

# **FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT**

**FOR**

**SAAISH INC.  
89 RICHMOND ROAD**

**CITY OF OTTAWA**

**PROJECT NO.: 18-1068**

**NOVEMBER 2018  
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FOR  
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89 RICHMOND ROAD**

**NOVEMBER 2018  
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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 <sup>1</sup> (L/min)
Average Daily Demand	0.9
Max Day	7.6
Peak Hour	11.5
1) Water demand calculation per <b>Water Supply Guidelines</b> . See <b>Appendix B</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 <b>ISDTB-2018-02</b>	

**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 <sup>1</sup> (L/min)	Boundary Conditions <sup>2</sup> (m H <sub>2</sub> O / 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 <b>Water Supply Guidelines</b> . See <b>Appendix B</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 watermain 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**, located in **Drawings/Figures**. 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.

**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	$Q = \frac{1}{n} AR^{\frac{2}{3}} S^{\frac{1}{2}}$
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 <sup>1</sup> (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 <b>Table 3</b>	

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	11.9
5-year	16.3
100-year	31.2

### 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 **5.4 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. Refer to the drawing **SSP-1**.

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	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m <sup>3</sup> )	(L/s)	(m <sup>3</sup> )
Unattenuated Areas	0.8	0.0	1.5	0.0
Attenuated Areas	2.0	4.7	3.8	9.0
<b>Total</b>	<b>2.8</b>	<b>4.7</b>	<b>5.4</b>	<b>9.0</b>

Summarized in the table above, the internal cistern will require approximately **9.0 m<sup>3</sup>** of storage to ensure a total 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 **3.8 L/s**.

### 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 **9.0 m<sup>3</sup>** 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.

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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 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:

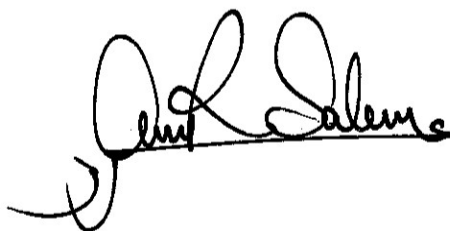
- Verification that water is not flowing under silt barriers; and
- Clean and change filter cloth at catch basins.

## 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 consultation 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 **9.0m<sup>3</sup>** 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***

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# DEVELOPMENT SERVICING STUDY CHECKLIST

18-1068

21/11/2018

## 4.1 General Content

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

## 4.2 Development Servicing Report: Water

<input type="checkbox"/>	Confirm consistency with Master Servicing Study, if available	N/A
<input checked="" type="checkbox"/>	Availability of public infrastructure to service proposed development	Section 3.1
<input checked="" type="checkbox"/>	Identification of system constraints	Section 3.1
<input checked="" type="checkbox"/>	Identify boundary conditions	Section 3.1, 3.2
<input checked="" type="checkbox"/>	Confirmation of adequate domestic supply and pressure	Section 3.3

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

#### 4.3 Development Servicing Report: Wastewater

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

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

#### 4.4 Development Servicing Report: Stormwater Checklist

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

<input checked="" type="checkbox"/>	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
<input type="checkbox"/>	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
<input type="checkbox"/>	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
<input checked="" type="checkbox"/>	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
<input type="checkbox"/>	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
<input type="checkbox"/>	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

#### 4.5 Approval and Permit Requirements: Checklist

<input checked="" type="checkbox"/>	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 1.2
<input type="checkbox"/>	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
<input type="checkbox"/>	Changes to Municipal Drains.	N/A
<input type="checkbox"/>	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

#### 4.6 Conclusion Checklist

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

## 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](http://ottawa.ca/planning) / [ottawa.ca/urbanisme](http://ottawa.ca/urbanisme)

