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SITE SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

HP URBAN
2487 INNES ROAD

CITY OF OTTAWA

PROJECT NO.: 20-1170
CITY APPLICATION NO.: D07-12-XX-XXXX

JUNE 2020 – REV 1

SITE SERVICING AND STORMWATER MANAGEMENT REPORT
FOR
2487 INNES ROAD

HP URBAN

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by HP Urban to prepare a Site Serving and Stormwater Management report in support of the application for a Site Plan Control (SPC) at 2487 Innes Road.

The subject property is located within the City of Ottawa urban boundary, in the Innes ward. As illustrated in ***Figure 1***, the subject property is located east of the intersection of Innes Road and Gravelle Cres. Comprised of a single parcel the subject property measures approximately ***0.22 ha*** and is zoned Arterial Main (AM11).

Figure 1: Site Location

The proposed SPC would allow for the development of a four-storey apartment building fronting onto Innes Road, comprised of approximately ***33 units***. A copy of the Site Plan is included in ***Drawings/Figures***.

The objective of this report is to provide sufficient detail to demonstrate that the proposed development is supported by existing municipal services.

1.1 Existing Conditions

The existing site includes a detached house and garage, an asphalt parking lot, and vegetated areas. The elevations range between 74.08 m and 75.21 m with a minimal grade change of approximate 1.65 % from the Northeast to the Southwest corner of the property.

Sewer and watermain mapping collected from the City of Ottawa indicate that the following services exist across the property frontages within the adjacent municipal right-of-ways: definitely

Innes Road

- 406 diameter CI watermain;
- 675 mm diameter concrete storm sewer tributary to Greens Creek; and
- 450 mm diameter concrete sanitary sewer tributary to Innes Road Trunk.

1.2 Required Permits / Approvals

The proposed development is subject to site plan control approval process. The City of Ottawa must approve the engineering design drawings and reports prior to the issuance of site plan control.

The proposed development is a single parcel; as a result, the stormwater management system qualifies for an exemption under the OWRA.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, 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 ISTB-2018-01**
      City of Ottawa, March 21, 2018.
      (*ISTB-2018-01*)
    - **Technical Bulletin ISTB-2018-03**
      City of Ottawa, March 21, 2018.
      (*ISTB-2018-03*)
- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)
    - **Technical Bulletin ISD-2010-2**
      City of Ottawa, December 15, 2010.
      (*ISD-2010-2*)
    - **Technical Bulletin 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*)
- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)
- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)
- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

- **Geotechnical Investigation (PG5171-1)**
  Paterson Group, June 8, 2020
  (Geotechnical Report)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2E pressure zone, as shown by the Pressure Zone map in ***Appendix B***. A local 406 mm diameter watermain exists within the Innes Road right-of-way.

3.2 Water Supply Servicing Design

It is proposed to service the development by connecting to the existing 406 mm diameter watermain within Innes Road via a 200 mm diameter service connection. Refer to drawing ***SSP-1***, for a detailed servicing layout.

Based on as-built drawings provided by the City of Ottawa, there is one fire hydrant fronting the property along Innes Road, approximately 30 m from the proposed development. Two additional hydrants also exist along Innes road and Gravelle Crescent located within 150 m of the development.

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

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	4.9 x Average Daily *
Residential Maximum Hourly	7.4 x Average Daily *
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa
Daily average based on Appendix 4-A from **Water Supply Guidelines* *** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.* *-Table updated to reflect ISD-2010-2*	

Table 2, below, summarizes the estimated water supply demand and boundary conditions for the proposed development based on the ***Water Supply Guidelines***.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Estimated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)
Average Daily Demand	10.7	42.3 / 415.0
Max Day + Fire Flow	52.4 + 12,000= 12,052.4	30.7 / 291.4
Peak Hour	79.1	34.4 / 337.5

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 73.7 m. See ***Appendix B.***

Fire flow requirements are to be determined in accordance with City of Ottawa ***Water Supply Guidelines*** and the Ontario Building Code.

Fire flow requirements were estimated per City of Ottawa Technical Bulletin ***ISTB-2018-02***. The following parameters were coordinated with the Architect:

- Type of construction – Ordinary Construction;
- Occupancy type – Limited Combustibility; and
- Sprinkler Protection – Non-sprinklered.

The above assumptions result in an estimated fire flow of approximately ***12,000 L/min***, noting that actual building materials selected will affect the estimated flow.

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***.

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the demands indicated by the correspondence in ***Appendix B***. As shown by ***Table 2,*** above, the minimum and maximum pressures fall within the required range identified in ***Table 1***.

Based on the updated building materials, the required fire flow has decreased by approximately ***3,000 L/s*** from the boundary conditions received on April 3rd, 2020. It is not anticipated to have a significant impact on the previously provided boundary conditions.

3.3 Water Supply Conclusion

Estimated water demand under proposed conditions was submitted to the City of Ottawa for establishing boundary conditions.

Based on the updated building materials, the required fire flow has decreased by approximately ***3,000 L/s*** from the boundary conditions received on April 3rd, 2020. It is not anticipated to have a significant impact on the previously provided boundary conditions.

The estimated 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. The minimum and maximum pressures fall within the required range identified in ***Table 1.*** 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.

DSEL employed a daily consumption rate of 280 L/person/day to align with the revised wastewater rates identified by City of Ottawa Technical Bulletin ISTB-2018-03. As a result, DSEL is submitting for a deviation from the ***Water Supply Guidelines***.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the Greens Creek Collector North catchment area, as shown by the City sewer mapping included in ***Appendix C***. An existing 450 mm diameter sanitary sewer within Innes Road is available to service the proposed development.

The existing site consists of a single family home contributing wastewater to the local 450 mm diameter sewer system. The 450 sanitary sewer is tributary to the Innes Road Trunk, located approximately 200 m downstream of the site.

4.2 Wastewater Design

It is proposed that the development will be serviced via the existing 450 mm sanitary sewer within Innes Road via a 250 mm diameter internal sanitary sewer. Refer to drawing ***SSP-1***, for a detailed servicing layout.

Table 3, below***,*** summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 3
Wastewater Design Criteria

Design Parameter	Value
Residential 1 Bedroom Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon's Corrector Factor 0.8
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 4, below, demonstrates the estimated peak flow from the proposed development. See ***Appendix C*** for associated calculations.

Table 4
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	**0.19**
Estimated Peak Dry Weather Flow	**0.66**
Estimated Peak Wet Weather Flow	**0.72**

The estimated sanitary flow based on the ***Site Plan,*** included in ***Drawings/Figures,*** results in a peak wet weather flow of ***0.72 L/s***.

Due to the complexity of the drainage area, the impacts from the estimated flow from the site require further review by the City in order to confirm available capacity and resulting HGL within the existing sanitary sewer.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Innes Road Trunk. It is proposed to discharge wastewater to the existing 450 mm diameter sanitary sewer within Innes Road Trunk via a 250 mm diameter internal sewer network.

Due to the complexity of the drainage area the City is asked to confirm that capacity is available to accommodate the estimated ***0.72 L/s*** peak wet weather 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 located within the Greens Creek sub-watershed. As such, approvals for proposed development within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the 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***.

It was assumed that the existing development contained no stormwater management controls for flow attenuation. Approximately ***0.183 ha*** of external drainage (EX-1) runs through the subject property. A C-value of ***0.45*** was estimated for the existing site including the external area based on the assumption that landscape areas represent a C value of ***0.2*** and hardscaped areas have a value of ***0.9***. The estimated pre-development peak flows for the subject property including the existing external drainage for the 2, 5, and 100-year events are summarized in ***Table 5,*** below:

Table 5
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	33.1
5-year	44.9
100-year	96.0

5.2 Post-development Stormwater Management Target

Stormwater management requirements for the proposed development were reviewed with the City of Ottawa, where the proposed development is required to:

- Meet an allowable release rate based on a pre-development Rational Method Coefficient, employing the City of Ottawa IDF parameters for a 5-year storm with a 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
- Provide quality controls to an enhanced level of treatment for the proposed development due to the site's distance from the outlet; correspondence with the RVCA is included in ***Appendix A***.
- Convey any external areas tributary to the development towards Innes Road, maintaining existing drainage patterns.

Based on the above the allowable release rate for the proposed development is ***44.9 L/s***.

5.3 Proposed Stormwater Management System

It is proposed that the stormwater outlet from the development will be to the 675 mm diameter storm sewer within Innes Road via a 375 mm diameter internal storm sewer. Refer to drawing ***SSP-1***, for a detailed servicing layout.

To meet the stormwater objectives the proposed development will contain a combination of roof top flow attenuation along with surface storage.

As indicated by drawing ***GP-1*** and by the stormwater calculations included in ***Appendix D***, runoff from the parking area and landscaped areas (A1, A2 and EX-1) will flow to landscaping catch basins and will be attenuated by a ***90 mm ICD*** or an approved equivalent at the outlet side of storm maintenance hole STM101 prior to discharging to the existing storm sewer within Innes Road. As Area ***EX-1*** is tributary to the internal storm sewer network, controls and pipe sizing have been sized to convey the external flows.

Flow from rooftops will be controlled before discharging to the storm sewer system. Approximately ***41.5 m^3*** of storage will be provided by rooftop storage. The release rate and storage calculations for roof top attenuation were estimated based on Zurn Industries Ltd. design guidelines for Model Z-105-5 Control-Flo Single Notch drains. Other products may be specified provided that the restricted release rate and sufficient storage is provided to meet or exceed the values in ***Appendix D***.

Table 6, below, summarizes post-development flow rates. The following storage requirement estimates that approximately ***0.03 ha*** of the development area will be directed to the outlet without flow attenuation. These areas will be compensated for in areas with flow attenuation controls.

Table 6
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage (Required)	100-Year Storage (Available)
	(L/s)	(m^3)	(L/s)	(m^3)	(m^3)
Unattenuated Areas (U1 & U2)	1.6	0.0	3.4	0.0	0.0
Attenuated Areas (A1. A2. EX1)	37.2	8.1	37.5	39.1	129.6
Attenuated Areas (BLDG)	2.9	7.7	3.8	17.5	41.7
Total	**41.6**	**15.8**	**44.7**	**56.6**	**171.3**

It is anticipated that approximately ***56.6 m^3*** of storage will be required on site to attenuate flow to the established release rate of ***44.9 L/s***; storage calculations are contained within ***Appendix D***.

Quality controls are proposed to be provided via an Aqua-swirl AS-2 Oil-Grit Separator or an approved equivalent. Details of the OGS are provided within ***Appendix D***.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm in accordance with City of Ottawa ***City Standards***. The post-development allowable release rate was calculated as ***44.9 L/s*** based on consultation with the City of Ottawa. It is estimated that ***56.6 m^3*** will be required to meet this release rate.

Based on consultation with the RVCA, stormwater quality controls are required to provide an enhanced level of treatment and will be provided via an Aqua-Swirl AS-2.

