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FUNCTIONAL SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

OTTAWA COMMUNITY HOUSING
811 GLADSTONE AVENUE

CITY OF OTTAWA

PROJECT NO.: 17-963

MARCH 2019 – REV 3

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FOR
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MARCH 2019 – REV 3
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1.0 INTRODUCTION

David Schaeffer Engineering Ltd. (DSEL) has been retained by Ottawa Community Housing to prepare a Functional Servicing and Stormwater Management Report in support of the Site Plan Control Application for the proposed development of 811 Gladstone Avenue.

The subject property is located within the City of Ottawa urban boundary, in the Somerset Ward. As illustrated in ***Figure 1***, below, the subject property is bounded by Balsam Street to the north, St. Anthony's Children's Centre and Booth Street to the east, Gladstone Avenue to the south and Rochester Street to the west. The subject property measures approximately ***0.472 ha*** and is designated Residential Fourth Density Zone (R4A), as well as, Traditional Main Street Zone (TM) under the current City of Ottawa zoning by-law and is within the Mature Neighbourhoods Area.

Figure 1: Site Location

The proposed development involves the construction of 32 stacked townhome units, as well as, a 6-storey residential apartment building with underground parking and 108

residential units. Townhome units are proposed to include basements and a common sub-basement for plumbing distribution. A copy of the proposed site plan is included in ***Drawings/Figures.***

This report is submitted in support of the application for Site Plan Control.

1.1 Existing Conditions

The subject site currently consists of 25 townhome units and one single family residence and at grade parking which is accessed from Balsam Street.

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

Balsam Street:

- 203 mm diameter PVC watermain; and
- 375 mm diameter PVC combined sewer.

Booth Street:

- 406 mm diameter watermain; and
- 300 mm diameter PVC combined sewer.

Gladstone Avenue:

203 mm diameter PVC watermain; and

450 mm diameter PVC combined sewer.

Rochester Street:

- 203 mm diameter PVC watermain; and
- 375 mm diameter concrete combined sewer.

1.2 Required Permits / Approvals

Development of the site is subject to the Site Plan Control process. The City of Ottawa must approve detailed engineering design drawings and reports, for the site work to proceed.

It is proposed that both sanitary and storm flow from the site will discharge to an existing combined sewer. As such, it is anticipated that an Environmental Compliance Approval (ECA) through a direct submission to the Ministry of the Environment, Conservation and Parks (MECP) will be required.

1.3 Pre-consultation

Pre-consultation correspondence and the servicing guidelines checklist are 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)

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 in ***Appendix B.*** Watermains exist within Gladstone Avenue, Balsam Street, Booth Street and Rochester Street.

3.2 Water Supply Servicing Design

The subject property is proposed to be serviced through two 150 mm diameter service connections to the proposed 6-storey residential building; one connection to the existing 203 mm diameter municipal watermain within Gladstone Avenue and one to the 203 mm diameter municipal watermain within Rochester Street. It is proposed to meter the site within the apartment building, individual meters are not proposed for the townhomes. Refer to the ***SSP-1*** for proposed water servicing.

The proposed townhomes are to be serviced from the 6-storey residential building, distribution is designed by others. Refer to mechanical engineering drawings for the proposed water servicing from the apartment building to the townhome units.

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 Demand	280 L/p/d
Residential Maximum Daily Demand	3.6 x Average Daily *
Residential Maximum Hourly	5.4 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 shall not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa
** 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-2018-2*	

Table 2, below, summarizes the anticipated water demand and boundary conditions for the proposed development, and was calculated using the ***Water Supply Guidelines.***

Table 2
Proposed Water Demand

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Conditions[2] Gladstone Avenue (m H_2O / kPa)		Boundary Conditions[3] Rochester Street (m H_2O / kPa)	
Average Daily Demand	53.7	48.3	473.3	49.0	481.1
Max Day + Fire Flow (Townhomes)	193.2 + 17,000	34.3	336.0	35.0	343.7
Max Day + Fire Flow (Apartments)	193.2 + 14,000	34.3	336.0	35.0	343.7
Peak Hour	289.8	40.7	398.8	41.4	406.5

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied for the connection to Balsam Street by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 65.96 m at the connection to the municipal watermain. See ***Appendix B.*** The conditions were assumed to be the same for Gladstone Avenue.
3) Boundary conditions supplied for the connection to Rochester Street by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 65.41 m at the connection to the municipal watermain. See ***Appendix B.***

The City provided both the anticipated minimum, maximum and peak hour water pressures as indicated by the correspondence in ***Appendix B***. Since the original boundary condition request, a watermain is now proposed connecting to Gladstone Avenue. It is assumed that this connection would have the same boundary conditions.

Based on the boundary conditions provided in ***Table 2*** and the estimated pressure drop from the building and the headloss along the watermain, the resulting pressures fall within the range outlined in ***Table 1***. Correspondence with the mechanical engineer and headloss calculation sheets are included in ***Appendix B***.

The required fire flow (RFF) was estimated in accordance with **ISTB-2018-02**; the resulting highest flows for each building type were sent to the City of Ottawa for boundary conditions. The following parameters, below, were provided by the Architect, see for correspondence ***Appendix A***:

- Type of construction – Wood frame for townhouse style homes, and non-combustible construction for the apartment building;
- Occupancy type –Limited combustible;
- Sprinkler Protection – Sprinklered system for the apartment building and non-combustible construction for the townhomes.

Table 3, below, summarizes the fire flow for each building, per the above assumptions***.*** Calculation sheets per the ***ISTB-2018-02*** can be found in ***Appendix B.***

Table 3
Anticipated Fire Flow Demand

Building Type	Anticipated Fire Demand (L/min)	Available Fire Flow per Table 18.5.4.3 of ISTB-2018-02 (L/min)
Townhomes 1 (West)	16,000	16,087
Townhomes 2 (East)	17,000	17,980
Apartment Building (6-Storey)	14,000	18,926

The property has four (4) adjacent hydrants listed below:

1. Located on Rochester Street;
2. Located on Gladstone Avenue, between Booth Street and Rochester Street;
3. Located on Gladstone Avenue at the intersection of Booth Street and Gladstone Avenue; and
4. Located on Booth Street at the intersection of Booth Street and Balsam Street.

According to ***Table 18.5.4.3*** of **ISTB-2018-02** and the resulting pressure during the fire flow scenario provided by the City of Ottawa, the existing hydrants are able to meet the required fire flow demands of the proposed development at minimum pressure. Refer to the Existing Hydrant Location Figure included in ***Appendix B*** for existing hydrant location and distances to buildings.

3.4 Water Supply Conclusion

It is proposed to service the development through two connections to the 6-storey residential building, with one connection to the existing 203 mm diameter watermain within Gladstone Avenue and the other to the existing 203 mm watermain within Rochester Street.

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.

It is proposed that the development will be serviced by four existing fire hydrants on the adjacent streets. Based on ***Table 18.5.4.3*** of **ISTB-2018-02,** the fire flow demands of the proposed buildings fall within a range that can be supplied through the existing hydrants.

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

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject property lies within the Preston Street Trunk sewer catchment area, as shown by the ***Trunk Sanitary Sewers and Collection Areas Map,*** included in ***Appendix C***. There are existing combined sewers within Gladstone Avenue, Balsam Street, Booth Street and Rochester Street. The existing site consists of 25 townhomes and one single family residence and existing wastewater flow is summarized in ***Table 4,*** below:

Table 4
Summary of Existing Wastewater Flows

Design Parameter	Anticipated Sanitary Flow[1] (L/s)
Average Dry Weather Flow Rate	0.23
Peak Dry Weather Flow Rate	0.85
Peak Wet Weather Flow Rate	1.00
1) Based on criteria shown in ***Table 5***	

4.2 Wastewater Design

It is proposed that the development will be serviced via a connection to the existing 375 mm sanitary sewer within Rochester Street. Refer to the drawing ***SSP-1*** for sanitary servicing layout.

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	0.33 L/s/ha
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sanitary Sewer Lateral	135 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 6, below summarizes the peak sanitary flow from the proposed development to the combined sewer within Rochester Street. See ***Appendix C*** for associated calculations.

Table 6
Summary of Proposed Wastewater Flows

Design Parameter	Anticipated Sanitary Flow[1] (L/s)
Average Dry Weather Flow Rate	0.89
Peak Dry Weather Flow Rate	3.11
Peak Wet Weather Flow Rate	3.26
1) Based on criteria shown in ***Table 5***	

The estimated sanitary flow based on the ***Site Plan*** provided in ***Drawings/Figures,*** results in a peak wet weather flow of ***3.26 L/s*** to the combined sewer within Rochester Street. This results in a ***2.26 L/s*** increase from existing conditions. Detailed calculations are included in ***Appendix C***.

The increase in wastewater discharge will be compensated for by a reduction in stormwater flow, detailed in ***Section 5.0 & Section 6.0*** of this report.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Preston Trunk sewer. It is proposed to discharge the subject property's wastewater via a connection to the existing 375 mm combined sewer within Rochester Street.

The sanitary flow analysis for the proposed development results in an estimated increase, from existing conditions, of ***2.26 L/s*** to the Rochester Street combined sewer. This increase in wastewater discharge will be compensated for by a reduction in stormwater flow, as per City of Ottawa Criteria.

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 Central sub-watershed. As such, approvals for proposed developments 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).

It is anticipated that no stormwater management controls for flow attenuation exist on-site. The estimated pre-development peak flows for the 2, 5, and 100-year 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	68.5
5-year	92.9
100-year	199.0

5.2 Post-development Stormwater Management Targets

Stormwater management quantity control requirements for the proposed development were reviewed with the City of Ottawa, correspondence is included in ***Appendix A*** and summarized below:

- Meet a combined allowable release rate based on existing sanitary flow in addition to storm flow equal to a calculated Rational Method Coefficient determined as per existing conditions but no more than 0.4, employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration no less than 10 minutes;
- The stormwater release rate is equal to the allowable combined flow subtract the proposed sanitary flow;
- Attenuate storms up to and including the City of Ottawa 100-year design event on site;
- Quality controls are not required for the development since stormwater is tributary to a combined sewer. Correspondence with the RVCA is included in ***Appendix A***.

Based on the above criteria, the allowable combined flow rate equals ***55.5 L/s*** and the allowable stormwater release rate is equal to ***52.4 L/s.*** (55.5 – 3.11= 52.4 L/s).

5.3 Proposed Stormwater Management System

It is proposed that the stormwater for the development be serviced through a connection to the 375 mm diameter combined sewer within Rochester Street.

To achieve the allowable post-development stormwater runoff release rate identified in ***Section 5.2*** above, the proposed development will employ flow attenuation using onsite storage through the combined use of underground storage chambers as well as roof storage on both the apartment building and the townhomes. An Inlet Control Device (ICD) is proposed at STM MH 101A, with a diameter of 85 mm to attenuate flow to the allowable release rate.

Roof drainage is proposed to be controlled using Zurn Model Z-105-5 (or approved equivalent) control drains. Roof drainage controls are proposed for the roofs of both townhouse complexes as well as for the apartment building. These areas are shown as TH1, TH2 and BLDG3 on drawing ***SWM-1***. The controlled roof drainage is proposed to be directed to the storm sewer system, upstream of the proposed ICD at STM MH 101A. The stormwater runoff within the property that is shown as drainage area A1 on ***SWM-1*** is collected through proposed catchbasins within the landscape area and parking lot. The catchbasins direct the captured flow to the proposed storm system, upstream of the proposed ICD. The flow from the rooftop drainage areas (TH1, TH2 and BLDG 3) and drainage area A1 is further controlled by the ICD at STM MH 101A.

Drainage areas U1, U2, and U3, as show on ***SWM-1*** represent unattenuated drainage areas. The runoff from drainage areas U1 and U2 flow uncontrolled primarily towards Balsam Street where minor flow is captured through existing catchbasins and major flow is directed overland towards the City right-of-way. Runoff from drainage area U3 flows uncontrolled towards Rochester Street and Gladstone Avenue where minor flow is collected through existing catchbasins and major flow is directed overland, west on Gladstone Avenue.

Table 8, below***,*** estimates post-development flow rates and storage requirements.

Table 8
Stormwater Flow Rate Summary

Control Area	2-Year Release Rate	2-Year Storage	100-Year Release Rate	100-Year Storage	100-Year Available Storage
	(L/s)	(m^3)	(L/s)	(m^3)	(m^3)
Unattenuated Areas	10.4	0.0	30.1	0.0	0.0
Roof Storage Apt.	10.2	12.7	15.9	44.9	126.7
Roof Storage Townhomes 1	2.8	3.1	4.3	10.9	31.7
Roof Storage Townhomes 2	2.8	3.1	4.3	10.9	31.7
Attenuated Areas	12.6	26.7	22.3	74.5	83.1
Sanitary Flow	3.1	0.0	3.1	0.0	0.0
Total	**26.0**	**45.6**	**55.5**	**141.1**	**273.1**
Required storage determined using the average flow rate in the storage tank equal to **21.8 L/s.* Release rate shown in Table 8 equal to the flow rate at the top of the tank.					

It is estimated that a total of ***66.7 m^3*** of rooftop storage and ***74.5 m^3*** of underground storage is required to attenuate stormwater flow to a release rate of ***52.4 L/s***. The estimated 100-year storage elevation is 65.26 m. The 100-year flow rate through the Inlet Control Device (ICD) at manhole STM101A is ***22.3 L/s***. Storage calculations are contained within ***Appendix D***.

A Brentwood Stormtank Model ST36 is proposed. ***Table 9***, below, summarizes the specifications of the storage tank that is proposed. Shop drawings for the proposed storage tank are included in ***Appendix D***.

