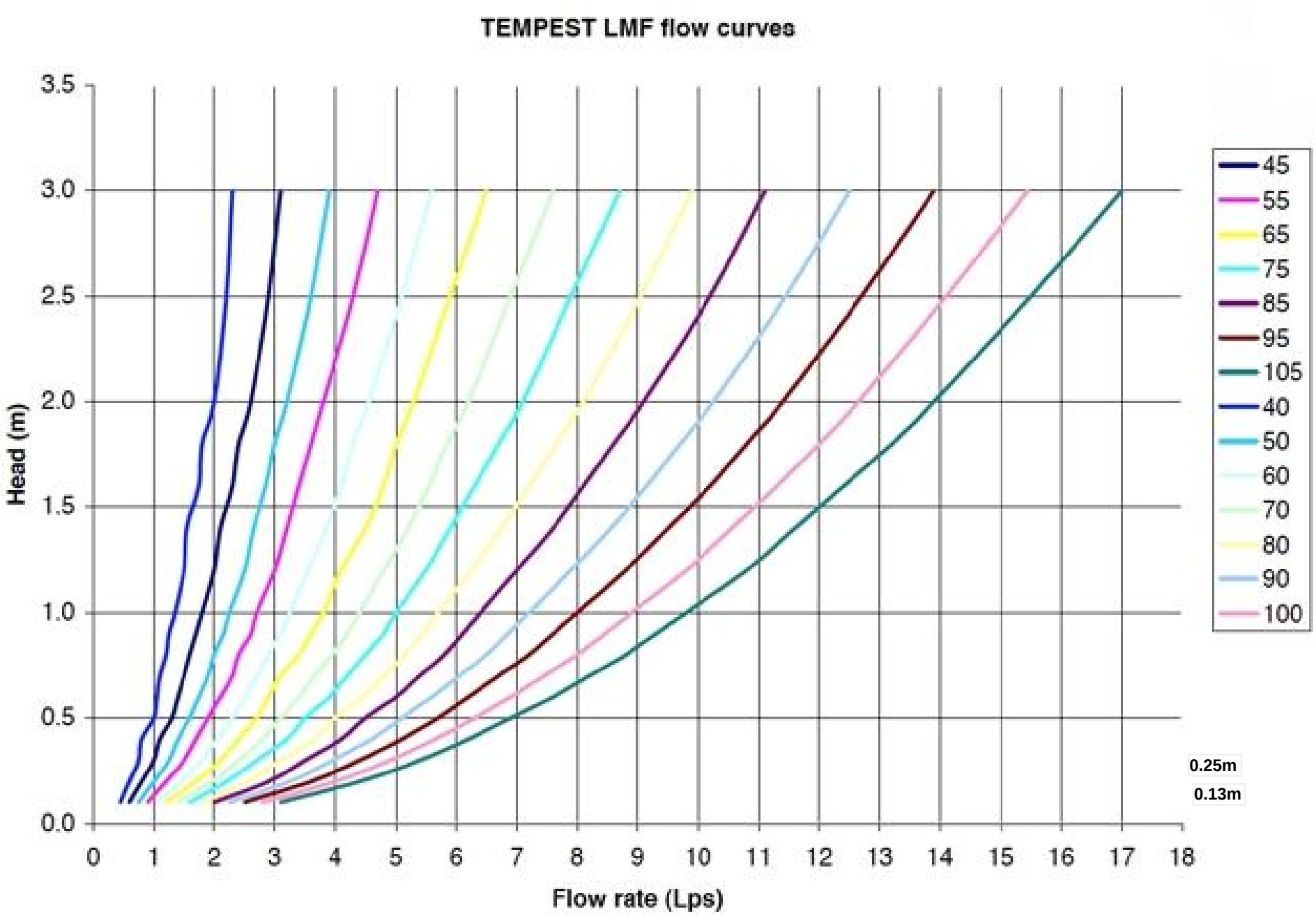
2-year $Q_{attenuated}$ 1.92 L/s

2-year Max. Storage Required 3.4 m^3

2-year Storage Elevation 65.20 m

Summary of Release Rates and Storage Volumes

Control Area	2-Year Release Rate (L/s)	2-Year Required Storage (m^3)	100-Year Available Storage (m^3)
Unattenuated Areas	0.1	0.0	0.0
Attenutated Areas	1.9	3.4	12.5
Total	**2.0**	**3.4**	**12.5**