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

6.0 UTILITIES

Gas and Hydro services currently exist within the subject site and Innes 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. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming 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 or an approved equivalent 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 HP Urban to prepare a Site Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) at 2487 Innes 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 FUS method for estimating fire flow indicated ***12,000 L/min*** is required for the proposed development;
- The proposed development is estimated to have a peak wet weather flow of ***0.72 L/s***; Due to the complexity and size of the existing municipal sewer infrastructure The City is asked to confirm that there is sufficient capacity to support the development;
- Based on consultation with the ***City of Ottawa,*** the proposed development will be required to attenuate post development flows to an equivalent release rate of ***44.9 L/s*** for all storms up to and including the 100-year storm event;
- It is proposed that stormwater objectives may be met through storm water retention via roof top and surface storage. It is estimated that ***56.6 m^3*** of onsite storage will be required to attenuate flow to the established release rate above; and
- Based on consultation with the RVCA, stormwater quality controls are required and are proposed to be provided via an Aqua-Swirl AS-2.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

20-1170 12/06/2020

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, EX-1
☒	Plan showing the site and location of all existing services.	Figure 1, EX-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, Section 5.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3, Appendix A
☒	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, EX-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.	GP-1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☐	Reference to geotechnical studies and recommendations concerning servicing.	Section 2.1
☐	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	Drawings/Figures

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, Appendix B
☒	Confirmation of adequate domestic supply and pressure	Section 3.2, 3.2.1, 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, Appendix B
☐	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, 3.2.1, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Section 3.2, SSP-1
☐	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, Appendix B
☒	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Section 3.2.1, Appendix B

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, EX-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, Appendix C
☒	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, SSP-1
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

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

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

4.4 Development Servicing Report: Stormwater Checklist

☒	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
☒	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
☒	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
☒	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
☒	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2
☒	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
☐	Set-back from private sewage disposal systems.	N/A
☐	Watercourse and hazard lands setbacks.	N/A
☒	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	Appendix A
☐	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	Section 5.3
☒	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, Appendix D
☐	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.	Section 5.3
☐	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.	Section 5.4
☒	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 1.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

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

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

Charlotte Kelly

From: Peter Hume <peter.hume@hpurban.ca>
Sent: February 18, 2020 1:47 PM
To: Alison Gosling
Subject: FW: FW: FW: 2487 Innes - Follow-up summary notes - Pre-Application Consultation
Attachments: 2487 INNES 36X24.pdf; 356-19 PrtLt15Con2 2487InnesRd D F (2).pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Alison,
Here is what the City sent us as a result of the pre-consultation.
Cheers,
Peter

---------- Forwarded message ---------
From: **Rwagasore, Evode** <Evode.Rwagasore@ottawa.ca>
Date: Tue, Sep 10, 2019 at 14:13
Subject: 2487 Innes - Follow-up summary notes - Pre-Application Consultation
To:

In follow up to the Pre-Application Consultation meeting of Friday, 6 September 2019, I have outlined below the required submission materials for a site plan control application at 2487 Innes Road. To summarize City staff's understanding, your development proposal is in the form of a construction of four storey plus basement rental apartment building with approximately 50 units, with rear yard surface and underground parking spaces. These comments are provided based on the site layout (not detailed) presented to City staff, in that the said building is within Blackburn Hamlet.

The proposed development qualifies for Complex (Manager Approval, Public Consultation) type of application. As indicated and discussed during the meeting, there are possibilities of modifying the site layout and building height. If that is the case, and upon receipt of which option you are proceeding with, the comments and submission requirements will be adjusted accordingly.

Comments on Urban Design (Site Design and Building Design) will be provided upon receipt of site plan and elevations.

As part of Planning staff's review, we will evaluate the proposed development against the Zoning By-law 2008-250. This proposal will be treated through Site Plan Control approval, requiring a Site Plan Agreement.

Given the above information, please review the following requirements in order to make the application to the City.

SITE PLAN CONTROL APPLICATION SUBMISSION:

Application Type and Fees:

Application Type – "**Complex** - Manager Approval, Public Consultation"

Application Fee at Submission:

$32,106.89 [*includes: Planning Fee **$28,996**; On-Site Sign Fee **$590.99** (incl. HST); Legal Fee **$2,519.90** ($2,230 + 289.90 HST)*]

Plus **Initial Engineering Design Review and Inspection Fee**:

$1,000 (includes HST) *(value of Hard and Soft Servicing <$50,000)* ***or***
$5,000 (includes HST) *(value of Hard and Soft Servicing $50,000-$300,000)* ***or***
$10,000 (includes HST) *(value of Hard and Soft Servicing >$300,000)*

Plus **Conservation Authority Fee**

Wards 7, 8, 9, 12, 13, 14, 15, 16, 17, 18	**$100 or**
Remainder of City	**$955**

Fee for appraisal services - any development application to which cash-in-lieu of parkland is applicable and for which an appraisal is required, will be subject to a fee for appraisal services of **$565** (including HST).

Required Plans and Reports:

The following is the list of requirements for a complete submission of the proposal. I have also included a few points of clarification where necessary:

- Site Plan – 15 copies
- Landscape Plan – 15 copies

· Grade Control and Drainage Plan – 15 copies

· Site Servicing Plan –15 copies

· Site Survey Plan – 2 copies·

Erosion and Sediment Control Plan – 4 copies

· Geotechnical Report – 4 copies

Noise Study – 4 copies

· Design Brief / Report – 4 copies

may include/compile:

Site Servicing (Sanitary/Storm and Water) and Servicing Options

Stormwater Management

Hydraulic Assessment and Fire Flow

Erosion and Sediment Control

· Phase 1 ESA – 4 copies

Tree Conservation Report – 4 copies

_ Transportation - Screening Form

Confederation Line Proximity Study may be requested by the City of Ottawa's Rail Implementation Office

· Planning Rationale – 4 copies

· Plans and Reports in .pdf format

And, the following items are also required, but not for the purposes of a complete resubmission. If these items are not submitted with the submission package, I would like to receive them not too long afterwards.

· Coloured Elevations – 4 copies (of the new building)

· Details of Proposed Site Furnishings – 1 copy – This includes site details, as applicable, such as fencing, garbage enclosures, paving materials/surface treatments, light standards (building-mounted and ground-mounted), garbage receptacles. Manufacturers' specifications may be provided for some of these furnishings.

Other issues to note:

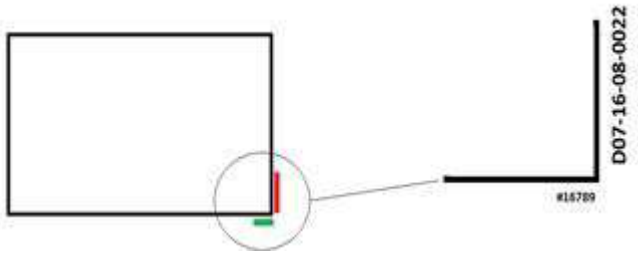
1. Contact the Conservation Authority (RVCA) Office for their requirements

2. As a suggestion, if you have not already done so, please contact Ward – 2 Innes Councillor, Laura Dudas to brief him on your proposed revision application.

3. Minimum drawing and file requirements - All plans

Plans are to be submitted on standard **A1 size** (594mm x 841mm) sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400, or 1:500).

4. Use the standard Planning and Growth Management Border (attached)



A0.1 Place on all plans; DWG # and D07 # as per sample

Use **Bold Black text**:

Your Numbers are as per the colours listed here.

DWG 17487 (place number on the bottom right)

D07 Number D07-12-19-

5. For information/question related to Development Charge, please contact Colleen Lavallée, Development Information Officer, Suburban East at Colleen.Lavallée@ottawa.ca or 613-580-2424, ext. 27905

Engineering - Detailed MEMO (some items may be repeated)

Subject / Objet Rental Building

Please note the following information regarding the engineering design submission for the above noted site:

1. The Servicing Study Guidelines for Development Applications are available at the following address: https://ottawa.ca/en/city-hall/planning-and-development/information-developers/development-application-review-process/development-application-submission/guide-preparing-studies-and-plans#servicing-study-guidelines-development-applications

2. Servicing and site works shall be in accordance with the following documents:

- Ottawa Sewer Design Guidelines (October 2012)
- Ottawa Design Guidelines – Water Distribution (2010)
- Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa (2007)
- City of Ottawa Slope Stability Guidelines for Development Applications (revised 2012)
- City of Ottawa Environmental Noise Control Guidelines (January, 2016)
- City of Ottawa Park and Pathway Development Manual (2012)
- City of Ottawa Accessibility Design Standards (2012)
- Ottawa Standard Tender Documents (latest version)
- Ontario Provincial Standards for Roads & Public Works (2013)

3. Record drawings and utility plans are also available for purchase from the City (Contact the City's Information Centre by email at InformationCentre@ottawa.ca or

by telephone at (613) 580-2424, ext.44455).

4. The Stormwater Management Criteria, for the subject site, is to be based on the following:

i. The 5-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

ii. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

iii. A calculated time of concentration (Cannot be less than 10 minutes).

iv. Flows to the storm sewer in excess of the 5-year storm release rate, up to and including the 100-year storm event, must be detained on site.

5. Water Boundary condition requests must include the location of the service and the expected loads required by the proposed development. Please provide the following information:

Location of service

Type of development and the amount of fire flow required (as per FUS, 1999).

Average daily demand: ___ l/s.

Maximum daily demand: ___l/s.

Maximum hourly daily demand: ___ l/s.

6. MECP ECA Requirements

An MECP Environmental Compliance Approval is only required if servicing more than one parcel of land in this case. Maintain your stormwater flow to this property and no ECA is required.

Submission Requirements

Minimum Drawing and File Requirements- All Plans

Plans are to be submitted on standard **A1 size** (594mm x 841mm) sheets, utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400, or 1:500).

With all submitted plans provide an individual PDF of the plans and reports please provide one complete PDF file of the reports.

7. Engineering Plans: Cover page; Index and Legend; Engineering Details

Should you have any questions or require additional information, please contact me directly at (613) 580-2424, ext. 22191 or by email at Mike.Thivierge@ottawa.ca

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TRANSPORTATION MASTER PLAN

- Follow Traffic Impact Assessment Guidelines
    - Complete the screening form and submit. At this time, if nothing changes from what was presented, a Traffic Impact Assessment will not be required with submission as being on a cycling spine route was the only trigger. In the event that traffic is raised as a concern by anyone prior to SPA, a Traffic Impact Assessment will be required.
    - Applicant advised that their application will not be deemed complete (if a Traffic Impact Assessment is deemed required) until the submission of the draft step 1-4, including the functional draft RMA package (if applicable) and/or monitoring report (if applicable).

- Noise Impact Studies required for the following:

    - Road
    - Stationary (if there will be any exposed mechanical equipment due to the proximity to neighbouring noise sensitive land uses)

- Clear throat requirements for apartment that is under 100 units on a major collector is 8m, measured as per TAC Guidelines.
- On site plan:

    - Show all details of the roads abutting the site up to and including the opposite curb; include such items as pavement markings, accesses and/or sidewalks.
    - Turning templates will be required for all accesses showing the largest vehicle to access the site; required for internal movements and at all access (entering and exiting and going in both directions).
    - Show all curb radii measurements; ensure that all curb radii are reduced as much as possible
    - Show lane/aisle widths.
    - Sidewalk is to be continuous across access as per City Specification 7.1.
    - Grey out any area that will not be impacted by this application.
    - If the access is relocated from the existing location, the proponent will be responsible to return the curb and sidewalk to full height.

Rosanna Baggs, C.E.T.

Project Manager, Infrastructure Approvals | GPRJ Approbation demandes infrastructure

Development Review West Branch | Dir Services d'exam des dem d'amgt

Tel |Tél. : 613-580- 2424 ext. | poste 26388

If you have any questions with the above information, please do not hesitate to contact me.

Sincerely,

Evode Rwagasore

Planner - MCIP, RPP | *Urbaniste - MICU, PPC*

Development Review | *Examen d'aménagement*

Planning, Infrastructure and Economic Development |

Planification, Infrastructure et Dévelopment Économique

Ottawa

613 580-2424-16483 Fax 613 560-6006

ottawa.ca/planning I ottawa.ca/urbanisme

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Sent from my IPhone

Charlotte Kelly

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: June 3, 2020 8:46 AM
To: Charlotte Kelly; Eric Lalande
Subject: RE: Quality Control Requirements - 2487 Innes Road

Hi Charlotte,

Based on the proposal and the distance from the outlet to the creek, onsite water quality control will be required. The appropriate water quality target is 80% TSS removal.

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

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

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: Tuesday, June 2, 2020 9:13 PM
To: Eric Lalande <eric.lalande@rvca.ca>; Jamie Batchelor <jamie.batchelor@rvca.ca>
Subject: Quality Control Requirements - 2487 Innes Road

Hello Eric and Jamie,

We wanted to touch base with you regarding a development at 2487 Innes Road.

The existing site conditions consists of mainly landscaped areas with a house, garage and paved driveway.

The development involves the construction of a residential apartment with above ground parking areas as shown in the attached contemplated Site Plan. Based on the information available, the development contemplates discharging stormwater to the 675 mm diameter sewer within Innes Road. The sewer travels approx.. 630m before discharging stormwater directly into a small creek, tributary to Greens Creek.

Can you please review and provide recommendations on quality control requirements?

Please feel free to contact me to discuss.