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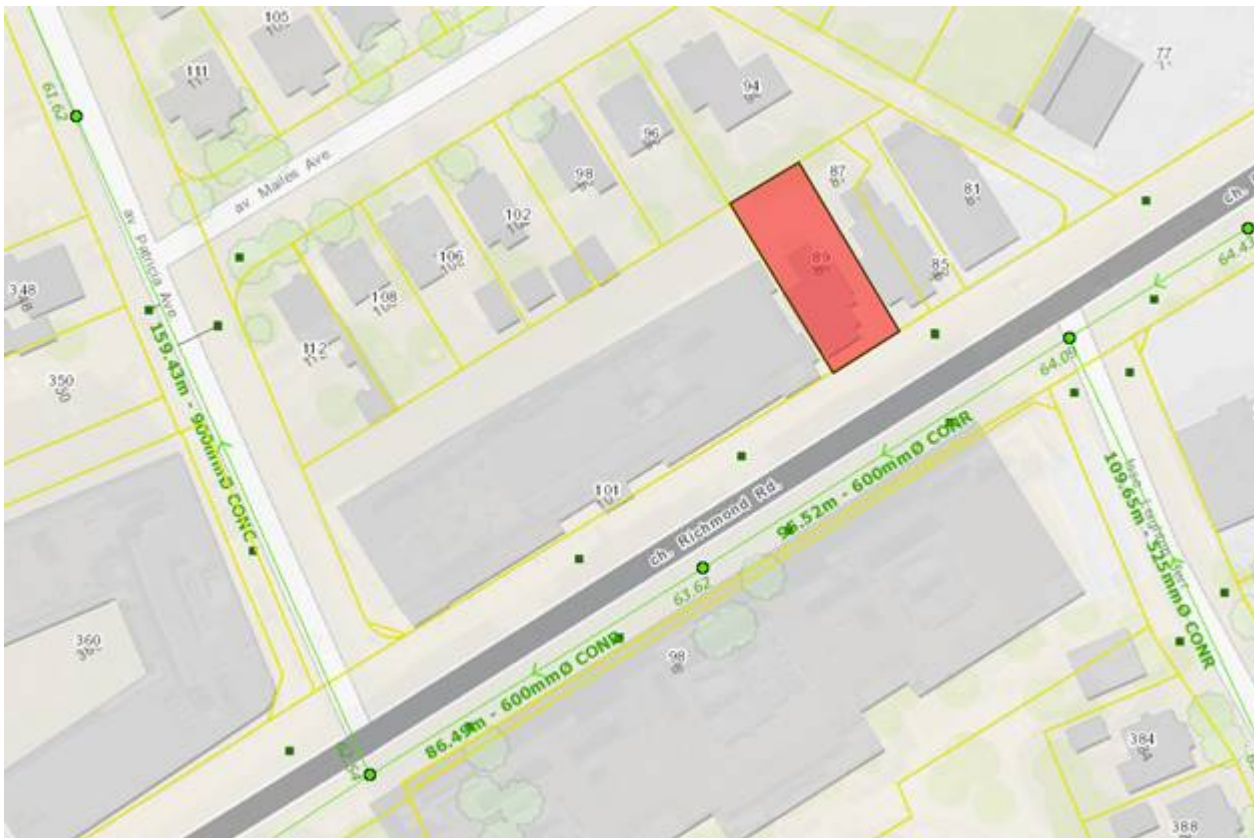
**From:** Amr Salem <ASalem@dsel.ca>  
**Sent:** Thursday, November 01, 2018 10:13 AM  
**To:** Buchanan, Richard <Richard.Buchanan@ottawa.ca>  
**Cc:** Steve Merrick <SMerrick@dsel.ca>  
**Subject:** 1068- 89 Richmond Road Proposed Development

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](mailto:asalem@DSEL.ca)

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,

## Amr Salem

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**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](mailto:asalem@DSEL.ca)

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## ***APPENDIX B***

### ***Water Supply***

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## Amr Salem

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**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](http://ottawa.ca/planning) / [ottawa.ca/urbanisme](http://ottawa.ca/urbanisme)

**From:** Amr Salem <[ASalem@dsel.ca](mailto:ASalem@dsel.ca)>  
**Date:** November 15, 2018 at 2:28:54 PM EST  
**To:** "Buchanan, Richard" <[Richard.Buchanan@ottawa.ca](mailto:Richard.Buchanan@ottawa.ca)>  
**Cc:** Steve Merrick <[SMerrick@dsel.ca](mailto: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, 1<sup>st</sup> and 2<sup>nd</sup> 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
<b>Avg. Daily</b>	10	0.17
<b>Max Day + OBC</b>	49.2 + 3580.0 = 3629.2	0.82 + 59.78 = 60.6
<b>Peak Hour</b>	76.5	1.28

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**Boundary Condition for 1068-89 Richmond**

**Legend**

**Pipe Ownership**

- Private (Green line)
- Public (Blue line)

The map shows a residential area with streets including MAILES AVE, RICHMOND RD, and LEIGHTON TERR. A green cross marks a proposed connection point between a private pipe (green line) and a public pipe (blue line). The map also displays various lot numbers and pipe diameters (e.g., 203mm, 152mm, 305mm). A north arrow is located in the top right corner.