Table 9
Storage Tank Detail Summary

Stormtank Model	Length	Width	Height	Capacity	Depth of Cover	Bottom Slope
	(m)	(m)	(m)	(m^3)	(m)	(%)
ST-36	16.15	6.18	1.295	83.06	>0.61	<1

The storage system will need to be observed initially through semi-annual inspections until a precise maintenance schedule based on use can be established. The maintenance for this unit will require the use of a vacuum truck to remove accumulated sediment on an annual basis unless another schedule is determined based on observation. A detailed maintenance technical bulletin is included in ***Appendix D***.

Foundation drainage for the development is proposed to be collected through an independent sewer network. The foundation drainage collected from both townhome complexes as well as the apartment building discharges to the proposed stormsewer manhole STM101, downstream of the proposed ICD located at storm manhole STM101A. Refer to drawing ***SSP-1*** for detailed foundation drainage sewer design.

5.5 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 stormwater allowable release rate to the combined sewer within Rochester Street was calculated to be ***55.5 L/s***. It is estimated that ***141.1m^3*** of storage will be required to meet this release rate.

Quantity controls will be provided through the combined use of underground storage chambers, roof storage on the apartment building, a cistern and an ICD.

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

6.0 COMBINED SEWER SYSTEM FLOW

Based on criteria outlined in ***Section 5.2***, the combined stormwater and sanitary flow is not to exceed ***55.5 L/s***.

Table 10, below, summarizes the pre-development and post-development flow rates to the combined sewershed.

Table 10
Summary of Release Rates to the Combined Sewer

Flow Type	2-Year		100-year	
	Pre-Development (L/s)	Post-Development (L/s)	Pre-Development (L/s)	Post-Development (L/s)
Sanitary*	0.85	3.11	0.85	3.11
Storm	68.5	23.0	199.0	52.4
Combined Flow	**69.4**	**26.1**	**199.9**	**55.5**
*Infiltration flows have been taken into account in stormwater calculations. Sanitary flow is equal to the peak dry weather flow.				

As shown by ***Table 10,*** the post-development combined flow meets the target objective described in section 5.2. In addition, the development proposes to decrease the discharge to the existing combined sewer by approximately 72% in the 100-year storm event.

7.0 UTILITIES

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

8.0 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.

9.0 CONCLUSION AND RECOMMENDATIONS

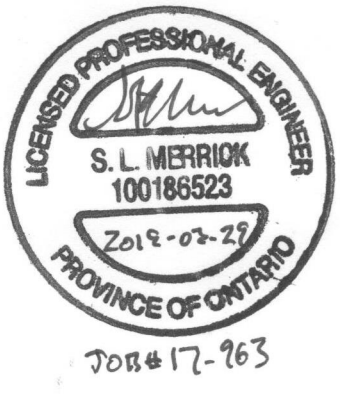
David Schaeffer Engineering Ltd. (DSEL) has been retained by Ottawa Community Housing to prepare a Functional Servicing and Stormwater Management Report in support of the Site Plan Control application for 811 Gladstone Avenue. The preceding report outlines the following:

- 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;
- Fire flow demands for the building will be met through existing hydrants on the adjacent streets;
- The proposed development is anticipated to have a peak wet weather flow of ***3.26 L/s*** directed to the Rochester Street combined sewer. Based on the sanitary analysis that was conducted, the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Based on the ***City Standards***, the proposed development will attenuate flow to a release rate of ***55.5 L/s*** and will not have an impact on peak flows to the combined sewer within Rochester Street;
- It is proposed to attenuate flow through underground and roof storage. It is anticipated that ***141.1 m^3*** of onsite storage will be required to attenuate flow to the established release rate above.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Genavieve G. Melatti

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Steven L. Merrick, P.Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

17-963 15/02/2019

4.1 General Content

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

4.2 Development Servicing Report: Water

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

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

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

4.3 Development Servicing Report: Wastewater

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

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

☐	Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.	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.	N/A
☒	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.	N/A
☒	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
☐	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
☒	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3
☐	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
☐	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	N/A
☐	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
☐	Identification of potential impacts to receiving watercourses	N/A
☐	Identification of municipal drains and related approval requirements.	N/A

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

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 8.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

☒	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 5.2
☐	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
☐	Changes to Municipal Drains.	N/A
☐	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 9.0
☐	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

Genavieve Melatti

From: Jamie Batchelor <jamie.batchelor@rvca.ca>
Sent: Thursday, November 29, 2018 9:42 AM
To: Genavieve Melatti
Cc: Steve Merrick
Subject: RE: 811 Gladstone Avenue

Good Morning Genavieve,

I can confirm that if the stormwater is being directed to a combined sewer then additional onsite water quality controls are not required.

Jamie Batchelor, MCIP,RPP
Planner
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: Genavieve Melatti <GMelatti@dsel.ca>
Sent: Thursday, November 08, 2018 2:34 PM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 811 Gladstone Avenue

Good afternoon Jamie,

I wanted to touch base with you regarding a development at 811 Gladstone Avenue shown in the map below.

The development proposes to construct 32 stacked townhomes and a 6-storey apartment building with 15 above ground parking spaces as well as underground parking. Stormwater from site will be discharged the existing 375mm diameter combined sewer within Rochester Avenue.

I wanted to confirm that quality controls would not be required as it will be discharging into a combined sewer.

Please let me know if there is any further information that you might need from me.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

Genavieve Melatti

From: Genavieve Melatti
Sent: Thursday, November 8, 2018 3:55 PM
To: 'Emily.Diamond@ontario.ca'
Cc: Steve Merrick
Subject: 811 Gladstone Avenue - ECA Application Requirement

Good afternoon Emily,

I would like to confirm that an ECA will be required for the contemplated development at 811 Gladstone Avenue.

The proposed development would be discharging into the 375mm combined sewer within Rochester Street. The design will be controlling to the 2-year storm event with a time of concentration of 20 minutes and a runoff coefficient of 0.4.

There is no exemption for this project as per O.Reg. 525/98 as the development would be discharging to a combined sewer.

Please let me know if there is any additional information that you require.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

Genavieve Melatti

From: Genavieve Melatti
Sent: Tuesday, November 13, 2018 12:17 PM
To: Genavieve Melatti
Subject: FW: 811 Gladstone Avenue - Combined Sewer Servicing and Criteria

From: Mottalib, Abdul [mailto:Abdul.Mottalib@ottawa.ca]
Sent: Tuesday, November 13, 2018 11:52 AM
To: Steve Merrick <SMerrick@dsel.ca>
Cc: Wu, John <John.Wu@ottawa.ca>; Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 811 Gladstone Avenue - Combined Sewer Servicing and Criteria

Hi Steve,

I am the project manager for this site. Please see SWM criteria below for connecting into a combined sewer. For option, two please call me to discuss.

Stormwater Management criteria connecting into the combined sewer system (Quantity control criteria)

- Total (storm +sanitary) allowable release rate will be 2 year pre-development rate.
- C Coefficient of runoff will need to be determined **as per existing conditions** but in no case more than 0.4
- TC =20 minutes or can be calculated ,
- TC should not be less than 10 minute, since the IDF curves become unrealistic less than 10min.
- Any storm events greater than 2 year, up to 100 year, and including 100-year storm event must be detained on site.
- Two separate service laterals (one for sanitary and the other for storm) will be required for a single unit

--

Thanks,

Abdul Mottalib, P. Eng.

From: Wu, John
Sent: November 08, 2018 10:50 AM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: FW: 811 Gladstone Avenue - Combined Sewer Servicing and Criteria

Abdul:
I am not the person who is doing the pre-consultation for this.

John

From: Steve Merrick <SMerrick@dsel.ca>
Sent: Tuesday, November 06, 2018 3:38 PM
To: Wu, John <John.Wu@ottawa.ca>
Cc: Genavieve Melatti <GMelatti@dsel.ca>
Subject: 811 Gladstone Avenue - Combined Sewer Servicing and Criteria

Hi John,

I understand that you were the contact for the above noted site during the pre-consultation. We would like to confirm a few servicing items with you, if you are no longer the contact please forward on the request to the appropriate contact. We are contemplating connecting to the existing 375mm diameter combined sewer on Rochester Street as well as the possibility of connecting to the existing 375mm combined sewer on Balsam Street shown in Option #2 attached. We would like to confirm the combined release rate will be equal to the existing sanitary flow + 2-year storm event at a maximum runoff coefficient of 0.40 and a TC equal to 20 minutes for both potential connection points. Can you also confirm the proposed sanitary flow should be included in the target release rate.

As for the 2 options, we would like to confirm if the City of Ottawa would allow direct connections to be made to the Balsam combined and watermain from the back 2 back townhomes as shown. The benefit of this layout would be to allow us to retain existing trees along Balsam, we would like to pursue this option and want the City's input on the proposal.

Look forward to hearing back from you on the release rates and your thoughts on the 2 servicing options attached.

Thanks in advance,

Steve Merrick, P.Eng.
Project Manager / Intermediate Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 561
cell: (613) 222-7816
email: smerrick@DSEL.ca

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'

Genavieve Melatti

From: Genavieve Melatti
Sent: Friday, February 22, 2019 1:42 PM
To: Genavieve Melatti
Subject: FW: Internal Circulation DR5 - 811 Gladstone Avenue - Site Plan Control Proposal - D07-12-18-0181

From: Wessel, Shawn [mailto:shawn.wessel@ottawa.ca]
Sent: Monday, January 28, 2019 1:47 PM
To: Steve Merrick <SMerrick@dsel.ca>
Subject: FW: Internal Circulation DR5 - 811 Gladstone Avenue - Site Plan Control Proposal - D07-12-18-0181

Good afternoon Mr. Merrick.

Further to the first round of engineering related comments that I have submitted to the file lead, please see comments below from our Water Resources Dept. as a result of our internal circulations.

Please combine these comments below to the ones I have proviede (once receieved) and make the necessary revisions to the plans and/or reports.

If there are any other comments from ROW or Water, I will send them along as well.

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

Thank you

Regards,

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

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017
Int. Mail Code | Code de Courrier Interne 01-14
shawn.wessel@ottawa.ca

From: Tousignant, Eric
Sent: Monday, January 28, 2019 1:19 PM
To: Wessel, Shawn <shawn.wessel@ottawa.ca>
Subject: RE: Internal Circulation DR5 - 811 Gladstone Avenue - Site Plan Control Proposal - D07-12-18-0181

Hi Shawn

I reviewed the SWM report and I have no problems with the approach and the proposed release rates. The only issue I have is with the volume computation for the underground storage. They are assuming a constant release rate of 15 L/s, which is incorrect. Assuming a constant release rate is fine for surface storage when the head fluctuation is small (typically 1.5 m to 1.2 m), therefore the change in release rate is negligible. In their case, the head fluctuates from over 2.0 m to 0 m, therefore they need to assume an average release rate. Often, if consultants do not model the underground storage, they will use half the max release rate as the average.

Now, to help their cause they can increase the allowable release rate to the 5 year event since the Preston combined system North of Carling has a 5 year level of service.

Regards
Eric

Eric Tousignant, P.Eng.
Senior Water Resources Engineer
Infrastructure Services
613-580-2424 ext 25129

'

'

Genavieve Melatti

From: Genavieve Melatti
Sent: Friday, February 22, 2019 1:44 PM
To: Genavieve Melatti
Subject: FW: 811 Gladstone
Attachments: 2018-12-12 - Servicing and SWM Report - D07-12-18-0181.pdf; 2018-12-12 - Site Servicing Plan - D07-12-18-0181.pdf; 2018-12-12 - Grading Plan - D07-12-18-0181.pdf; 2018-12-12 - SWM Plan - D07-12-18-0181.pdf; 2018-12-12 - Existing Conditions Plan - D07-12-18-0181.pdf; FW: Internal Circulation DR5 - 811 Gladstone Avenue - Site Plan Control Proposal - D07-12-18-0181

From: Wessel, Shawn [mailto:shawn.wessel@ottawa.ca]
Sent: Thursday, February 14, 2019 3:38 PM
To: Steve Merrick <SMerrick@dsel.ca>
Subject: FW: 811 Gladstone

Good afternoon Mr. Merrick.

I have confirmed with Eric Tousignant that the 100 + 20% stress test only applies to site plans that acts like a small subdivision, or when it appears that the freeboard within the ROW may be an issue.

We do not have the above mentioned concerns with this site.

Please disregard this comment.

Out of Office Alert:
Please be advised that I will be out of the office Thursday, Februrary 21 to Monday, March 4th, 2019.

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

Thank you

Regards,

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

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
Planning, Infrastructure and Economic Development Department | Direction générale de la planification de l'infrastructure et du développement économique
City of Ottawa | Ville d'Ottawa
110 Laurier Ave. W. | 110, avenue Laurier Ouest, Ottawa ON K1P 1J1
(613) 580 2424 Ext. | Poste 33017

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

From: Wessel, Shawn
Sent: Thursday, February 14, 2019 2:48 PM
To: Tousignant, Eric <Eric.Tousignant@ottawa.ca>
Subject: 811 Gladstone

Good afternoon Eric,

May I request that you confirm whether or not, for this site, should I be requiring this from the consultant for this particular site?:

The water level in the major system must not touch any part of the building envelope and must remain below the lowest building opening that is in proximity of the overland flow route or ponding area, during the stress-test event (100 year + 20%). Provide discussion in the report and include plan/figure. Adjust design if necessary. Revise

DSEL has raised concerns about our requirement to requiring modeling and stress test for this site based on their design and application.

By the way, this is a standard comment that I apply to SPC applications and particularly large sites.

Your help would be appreciated.

Out of Office Alert:
Please be advised that I will be out of the office Thursday, Februrary 21 to Monday, March 4th, 2019.