Figure 1: Distance to Outlet

Thank-you,

Charlotte Kelly, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

Charlotte Kelly

From: Charlotte Kelly
Sent: March 2, 2020 8:44 AM
To: 'William.Curry@ottawa.ca'; 'Mashaie, Sara'
Cc: Alison Gosling
Subject: FW: 2487 Innes Road - Boundary Condition Request
Attachments: wtr-2020-03-02_1170_cmk.pdf

Good Morning,

Base on subsequent information provided by the architect an update the FUS calculation was completed. Please see the revised BC request below as well as the attached updated calculations.

Please let us know if you require further information.

Thank-you,

Charlotte Kelly, E.I.T.
Junior Engineering Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

From: Thivierge, Mike <mike.thivierge@ottawa.ca>
Sent: February 28, 2020 10:35 AM
To: Charlotte Kelly <CKelly@dsel.ca>
Cc: Alison Gosling <AGosling@dsel.ca>
Subject: RE: 2487 Innes Road - Boundary Condition Request

Hi Charlotte,

I've forwarded your request to William Curry and Sara Mashaie. They'll be able to handle your request as I'm now working for infrastructure Services.

Cheers,

Mike

Michael Thivierge, P.Eng., PE

Senior Engineer, Design and Construction Facilities Branch, Unit 3
City of Ottawa

ph 613 580-2424, Ext 22191
cell 613 913-2715

From: Charlotte Kelly <CKelly@dsel.ca>
Sent: February 27, 2020 3:09 PM
To: Thivierge, Mike <mike.thivierge@ottawa.ca>
Cc: Alison Gosling <AGosling@dsel.ca>
Subject: 2487 Innes Road - Boundary Condition Request

Good afternoon Mike,

We would like to kindly request boundary conditions for the proposed development at 2487 Innes Road using the following proposed development demands:

1. Location of Service / Street Number: 2487 Innes Road
2. Type of development and the amount of fire flow required for the proposed development:
   - Type of development: The proposed development involves 3.5-storey residential apartment building.
   - The apartment building is proposed to consist of ***33*** residential units.
   - Proposed Connection:
     - Connection to existing 406 mm diameter watermain within Innes Road
   - Fire demand based on Technical Bulletin ISTB-2018-02 has been used to estimate a max fire demand of ***17,000 L/min***. Refer to the attached for detailed calculations.

Demand	L/min	L/s
Avg. Daily	10.7	0.18
Max Day	52.4	0.87
Peak Hour	79.1	1.32

Please let us know if you have any questions.

Thank-you,

Charlotte Kelly, E.I.T.
Junior Engineering Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.511
email: ckelly@dsel.ca

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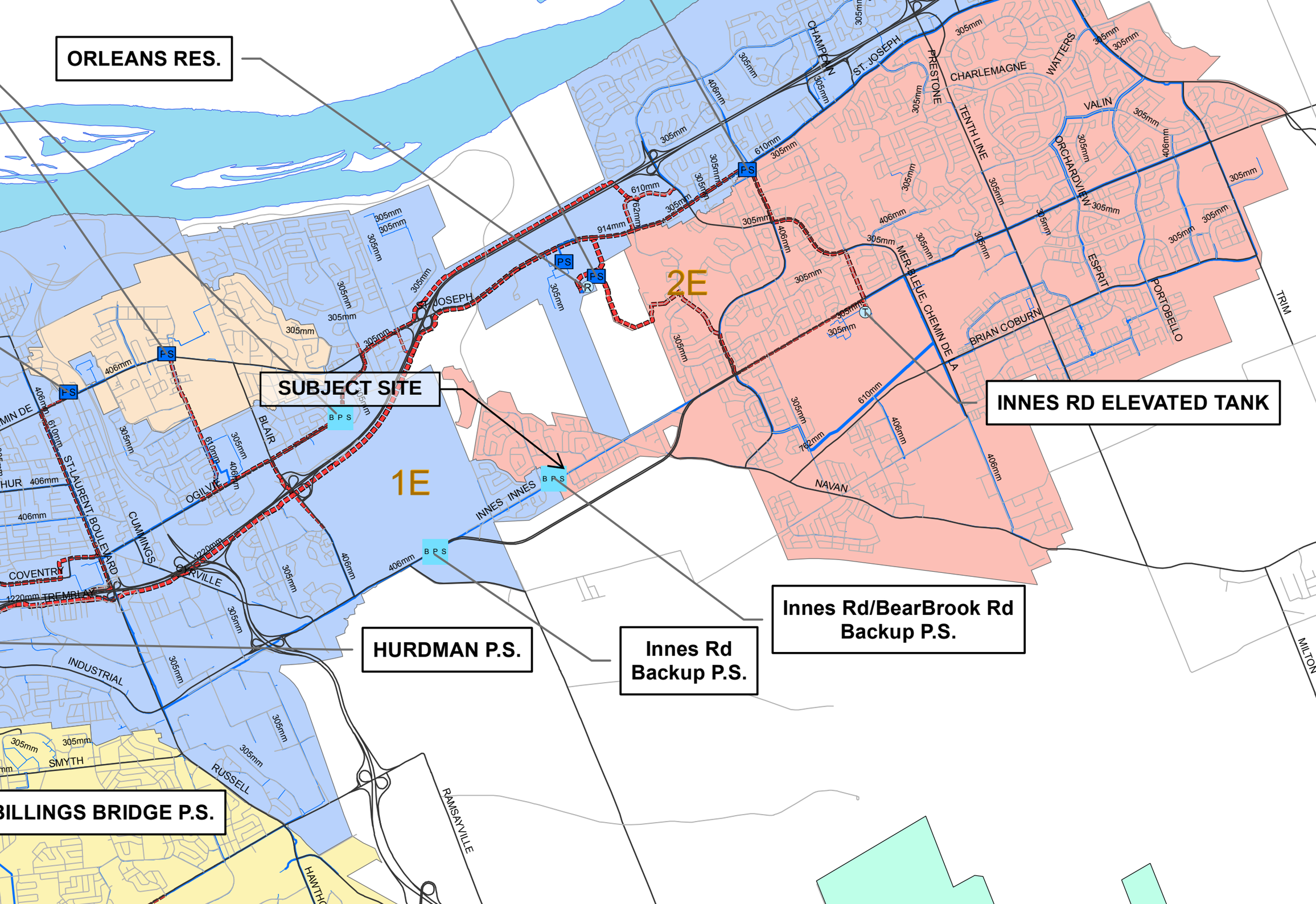
APPENDIX B

Water Supply


ORLEANS RES.
SUBJECT SITE
INNES RD ELEVATED TANK
HURDMAN P.S.
Innes Rd Backup P.S.
Innes Rd/BearBrook Rd Backup P.S.
BILLINGS BRIDGE P.S.
1E
2E
ST. JOSEPH
INNES
CHAMPLAIN
PRESTONE
CHARLEMAGNE
WATTERS
VALIN
TENTH LINE
ORCHARDVIEW
ESPRIT
PORTOBELLO
BRIAN COBURN
MER BLEUE
CHEMIN DE A
NAVAN
TRIM
MILTON
BLAIR
OGILVIE
CUMMINGS
ST-LAURENT BOULEVARD
COVENTRY
TREMBLAY
INDUSTRIAL
SMYTH
RUSSELL
RAMSAYVILLE
610mm
406mm
305mm
762mm
914mm
1220mm
PS
BPS

Water Demand Design Flows per Unit Count
City of Ottawa - Water Distribution Guidelines, July 2010

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4	-	0
Semi-detached	2.7	-	0
Townhouse	2.7	-	0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4	22	31
2 Bedroom	2.1	11	24
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	55	15.4	10.7	75.5	52.4	114.0	79.1
Total Demand		**15.4**	**10.7**	**75.5**	**52.4**	**114.0**	**79.1**

* Estimated number of seats at 1 seat per 9.3m^2

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

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

Type of Construction: Ordinary Construction

C	1		*Type of Construction Coefficient per FUS Part II, Section 1*
A	2396.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	10768.8	L/min	
	11000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**9350.0**	**L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered	0%	
Reduction	**0**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	30.1m-45m	32	2	64	5%	
S	Wood Frame	>45m	0	0	0	0%	
E	Wood Frame	20.1m-30m	43	2	86	9%	
W	Wood Frame	10.1m-20m	42	1	42	13%	
		% Increase				**27%**	*value not to exceed 75%*

Increase	**2524.5**	**L/min**

Lw = Length of the Exposed Wall
Ha = number of storeys of the adjacent structure. Max 5 stories
LH = Length-height factor of exposed wall. Value rounded up.
EC = Exposure Charge

Total Fire Flow

Fire Flow	11874.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by Figurr Architects Collective,
-Calculations based on Fire Underwriters Survey - Part II

2487 Innes Road
Boundary Condition Results

Boundary Conditions Unit Conversion

Grnd Elev 73.7

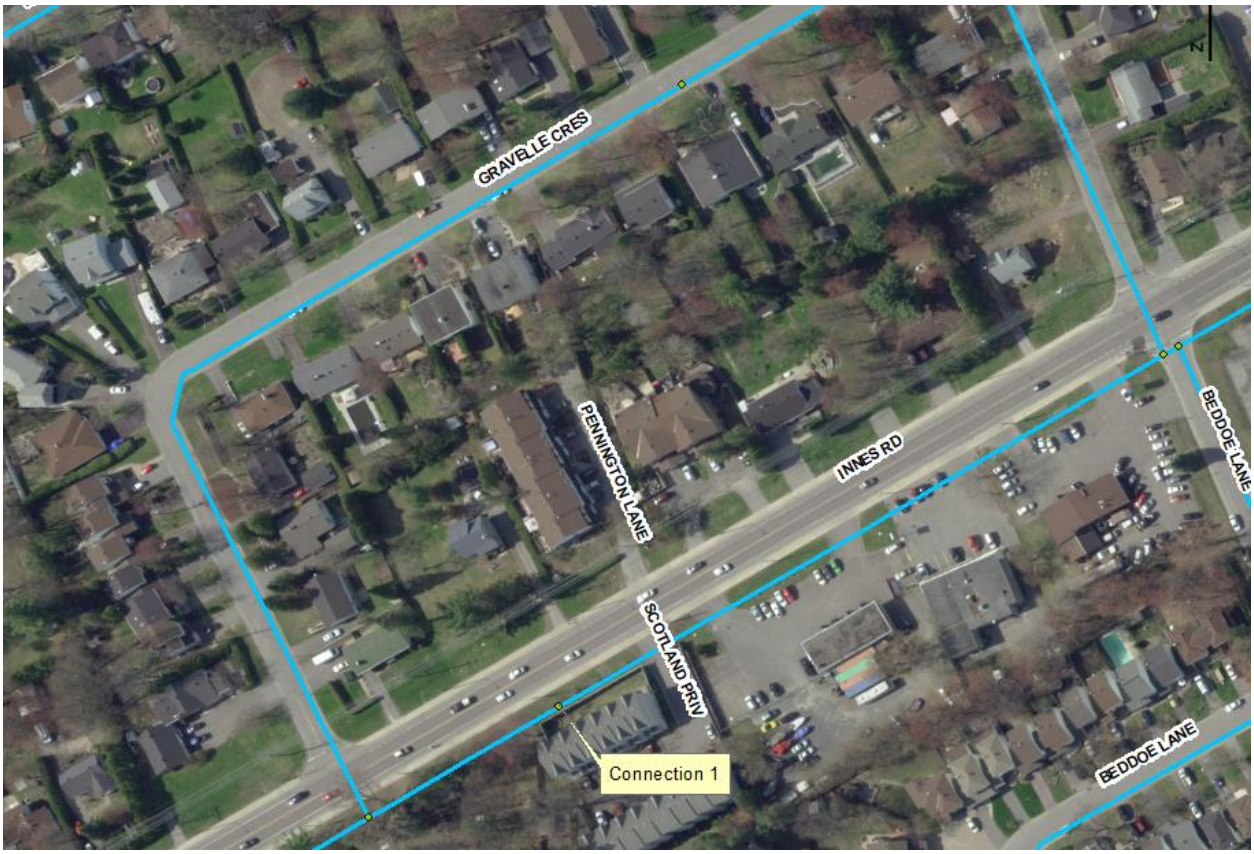
	Head (m)	m H_2O	PSI	kPa
Avg. Day	**116**	**42.3**	60.2	415.0
Peak Hour	**108.1**	**34.4**	48.9	337.5
Max Day + FF(150L/s)	**103.4**	**29.7**	42.3	291.4
Max Day + FF(250L/s)	**104.4**	**30.7**	43.7	301.2