**Boundary Condition for 1068-89 Richmond**

**Legend**

**Pipe Ownership**

- Private (Green line)
- Public (Blue line)

The map shows a residential area with streets including MAILES AVE, RICHMOND RD, and LEIGHTON TERR. A green cross marks a proposed connection point between a private pipe (green line) and a public pipe (blue line). The map also displays various lot numbers and building footprints.

**Boundary Condition for 1068-89 Richmond**

**Legend**

**Pipe Ownership**

- Private (Green line)
- Public (Blue line)

The map displays a residential area with streets including MAILES AVE, RICHMOND RD, and LEIGHTON TERR. A specific property at 1068-89 Richmond is highlighted with a red rectangle. A green cross marks a proposed connection point on Richmond Rd. Pipe ownership is indicated by line colors: green for private and blue for public. Pipe diameters are noted along the routes: 203mm, 152mm, and 305mm. A north arrow is located in the top right corner.

**Boundary Condition for 1068-89 Richmond**

**Legend**

**Pipe Ownership**

- Private (Green line)
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The map displays a residential area with streets including MAILES AVE, RICHMOND RD, and LEIGHTON TERR. A specific property at 1068-89 Richmond is highlighted with a red rectangle. A green cross marks a proposed connection point on Richmond Rd. Pipe ownership is indicated by line colors: green for private and blue for public. Pipe diameters are noted along the routes: 203mm, 152mm, and 305mm. A north arrow is located in the top right corner.

**Boundary Condition for 1068-89 Richmond**

**Legend**

**Pipe Ownership**

- Private (Green line)
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**Boundary Condition for 1068-89 Richmond**

**Legend**

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The map displays a residential area with streets including MAILES AVE, RICHMOND RD, and LEIGHTON TERR. A specific property at 1068-89 Richmond is highlighted with a red rectangle. A green cross marks a proposed connection point on Richmond Rd. Pipe ownership is indicated by line colors: green for private and blue for public. Pipe diameters are noted along the routes: 203mm, 152mm, and 305mm. A north arrow is located in the top right corner.

**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. 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 **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**

<b>Occupancy</b>	<b>Inside Hose</b>		<b>Total Combined Inside and Outside Hose</b>		<b>Duration (minutes)</b>
	<b>gpm</b>	<b>L/min</b>	<b>gpm</b>	<b>L/min</b>	
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**  
**Saish 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 <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min
<b>Total Domestic Demand</b>	<b>4</b>	<b>1.1</b>	<b>0.8</b>	<b>10.6</b>	<b>7.4</b>	<b>16.0</b>	<b>11.1</b>

**Institutional / Commercial / Industrial Demand**

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min
Office	75 L/9.3m <sup>2</sup> /d		0.00	0.0	0.0	0.0	0.0	0.0
Commercial floor space**	2.8 L/m <sup>2</sup> /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
<b>Total I/CI Demand</b>			<b>0.2</b>	<b>0.2</b>	<b>0.3</b>	<b>0.2</b>	<b>0.6</b>	<b>0.4</b>
<b>Total Demand</b>			<b>1.3</b>	<b>0.9</b>	<b>11.0</b>	<b>7.6</b>	<b>16.6</b>	<b>11.5</b>

\*\*Assuming 12 hour operation

**89 Richmond**  
**Saish 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 <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min
<b>Total Domestic Demand</b>	<b>22</b>	<b>6.2</b>	<b>4.3</b>	<b>58.5</b>	<b>40.6</b>	<b>88.1</b>	<b>61.2</b>

**Institutional / Commercial / Industrial Demand**

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min	m <sup>3</sup> /d	L/min
Office	75 L/9.3m <sup>2</sup> /d		0.00	0.0	0.0	0.0	0.0	0.0
Commercial floor space	5.0 L/m <sup>2</sup> /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
<b>Total I/CI Demand</b>			<b>8.2</b>	<b>5.7</b>	<b>12.3</b>	<b>8.5</b>	<b>22.1</b>	<b>15.4</b>
<b>Total Demand</b>			<b>14.4</b>	<b>10.0</b>	<b>70.8</b>	<b>49.2</b>	<b>110.2</b>	<b>76.5</b>