TEMPEST LMF flow curves
Head (m)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Flow rate (Lps)
45
55
65
75
85
95
105
40
50
60
70
80
90
100
0.25m
0.13m

PRODUCT INFORMATION: TEMPEST LOW, MEDIUM FLOW (LMF) ICD

Purpose

To control the amount of storm water runoff entering a sewer system by allowing a specified flow volume out of a catch basin or manhole at a specified head. This approach conserves pipe capacity so that catch basins downstream do not become uncontrollably surcharged, which can lead to basement floods, flash floods and combined sewer overflows.

Product Description

Our LMF ICD is designed to accommodate catch basins or manholes with sewer outlet pipes 6" in diameter and larger. Any storm sewer larger than 12" may require custom modification. However, IPEX can custom build a TEMPEST device to accommodate virtually any storm sewer size.

Available in 14 preset flow curves, the LMF ICD has the ability to provide flow rates: 2lps – 17lps (31gpm – 270gpm)

Product Function

The LMF ICD vortex flow action allows the LMF ICD to provide a narrower flow curve using a larger orifice than a conventional orifice plate ICD, making it less likely to clog. When comparing flows at the same head level, the LMF ICD has the ability to restrict more flow than a conventional ICD during a rain event, preserving greater sewer capacity.

Product Construction

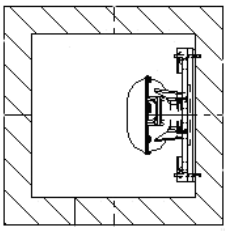
Constructed from durable PVC, the LMF ICD is light weight 8.9 Kg (19.7 lbs).

Product Applications

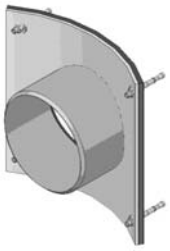
Will accommodate both square and round applications:

Square Application

Universal Mounting Plate



Round Application



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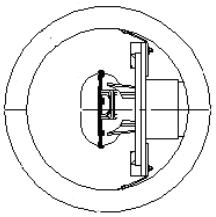
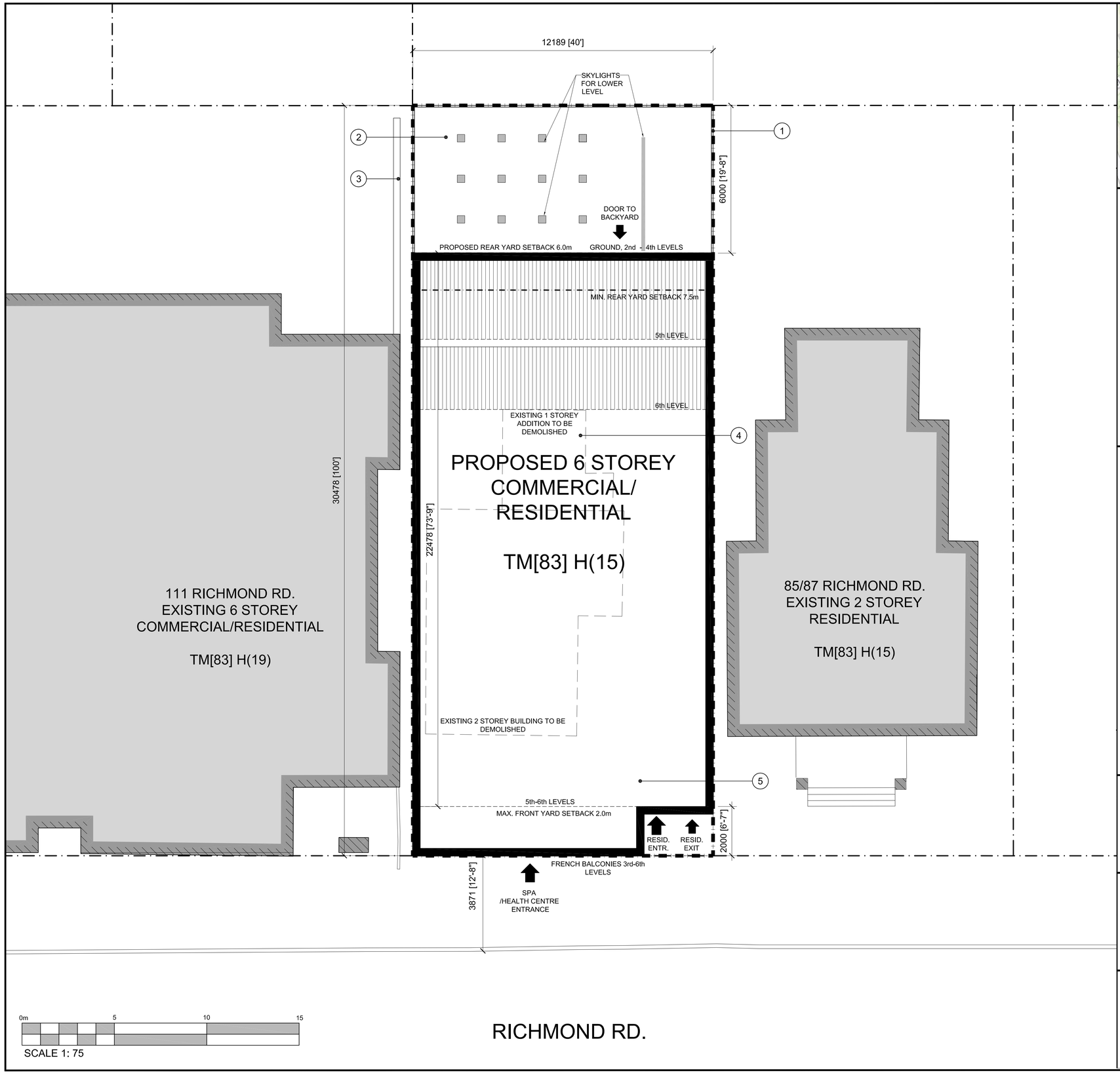
Spigot CB Wall Plate

=

Universal Mounting Plate Hub Adapter



DRAWINGS / FIGURES



SITE PLAN SYMBOLS

- CRUSHED STONE
- BALCONY / TERRACE
- PRIMARY RESIDENTIAL ENTRANCE
- PRIMARY RESIDENTIAL EXIT
- PROPERTY LINE
- BUILDING SETBACKS

DRAWING NOTES

1. PROPERTY LINE
2. LANDSCAPED 'ZEN GARDEN'
3. EXISTING PRIVACY WALL
4. OUTLINE OF EXISTING BUILDING TO BE DEMOLISHED
5. EXTENT OF GROUND FLOOR

PROJECT INFORMATION

For 89 Richmond Road

ZONING: TM[83] H(15)

SITE AREA: 1,554.6 sq. m. (16,734.3 sq. ft)

Performance Standards	Required	Provided
Building Height	15 m max.	19.1 m
Front Yard Setback	2 m max.	2 m
Interior Side Yard Setback	3 m max.	0 m
Rear Yard Setback	7.5 m min.	6 m
Landscape Area Width (Abutting a Residential Zone)	3 m min.	6 m
Landscape Area Width (Other Instances)	0 m min.	0 m
Amenity Space	6 sq. m. x 14 units = 84 sq. m. (50% required to be communal amenity = 42 sq. m.)	Level 6 (Common Exterior): 18.2 m² Ground Level Zen Garden (Common Exterior): 70.7 m² Private Balconies: 64.6 sq. m. Total = **150.7 sq. m.**
Minimum Bicycle Parking Spaces	7 Residential (0.5 per unit)	19 (Interior)
Storage Lockers	0	0