Boundary Conditions
2487 Innes Road

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	11	0.18
Maximum Daily Demand	52	0.87
Peak Hour	79	1.32
Fire Flow Demand #1	9,000	150.00
Fire Flow Demand #2	15,000	250.00

Location



Results

Connection 1 - Innes Road

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	116.0	60.2
Peak Hour	108.1	49.0
Max Day plus Fire 1	103.4	42.3
Max Day plus Fire 2	88.3	20.9

[1] Ground Elevation = 73.7 m

Notes:

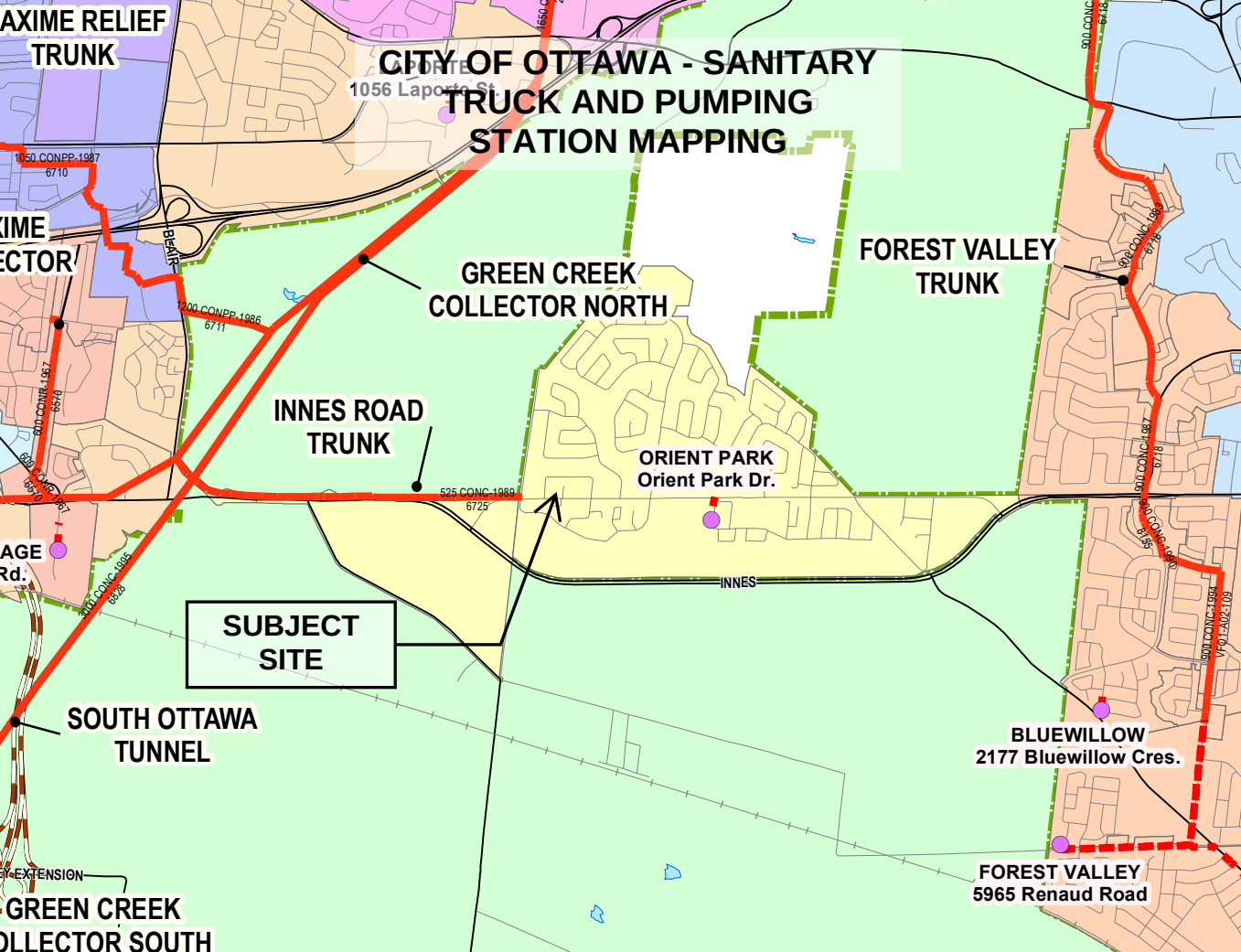
1. Providing a second connection on Innes Road is required to decrease vulnerability of the water system in case of breaks.

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. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

APPENDIX C

Wastewater Collection


CITY OF OTTAWA - SANITARY TRUCK AND PUMPING STATION MAPPING
AXIME RELIEF TRUNK
1056 Laporte St.
1050 CONPP-1987 6710
XIME ECTOR
BEAIR
GREEN CREEK COLLECTOR NORTH
1200 CONPP-1986 6711
FOREST VALLEY TRUNK
900 CONC-1987 6718
INNES ROAD TRUNK
600 CONC-1987 6570
600 CONC-1987 6571
525 CONC-1989 6725
ORIENT PARK Orient Park Dr.
900 CONC-1987 6718
900 CONC-1990 8155
AGE Rd.
600 CONC-1995 6828
INNES
SUBJECT SITE
500 CONC-1994 VFO1-A02-109
SOUTH OTTAWA TUNNEL
BLUEWILLOW 2177 Bluewillow Cres.
FOREST VALLEY 5965 Renaud Road
EXTENSION
GREEN CREEK OLLECTOR SOUTH

2487 Innes Road
Proposed Site Conditions

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

Site Area 0.220 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.01**	**L/s**
Infiltration / Inflow (Wet)	**0.06**	**L/s**
Infiltration / Inflow (Total)	**0.07**	**L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4	22	31
2 Bedroom	2.1	11	24
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**55**	
Average Domestic Flow	**0.18**	**L/s**
Peaking Factor	**3.64**	
Peak Domestic Flow	**0.65**	**L/s**

Total Estimated Average Dry Weather Flow Rate	**0.19**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.66**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**0.72**	**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	0.39	ha
C	0.45	Rational Method runoff coefficient
L	68	m
Up Elev	75.75	m
Dn Elev	73.95	m
Slope	2.6	%
Tc	12.6	min

1) Time of Concentration per Federal Aviation Administration

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

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

Estimated Peak Flow

	2-year	5-year	100-year	
i	68.0	92.1	157.6	mm/hr
Q	33.1	44.9	96.0	L/s

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

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

Target Flow Rate

rea (EX1, U1, U2, A1, A2, BLDG)	0.390	ha
C	0.45	Rational Method runoff coefficient
Tc	12.6	min

	5-year	
i	92.1	mm/hr
Q	44.9	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID	**U1 & U2**	
Total Area	0.026	ha
C	0.22	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)
11.1	98.6	1.6	1.6	0.0	0.0	168.9	3.4	3.4	0.0	0.0

Note:
C value for the 100-year storm is increased by 25%, to a maximum of 1.0 per Ottawa Sewer Design Guidelines (5.4.5.2.1)

Estimated Post Development Peak Flow from Attenuated Areas

Area ID A1, A2, EX1

Total Subsurface Storage (m^3)

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage (m)	Ponding (m^2)	h_o (m)	delta d (m)	V* (m^3)	V_{acc}** (m^3)	$Q_{release}$† (L/s)	$V_{drawdown}$ (hr)
Orifice INV	69.93		0.00			0.0	0	0.00
T/L	74.53	0.4	4.60	4.60	0.6	0.6	36.9	0.00
0.10m Ponding	74.63	289.0	4.70	0.10	10.0	10.6	37.3	0.08
0.20m Ponding	74.73	572.1	4.80	0.10	42.3	52.9	37.7	0.39
0.30m Ponding	74.83	981.0	4.90	0.10	76.7	129.6	38.0	0.95

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† Qrelease = Release rate calculated from orifice equation

Orifice Location **STM101** **Dia** 90
Total Area 0.309 ha
C 0.53 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	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)
5	141.2	64.0	37.2	26.9	8.1	242.7	137.6	37.5	100.1	30.0
10	104.2	47.3	37.2	10.1	6.1	178.6	101.2	37.5	63.7	38.2
15	83.6	37.9	37.2	0.7	0.7	142.9	81.0	37.5	43.5	39.1
20	70.3	31.9	31.9	0.0	0.0	120.0	68.0	37.5	30.5	36.6
25	60.9	27.6	27.6	0.0	0.0	103.8	58.9	37.5	21.4	32.0
30	53.9	24.5	24.5	0.0	0.0	91.9	52.1	37.5	14.6	26.2
35	48.5	22.0	22.0	0.0	0.0	82.6	46.8	37.5	9.3	19.5
40	44.2	20.0	20.0	0.0	0.0	75.1	42.6	37.5	5.1	12.2
45	40.6	18.4	18.4	0.0	0.0	69.1	39.2	37.5	1.6	4.4
50	37.7	17.1	17.1	0.0	0.0	64.0	36.3	37.5	0.0	0.0
55	35.1	15.9	15.9	0.0	0.0	59.6	33.8	37.5	0.0	0.0
60	32.9	14.9	14.9	0.0	0.0	55.9	31.7	37.5	0.0	0.0
65	31.0	14.1	14.1	0.0	0.0	52.6	29.9	37.5	0.0	0.0
70	29.4	13.3	13.3	0.0	0.0	49.8	28.2	37.5	0.0	0.0
75	27.9	12.7	12.7	0.0	0.0	47.3	26.8	37.5	0.0	0.0
80	26.6	12.0	12.0	0.0	0.0	45.0	25.5	37.5	0.0	0.0
85	25.4	11.5	11.5	0.0	0.0	43.0	24.4	37.5	0.0	0.0
90	24.3	11.0	11.0	0.0	0.0	41.1	23.3	37.5	0.0	0.0
95	23.3	10.6	10.6	0.0	0.0	39.4	22.4	37.5	0.0	0.0
100	22.4	10.2	10.2	0.0	0.0	37.9	21.5	37.5	0.0	0.0
105	21.6	9.8	9.8	0.0	0.0	36.5	20.7	37.5	0.0	0.0

5-year $Q_{attenuated}$ **37.16 L/s** **100-year $Q_{attenuated}$** **37.53 L/s**
5-year Max. Storage Required **8.1 m^3** **100-year Max. Storage Required** **39.1 m^3**
Est. 5-year Storage Elevation **74.60 m** **Est. 100-year Storage Elevation** **74.70 m**

Building ID	**BLDG**		
Roof Area	0.053	ha	
Avail Storage Area	0.050	ha	
C	0.90	Rational Method runoff coefficient	*Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*
t_c	10	min, tc at outlet without restriction	

Estimated Number of Roof Drains

Building Length	20	
Building Width	12	
Number of Drains	3	
m^2 / Drain	166.7	max 232.25m^2/notch as recommended by Zurn for Ottawa

Roof Top Rating Curve per Zurn Model Z-105-5

d	A	V_{acc}	V_{avail}	Q_{notch}	Q_{roof}	$V_{drawdown}$
(m)	(m^2)	(m^3)	(m^3)	(L/s)	(L/s)	(hr)
0.000	0	0.0	0.0	0.00	0.00	0.00
0.025	31.3	0.3	0.3	0.32	0.95	0.08
0.050	125.0	1.8	2.1	0.63	1.89	0.34
0.075	281.3	4.9	7.0	0.95	2.84	0.83
0.100	500.0	9.6	16.7	1.26	3.79	1.53
0.125	500.0	12.5	29.2	1.58	4.73	2.27
0.150	500.0	12.5	41.7	1.89	5.68	2.88

* Assumes one notch opening per drain, assumes maximum slope of 10cm. Each notch estimates a maximum flow rate of 10 GPM (US) (37.8 L/min) per Manufacturer Specifcations (Z105).