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

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## ***APPENDIX C***

### ***Wastewater Collection***

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<div>2008</div> <div>SANITARY &amp; STORM COLLECTION SYSTEM</div>	<div>Legend</div> <div><div><div> Regulator</div><div> Storm Pump Station</div><div> Sanitary Pump Station</div><div> Wastewater Treatment Plant</div></div><div><div> Storm Outlet</div><div> Storm Manhole</div><div> Storm Pipe</div><div> Sanitary Trunk Sewer</div></div><div><div> Sanitary Manhole</div><div> Sanitary Pipe</div><div> Combined Manhole</div><div> Combined Pipe</div></div></div>						<table><thead><tr><th colspan="2">nominal (mm)</th><th colspan="2">actual (inches)</th><th colspan="2">PIPE EQUIVALENTS nominal (mm)</th><th colspan="2">actual (inches)</th><th colspan="2">nominal (mm)</th><th colspan="2">actual (inches)</th></tr></thead><tbody><tr><td>100</td><td>4</td><td>675</td><td>27</td><td>1800</td><td>72</td></tr><tr><td>150</td><td>6</td><td>750</td><td>30</td><td>1950</td><td>78</td></tr><tr><td>200</td><td>8</td><td>825</td><td>33</td><td>2025</td><td>80</td></tr><tr><td>250</td><td>10</td><td>900</td><td>36</td><td>2100</td><td>84</td></tr><tr><td>300</td><td>12</td><td>975</td><td>39</td><td>2250</td><td>90</td></tr><tr><td>375</td><td>15</td><td>1050</td><td>42</td><td>2400</td><td>96</td></tr><tr><td>400</td><td>16</td><td>1200</td><td>48</td><td>2550</td><td>102</td></tr><tr><td>450</td><td>18</td><td>1350</td><td>54</td><td>2700</td><td>108</td></tr><tr><td>525</td><td>21</td><td>1500</td><td>60</td><td>2850</td><td>114</td></tr><tr><td>600</td><td>24</td><td>1650</td><td>66</td><td>3000</td><td>120</td></tr></tbody></table>						nominal (mm)		actual (inches)		PIPE EQUIVALENTS 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																																											
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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



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

## 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  
Avg. Daily Flow Comm. 28,000 L/ha/d  
Avg. Daily Flow Instit. 28,000 L/ha/d  
Avg. Daily Flow Indust. 35,000 L/ha/d  
Peak Fact. Res. Per Harmons: Min = 2.0, Max =3.8  
Peak Fact. Comm. If (Q<sub>i</sub>/Q<sub>TOTAL</sub>>20%) 1.5  
Peak Fact. Instit. If (Q<sub>i</sub>/Q<sub>TOTAL</sub>>20%) 1.5  
Peak Fact. Indust. per MOE graph 0.8  
Correction Factor K  
Infiltration / Inflow 0.33 L/s/ha  
1 Min. Pipe Velocity 0.60 m/s full flowing  
1 Max. Pipe Velocity 3.00 m/s full flowing  
Mannings N 0.013



Location			Residential Area and Population										Commercial		Institutional		Industrial		Infiltration				Pipe Data										
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative		Peak Fact.	Q <sub>res</sub>	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q <sub>C+H+I</sub>	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	A <sub>hydraulic</sub>	R	Velocity	Q <sub>cap</sub>	Q / Q full	Qresidual	
				Singles	Semi's	Town's	Apt's**		Area (ha)	Pop.																							(ha)
			(ha)							(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m <sup>2</sup> )	(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	



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## ***APPENDIX D***

### ***Stormwater Management***

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## 89 Richmond Road Existing Conditions

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



### Existing Drainage Characteristics From Internal Site

<b>Area</b>	0.04 ha
<b>C</b>	0.90 Rational Method runoff coefficient
<b>L</b>	30 m
<b>Up Elev</b>	68 m
<b>Dn Elev</b>	67 m
<b>Slope</b>	3.3 %
<b>Tc</b>	2.4 min

1) Time of Concentration per Federal Aviation Administration

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

$t_c$ , in minutes

C, rational method coefficient, (-)