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

Thank you

Regards,

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

Development Review Central Branch | Direction de l'examen des projets d'aménagement, Centrale
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(613) 580 2424 Ext. | Poste 33017

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

Please consider the environment before printing this email

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Goodkey, Weedmark & Associates Limited

Consulting Engineers

1688 Woodward Dr.
Ottawa, ON
Canada
K2C 3R8

Tel. 613-727-5111
Fax 613-727-5115
info@gwal.com

Principals & Associates
A. Bogdanowicz, P.Eng.
M.G. Carriere, C.E.T.
R.J. McIntyre, P.Eng.
F.W.A. Bann, P.Eng.
R. Lefebvre, P.Eng.
D.R. Vyas, P.Eng., MIEEE
S. Hamilton, P.Eng.
J. Moffat, P.Eng.
E. Pérusse, P.Eng., ing.
R. Boivin, P.Eng., ing.
R. Leonard, P.Eng.
M. Sarasin, P.Eng.

February 26, 2019

VIA E-MAIL

City of Ottawa
Planning Department
111 Sussex Drive
Rideau Pavillion
Ottawa, Ontario
K1N 5A1

ATTENTION: PLAN EXAMINER

SUBJECT: 811 GLADSTONE AVE., OTTAWA, ON - ROCHESTER HEIGHTS REDEVELOPMENT PHASE 1 - OTTAWA COMMUNITY HOUSING CORPORATION - MERX RFQ #OCHAM2018-811G ADDITIONAL FEES NO. 1 OUR PROJECT NO. 2018-330

Dear Plan Examiner:

With regards to the proposed building in he above mentioned address. It's our opinion that the roof storage capacity proposed by the civil consultant (DSEL) can be achieved and that the piping used in design will be pressurized piping, and that the roof parapet will have scupper.

Should you have questions, please feel free to contact us.

Yours very truly,

GOODKEY, WEEDMARK & ASSOCIATES LIMITED

Mohamed Elgezary, P.Eng., Ph.D.
ME/jvo

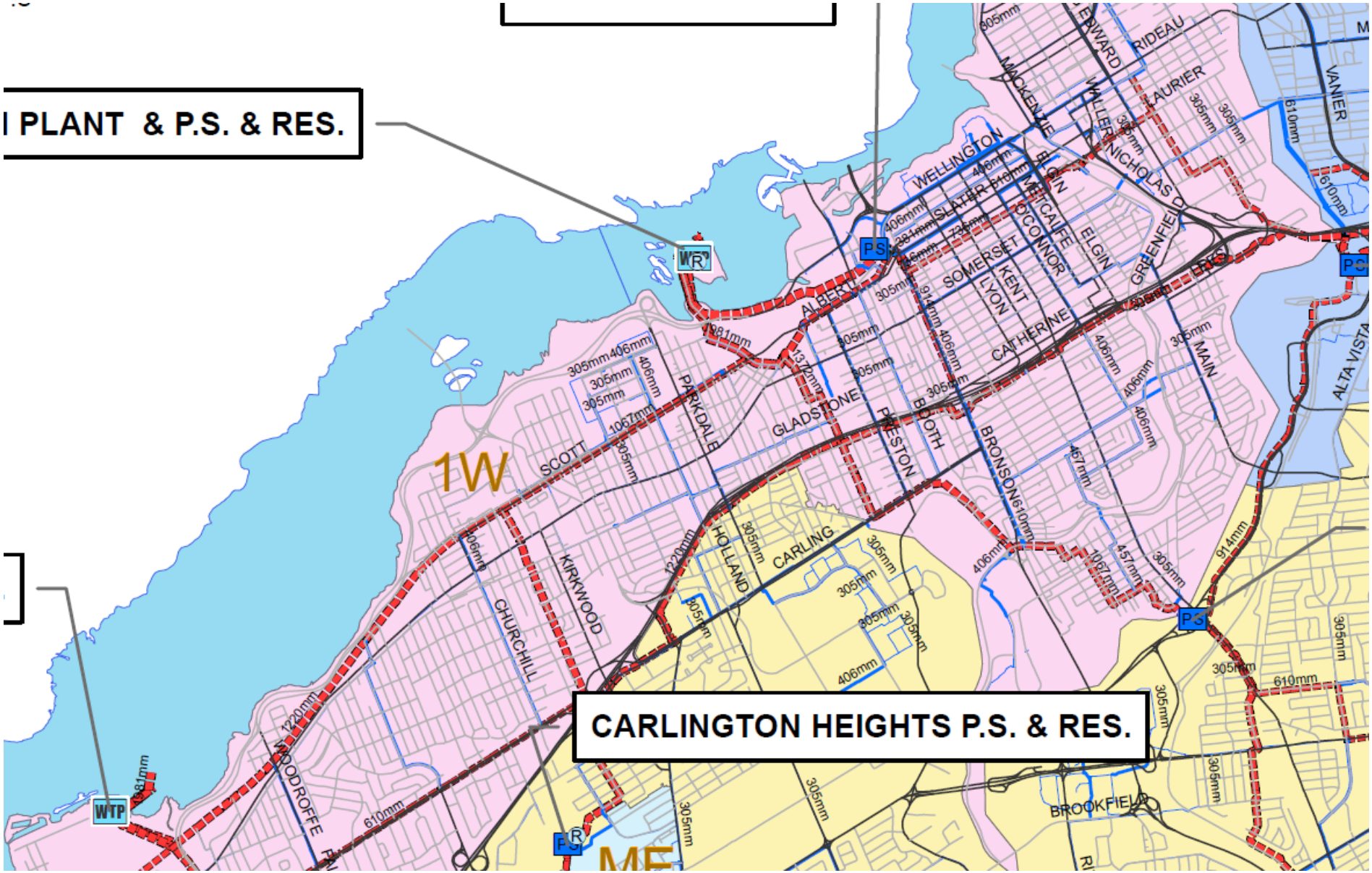
LICENSED PROFESSIONAL ENGINEER
Feb 26th
M. A. S. ELGEZARY
100512603
2019
PROVINCE OF ONTARIO

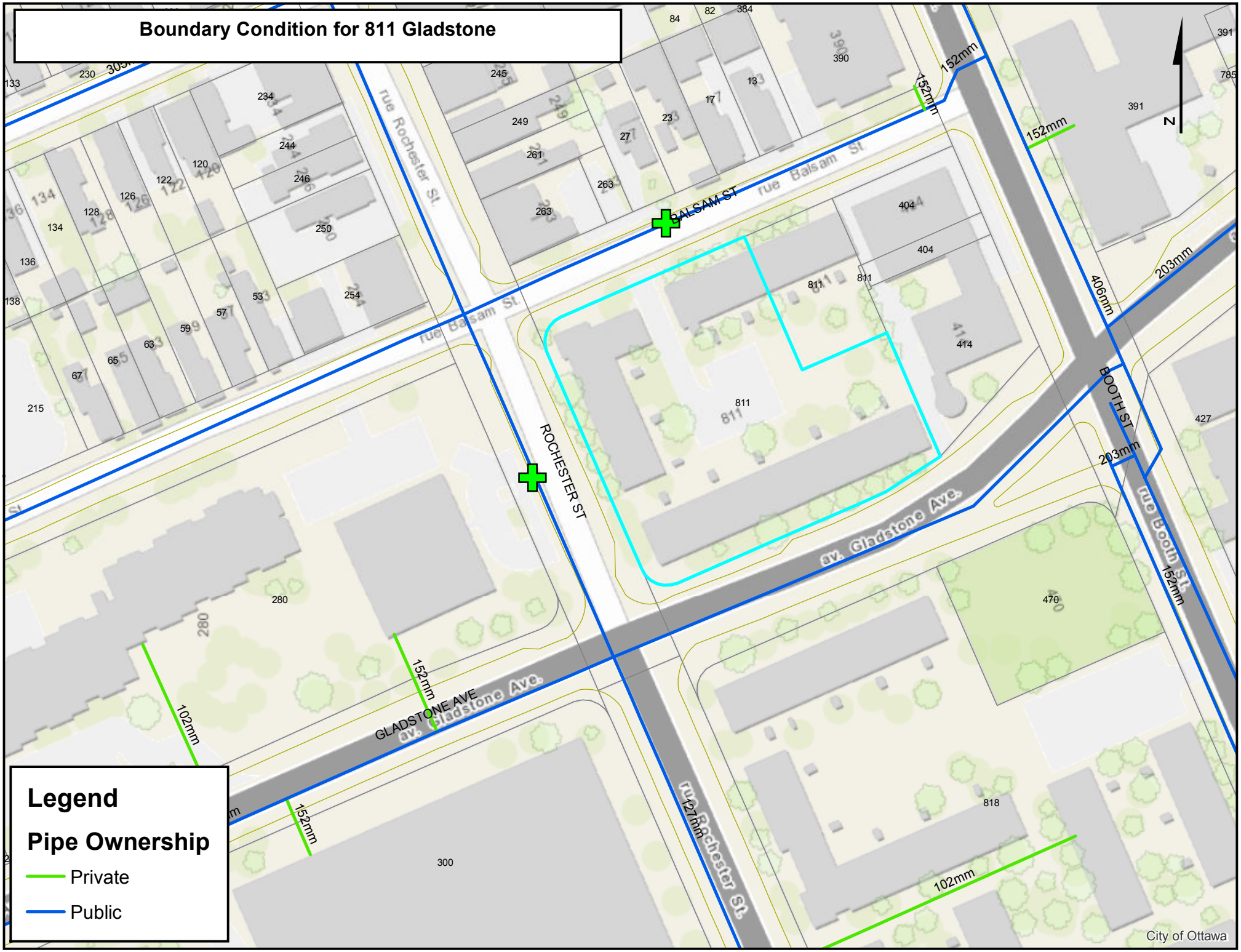
Goodkey Weedmark 60 years 1956 – 2016

APPENDIX B

Water Supply

Pressure Zone Map




Boundary Condition for 811 Gladstone
BALSAM ST
rue Balsam St
ROCHESTER ST
rue Rochester St.
av. Gladstone Ave.
GLADSTONE AVE
BOOTH ST
rue Booth St
811
404
414
280
300
470
818
427
391
152mm
203mm
406mm
102mm
127mm
N
Legend
Pipe Ownership
Private
Public
City of Ottawa

Genavieve Melatti

From: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Sent: Monday, November 19, 2018 3:58 PM
To: Genavieve Melatti
Cc: Mottalib, Abdul
Subject: FW: 811 Gladstone - Boundary Condition Request
Attachments: 811 Gladstone Nov 2018.pdf

Please see below as requested.

--

Thanks,

Abdul Mottalib, P. Eng.

From: ……..
Sent: November 19, 2018 2:17 PM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 811 Gladstone - Boundary Condition Request

The following are boundary conditions, HGL, for hydraulic analysis at 811 Gladstone (zone 1W) assumed to be connected to the 203mm on Balsam and 203mm on Rochester (see attached PDF for location).

Minimum HGL = 107.4m, same at both connections

Maximum HGL = 115.0m, same at both connections

MaxDay + FireFlow (283 L/s) = 101.0m, same at both connections

HGL has been provided for the higher fire flow since that would govern the design.

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.

From: Genavieve Melatti <GMelatti@dsel.ca>
Sent: November 16, 2018 3:37 PM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: RE: 811 Gladstone - Boundary Condition Request

Hey Abdul,

In follow up to our phone conversation, to clarify the last line of the boundary condition request, we would like to amend the statement to the below:

- We are looking for the boundary conditions at the two proposed connection points shown.

Please disregard the mention of the existing hydrants.

Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

From: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Sent: Friday, November 16, 2018 2:42 PM
To: Genavieve Melatti <GMelatti@dsel.ca>
Cc: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Subject: RE: 811 Gladstone - Boundary Condition Request

Hi Genavieve,

I lefty a message for you on your voice mailbox. Please can you call me to discuss?

--

Thanks,

Abdul Mottalib, P. Eng.

From: Genavieve Melatti <GMelatti@dsel.ca>
Sent: November 13, 2018 1:50 PM
To: Mottalib, Abdul <Abdul.Mottalib@ottawa.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: 811 Gladstone - Boundary Condition Request

Good afternoon Abdul,

Would we be able to request boundary conditions for the proposed redevelopment of the existing building at 811 Gladstone Avenue using the following proposed development demands:

1. Location of Service / Street Number: 811 Gladstone Avenue

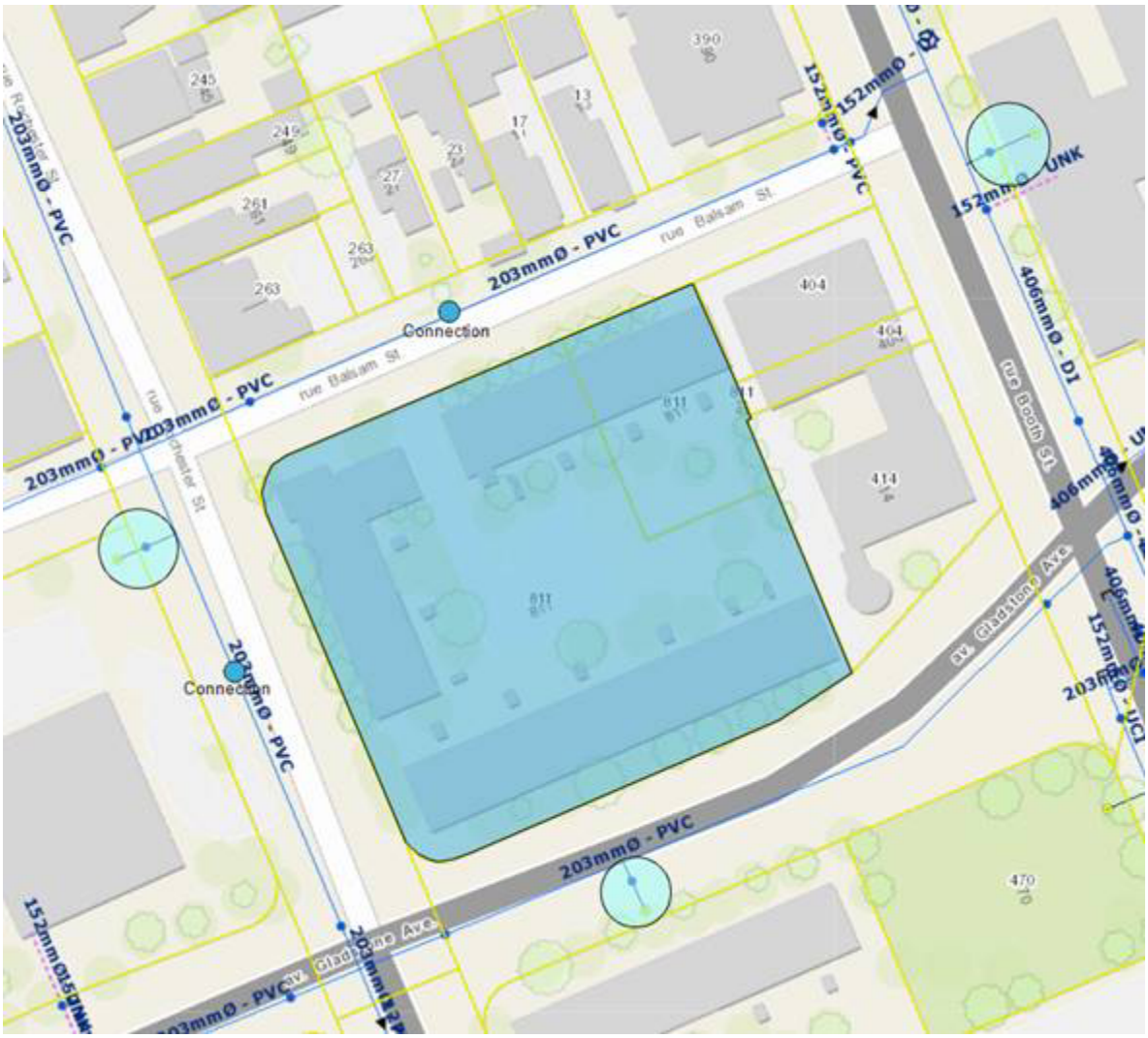
2. Type of development and the fire flow required for the proposed development:

- The proposed development is residential, consisting of 32 stacked townhome units as well as a 6-storey residential building consisting of 15 bachelor apartments, 58 1-bedroom apartments, 38 2-bedroom apartments and 28 3 or 4-bedroom apartments.
- We are proposing a looped connection with one connection to the existing 203mm diameter watermain within Balsam Street and the other to the existing 203mm diameter watermain within Rochester Street.
- The maximum fire flow demand for the proposed development is 17,000L/min for the townhomes that are contemplated along Balsam Street and 14,000L/min for the proposed residential apartment building along Gladstone Avenue. The calculations and parameters used in these calculations are in the attached FUS calculation sheet.
- We are looking for the boundary conditions at the two proposed connection points shown below, as well as the boundary conditions for the existing hydrants shown below.

3.

	L/min	L/s
Avg. Daily	53.7	0.89
Max Day	193.2	3.22
Peak Hour	289.8	4.83

It you have any questions please feel free to contact me.



Thank you,

Genavieve Melatti
Project Coordinator/ Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
email: gmelatti@DSEL.ca

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This e-mail originates from the City of Ottawa e-mail system. Any distribution, use or copying of this e-mail or the information it contains by other than the intended recipient(s) is unauthorized. Thank you.

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811 Gladstone Avenue
Existing Site Conditions
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	25	68
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

Type of Housing	Per/Bed	Beds	Pop
Boarding*	1		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	68	19.0	13.2	93.3	64.8	140.9	97.8

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Restaurant	125.0	L/seat/d		0.00	0.0	0.0	0.0	0.0	0.0
Commercial floor space**	28,000.0	L/ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Laundry	1,200.0	L/machine/d		0.00	0.0	0.0	0.0	0.0	0.0
School	70	L/student/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
			Total I/CI Demand	0.0	0.0	0.0	0.0	0.0	0.0
			Total Demand	**19.0**	**13.2**	**93.3**	**64.8**	**140.9**	**97.8**

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines
**Assuming a 12 hour commercial operation

811 Gladstone Avenue
Proposed Site Conditions
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	32	87
Apartment			0
Bachelor	1.4	15	21
1 Bedroom	1.4	59	83
2 Bedroom	2.1	22	47
3 Bedroom	3.1	12	38
Average	1.8		0

Type of Housing	Per/Bed	Beds	Pop
Boarding*	1		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	276	77.3	53.7	278.2	193.2	417.3	289.8

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Restaurant	125.0	L/seat/d		0.00	0.0	0.0	0.0	0.0	0.0
Commercial floor space**	28,000.0	L/ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Laundry	1,200.0	L/machine/d		0.00	0.0	0.0	0.0	0.0	0.0
School	70	L/student/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
			Total I/CI Demand	0.0	0.0	0.0	0.0	0.0	0.0
			Total Demand	**77.3**	**53.7**	**278.2**	**193.2**	**417.3**	**289.8**

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines
**Assuming a 12 hour commercial operation

Genavieve Melatti

From: Genavieve Melatti
Sent: Friday, February 22, 2019 12:00 PM
To: Genavieve Melatti
Subject: FW: 811 Gladstone: Civil Drawings

From: Mohamed Elgezary [mailto:melgezary@gwal.com]
Sent: Wednesday, February 20, 2019 1:01 PM
To: Steve Merrick <SMerrick@dsel.ca>; Gord Lorimer <glorimer@hobinarc.com>
Cc: Frank Bann <fbann@gwal.com>; Leila Emmrys <lemmrys@hobinarc.com>
Subject: RE: 811 Gladstone: Civil Drawings

From: Steve Merrick [mailto:SMerrick@dsel.ca]
Sent: Wednesday, February 20, 2019 12:25 PM
To: Gord Lorimer
Cc: Frank Bann; Leila Emmrys; Martha Lush; Robert MacNeil; Mohamed Elgezary
Subject: RE: 811 Gladstone: Civil Drawings

Thanks Gord,

Speaking with Leila, I understand we will be proceeding with a single cold water, hot water and sanitary feed to both townhouse blocks. Can GWAL confirm a few items today/tomorrow for us to complete our design:

1) Size of hot water feed and cold water feed to the townhouse.
   2" common hot and cold- then divided to 1-1/2" hot and cold for each cluster of townhomes
2) Size of the sanitary service to the townhomes
   6" common - then divided to 4" for each cluster of townhomes (1% slope)
3) Pressure drop within the building due to valves, water metres, etc. Frank had originally estimated 10-15 PSI pressure drop
   10psi
4) GWAL to prepare a letter to respond to comment #104, see attached correspondence
   What letter?
   I need to see civil drawings and understand how these service will be running (buried, culvert, crawl space,…etc)
   Moving forward I need to know the circulation personnel, and who shall be involved and who's not.

Thanks,

Steve Merrick, P.Eng.
Project Manager / Intermediate Designer

DSEL
david schaeffer engineering ltd.

811 Gladstone Avenue
Proposed Site Conditions
Water Demand

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: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1378.7	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	12253.2	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**10200.0**	**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	10.1m-20m	30.5	2	61	14%	
S	Wood Frame	10.1m-20m	30.5	6	183	15%	
E	Wood Frame	3.1m-10m	13.6	3	41	18%	
W	Wood Frame	30.1m-45m	13.6	21	286	5%	
		% Increase				**52%**	*value not to exceed 75%*

Increase	**5304.0**	**L/min**

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

Total Fire Flow

Fire Flow	15504.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section*
	16000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _Hobin Architecture_.
-Calculations based on Fire Underwriters Survey - Part II

811 Gladstone Avenue
Proposed Site Conditions
Water Demand

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: Wood Frame

C	1.5		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1378.7	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	12253.2	L/min	
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%
Fire Flow	**10200.0 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	10.1m-20m	30.5	2	61	14%
S	Wood Frame	10.1m-20m	30.5	6	183	15%
E	Wood Frame	3.1m-10m	13.6	2.5	34	18%
W	Wood Frame	3.1m-10m	13.6	3	41	18%
		% Increase				**65%** *value not to exceed 75%*

Increase	**6630.0 L/min**

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

Total Fire Flow

Fire Flow	16830.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	17000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _Hobin Architecture_.
-Calculations based on Fire Underwriters Survey - Part II

811 Gladstone Avenue
Proposed Site Conditions
Water Demand

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

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

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	8903.1	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	16606.7	L/min	
	17000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**14450.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%	
Reduction	**-7225**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Non-Combustible	10.1m-20m	66.5	3	200	15%	
S	Non-Combustible	20.1m-30m	66.5	2	133	10%	
E	Non-Combustible	3.1m-10m	27	2.5	68	19%	
W	Non-Combustible	30.1m-45m	27	21	567	5%	
		% Increase				**49%**	*value not to exceed 75%*

Increase	**7080.5**	**L/min**

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

Total Fire Flow

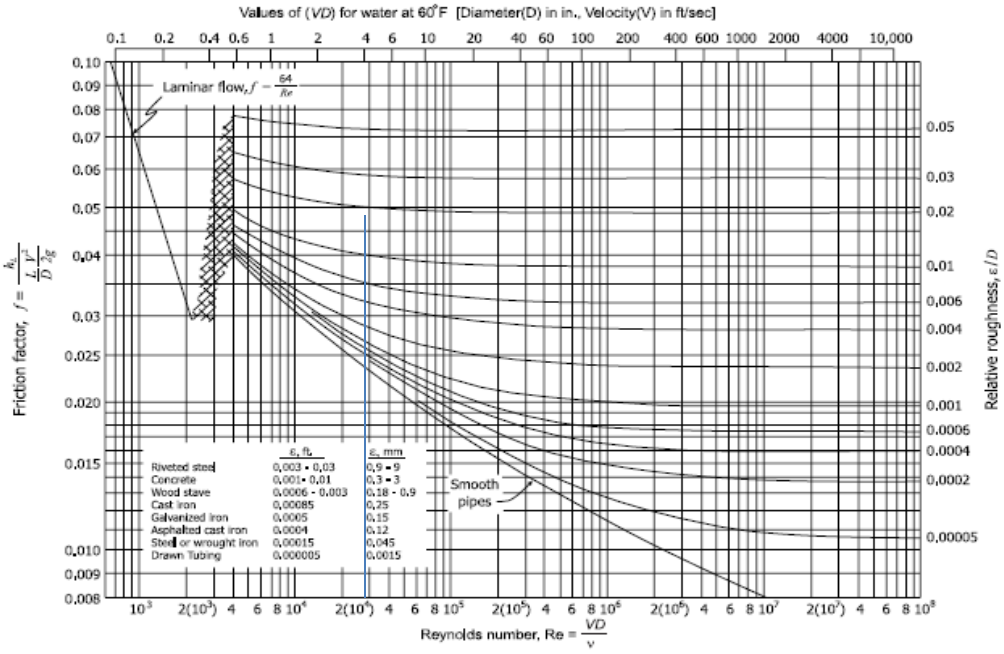
Fire Flow	14305.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section*
	14000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by _Hobin Architecture_.
-Calculations based on Fire Underwriters Survey - Part II

811 Gladstone Avenue
Proposed Site Conditions
Headloss Calculation

Estimated Head Loss per Darcy-Weisbach

Service Size	150	mm
Service Length	59.6	m
Peak Demand	4.83	L/s
Relative Roughness	0.001	
Kinematic Viscosity @ 4^{O}C, v	0.00000151	m^2/s
Velocity, V	0.27	m/s
Re	27,151	

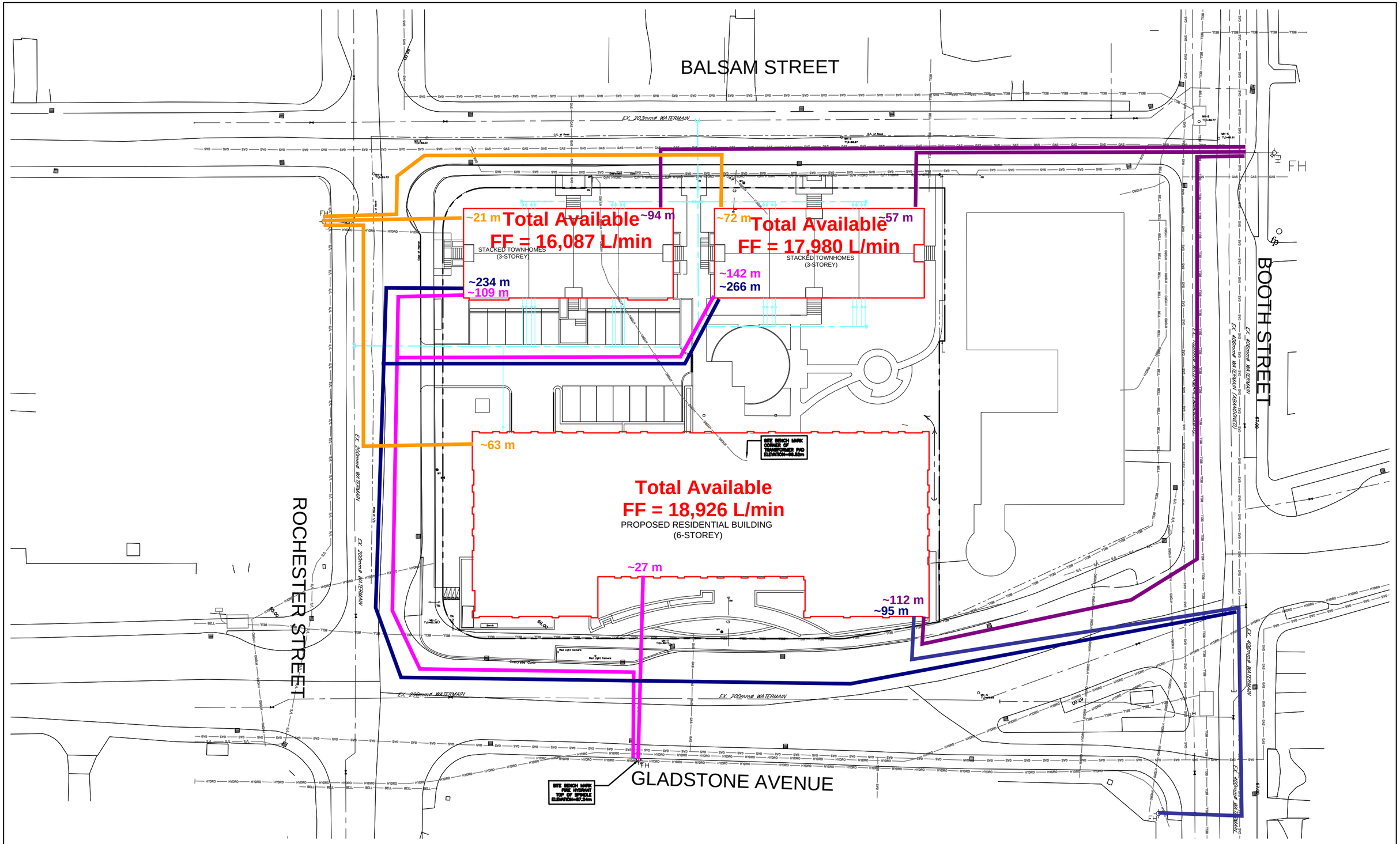


Friction Factor, f 0.028 (From Moody Diagram)