	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)
5	141.2	18.7	2.9	15.8	4.7	242.7	35.7	3.8	31.9	9.6
10	104.2	13.8	2.9	10.9	6.5	178.6	26.3	3.8	22.4	13.5
15	83.6	11.1	2.9	8.2	7.3	142.9	21.0	3.8	17.2	15.5
20	70.3	9.3	2.9	6.4	7.7	120.0	17.7	3.8	13.8	16.6
25	60.9	8.1	2.9	5.2	7.7	103.8	15.3	3.8	11.4	17.2
30	53.9	7.1	2.9	4.2	7.6	91.9	13.5	3.8	9.7	17.4
35	48.5	6.4	2.9	3.5	7.4	82.6	12.2	3.8	8.3	17.5
40	44.2	5.9	2.9	2.9	7.1	75.1	11.1	3.8	7.2	17.3
45	40.6	5.4	2.9	2.5	6.7	69.1	10.2	3.8	6.3	17.1
50	37.7	5.0	2.9	2.1	6.2	64.0	9.4	3.8	5.6	16.7
55	35.1	4.7	2.9	1.7	5.8	59.6	8.8	3.8	4.9	16.3
60	32.9	4.4	2.9	1.5	5.2	55.9	8.2	3.8	4.4	15.8
65	31.0	4.1	2.9	1.2	4.7	52.6	7.8	3.8	3.9	15.2
70	29.4	3.9	2.9	1.0	4.1	49.8	7.3	3.8	3.5	14.6
75	27.9	3.7	2.9	0.8	3.5	47.3	7.0	3.8	3.1	14.0
80	26.6	3.5	2.9	0.6	2.9	45.0	6.6	3.8	2.8	13.3
85	25.4	3.4	2.9	0.5	2.3	43.0	6.3	3.8	2.5	12.6
90	24.3	3.2	2.9	0.3	1.7	41.1	6.1	3.8	2.2	11.9
95	23.3	3.1	2.9	0.2	1.0	39.4	5.8	3.8	2.0	11.2
100	22.4	3.0	2.9	0.1	0.4	37.9	5.6	3.8	1.7	10.4
105	21.6	2.9	2.9	0.0	0.0	36.5	5.4	3.8	1.5	9.6

5-year Q_{roof}	**2.91 L/s**	**100-year Q_{roof}**	**3.85 L/s**
5-year Max. Storage Required	**7.7 m^3**	**100-year Max. Storage Required**	**17.5 m^3**
5-year Storage Depth	**0.077 m**	**100-year Storage Depth**	**0.102 m**
5-year Estimated Drawdown Time	**0.88 hr**	**100-year Estimated Drawdown Time**	**1.58 hr**

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 (U1 & U2)	1.6	0.0	3.4	0.0	0.0
Attenuated Areas (A1. A2. EX1)	37.2	8.1	37.5	39.1	129.6
Attenuated Areas (BLDG)	2.9	7.7	3.8	17.5	41.7
Total	**41.6**	**15.8**	**44.7**	**56.6**	**171.3**

HP Urban
2487 Innes Road
Storm Sewer Calculation Sheet

										Sewer Data								
Area ID	**Up**	**Down**	**Area**	**C**	**Indiv AxC**	**Acc AxC**	**T_C**	**I**	**Q**	**DIA**	**Slope**	**Length**	**$A_{hydraulic}$**	**R**	**Velocity**	**Qcap**	**Time Flow**	**Q / Q full**
			(ha)	**(-)**			**(min)**	**(mm/hr)**	**(L/s)**	**(mm)**	**(%)**	**(m)**	**(m^2)**	**(m)**	**(m/s)**	**(L/s)**	**(min)**	**(-)**
A2	STM103	STM102	0.039	0.90	0.04	0.04	10.0	104.2	17.1	250	0.50	17.2	0.049	0.063	0.86	42.0	0.3	0.41
EX1			0.183	0.34	0.06	0.06	10.0	104.2	18.1									
					0.00	0.10	10.3	102.5	27.8	300	0.35	28.3	0.071	0.075	0.81	57.2	0.6	0.49
A1	STM102	STM101	0.087	0.76	0.07	0.16	10.3	102.5	46.6	300	0.35	1.4	0.071	0.075	0.81	57.2	0.0	0.81
BLDG			0.530	0.90	0.48	0.64	10.4	102.3	182.1	375	0.20	32.2	0.110	0.094	0.71	78.4	0.8	2.32
							11.1											

Zurn Roof Drains

ZURN Control-Flo . . . Today's Successful Answer to More

THE ZURN "CONTROL-FLO CONCEPT"

Originally, Zurn introduced the scientifically- advanced "Control-Flo" drainage principle for dead-level roofs. Today, after thousands of successful applications in modern, large dead-level roof areas, Zurn engineers have adapted the comprehensive "Control-Flo" data to **sloped roof** areas.

WHAT IS "CONTROL-FLO"?

It is an advanced method of removing rain water off dead-level or sloped roofs. As contrasted with conventional drainage practices, which attempt to drain off storm water as quickly as it falls on the roof's surface, "Control- Flo" drains the roof at a controlled rate. Excess water accumulates on the roof under controlled conditions... then drains off at a lower rate after a storm abates.

CUTS DRAINAGE COSTS

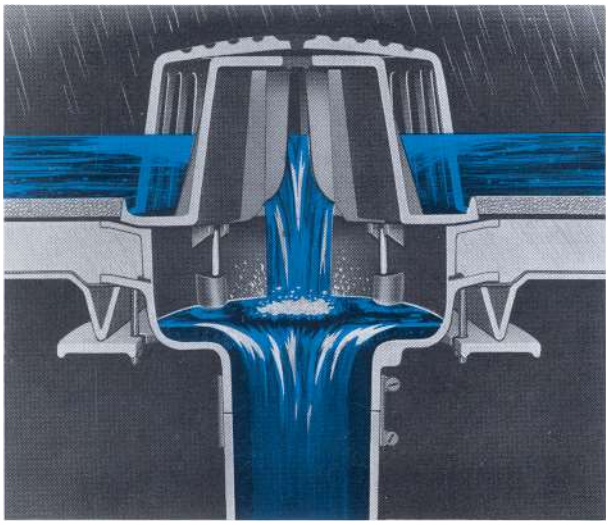
Fewer roof drains, smaller diameter piping, smaller sewer sizes, and lower installation costs are possible with a "Control-Flo" drainage system because roof areas are utilized as temporary storage reservoirs.

REDUCES PROBABILITY OF STORM DAMAGE

Lightens load on combination sewers by reducing rate of water drain from roof tops during severe storms thereby reducing probability of flooded sewers, and consequent backflow into basements and other low areas.

THANKS TO EXCLUSIVE ZURN "AQUA-WEIR" ACTION

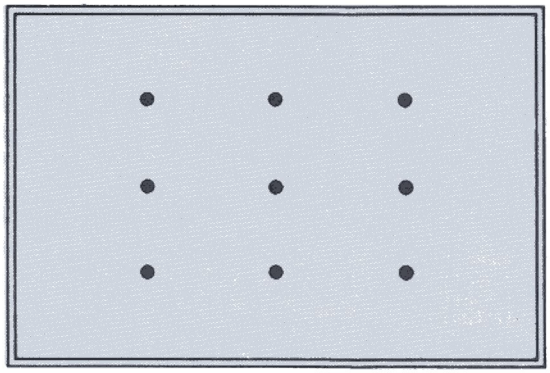
Key to successful "Control-Flo" drainage is a unique, scientifically-designed weir containing accurately calibrated notches with sides formed by parabolic curves which provide flow rates directly proportional to the head. Shape and size of notches are based on pre- determined flow rates, and all factors involved in roof drainage to assure permanent regulation of drainage flow rates for specific geographic locations and rainfall intensities.



DEFINITION

DEAD LEVEL ROOFS

A dead-level roof for purposes of applying the Zurn "Control-Flo" drainage principle is one which has been designed for zero slope across its entire surface.



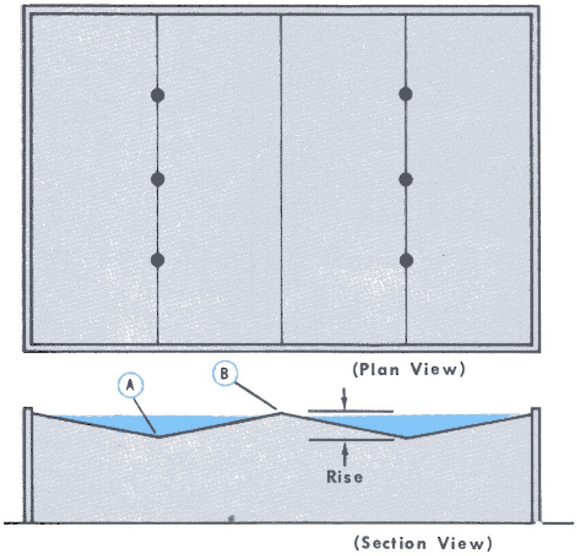
(Plan View)

(Section View)

SLOPED ROOFS

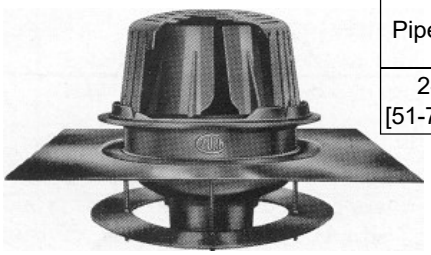
A sloped roof is one designed commonly with a shallow slope. The Zurn "Control-Flo" drainage system can be applied to any slope which results in a total rise up to 6"... and data can be calculated for rises exceeding 6".

The total rise of a roof as calculated for "Control-Flo" application is defined as the vertical increase in height in inches, from the low point or valley of a sloping roof (A) to the top of the sloping section (B). (Example: a roof that slopes 1/8" per foot having a 24-foot span would have a rise of 24 x 1/8 or 3")

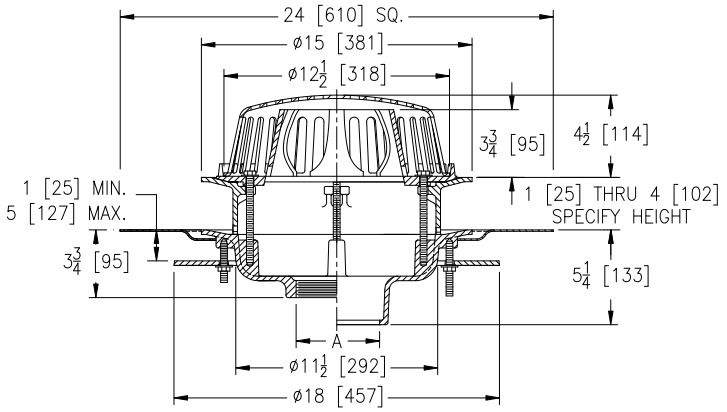


Economical Roof Drainage Installation

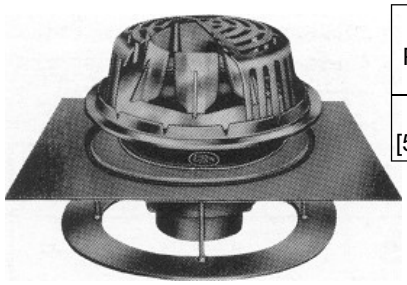
SPECIFICATION DATA



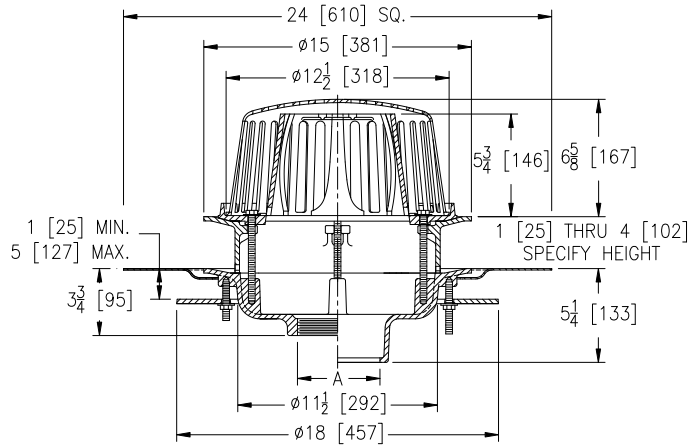
A Pipe Size	Approx. Wt. Lbs. [kg]	Dome Open Area Sq. In. [cm²]
2-3-4 [51-76-102]	56 [25]	103 [665]



ENGINEERING SPECIFICATION: ZURN Z105-C-E-R 15" Diameter "Control-Flo" roof drain for dead-level roof construction, Dura-Coated cast iron body, "Control-Flo" weir shall be linear functioning with integral membrane flashing clamp/gravel guard, static extension, secondary clamping collar with O-ring, Poly-Dome, roof sump receiver and underdeck clamp. All data shall be verified proportional to flow rates.