L, length in ft

S, average watershed slope in %

### Estimated Peak Flow

	<b>2-year</b>	<b>5-year</b>	<b>100-year</b>
<b>i</b>	128.4	175.8	302.9 mm/hr
<b>Q</b>	11.9	16.3	31.2 L/s

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



Area 0.037 ha  
C 0.50 Rational Method runoff coefficient  
t<sub>c</sub> 10.0 min \*Based on a time of concentration equal to or greater than 10 min

5-year  
i 104.2 mm/hr  
Q 5.4 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area 0.003 ha  
C 0.90 Rational Method runoff coefficient

t <sub>c</sub> (min)	5-year					100-year				
	i (mm/hr)	Q <sub>actual</sub> (L/s)	Q <sub>release</sub> (L/s)	Q <sub>stored</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )	i (mm/hr)	Q <sub>actual</sub> (L/s)	Q <sub>release</sub> (L/s)	Q <sub>stored</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
10.0	104.2	0.8	0.8	0.0	0.0	178.6	1.5	1.5	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 0.034 ha  
C 0.90 Rational Method runoff coefficient

t <sub>c</sub> (min)	5-year					100-year				
	i (mm/hr)	Q <sub>actual</sub> (L/s)	Q <sub>release</sub> (L/s)	Q <sub>stored</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )	i (mm/hr)	Q <sub>actual</sub> (L/s)	Q <sub>release</sub> (L/s)	Q <sub>stored</sub> (L/s)	V <sub>stored</sub> (m <sup>3</sup> )
10	104.2	8.9	2.0	6.8	4.1	178.6	16.9	3.8	13.0	7.8
15	83.6	7.1	2.0	5.1	4.6	142.9	13.5	3.8	9.7	8.7
20	70.3	6.0	2.0	4.0	4.7	120.0	11.3	3.8	7.5	9.0
25	60.9	5.2	2.0	3.2	4.7	103.8	9.8	3.8	6.0	9.0
30	53.9	4.6	2.0	2.6	4.6	91.9	8.7	3.8	4.8	8.7
35	48.5	4.1	2.0	2.1	4.4	82.6	7.8	3.8	4.0	8.3
40	44.2	3.8	2.0	1.7	4.1	75.1	7.1	3.8	3.3	7.8
45	40.6	3.5	2.0	1.4	3.8	69.1	6.5	3.8	2.7	7.3
50	37.7	3.2	2.0	1.2	3.5	64.0	6.0	3.8	2.2	6.6
55	35.1	3.0	2.0	1.0	3.1	59.6	5.6	3.8	1.8	5.9
60	32.9	2.8	2.0	0.8	2.8	55.9	5.3	3.8	1.4	5.2
65	31.0	2.6	2.0	0.6	2.4	52.6	5.0	3.8	1.1	4.4
70	29.4	2.5	2.0	0.5	1.9	49.8	4.7	3.8	0.9	3.7
75	27.9	2.4	2.0	0.3	1.5	47.3	4.5	3.8	0.6	2.8
80	26.6	2.3	2.0	0.2	1.1	45.0	4.2	3.8	0.4	2.0
85	25.4	2.2	2.0	0.1	0.6	43.0	4.1	3.8	0.2	1.2
90	24.3	2.1	2.0	0.0	0.1	41.1	3.9	3.8	0.1	0.3
95	23.3	2.0	2.0	0.0	0.0	39.4	3.7	3.8	0.0	0.0
100	22.4	1.9	2.0	0.0	0.0	37.9	3.6	3.8	0.0	0.0
105	21.6	1.8	2.0	0.0	0.0	36.5	3.4	3.8	0.0	0.0
110	20.8	1.8	2.0	0.0	0.0	35.2	3.3	3.8	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 <sub>attenuated</sub>	2.02 L/s	100-year Q <sub>attenuated</sub>	3.83 L/s
5-year Max. Storage Required	4.7 m <sup>3</sup>	100-year Max. Storage Required	9.0 m <sup>3</sup>

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m <sup>3</sup> )	100-Year Release Rate (L/s)	100-Year Storage (m <sup>3</sup> )
Unattenuated Areas	0.8	0.0	1.5	0.0
Attenuated Areas	2.0	4.7	3.8	9.0
<b>Total</b>	<b>2.8</b>	<b>4.7</b>	<b>5.4</b>	<b>9.0</b>