Head Loss

$$h_f = \frac{fL}{D}\frac{V^2}{2g}$$

h_f	0.04	m H_2O
h_f	0.4	kPa



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EXISTING HYDRANT LOCATION FIGURE

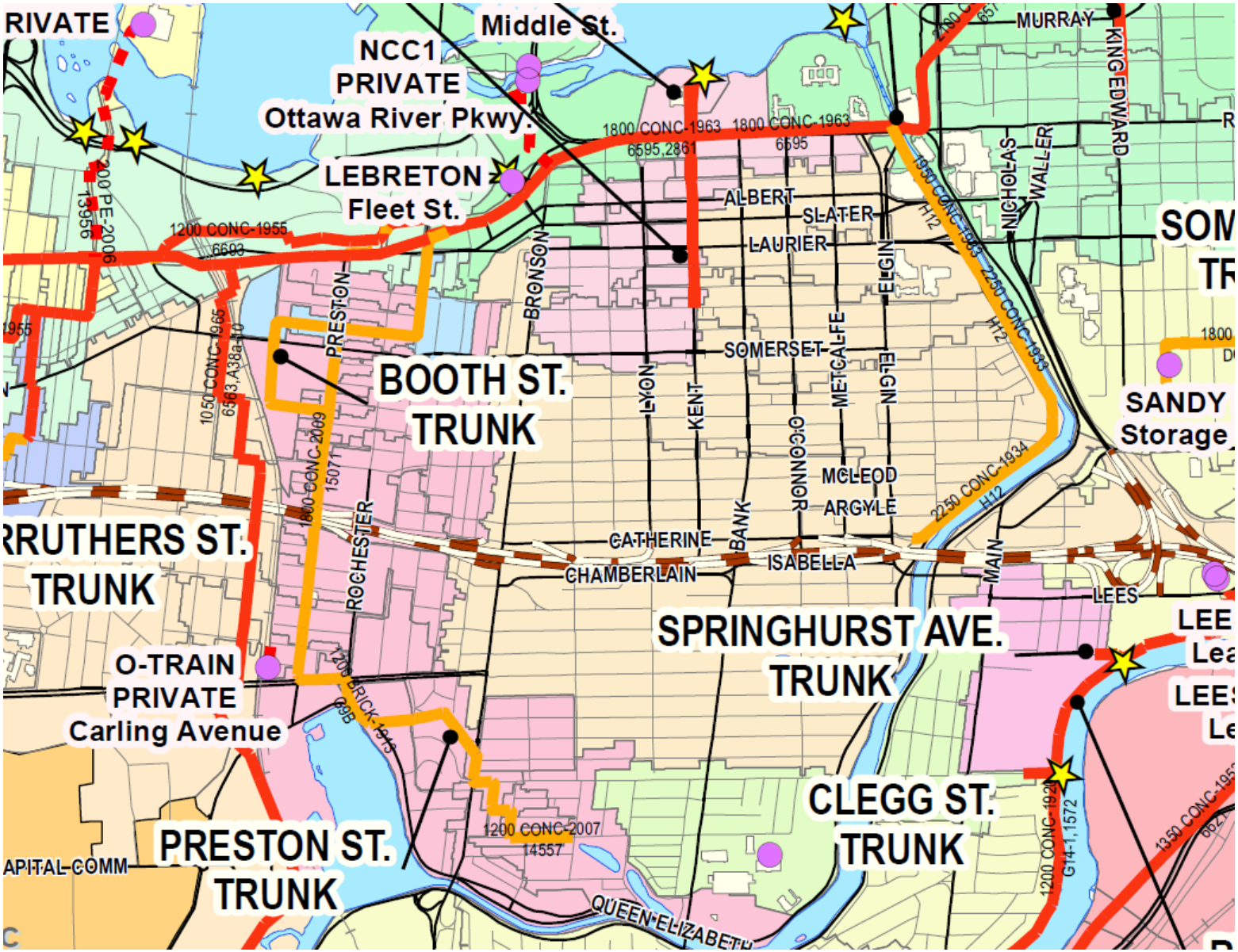
PROJ NO.:	17-963
DRAWN BY:	GGM
DATE:	2019-02-19
SCALE:	1:500
FIGURE NO.:	FIG-1

z:\projects\17-963_och_811 gladstone\b_design\b2_drawings\b2-2_main (dsel)\03_spa-subm2\2019-02-15_963_prelim_ggg.dwg

APPENDIX C

Wastewater Collection

Trunk Sanitary Sewers and Collection Areas Map



811 Gladstone Avenue
Existing Conditions

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

Site Area 0.472 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.16**	**L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4	1	4
Semi-detached and duplex	2.7		0
Duplex	2.3		0
Townhouse	2.7	25	68
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	**72**	
Average Domestic Flow	**0.23**	**L/s**
Peaking Factor	**3.62**	
Peak Domestic Flow	**0.85**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	28,000	L/ha/d		0.00
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

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

** assuming a 12 hour commercial operation*

*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**0.23**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**0.85**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.00**	**L/s**

811 Gladstone Avenue
Proposed Development

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

Site Area 0.472 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**0.16**	**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	32	87
			0
Apartment			
Bachelor	1.4	15	21
1 Bedroom	1.4	59	83
2 Bedroom	2.1	22	47
3 Bedroom	3.1	12	38
Average	1.8		0

Total Pop	**276**	
Average Domestic Flow	**0.89**	**L/s**
Peaking Factor	**3.47**	
Peak Domestic Flow	**3.11**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Dining room	125 L/seat/d		0.00
Commercial floor space	28,000.0 L/ha/d		0.00
Water Closets**	150 L/hr		0.00
Laundry Facility	1,200 L/unit/d		0.00

Average I/C/I Flow	**0.00**
Peak Institutional / Commercial Flow	0.00
Peak I/C/I Flow	**0.00**

Total Estimated Average Dry Weather Flow Rate	**0.89**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**3.11**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**3.26**	**L/s**

** Water closets demand of 150 L/hour from Appendix 4-A of the Sewer design guidelines, assuming a 12 hour operation

APPENDIX D

Stormwater Management

811 Gladstone Avenue
Existing Conditions

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

Existing Drainage Charateristics From Internal Site

Area	0.472	ha
C	0.68	Rational Method runoff coefficient
L	64.41	m
Up Elev	66.66	m
Dn Elev	65.38	m
Slope	2.0	%
Tc	10.00	min

1) Time of Concentration per Federal Aviation Administration

$$t_c = \frac{1.8(1.1-C)L^{0.5}}{S^{0.333}}$$ 4.11

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

Estimated Peak Flow

	2-year	5-year	100-year	
i	76.8	104.2	178.6	mm/hr
Q	68.5	92.89	198.99	L/s

811 Gladstone Avenue
Proposed Development
Roof Control Underground Storage

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

Target Flow Rate

Area	0.472	ha	
C	0.40	Rational Method runoff coefficient	
t_c	10.0	min	
	5-year		
i	104.2	mm/hr	
Q	54.6	L/s	
Ex. Sanitary Flow	0.85	L/s	*Based on an assumption of 26 existing units, dry weather release.
Total Combined Allowable Release	**55.5**	**L/s**	**<---- 5-Year Release (54.6 L/s) + Ex. Sanitary Flow (0.85 L/s)**
Proposed Sanitary	3.11	L/s	*Based on an assumption of 171 proposed units.
Total Allowable Stormwater Release	**52.4**	**L/s**	**<---- Total Combined Release (55.5 L/s) - Proposed Sanitary Flow (3.11 L/s)**

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.09	ha	
C	0.55	Rational Method runoff coefficient	

	2-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	76.8	10.4	10.4	0.0	0.0	178.6	30.1	30.1	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 Roof Storage Apartment Building

Building ID	BLDG3		
Roof Area	0.160	ha	
Avail Storage Area	0.152		
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	66	
Building Width	22	
Number of Drains	11	
m^2 / Drain	138.2	max 232.25m^2/notch as recommended by Zurn for Ottawa

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

d (m)	A (m^2)	V_{acc} (m^3)	V_{avail} (m^3)	Q_{notch} (L/s)	Q_{roof} (L/s)	$V_{drawdown}$ (hr)
0.000	0	0.0	0.0	0.00	0.00	0.00
0.025	95.0	0.8	0.8	0.38	4.18	0.05
0.050	380.0	5.5	6.3	0.77	8.47	0.23
0.075	855.0	15.0	21.4	1.14	12.54	0.57
0.100	1520.0	29.3	50.7	1.52	16.72	1.05
0.125	1520.0	38.0	88.7	1.90	20.90	1.56
0.150	1520.0	38.0	126.7	2.28	25.08	1.98

* Assumes one notch opening per drain, assumes maximum slope of 10cm

	2-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10	76.8	30.7	10.2	20.5	12.3	178.6	79.4	15.9	63.5	38.1
20	52.0	20.8	10.2	10.6	12.7	120.0	53.3	15.9	37.4	44.9
30	40.0	16.0	10.2	5.8	10.5	91.9	40.8	15.9	24.9	44.9
40	32.9	13.1	10.2	2.9	7.1	75.1	33.4	15.9	17.5	42.0
50	28.0	11.2	10.2	1.0	3.0	64.0	28.4	15.9	12.5	37.6
60	24.6	9.8	9.8	0.0	0.0	55.9	24.8	15.9	8.9	32.2
70	21.9	8.8	8.8	0.0	0.0	49.8	22.1	15.9	6.2	26.2
80	19.8	7.9	7.9	0.0	0.0	45.0	20.0	15.9	4.1	19.7
90	18.1	7.3	7.3	0.0	0.0	41.1	18.3	15.9	2.4	12.8
100	16.7	6.7	6.7	0.0	0.0	37.9	16.8	15.9	1.0	5.7
110	15.6	6.2	6.2	0.0	0.0	35.2	15.6	15.6	0.0	0.0
120	14.6	5.8	5.8	0.0	0.0	32.9	14.6	14.6	0.0	0.0
130	13.7	5.5	5.5	0.0	0.0	30.9	13.7	13.7	0.0	0.0
140	12.9	5.2	5.2	0.0	0.0	29.2	13.0	13.0	0.0	0.0
150	12.3	4.9	4.9	0.0	0.0	27.6	12.3	12.3	0.0	0.0
160	11.7	4.7	4.7	0.0	0.0	26.2	11.7	11.7	0.0	0.0
170	11.1	4.4	4.4	0.0	0.0	25.0	11.1	11.1	0.0	0.0
180	10.6	4.3	4.3	0.0	0.0	23.9	10.6	10.6	0.0	0.0
190	10.2	4.1	4.1	0.0	0.0	22.9	10.2	10.2	0.0	0.0
200	9.8	3.9	3.9	0.0	0.0	22.0	9.8	9.8	0.0	0.0

2-year Q_{roof}	**10.20 L/s**	**100-year Q_{roof}**	**15.90 L/s**
2-year Max. Storage Required	**12.7 m^3**	**100-year Max. Storage Required**	**44.9 m^3**
2-year Storage Depth	**0.061 m**	**100-year Storage Depth**	**0.095 m**
2-year Estimated Drawdown Time	**0.38 hr**	**100-year Estimated Drawdown Time**	**0.96 hr**

811 Gladstone Avenue
Proposed Development
Roof Control Underground Storage

Estimated Roof Storage Townhomes 1

Building ID	TH1	
Roof Area	0.040	ha
Avail Storage Area	0.038	
C	0.90	Rational Method runoff coefficient
t_c	10	min, tc at outlet without restriction

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

Estimated Number of Roof Drains

Building Length	30	
Building Width	13	
Number of Drains	3	
m^2 / Drain	126.7	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	23.8	0.2	0.2	0.38	1.14	0.05
0.050	95.0	1.4	1.6	0.77	2.31	0.21
0.075	213.8	3.8	5.3	1.14	3.42	0.52
0.100	380.0	7.3	12.7	1.52	4.56	0.97
0.125	380.0	9.5	22.2	1.90	5.70	1.43
0.150	380.0	9.5	31.7	2.28	6.84	1.82