A Pipe Size	Approx. Wt. Lbs. [kg]	Dome Open Area Sq. In. [cm²]
2-3-4 [51-76-102]	60 [27]	148 [955]



ENGINEERING SPECIFICATION: ZURN Z105-C-E-R-10 "Control-Flo" roof drain for Sloped Roof construction, Dura-Coated cast iron body, "Control-Flo" weir shall be linear functioning with integral membrane flashing clamp/gravel guard and 6 5/8 [168] high Aluminum dome. All data shall be verified proportional to flow rates.

ROOF DESIGN RECOMMENDATIONS

Basic roofing design should incorporate protection that will prevent roof overloading by installing adequate overflow scuppers in parapet walls.

GENERAL RECOMMENDATIONS

On dead-level roofs, our general recommendations are to design for a 3" depth for the 10-year storm. In this case, even the 100-year storm will not result in a maximum depth of 6". A 6" depth represents a roof load of 31.2 pounds per square foot which approximates the 30 pound per square foot factor commonly used in roof design.

NOTE: A more conservative practice used by a few engineers in the past, depending upon other design considerations, has been to design for the 3" depth with the 25, 50, or even 100-year storm . . . and to also lower scuppers to 5" or 4" above roof level. In either case, the final determination rests with the engineering personnel responsible for this phase of the design.

GENERAL RECOMMENDATIONS

On sloping roofs, we again recommend a 3" design depth for the l0-year storm, but by 3" we refer to an equivalent depth of 3". An equivalent depth is the depth of water attained at the drains that results in the same roof stresses as those realized on a dead-level roof. In all cases this equivalent depth is almost equal to that attained by using the same notch area rating for the different rises to 6". With the same depth of water at the drain the roof stresses will decrease with increasing total rise. Therefore, it would be possible to have a depth in excess of 6" at the drain on a sloping roof without exceeding stresses normally encountered in a 6" depth on a dead-level roof. However, it is recommended that scuppers be placed to limit the maximum water depth on any roof to 6" to prevent the over flow of the weirs on the drains and consequent overloading of drain piping.

NOTE: An equivalent depth is that depth of water attained at the drains at the lowest line or valley of the roof with all other conditions such as notch area and rainfall intensity being equal. For Galveston, Texas a notch area of 1800 square feet results in a 3" depth on a **dead-level** roof for a 10-year storm. For the same notch area and a 10-year storm, equivalent depths for a 2", 4", and 6" rise respectively on a **sloped roof** would be 3.4", 3.8", and 4.6". Roof stresses will be approximately equal in all cases.

Control-Flo Drain Selection is Quick and Easy . .

The exclusive Zurn “Selecta-Drain”. Chart (pages 6, 7, 8, 9) tabulates recommended selection data for several hundred localities in the United States. It constitutes your best assurance of sure, safe, economical additional data for your Zurn “Control-Flo” systems for your specific geographical area.

If the “Selecta-Drain” Chart doesn’t not suit your specific design criteria, write directly to Zurn Industries, Inc. Field Service Engineering, Specification Drainage Operations, Erie, Pa for additional date for your locality. Listed below is additional information pertinent to proper engineering of the “Control-Flo” system.

ROOF USED AS TEMPORARY RETENTION

The key to economical “Control-Flo” drainage is the utilization of large roof areas to temporarily store the maximum amount of water without overloading average roofs or creating excessive drain down time during periods of heavy rainfall.

The data shown in the “Selecta-Drain” Chart, which takes all these factors into consideration, represents only one point on a series of curves prepared for each locality and was determined after careful study and research as imparting optimum economy in design.

ROOF LOADING AND RUN-OFF RATES

The values for notch areas selected from the design curves were based on a 3" head on a dead-level roof for the 10-year storm. In low rainfall localities the area per notch was limited to 25,000 square feet to keep the drain down time within reasonable limits. The same area for each respective locality was used for the various roof rises for sloping roofs.

Extensive studies show that stresses due to water load on a sloping roof for any fixed set of conditions are very nearly the same as those on a dead-level roof. A sloping roof tends to concentrate more water in the valleys and increase the water depth at this point. The greater depth around the drain leads to a faster run-off rate, particularly a faster early run-off rate. As a result, the total volume of water stored on the roof is less, and the total load on the sloping roof is less. By using the same area on the sloping roof as on the dead-level roof the increase in roof stresses due to increased water depth in the valleys is offset by the decrease in the total load due to less water stored. The net result is the maximum roof stresses are approximately the same for single span, rise and fixed set of conditions. A fixed set of conditions would be the same notch area, the same frequency storm, and the same locality.

NOTCH FLOW AND WATER DEPTH

The flow through each notch of the “Control-Flo” weir is 10 GPM per inch of head. To compute the depth of water in inches at the drain, obtain the total flow for any fixed set of conditions and locale from the “Selecta-Drain” Chart and divide by 10. For example, for Anniston, Alabama the discharge rates are 30, 35, 39 and 43 GPM for the 10, 25, 50 and 100-year storms respectively on a dead-level roof.

Since the possibility of exceeding 4.3" of water exists only once every 100 years, the drains can be sized to carry 43 GPM per notch and scuppers can be set at a height of 4.3" above the roof to prevent overloading the drains if a worse than 100-year storm occurs. On a similar basis, drain pipe sizes and scupper heights can be selected for various roof slopes and storm frequencies.

ADDITIONAL NOTCH RATINGS

The “Selecta-Drain” Chart along with Tables I and II enables the engineer to select “Control-Flo” Drains and drain pipe sizes for most applications. The “Selecta-Drain” Chart and Tables I and II are computed for a proportional flow weir that is sized to give a flow of 10 GPM per inch of head. However, this data can be applied to other sizes of proportional flow weirs by simple multiplication or division. For example, if a similar weir that is sized to give a flow of 5 GPM per inch is substituted for the 10 GPM per inch weir, the notch area and discharge in GPM would be divided by two, and this opening would be given a 7’2 notch area rating.

PROPER DRAIN LOCATION

The following good design practice is recommended for selecting the proper number of “Control-Flo” drains for a given area.

On dead-level roofs, drains should be located no further than 50 feet from each edge of the roof to assure good run-off regardless of wind direction. Weir should be flush with roof surface, not recessed.
On sloping roofs, drains should be located in the valleys at a distance no greater than 50 feet from each end of the valleys. Weir should be flush with the valley roof surface, not recessed.
On large roof areas, drains should not be spaced at a distance greater than 200 feet.

AquaShield™ STORMWATER TREATMENT SOLUTIONS

Sizing Report

2733 Kanasita Drive • Suite 111 • Chattanooga, TN 37343 • Phone: (423) 870-8888 • Fax: (423) 826-2112 • www.aquashieldinc.com

Site Information

Project Name: **Innes Rd.**

Site Area (hectacres): **0.317**

Unit Label: **OGS 1**

Runoff Coeff. : **.54**

Unit Location: **Ottawa, ON**

Target Removal Efficiency(%): **80% based on NJDEP**

Product Recommendation

Aqua-Swirl™ Model	Net Annual TSS Removal Efficiency	Chamber Diameter	Maximum Inside Diameter (mm)		Oil/Debris Storage Capacity	Sediment Storage Capacity
			Offline	BYP[5]		
AS-2	**91.49 %**	763 mm.	205 mm.	381 mm.	140 L	0.28 m^3

Rainfall Information

NCDC Station[1]: **OTTAWA MACDONALD-CARTIER INT'L A** Data Range[4]: **261,759 readings taken hourly between 1967 to 2007 (~40 years)**

Rainfall Event Range (mm/hre)	Rainfall Interval Point (mm/hre)	Operating Rate (Lps/m^2)	Total Rainfall (%)	Removal Efficiency (%)[2]	Relative Efficiency(%)
02.00 - 03.00	02.50	02.61	44.18	95.53	42.21
03.00 - 04.00	03.50	03.65	21.52	94.16	20.26
04.00 - 05.00	04.50	04.69	11.68	92.60	10.82
05.00 - 06.00	05.50	05.74	06.68	90.85	06.07
06.00 - 07.00	06.50	06.78	04.03	88.92	03.58
07.00 - 08.00	07.50	07.82	01.99	86.81	01.73
08.00 - 09.00	08.50	08.87	01.84	84.51	01.55
09.00 - 10.00	09.50	09.91	01.81	82.03	01.48
10.00 - 15.00	12.50	13.04	04.12	73.47	03.03
15.00 - 20.00	17.50	18.26	01.02	55.53	00.57
20.00 - 25.00	22.50	23.47	00.54	32.98	00.18
25.00 - 30.00	27.50	28.69	00.24	05.81	00.01
		Total Cumulative Rainfall %:	**99.65[3]**	**Net Annual %:**	**91.49**

Sales Agent Information

Agent Name: **Dave Kanters**

Phone: **416-347-2799**

Company Name: **Soleno**

Fax:

Address: **347, 15-75 Bayly St. W.**

E-mail: **dkanters@soleno.com**

City, State Zip: **Ajax, ON L1S7K7**

Footnotes

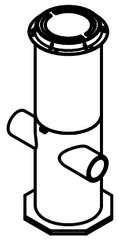
1. Recorded as hourly precipitation rainfall data (inches), National Climatic Data Center (NCDC)
2. Based on Tennessee Tech University laboratory testing of the AquaSwirl™ Model AS-3 for OK-110 silica particles 50-125 microns(Neary, 2002)
3. 90% Rainfall Event, calculated as a cumulative percentile of individual events, www.stormwatercenter.net, sizing criteria (Center for Watershed Protection)
4. NCDC data may not be consecutive, skipping days, months and/or years in the range of dates.
5. The Aqua-Swirl™ Internal Bypass (BYP) provides full treatment of the "first flush," while the peak design storm is diverted and channeled through the main conveyance pipe. Please refer to your local representative for more information.
6. When applicable, the performance curve was adjusted via Peclet Scaling to provide estimated sizing per NJDEP PSD (d50 = 67 microns).

To receive pricing and/or technical support on the Aqua-Swirl, please contact Soleno. (www.Soleno.com)

Paul Antoine
Sales Representative
Tel: 613-292-4094
Email: pantoine@soleno.com

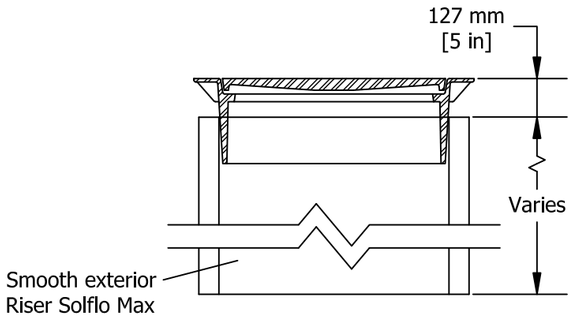
David Kanters
Engineer, Technical Service
Tel: 416-347-2799
Email: dkanters@soleno.com

Aqua-Swirl High Density Polyethylene (HDPE) Stormwater Treatment System



Projected View
SCALE 1:80

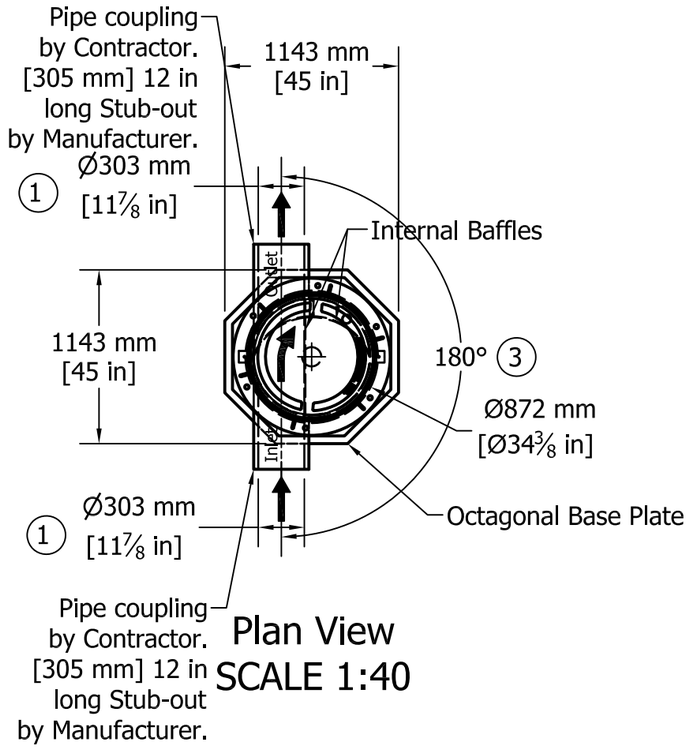
Please see accompanied Aqua-Swirl specification notes. See Site Plan for actual system orientation. Approximate dry (pick) weight: 400 kg [800 lbs].