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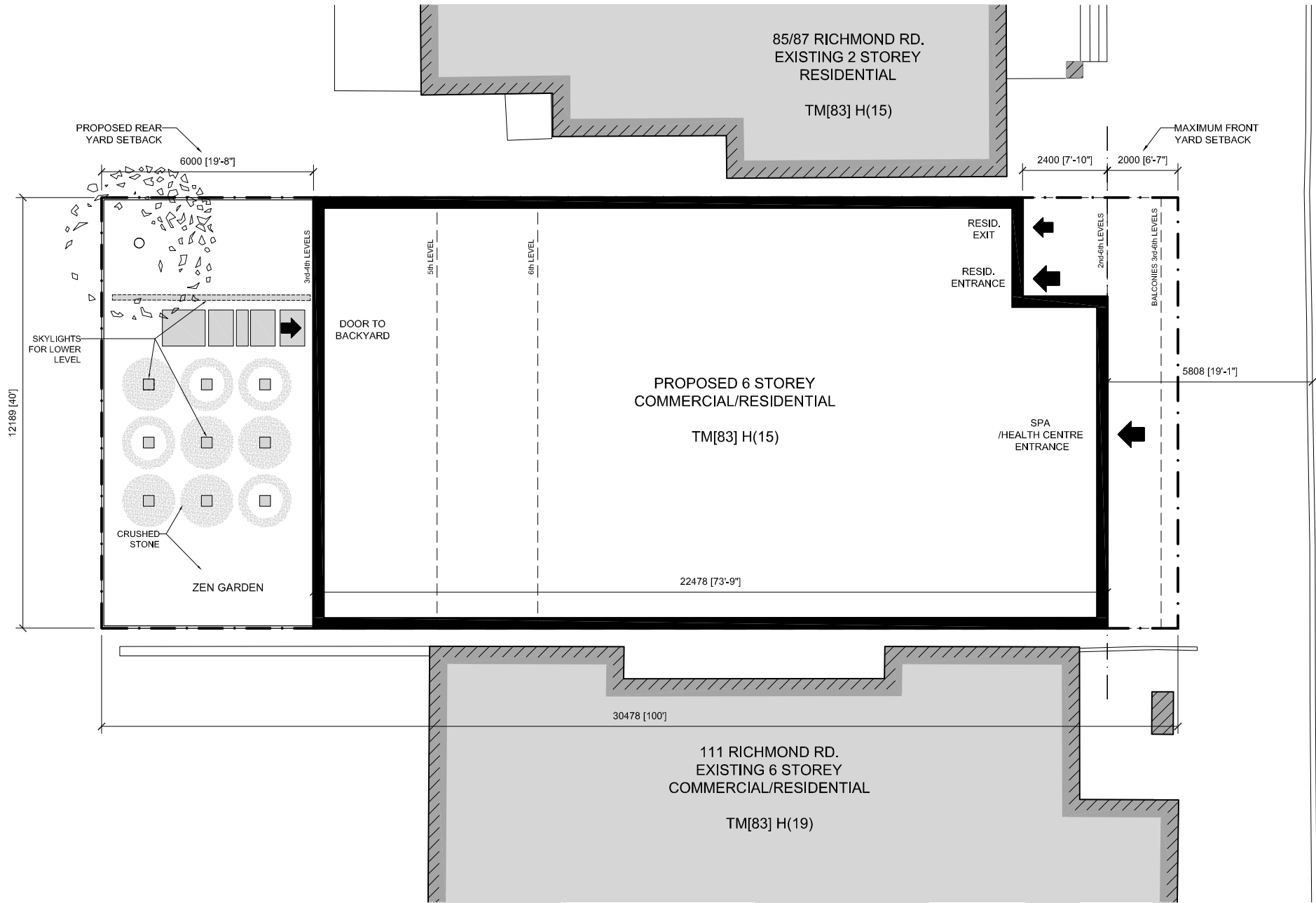
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***DRAWINGS / FIGURES***

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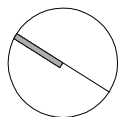


RICHMOND RD.