Building Statistics

Gross Floor Areas
(City of Ottawa Zoning By-law Definition)

Basement Level	204 sq. m. / 2,200 sq. ft.
Ground Level	131 sq. m. / 1,405 sq. ft.
2nd Level	162 sq. m. / 1,747 sq. ft.
3rd Level	213 sq. m. / 2,292 sq. ft.
4th Level	213 sq. m. / 2,292 sq. ft.
5th Level	172 sq. m. / 1,856 sq. ft.
6th Level	139 sq. m. / 1,494 sq. ft.
Total	**1,234 sq. m. / 13,286 sq. ft.**

Construction Area

Basement Level	372 sq. m. / 3,999 sq. ft.
Ground Level	267 sq. m. / 2,877 sq. ft.
2nd Level	274 sq. m. / 2,949 sq. ft.
3rd Level	274 sq. m. / 2,949 sq. ft.
4th Level	274 sq. m. / 2,949 sq. ft.
5th Level	231 sq. m. / 2,490 sq. ft.
6th Level	197 sq. m. / 2,116 sq. ft.
Total	**1,889 sq. m. / 20,329 sq. ft.**

Unit Statistics

Studio	1
1 Bedroom	12
2 Bedroom	1
Total	**14**

PEN STYLE: O-RLA-MASTERS.stb PAPER SIZE: ARCH_D_(24.00_x_36.00_Inches)

PLOT SCALE: 1:25.4

No.	DESCRIPTION	DATE
3	RE-ISSUED FOR SITE PLAN APPLICATION	2019.08.28
2	ISSUED FOR UDRP	2019.06.27
1	ISSUED FOR SITE PLAN APPLICATION	2019.04.09

REVISIONS:

ARCHITECT SEAL:

ONTARIO ASSOCIATION OF ARCHITECTS
RODERICK J. LAHEY
LICENCE 4375

NORTH ARROW:

CLIENT:

ARCHITECT:

rla/architecture
56 Beech Street, Ottawa, Ontario K1S 3J6
t.613.724.9932 f.613.724.1209 www.rodericklahey.ca

PROJECT TITLE:

89 RICHMOND ROAD

OTTAWA ONTARIO

SHEET TITLE:

SITE PLAN

DRAWN: RLA

CHECKED: RLA

SCALE: AS SHOWN

SHEET No. A100

PROJECT No. 1734

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D07-12-19-0067

CIVIL ENGINEER

David Schaeffer Engineering Inc.

120 Iber Road, Unit 103
Stittsville, Ont. K2S 1E9
Tel: 613-836-0856
Email: smerrick@DSEL.ca

LEGAL DESCRIPTION

TOPOGRAPHICAL PLAN OF THE

Part 1 of Lot 83
Registered Plan 400
City of Ottawa

PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.

LANDSCAPE ARCHITECT

FoTenn Consultants Inc.

223 McLeod Street
Ottawa, Ont. K2P 0Z8
Tel: 613-730-5709
Fax: 613-730-1136
Email: abbasi@fotenn.com

PROJECT DEVELOPER

Tanuja & Mahendra Vaidya

648 Mansfield Avenue
Ottawa, Ont. K2A 2T6
Email: tanujavaidya@hotmail.com

SURVEYOR

Annis, O'Sullivan, Vollebekk ltd.

14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Tel: 613-727-0850
Fax: 613-727-1079
Email: nepean@aovltd.com

URBAN PLANNER

FoTenn Consultants Inc.