* Assumes one notch opening per drain, assumes maximum slope of 10cm

	2-year					100-year				
t_c	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
10	76.8	7.7	2.8	4.9	3.0	178.6	19.8	4.3	15.6	9.3
15	61.8	6.2	2.8	3.4	3.1	142.9	15.9	4.3	11.6	10.4
20	52.0	5.2	2.8	2.5	2.9	120.0	13.3	4.3	9.0	10.9
25	45.2	4.5	2.8	1.8	2.6	103.8	11.5	4.3	7.3	10.9
30	40.0	4.0	2.8	1.3	2.3	91.9	10.2	4.3	5.9	10.7
35	36.1	3.6	2.8	0.9	1.8	82.6	9.2	4.3	4.9	10.3
40	32.9	3.3	2.8	0.5	1.3	75.1	8.3	4.3	4.1	9.8
45	30.2	3.0	2.8	0.3	0.7	69.1	7.7	4.3	3.4	9.2
50	28.0	2.8	2.8	0.1	0.2	64.0	7.1	4.3	2.8	8.5
55	26.2	2.6	2.6	0.0	0.0	59.6	6.6	4.3	2.3	7.7
60	24.6	2.5	2.5	0.0	0.0	55.9	6.2	4.3	1.9	7.0
65	23.2	2.3	2.3	0.0	0.0	52.6	5.8	4.3	1.6	6.1
70	21.9	2.2	2.2	0.0	0.0	49.8	5.5	4.3	1.3	5.3
75	20.8	2.1	2.1	0.0	0.0	47.3	5.3	4.3	1.0	4.4
80	19.8	2.0	2.0	0.0	0.0	45.0	5.0	4.3	0.7	3.5
85	18.9	1.9	1.9	0.0	0.0	43.0	4.8	4.3	0.5	2.5
90	18.1	1.8	1.8	0.0	0.0	41.1	4.6	4.3	0.3	1.6
95	17.4	1.7	1.7	0.0	0.0	39.4	4.4	4.3	0.1	0.6
100	16.7	1.7	1.7	0.0	0.0	37.9	4.2	4.2	0.0	0.0
105	16.1	1.6	1.6	0.0	0.0	36.5	4.1	4.1	0.0	0.0

2-year Q_{roof}	**2.75 L/s**	**100-year Q_{roof}**	**4.28 L/s**
2-year Max. Storage Required	**3.1 m^3**	**100-year Max. Storage Required**	**10.9 m^3**
2-year Storage Depth	**0.060 m**	**100-year Storage Depth**	**0.094 m**
2-year Estimated Drawdown Time	**0.34 hr**	**100-year Estimated Drawdown Time**	**0.86 hr**

811 Gladstone Avenue
Proposed Development
Roof Control Underground Storage

Estimated Roof Storage Townhomes 2

Building ID	TH2	
Roof Area	0.040	ha
Avail Storage Area	0.038	
C	0.90	Rational Method runoff coefficient
t_c	10	min, tc at outlet without restriction

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

Estimated Number of Roof Drains

Building Length	30	
Building Width	13	
Number of Drains	3	
m^2 / Drain	126.7	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	23.8	0.2	0.2	0.38	1.14	0.05
0.050	95.0	1.4	1.6	0.77	2.31	0.21
0.075	213.8	3.8	5.3	1.14	3.42	0.52
0.100	380.0	7.3	12.7	1.52	4.56	0.97
0.125	380.0	9.5	22.2	1.90	5.70	1.43
0.150	380.0	9.5	31.7	2.28	6.84	1.82

* Assumes one notch opening per drain, assumes maximum slope of 10cm

	2-year					100-year				
t_c	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}	i	Q_{actual}	$Q_{release}$	Q_{stored}	V_{stored}
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
10	76.8	7.7	2.8	4.9	3.0	178.6	19.8	4.3	15.6	9.3
15	61.8	6.2	2.8	3.4	3.1	142.9	15.9	4.3	11.6	10.4
20	52.0	5.2	2.8	2.5	2.9	120.0	13.3	4.3	9.0	10.9
25	45.2	4.5	2.8	1.8	2.6	103.8	11.5	4.3	7.3	10.9
30	40.0	4.0	2.8	1.3	2.3	91.9	10.2	4.3	5.9	10.7
35	36.1	3.6	2.8	0.9	1.8	82.6	9.2	4.3	4.9	10.3
40	32.9	3.3	2.8	0.5	1.3	75.1	8.3	4.3	4.1	9.8
45	30.2	3.0	2.8	0.3	0.7	69.1	7.7	4.3	3.4	9.2
50	28.0	2.8	2.8	0.1	0.2	64.0	7.1	4.3	2.8	8.5
55	26.2	2.6	2.6	0.0	0.0	59.6	6.6	4.3	2.3	7.7
60	24.6	2.5	2.5	0.0	0.0	55.9	6.2	4.3	1.9	7.0
65	23.2	2.3	2.3	0.0	0.0	52.6	5.8	4.3	1.6	6.1
70	21.9	2.2	2.2	0.0	0.0	49.8	5.5	4.3	1.3	5.3
75	20.8	2.1	2.1	0.0	0.0	47.3	5.3	4.3	1.0	4.4
80	19.8	2.0	2.0	0.0	0.0	45.0	5.0	4.3	0.7	3.5
85	18.9	1.9	1.9	0.0	0.0	43.0	4.8	4.3	0.5	2.5
90	18.1	1.8	1.8	0.0	0.0	41.1	4.6	4.3	0.3	1.6
95	17.4	1.7	1.7	0.0	0.0	39.4	4.4	4.3	0.1	0.6
100	16.7	1.7	1.7	0.0	0.0	37.9	4.2	4.2	0.0	0.0
105	16.1	1.6	1.6	0.0	0.0	36.5	4.1	4.1	0.0	0.0

2-year Q_{roof}	**2.75 L/s**	**100-year Q_{roof}**	**4.28 L/s**
2-year Max. Storage Required	**3.1 m^3**	**100-year Max. Storage Required**	**10.9 m^3**
2-year Storage Depth	**0.060 m**	**100-year Storage Depth**	**0.094 m**
2-year Estimated Drawdown Time	**0.34 hr**	**100-year Estimated Drawdown Time**	**0.86 hr**

811 Gladstone Avenue
Proposed Development
Roof Control Underground Storage

Estimated Post Development to UG Storage

Area ID A1
Available Sub-surface Storage

Total Subsurface Storage (m^3) 83.1

Stage Attenuated Areas Storage Summary

	Surface Storage				Surface and Subsurface Storage			
	Stage	**Ponding**	**h_o**	**delta d**	**V***	**V_{acc} ****	**$Q_{release}$ †**	**$V_{drawdown}$**
	(m)	**(m^2)**	**(m)**	**(m)**	**(m^3)**	**(m^3)**	**(L/s)**	**(hr)**
	62.70							
UG Storage INV	64.16	-	1.46	1.46	0.0	0.0	16.4	0.00
UG Storage Spring Line	64.78	-	2.08	0.62	41.6	41.6	19.6	0.59
Top of UG Storage (Top of Stone)	65.39	-	2.69	0.61	41.6	83.1	22.3	1.04

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† $Q_{release}$ = Release rate per Manufacturer flow rate vs head graph Tempest LMF 60 flow curves

Orifice Location **STM101** **Dia** 80
Total Area 0.14 ha
C 0.64 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	2-year					100-year				
t_c (min)	**i (mm/hr)**	**Q_{actual}‡ (L/s)**	**$Q_{release}$ (L/s)**	**Q_{stored} (L/s)**	**V_{stored} (m^3)**	**i (mm/hr)**	**Q_{actual}‡ (L/s)**	**$Q_{release}$ (L/s)**	**Q_{stored} (L/s)**	**V_{stored} (m^3)**
10	76.8	35.2	12.6	22.7	13.6	178.6	81.2	21.8	59.4	35.6
15	61.8	31.4	12.6	18.8	17.0	142.9	69.9	21.8	48.0	43.2
20	52.0	28.9	12.6	16.4	19.6	120.0	62.6	21.8	40.7	48.9
25	45.2	27.2	12.6	14.6	21.9	103.8	57.5	21.8	35.6	53.4
30	40.0	25.9	12.6	13.3	24.0	91.9	53.6	21.8	31.8	57.3
35	36.1	24.9	12.6	12.3	25.8	82.6	50.7	21.8	28.9	60.6
40	32.9	23.7	12.6	11.1	26.7	75.1	48.3	21.8	26.5	63.6
45	30.2	22.0	12.6	9.4	25.4	69.1	46.4	21.8	24.6	66.3
50	28.0	20.6	12.6	8.0	24.0	64.0	44.8	21.8	22.9	68.8
55	26.2	19.4	12.6	6.9	22.6	59.6	43.4	21.8	21.6	71.1
60	24.6	18.2	12.6	5.6	20.2	55.9	42.2	21.8	20.4	73.3
65	23.2	17.0	12.6	4.5	17.4	52.6	40.9	21.8	19.1	74.5
70	21.9	16.0	12.6	3.5	14.5	49.8	39.0	21.8	17.2	72.1
75	20.8	15.1	12.6	2.6	11.6	47.3	37.3	21.8	15.5	69.6
80	19.8	14.4	12.6	1.8	8.7	45.0	35.8	21.8	14.0	67.1
85	18.9	13.7	12.6	1.1	5.7	43.0	34.5	21.8	12.6	64.5
90	18.1	13.1	12.6	0.5	2.7	41.1	33.3	21.8	11.4	61.8
95	17.4	12.5	12.5	0.0	0.0	39.4	32.2	21.8	10.4	59.1
100	16.7	12.0	12.0	0.0	0.0	37.9	31.2	21.8	9.4	56.3
105	16.1	11.5	11.5	0.0	0.0	36.5	30.2	21.8	8.4	52.7

‡ includes flow from drainage areas A1, BLDG1, TH1 and TH2. Drainage boundaries can be found in drawing ***SWM-1.***

2-year $Q_{attenuated}$	**12.56 L/s**	**100-Year Average Release Rate**	**21.84 L/s**
2-year Max. Storage Required	**26.7 m^3**	**100-year Max. Storage Required**	**74.5 m^3**
Est. 2-year Storage Elevation	**64.03 m**	**Est. 100-year Storage Elevation**	**65.26 m**

Summary of Release Rates and Storage Volumes

Control Area	**2-Year Release Rate (L/s)**	**2-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	10.4	0.0	30.1	0.0	0.0
Roof Storage Apt.	10.2	12.7	15.9	44.9	126.7
Roof Storage Townhomes 1	2.8	3.1	4.3	10.9	31.7
Roof Storage Townhomes 2	2.8	3.1	4.3	10.9	31.7
Attenutated Areas*	12.6	26.7	22.3	74.5	83.1
Sanitary Flow	3.1	0.0	3.1	0.0	0.0
Total	**26.0**	**45.6**	**55.5**	**141.1**	**273.1**
Allowable Combined			**55.5**		

* The average flow rate is used to calculate the requred storage, the peak flow rate is shown in the summary table.

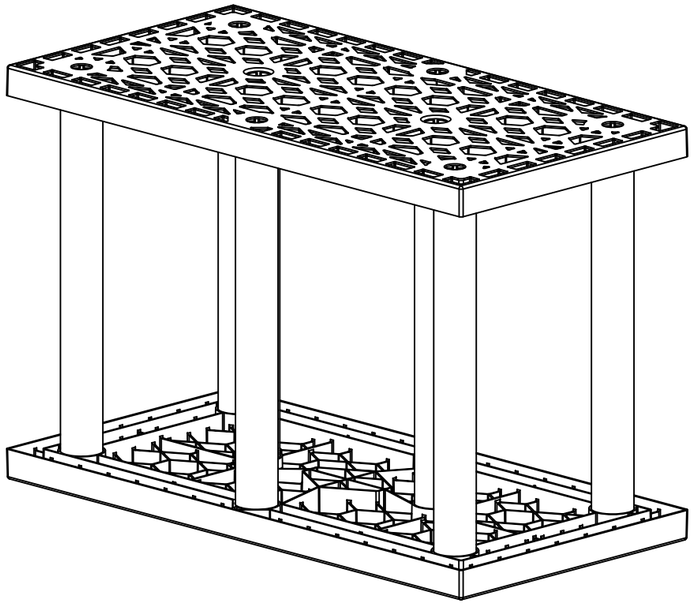
811 Gladstone Avenue
Existing Conditions

										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)**	**(-)**
A1, BLDG 3, TH1, TH2	STM102	STM101A	0.38	0.81	0.31	0.31	10.0	76.8	65.7	250	2.90	33.8	0.049	0.063	2.06	101.3	0.3	0.65
	STM101A	STM101			0.00	0.31	10.3	75.8	64.8	250	3.50	0.6	0.049	0.063	2.27	111.3	0.0	0.58
	STM101	STM100			0.00	0.31	10.3	75.8	64.8	250	3.50	10.8	0.049	0.063	2.27	111.3	0.1	0.58

LAYFIELD

BRENTWOOD STORMTANK
MODULE SHOP DRAWINGS

811 GLADSTONE
Ottawa, ON



Pages:

LAYFIELD
117 Basaltic Rd Unit 2
Vaughan, ON L4K 1G4 Canada
Ph: (905) 761-9123
www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM

Total Storage Volume	83.06 m³
Module Storage Volume	63.13 m³
Stone Storage Volume	19.93 m³
System Footprint	83.71 m²
Estimated Geotextile Fabric	450 m²
Estimated Stone Volume	49.82 m³
Excavation Required	140.32 m³
Excavation Depth	1.67 m
Stone Type	19mm clear
Stone Void Space	40%
Module Type	ST36