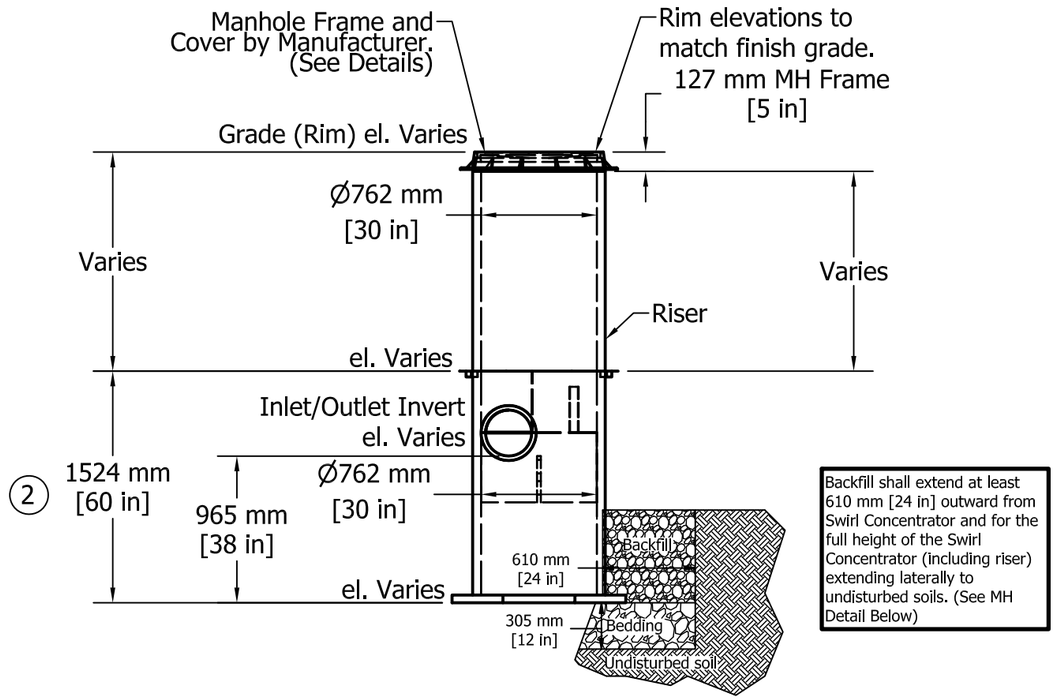
Adjustable Frame and Cover

System shall be designed for the following capacities:
Swirl Treatment Flow: 31 L/s [1.1 cfs]
Swirl Sediment Storage: 0.28 m³ [10 ft³]
Swirl Oil/Debris Storage: 140 L [37 gal]

1. AS-2 BYP inlet/outlet pipe size ranges from 203 mm [8 in] to 381 mm [15 in].
2. AS-2 chamber height may vary from 1321 mm [52 in] to 1524 mm [60 in], depending on inlet/outlet pipe size.
3. Orientation may vary from a minimum of 90° to a maximum of 180°.



Plan View
SCALE 1:40



Elevation View
SCALE 1:40

AquaShield
WATER TREATMENT SOLUTIONS
2733 Kanasita Drive, Suite 111, Chattanooga, TN 37343
Phone (888) 344-9044 Fax (423) 826-2112
www.aquashieldinc.com

Aqua-Swirl Concentrator
AS-2 BYP CW STD

Standard Detail

Structure #:	AS-2 STD	Rvwed	Rvw. Date
Drawn By:	OFlores		
Scale:	As Shown		
Date:	3/7/2018		

Series 35-1

- Eccentric flat bottom design
- Integral, all-rubber flange
- Lightweight, all-elastomer design
- Shorter length in sizes 42″ and larger

Materials of Construction

Neoprene, Hypalon®, Buna-N, EPDM, Viton®.

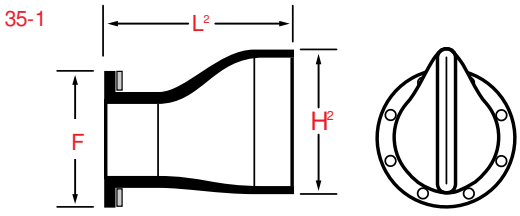
Backup Rings

Galvanized steel or stainless steel.

The flat-bottom Series 35-1 feature an integral rubber flange, allowing them to be mounted to flanged outfall pipes or directly to headwalls where the pipe is flush.

The flange size drilling conforms to ANSI B 16.10, Class 150#, or can be constructed with DIN, 2632 and other standards. The Series 35 Check Valve is furnished complete with steel or stainless steel backup rings for installation.

The Series 35-1 is often a direct replacement for flanged flapgates. Hinge pins rust and corrode if not routinely lubricated, causing the flapper to hang open and allow backflow. Small debris that collects in the seating area of the valve will also keep the flapper open. Tideflex® Series 35-1 valves 18" and larger are constructed with a curved bill as standard.



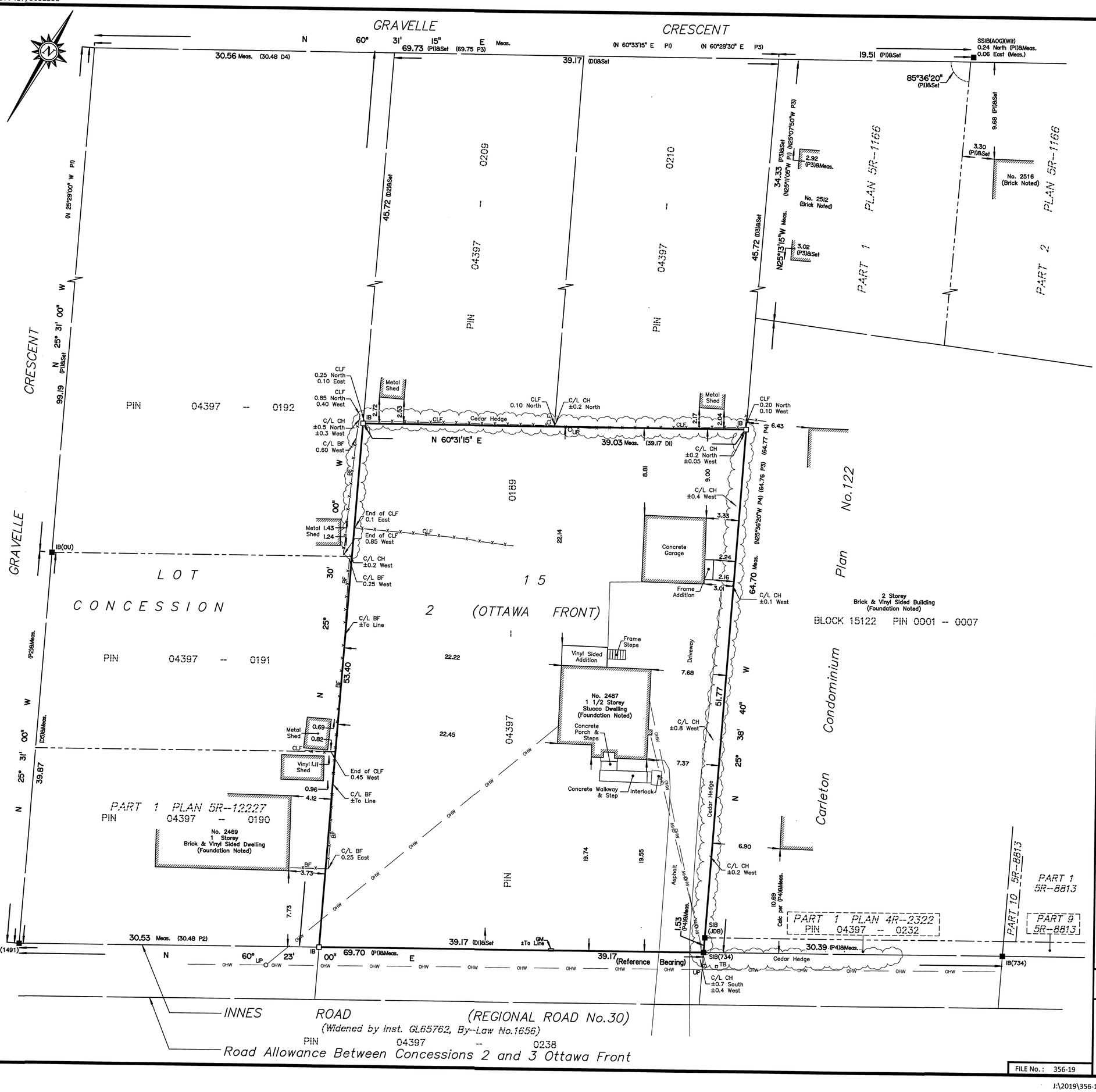
Series 35-1

Flange Size (ANSI)	Flange O.D. (F)	SERIES 35-1 Length (L²)	SERIES 35-1 Bill Height (H²)
4	9	10	8
5	10	10	8
6	11	16	12
8	13 1/2	18	16
10	16	23	19
12	19	28	23
14	21	30	27
16	23 1/2	35	30
18	25	40	34
20	27 1/2	48	37
24	32	52	44
30	38 3/4	62	55
32	41 3/4	66	59
36	46	72	70
42	53	69	73
48	59 1/2	75	81
54	66 1/4	79	90
60	73	82	94
72	86 1/2	95	120

Dimensions are subject to change due to customized construction

DRAWINGS / FIGURES

377487, 5032595



SURVEYOR'S REAL PROPERTY REPORT
PART 1 Plan of

PART OF LOT 15
CONCESSION 2 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

FARLEY, SMITH & DENIS SURVEYING LTD. 2019

Scale 1: 250

0 2.5 5 7.5 10 12.5 15 20 25 metres

Metric Note

Distances and coordinates on this plan are in metres and can be converted to feet by dividing by 0.3048.

Bearing Note

Bearings are astronomic and are referred to the northerly limit of Innes Road having a bearing of N 60° 23' 00" E as shown on Plan 5R-12227.

Notes & Legend

	Denotes	
—□—	"	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
(OU)	"	Origin Unknown
(Wit)	"	Witness
Meas	"	Measured
(P1)	"	Plan 5R-12264
(P2)	"	Plan 5R-12227
(P3)	"	Plan 5R-1166
(P4)	"	Carleton Condominium Plan No.122
(D1)	"	Inst. GL55372
(D2)	"	Inst. GL81422
(D3)	"	Inst. GL81426
(D4)	"	Inst. GL181022
(D5)	"	Inst. GL83085
TB	"	Unidentified Terminal Box
UP OHW	"	Overhead Wires
	"	Utility Pole
GM	"	Gas Meter
CH	"	Cedar Hedge
CLF	"	Chain Link Fence
BF	"	Board Fence
C/L	"	Centreline
	"	Property Line

PART 2

1. REGISTERED RIGHTS-OF-WAY/EASEMENTS
   No rights-of-way or easements were found to be registered against the subject property.
2. PROPERTY IMPROVEMENTS
   Fencing and hedges are displaced from the property lines. See Plan for Location.
3. COMPLIANCE WITH MUNICIPAL ZONING BYLAWS
   Compliance is not certified by this report.
4. ADDITIONAL REMARKS
   None noted.