223 McLeod Street
Ottawa, Ont. K2P 0Z8
Tel: 613-730-5709
Fax: 613-730-1136
Email: furney@fotenn.com

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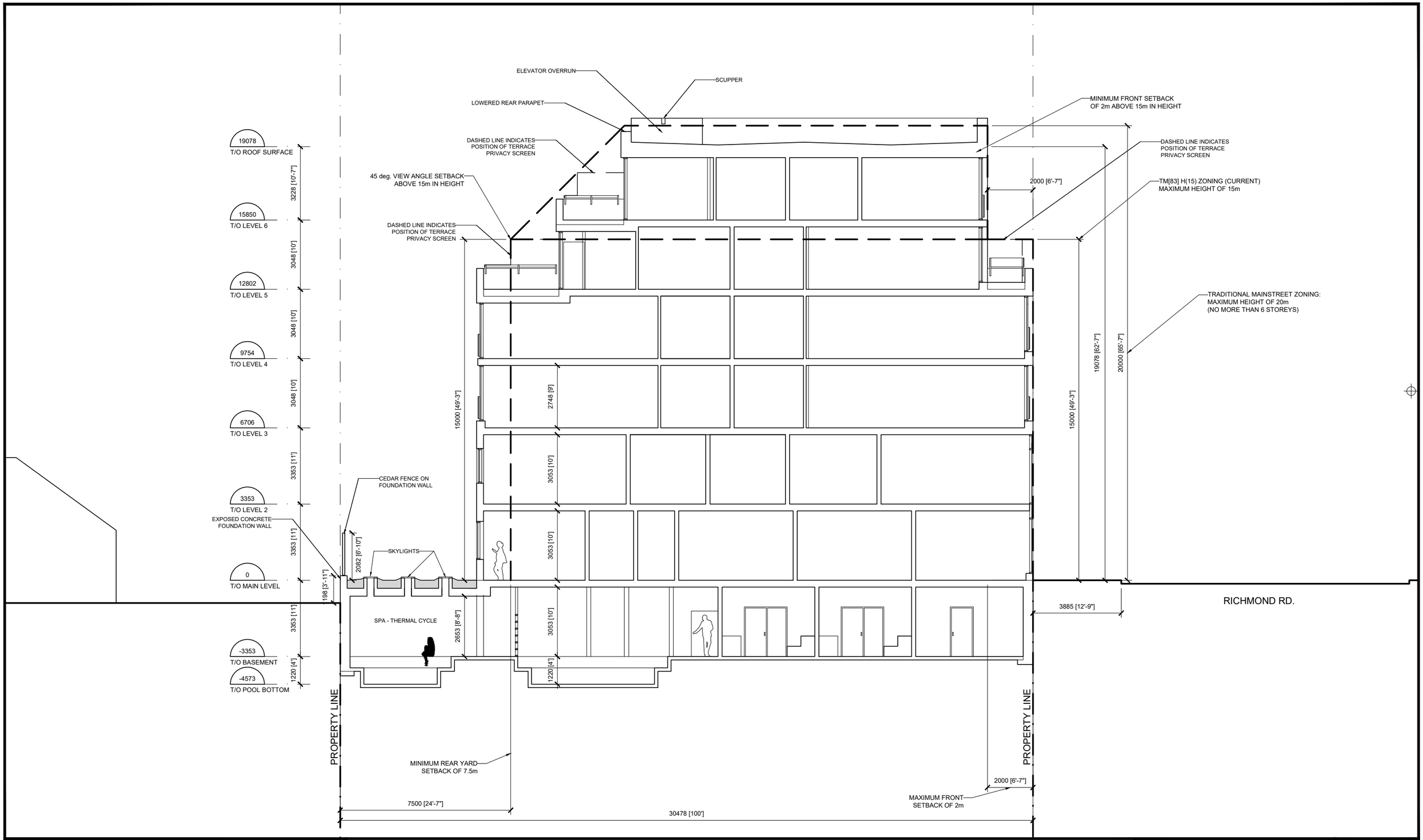

rla/architecture

SECTION A

SCALE 1:150
August 29, 2019

89
Richmond Rd
OTTAWA ONTARIO

SHEET #
8

PROJ. 1734