811 GLADSTONE
Ottawa, ON

REV.	Record of Changes	Date	By
1	Preliminary Drawing	139FEB19	AW

Page Name: Cover Page

Drawn by:	Checked By:
AW	Name
Scale: NTS	Date: 19FEB19

Sheet: **01 OF 07**

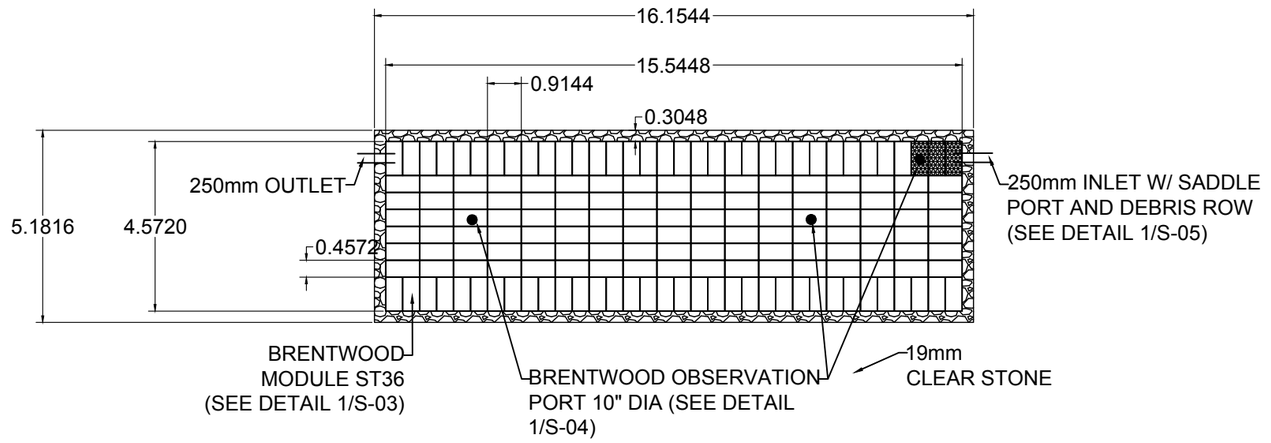
ANSI B Size Page (Horizontal)

Material Quantity

	ST36
Modules	170
Platens	340
Columns	1360
Side Panels	93
10" Observation Port4	3
6" Saddle Port	1

Elevations

Leveling Stone Invert	64.0176
Module Invert	64.16
Top of Module	65.0844
Top of Stone Backfill	65.3892
Minimum Finished Grade	65.6940



a. All dimensions are measured in millimeters unless noted otherwise.
b. Reference Brentwood Industries standard drawings and notes for detailed information.
c. Reference current Brentwoood Module installation instructions for proper installation practices.
   [http://www.brentwoodindustries.com/products/stormwater-management/stormtank/module.php#feature5]
d. Engineer of record to confirm conformance to manufacturer's allowable proximity to other structures and slopes.
e. All inlet and pipe locations and designs by others.
f. The sub-grade and side backfill needs to be compacted to 95%, unless noted otherwise.
g. During and after installation, the Brentwood Module area should be clearly marked and roped off to prevent unauthorized construction and equipment trafficking over the modules.
h. Top of Ground water is to be maintained 610 mm (2 ft) below the module to prevent buoyancy, unless otherwise noted by engineer.
i. The quantities related to stone and geosynthetics are estimated values as the roll size, overlaps, waste, ect. may vary.

1 S-02 **NOTES**

Contractor to confirm that quantities shipped to site match those listed above. Please report any discrepancy or damage to Layfield immediately.

2 S-02 MODULE LAYOUT
SCALE: NTS

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Vaughan, ON L4K 1G4 Canada
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www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM

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Module Storage Volume	63.13 m³
Stone Storage Volume	19.93 m³
System Footprint	83.71 m²
Estimated Geotextile Fabric	450 m²
Estimated Stone Volume	49.82 m³
Excavation Required	140.32 m³
Excavation Depth	1.67 m
Stone Type	19mm clear
Stone Void Space	40%
Module Type	ST36

811 GLADSTONE
Ottawa, ON

REV.	Record of Changes	Date	By
1	Preliminary Drawing	139FEB19	AW

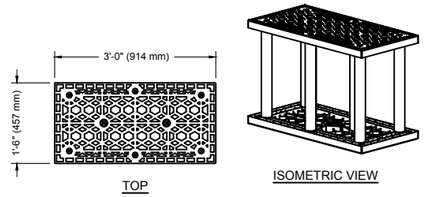
Page Name: Module Layout

Drawn by:	Checked By:
AW	Name
Scale	**Date:**
NTS	19FEB19

Sheet:

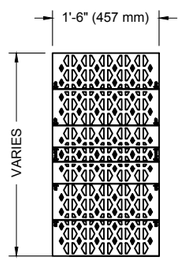
02 OF 07

ANSI B Size Page (Horizontal)

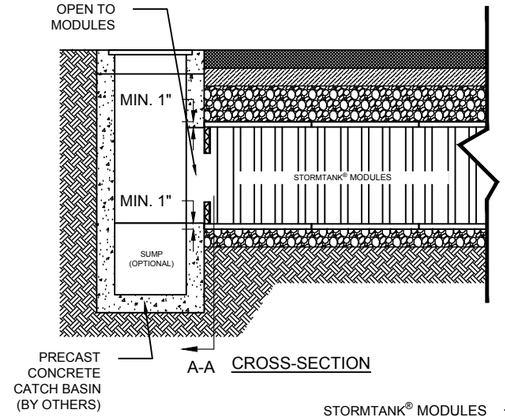


Note:
8 COLUMNS PER MODULE

1 S-03 18"(457mm)+33"(838mm) DOUBLE STACKED MODULE DETAIL

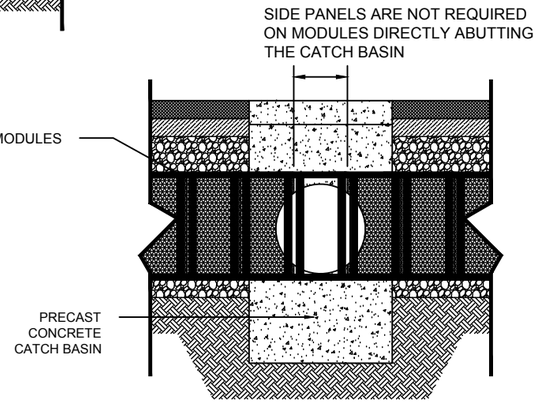


2 S-03 SIDE PANEL DETAIL

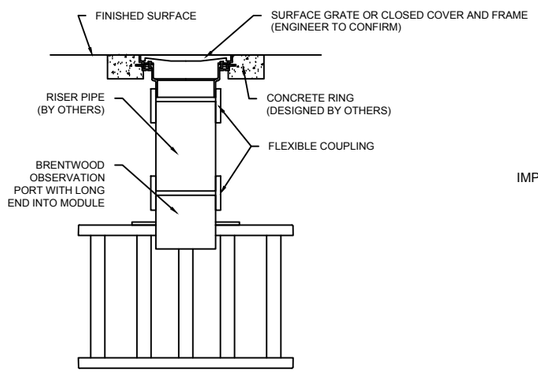


MAXIMUM PIPE DIAMETERS	
MODULE	NOMINAL PIPE DIAMETER (mm)
ST-18	14" (356)
ST-24	20" (508)
ST-30	26" (660)
ST-33	29" (737)
ST-36	32" (813)

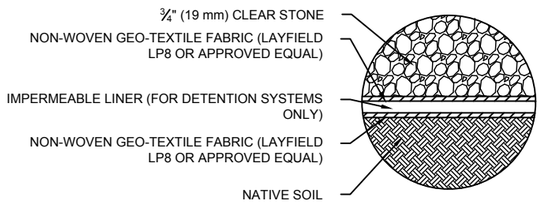
ORIFICE CONFIGURATIONS (BY OTHERS)



SECTION A-A

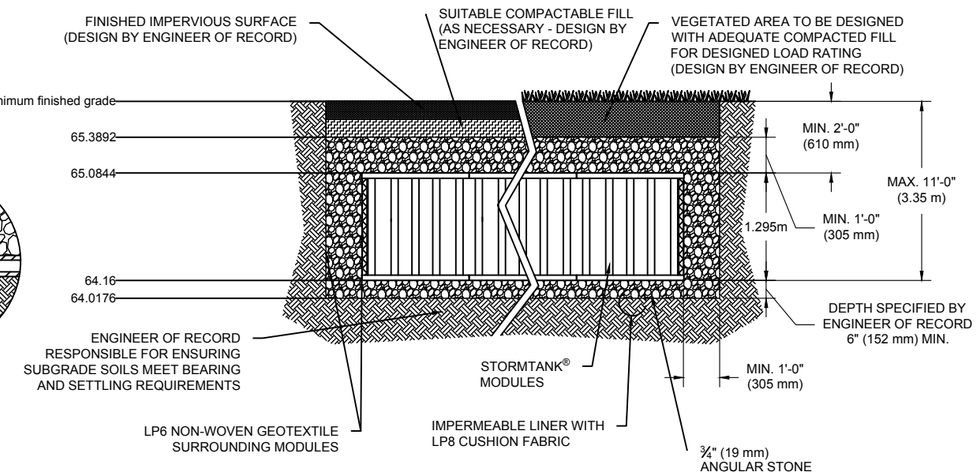


4 S-03 DOUBLE STACK OBSERVATION PORT DETAIL



DETAIL "A"

3 S-03 TYP. CATCH BASIN ABUTMENT DETAIL



5 S-03 TYPICAL DOUBLE STACKED SYSTEM BASIC CROSS-SECTION

LAYFIELD
117 Basaltic Rd Unit 2
Vaughan, ON L4K 1G4 Canada
Ph: (905) 761-9123
www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM

Total Storage Volume	83.06 m³
Module Storage Volume	63.13 m³
Stone Storage Volume	19.93 m³
System Footprint	83.71 m²
Estimated Geotextile Fabric	450 m²
Estimated Stone Volume	49.82 m³
Excavation Required	140.32 m³
Excavation Depth	1.67 m
Stone Type	19mm clear
Stone Void Space	40%
Module Type	ST36

811 GLADSTONE
Ottawa, ON

REV.	Record of Changes	Date	By
△	Preliminary Drawing	139FEB19	AW

Page Name: TYP. Construction Details

Drawn by:	Checked By:
AW	Name
Scale: NTS	Date: 19FEB19

Sheet: **03 OF 07**

ANSI B Size Page (Horizontal)

STEP 1:

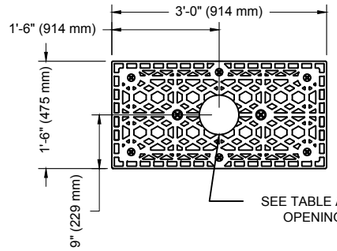
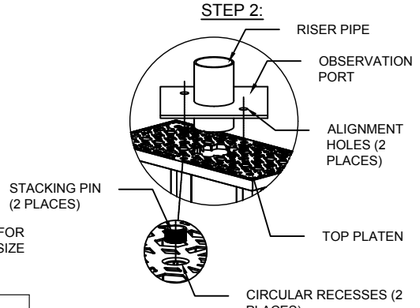


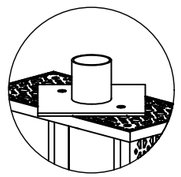
TABLE A: OBSERVATION PORT DIMENSION		
PORT SIZE	OPEN SIZE	RISER PIPE DIA.
6" (152 mm)	7" (178 mm)	6" (152 mm)
8" (203 mm)	9" (229 mm)	8" (203 mm)
10" (254 mm)	11" (279 mm)	10" (254 mm)

LAYOUT & CUT OPENING INTO THE CENTER OF THE TOP PLATEN FOR BRENTWOOD OBSERVATION PORT.

STEP 2:

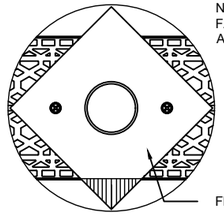


STEP 3:



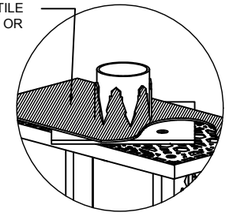
INSTALL OBSERVATION PORT

STEP 4:



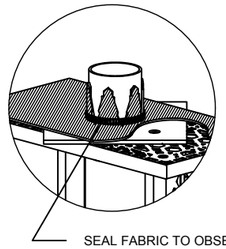
MARK & CUT FLANGE PLATE FLUSH WITH MODULE SIDE "WHEN MODULE IS ON THE PERIMETER OF THE SYSTEM."

STEP 5:



INSTALL GEOTEXTILE:
WRAP SPECIFIED GEOTEXTILE FABRIC AROUND ENTIRE INSTALLATION OF STORMTANK MODULES. CUT "X" PATTERN INTO GEOTEXTILE FABRIC AT OBSERVATION PORT AND PEEL EDGES OUT.