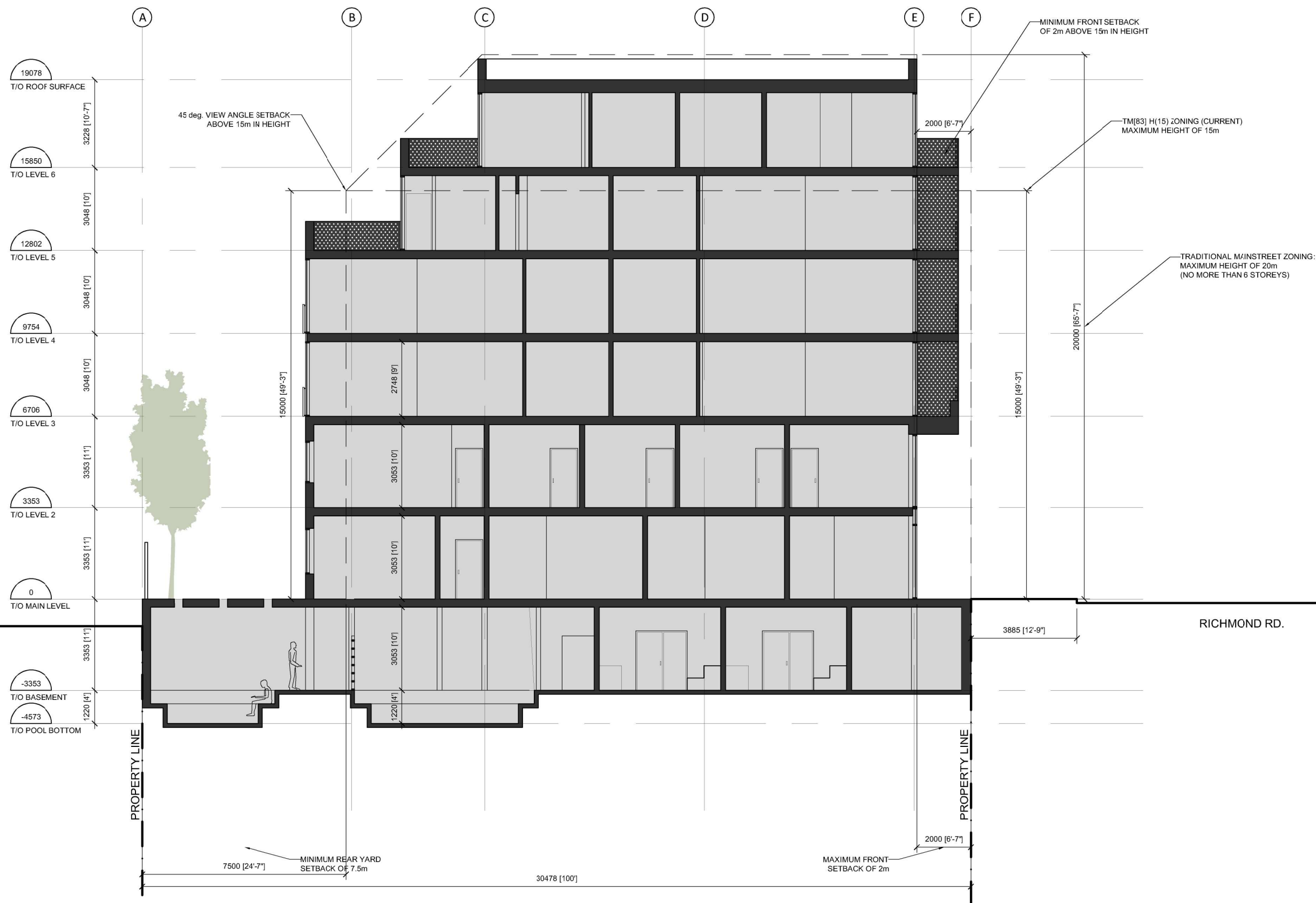


KEY PLAN (SCALE 1:2000)

RESIDENTIAL UNITS	14
BICYCLE STORAGE UNITS	17
REQUIRED AMENITY SPACE (6SM/UNIT)	77 SM
PROVIDED AMENITY SPACE	243 SM



SETBACK	REQUIRED	PROVIDED
FRONT YARD	MAX. 2.0m	4.4m @ RESIDENTIAL ENTRANCE, OTHERWISE 2.0m
REAR YARD	MIN. 7.5m	6.0m @ LEVELS GROUND, 2, 3 & 4, OTHERWISE 7.5m (LEVELS 5 & 6)
SIDE YARD	MAX. 3.0m	0.0m



## SECTION A

SCALE 1:150  
October 31, 2018

89  
Richmond Rd  
OTTAWA ONTARIO

SHEET #

8

PROJ. 1734