THIS REPORT WAS PREPARED FOR:
Guy Charbonneau, Gilles Charbonneau & Serge Charbonneau
- ("The Client"), the Client's solicitors, mortgagees, and other related parties. The undersigned accepts no responsibility for use by other parties.
See Part 2 of this Report.

Surveyor's Certificate

I certify that :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Regulations made under them.
2. The survey was completed on the 15th day of July, 2019.

July 16/19
Date

Jamie Leslie
Ontario Land Surveyor

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
2088495

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR
In accordance with Regulation 1026, Section 29 (3).

FARLEY, SMITH & DENIS SURVEYING LTD.

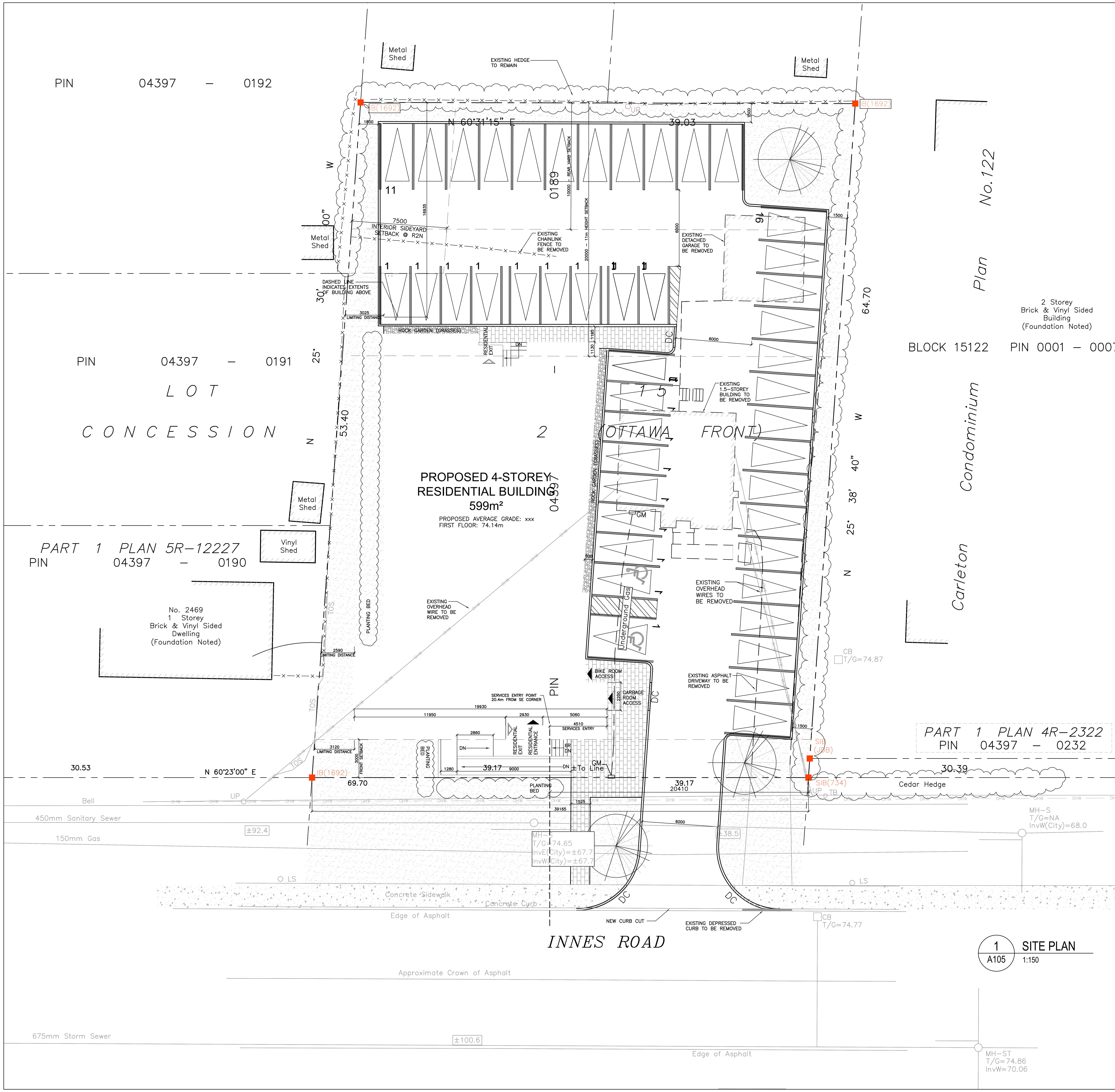
ONTARIO LAND SURVEYORS
CANADA LAND SURVEYORS

190 COLONNADE ROAD, OTTAWA, ONTARIO K2E 7J5
TEL. (613) 727-8226 FAX. (613) 727-1826

FILE No. : 356-19

SRPR 18X24

J:\2019\356-19_2487 Innes Rd_srpr\Final\356-19 PrtLt15Con2 2487InnesRd D F.dwg



1 A105 SITE PLAN 1:150

KEY PLAN

PROPERTY DESCRIPTION

FOUR STOREY RESIDENTIAL BUILDING	
CITY OF OTTAWA PIN NUMBER	04397-0238
MUNICIPAL ADDRESS	2487 Innes Road

SITE INFORMATION

LOT AREA:	2,183.22m²
LOT FRONTAGE:	39.17m
LOT DEPTH:	53.4m

BUILDING INFORMATION

BUILDING AREA:	523m²
BUILDING FLOOR AREA:	2,394m²
PROPOSED USE:	APARTMENT DWELLING, MID-RISE

UNIT BREAKDOWN:

FIRST FLOOR:	6 UNITS	0- STUDIO,	4- 1 BD,	2- 2BD
SECOND FLOOR:	9 UNITS	0- STUDIO,	6- 1 BD,	3- 2BD
THIRD FLOOR:	9 UNITS	0- STUDIO,	6- 1 BD,	3- 2BD
FOURTH FLOOR:	9 UNITS	0- STUDIO,	6- 1 BD,	3- 2BD
TOTAL:	33 UNITS	0- STUDIO,	22- 1 BD,	11- 2BD

ZONING TABLE

ZONING TABLE	AM11 [708]	
CITY OF OTTAWA ZONING BY-LAW No. 2008-250	REQUIRED	PROPOSED
MINIMUM LOT AREA	No minimum	--
MINIMUM LOT WIDTH	No minimum	--
MINIMUM FRONT YARD SETBACK	Section 186 - 11.4.1 & 11.4.2 - 3.0m - 50% of frontage along front lot line must be occupied by building walls located within 3.0m of the front lot line	3.0m Building Frontage = 20.04m Length of frontage located at 3.0m setback = 17.99m [89.7%]
MIN. INTERIOR SIDE YARD SETBACK	Section 185 - 3(d) - In all other cases = no minimum Section 186 - 11.8.2 - 7.5m beyond 20 meters back from street at residential zone	Minimum Setback at AM-11 zone = 2.49m Setback at R2N Zone = N/A
MINIMUM REAR YARD SETBACK	Section 186 - 11.9.2 - 10.0m	16.9m
MAXIMUM BUILDING HEIGHT	Section 186 - 11.14.1 - 0 - 20m from property line abutting R1, R2, R3 residential zone = 11.0m Section 186 - 11.14.3 20m - 30m from property line abutting R1, R2, R3 residential zone = 20.0m	>20.0m from R2 Zone = 12.56m <20.0m from R2 Zone = 15.52m
FIRST FLOOR HEIGHT & GLAZING	Section 186 - 11.6 - Minimum Storey Height = 4.5m Section 186 - 11.12 - 50% Transparent Glazing on Innes Rd.	Level 1 Height = 3.74m [with 0.64m below existing average grade] Transparent Glazing on Innes Rd = 20%
LANDSCAPED AREA	Section 110 - 1 - 15% of parking lot area Section 110 - 1(a) + Table 110 (b) / III - Landscape Buffer = 1.5m not abutting a street, 10-100 parking spaces	Parking Lot Area = 1,018m² Landscape Buffer Area = 331m² or [32.6%] Other Landscaping = 159m² Total Landscaped Area = 490m²
VEHICLE PARKING REQUIREMENTS (AREA C, SCHEDULE 1A)	Table 101 - R11 Dwelling low-rise apartment 1.2 per dwelling unit (33 x 1.2) = 39.6	40 SPACES
VISITOR PARKING REQUIREMENTS (AREA C, SCHEDULE 1A)	Table 102 Apartment dwelling, low-rise or mid-high-rise 0.2 per dwelling unit (33 x 0.2) = 6.6	5 SPACES (0.15 per dwelling unit)
AMENITY AREA REQUIREMENTS	N/A	None Provided
BICYCLE PARKING SPACES (AREA C, SCHEDULE 1)	0.5 per dwelling unit = 16.5	17 Total 5 Wall-Mounted / 12 Floor Mounted

LEGEND

- SOFT LANDSCAPING REFER TO LANDSCAPE
- UNIT PAVERS REFER TO LANDSCAPE
- ASPHALT PAVING
- CONCRETE
- EXISTING BUILDING ELEMENT TO BE REMOVED
- EXISTING FENCE
- NEW BOARD FENCE REFER TO LANDSCAPE
- LOT LINE
- SETBACK LINE
- DESIGNATED BUILDING ENTRANCE / EXIT
- FH FIRE HYDRANT. REFER TO CIVIL
- CB CATCH BASIN
- MH MANHOLE
- FD FLOOR DRAIN
- UP UTILITY POLE
- OHW OVERHEAD UTILITY WIRES
- LS LIGHT STANDARD
- DC DEPRESSED CURB
- 0.20ø EXISTING TREE TO REMAIN (REFER TO LANDSCAPE DRAWINGS)
- NEW TREE (REFER TO LANDSCAPE DRAWINGS)
- NEW SHRUBS (REFER TO LANDSCAPE DRAWINGS)
- NEW EVERGREEN SHRUB (REFER TO LANDSCAPE DRAWINGS)
- FIRE DEPARTMENT CONNECTION
- EXISTING GROUND ELEVATION [TO DETERMINE EXISTING AVERAGE GRADE]
- 58.84 NEW GROUND ELEVATION REFER TO CIVIL
- FIRE ROUTE

NOTE: "X"-E INDICATES EXISTING TO REMAIN

No.	Date	Émis pour / Object
1	2020–01–10	COORDINATION
2	2020–05–07	COORDINATION

Ingénieur / *Engineer* (Mécanique & Électricité / *Mechanical & Electrical*)

Ingénieur / *Engineer* (Structure / *Structure*)

Architecte/ *Architect* (paysagiste / *Landscape*)

Gino J. Aiello **landscape architect** www.GJALA.com
GINO@GJALA.com (613) 852 1343
110 Didsbury Road Unit #9 | Ottawa Ontario | K2T0C2

Ingénieur / *Engineer* (Civil / *Civil*)

DSEL
david schaeffer engineering ltd

Client / *Client*

10163074 Canada Inc.

Architecte / Architect — Collectif d'architectes / Architects Collective

fig. 1
3550, Saint-Antoine O.
Montréal QC H4C 1A9
T. 514 861-5122

fig. 2
190 Somerset St W #206
Ottawa ON K2P 0J4
T. 613 695-6122

figurr
Formerly Rubin & Rotman Architects
www.figurr.ca

Sceau / *Seal*

Note:

L'entrepreneur doit vérifier toutes les dimensions et informations sur le site et aviser immédiatement l'architecte de toutes erreurs ou omissions.

Contractor shall verify all information and dimensions on site and immediately report any errors or omissions to the architect.

Projet / *Project*

FOUR-STOREY APARTMENT BUILDING

2487 Innes Rd, Ottawa ON

Titre / *Title*

SITE PLAN

Dessiné par / *Drawn by*: LB	No. projet / *Project number*: 1963	
Vérifié par / *Verified by*: RC	No. dessin / *Drawing number*: A105	Révision / Revision: 0
Échelle / Scale: *As indicated*		
Date de création du dessin / *Drawing creation date*: 2019/12/20		

D07-12-18-0174

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