STEP 6:



1 S-04 TYP. OBSERVATION PORT INSTALLATION DETAIL

STEP 1:
LOCATE AND MARK OPENING

STEP 2:
REMOVE SIDE PANELS FROM MODULES AND CUT OPENING

STEP 3:
REINSTALL SIDE PANELS

STEP 4:
INSTALL PIPE (SLIP FIT)

DETAIL

STEP 5:
WRAP AND SECURE GEOTEXTILE

2 S-04 SMALL DIAMETER (14" [356 mm] AND SMALLER) PIPE CONNECTION DETAIL

STEP 1:
LOCATE AND MARK OPENING

STEP 2:
REMOVE SIDE PANELS FROM MODULES AND CUT OPENING

STEP 3:
REINSTALL SIDE PANELS

STEP 4:
INSTALL PIPE (SLIP FIT)

DETAIL

STEP 5:
WRAP AND SECURE GEOTEXTILE

3 S-04 LARGE DIAMETER (15" [381 mm] AND GREATER) PIPE CONNECTION DETAIL

LAYFIELD
117 Basaltic Rd Unit 2
Vaughan, ON L4K 1G4 Canada
Ph: (905) 761-9123
www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM

Total Storage Volume	83.06 m³
Module Storage Volume	63.13 m³
Stone Storage Volume	19.93 m³
System Footprint	83.71 m²
Estimated Geotextile Fabric	450 m²
Estimated Stone Volume	49.82 m³
Excavation Required	140.32 m³
Excavation Depth	1.67 m
Stone Type	19mm clear
Stone Void Space	40%
Module Type	ST36

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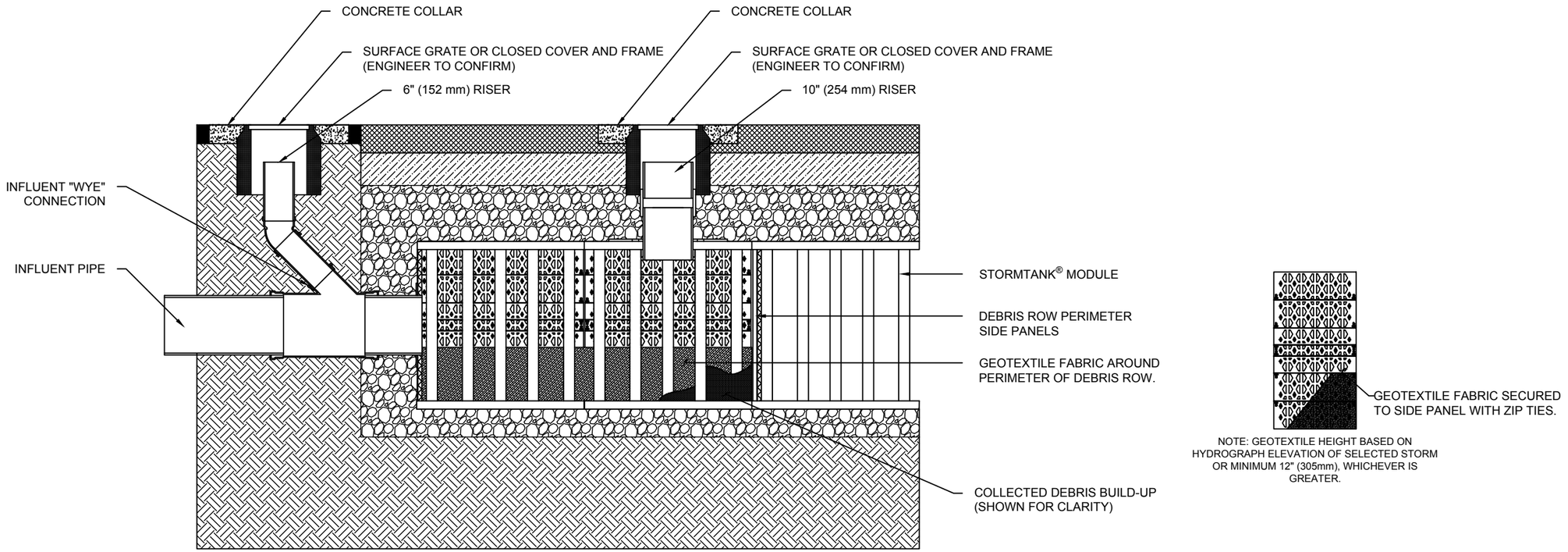
REV.	Record of Changes	Date	By
△	Preliminary Drawing	139FEB19	AW

Page Name: TYP. Pipe Penetration Details

Drawn by:	Checked By:
AW	Name
Scale: NTS	Date: 19FEB19

Sheet: **04 OF 07**

ANSI B Size Page (Horizontal)



NOTE: GEOTEXTILE HEIGHT BASED ON HYDROGRAPH ELEVATION OF SELECTED STORM OR MINIMUM 12" (305mm), WHICHEVER IS GREATER.

1 S-05 **TYP. DEBRIS ROW DETAIL**

LAYFIELD
117 Basaltic Rd Unit 2
Vaughan, ON L4K 1G4 Canada
Ph: (905) 761-9123
www.layfieldgroup.com

SINGLE STACK MODULE SYSTEM

Total Storage Volume	83.06 m³
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Stone Storage Volume	19.93 m³
System Footprint	83.71 m²
Estimated Geotextile Fabric	450 m²
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Stone Type	19mm clear
Stone Void Space	40%
Module Type	ST36

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Page Name: TYP. Debris Row Details

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AW	Name
Scale: NTS	Date: 19FEB19

Sheet:

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General Conditions

- Review installation procedures and coordinate the installation with other construction activities, such as grading, excavation, utilities, construction access, erosion control, etc.
- Engineered Drawings supersede all provided documentation, as the information furnished in this document is based on a typical installation.
- When installed based on Brentwood's Site Preparation and Installation Instructions or similar, a StormTank® system can support an HS-25 load.
- Coordinate the installation with manufacturer's representative/distributor to be on-site to review start up procedures and installation instructions.
- Components shall be unloaded, handled and stored in an area protected from traffic and in a manner to prevent damage.
- Assembled modules may be walked on, but vehicular traffic is prohibited until backfilled per Manufacturer's requirements. Protect the installation against damage with highly visible construction tape, fencing, or other means until construction is complete.

Ensure all construction occurs in accordance with Federal, Provincial and Local Laws, Ordinances, Regulations and Safety Requirements.

- Extra care and caution should be taken when temperatures are at or below 40° F (4.4° C).

1.0 StormTank® Assembly

StormTank® Modules:

StormTank® modules are delivered to the site as palletized components requiring simple assembly. No special equipment, tools or bonding agents are required; only a rubber mallet. A single worker can typically assemble a module in two minutes.

ASSEMBLY INSTRUCTIONS:

1. Place a platen on a firm level surface and insert the eight (8) columns into the platen receiver cups. Firmly tap each column with a rubber mallet to ensure the column is seated.
2. Place a second platen on a firm level surface. Flip the previously assembled components upside down onto the second platen, aligning the columns into the platen receiver cups.
3. Once aligned, seat the top assembly by alternating taps, with a rubber mallet at each structural column until all columns are firmly seated.

SIDE PANEL

4. If side panels are required, firmly tap the top platen upward to raise the top platen. Insert the side panel into the bottom platen.
5. Align the top of the side panel with the top platen and firmly seat the top platen utilizing a rubber mallet.

GENERAL NOTES:

- Remove packaging material and check for any damage. Report any damaged components to a StormTank® Distributor or Brentwood personnel.
- StormTank® components are backed by a one year warranty, when installed per manufacturer's recommendations.

2.0 Basin Excavation

1. Stake out and excavate to elevations per approved plans.Excavation Requirements:
   a. Sub-grade excavation must be a minimum of 6" (152 mm) below designed StormTank® Module invert.
   b. The excavation should extend a minimum of 12" (305 mm) beyond the StormTank® dimensions in each length and width (an additional 24" [610 mm] in total length and total width) to allow for adequate placement of side backfill material.
   c. Remove objectionable material encountered within the excavation, including protruding material from the walls.
   d. Furnish, install, monitor and maintain excavation support (e.g., shoring, bracing, trench boxes, etc.) as required by Federal, Provincial and Local Laws, Ordinances, Regulations and Safety Requirements.

3.0 Sub-Grade Requirements

1. Sub-grade shall be unfrozen, level (plus or minus 1%), and free of lumps or debris with no standing water, mud or muck. Do not use materials nor mix with materials that are frozen and/or coated with ice or frost.

2. Unstable, unsuitable and/or compromised areas should be brought to the Engineer's attention and mitigating efforts determined prior to compacting the sub-grade.

3. Sub-grade must be compacted to 95% Standard Proctor Density or as approved by the Engineer of Record. If code requirements restrict subgrade compaction, it is the requirement of the geotechnical Engineer to verify that the bearing capacity and settlement criteria for support of the system are met. *

* The Engineer of Record shall reference Brentwood document Appendix A for minimum soil bearing capacity required based on Load Rating and top cover depth. Minimum soil bearing capacity is required so that settlements are less than 1" through the entire sub-grade and do not exceed long-term 1/2" differential settlement between any two adjacent units within the system. Sub-grade must be designed to ensure soil bearing capacity is maintained throughout all soil saturation levels.

4.0 Leveling Bed Installation

1. Install geotextile fabric and/or liner material, as specified.
   a. Geotextile fabric shall be placed per manufacturer's recommendations.
   b. Additional material to be utilized for wrapping above the system must be protected from damage until use.

2. After the geotextile is secured, place a minimum 6" (152 mm) Leveling Bed.
   a. Material should be a 3/4" (19 mm) angular stone meeting Appendix B – Acceptable Fill Material.
   b. Material should be raked free of voids, lumps, debris, sharp objects and plate vibrated to a level with a maximum 1% slope.

3. Correct any unsatisfactory conditions.

5.0 StormTank® Module Placement

1. 1. Install geotextile fabric and/or liner material, as specified.
   a. Geotextile fabric shall be placed per manufacturer's recommendations.
   b. Additional material to be utilized for wrapping above the system must be protected from damage until use.

2. Mark the footprint of the modules for placement.
   a. Ensure module perimeter outline is square or similar prior to Module placement.
   b. Care should be taken to note any connections, ports or other irregular units to be placed.

3. Install the individual modules by hand, as detailed below.
   a. The modules should be installed as shown in the StormTank® submittal drawings with the short side of perimeter modules facing outward, except as otherwise required.
   b. Make sure the top/bottom platens are in alignment in all directions to within a maximum 1/4" (6.4 mm).
   c. For double stack configurations:
      i. Install the bottom module first. **DO NOT INTERMIX VARIOUS MODULE HEIGHTS ACROSS LAYERS.** Backfilling prior to proceeding to second layer is optional.
      ii. Insert stacking pins (2 per module) into the top platen of the bottom module.
      iii. Place the upper module directly on top of the bottom module in the same direction, making sure to engage the pins.

4. Install the modules to completion, taking care to avoid damage to the geotextile and/or liner material.

5. Locate any ports or other penetration of the StormTank®.
   a. Install ports/penetrations in accordance with the approved submittals, contract documents and manufacturer's recommendations.

6. Upon completion of module installation, wrap the modules in geotextile fabric and/or liner.
   a. Geotextile fabric shall be wrapped and secured per manufacturer's recommendations.
   b. Seal any ports/penetrations per Manufacturer's requirements

Notes:

- If damage occurs to the geotextile fabric or impermeable liner, repair the material in accordance with the geotextile/liner Manufacturer's recommendations.

6.0 Side Backfill

1. Inspect all geotextile, ensuring that no voids or damage exists; which will allow sediment into the StormTank® system.

2. Adjust the stone/soil interface geotextile along the side of the native soil to ensure the geotextile is taught to the native soil.

3. Once the geotextile is secured, begin to place the Side Backfill.
   a. a. Material should be a 3/4" (19 mm) angular stone meeting Appendix B – Acceptable Fill Material.
   b. b. Backfill sides "evenly" around the perimeter without exceeding single 12" (305 mm) lifts.
   c. Place material utilizing an excavator, dozer or conveyor boom.
   d. Utilize a plate vibrator to settle the stone and provide a uniform distribution.

Notes:

- Do not apply vehicular load to the modules during placement of side backfill. All material placement should occur with equipment located on the native soil surrounding the system.
- If damage occurs to the geotextile fabric or impermeable liner, repair the material in accordance with the geotextile/liner Manufacturer's recommendations.
-

7.0 Top Backfill (Stone)

1. Begin to place the Top Backfill.
   a. Material should be a 3/4" (19 mm) angular stone meeting Appendix B – Acceptable Fill Material.
   b. Place material utilizing an excavator, dozer or conveyor boom (Appendix C – Material Placement) and use a walk-behind plate vibrator to settle the stone and provide an even distribution.

DO NOT DRIVE ON THE MODULES WITHOUT A MINIMUM 12" (305 mm) COVER.

2. Upon completion of Top Backfilling, wrap the system in geotextile fabric and/or liner per manufacturer's recommendations.

3. Install metallic tape around the perimeter of the system to mark the area for future utility detection.

Notes:

- If damage occurs to the geotextile fabric or impermeable liner, repair the material in accordance with the geotextile/liner Manufacturer's recommendations.

8.0 Suitable Compactable Fill

Following Top Backfill placement and geotextile fabric wrapping; complete the installation as noted below.

Vegetated Area

1. Place fill onto the geotextile.
   a. Maximum 12" (305 mm) lifts, compacted with a vibratory plate or walk behind roller to a minimum of 90% Standard Proctor Density.
   b. The minimum top cover to finished grade should not be less than 24" (610 mm) and the maximum depth from final grade to the bottom of the lowest module should not exceed 11' (3.35 m).

2. Finish to the surface and complete with vegetative cover.

Impervious Area

1. Place fill onto the geotextile.
   a. Maximum 12" (305 mm) lifts, compacted with a vibratory plate or walk behind roller to a minimum of 90% Standard Proctor Density.
   b. The minimum top cover to finished grade should not be less than 24" (610 mm) and the maximum depth from final grade to the bottom of the lowest module should not exceed 11' (3.35 m).

2. Finish to the surface and complete with asphalt, concrete, etc.

Notes:

- A vibratory roller may only be utilized after a minimum 24" (610 mm) of compacted material has been installed or for the installation of the asphalt wearing course.
- If damage occurs to the geotextile fabric, repair the material in accordance with the geotextile Manufacturer's recommendations.
- For most recent installation guidelines visit: http://www.brentwoodindustries.com/products/stormwater-management/stormtank/module.php#feature5

9.0 Inspection and Maintenance

If the following inspections and maintenance procedures are not followed as specified below then the end-user is responsible for the performance of the modules. These Maintenance procedure must be performed after a heavy rainfall, flooding or any incident that will vary the flow of water drastically.

Inspection

1. Inspect all observation ports, inflow and outflow connection and the discharge area
2. Identify and log any sediment and debris accumulation, system backup, or discharge rate changes.
3. If there is a sufficient need for a cleanout, contact a local cleaning company for assistance.

Cleaning:

1. If a pretreatment device is installed, follow manufacturer recommendations.
2. Using vacuum pump truck, evacuate debris from the inflow and outflow points.
3. Flush the system with clean water, forcing debris from the system.
4. Repeat steps 2 and 3 until no debris is evident.

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SINGLE STACK MODULE SYSTEM

Total Storage Volume	83.06 m³
Module Storage Volume	63.13 m³
Stone Storage Volume	19.93 m³
System Footprint	83.71 m²
Estimated Geotextile Fabric	450 m²
Estimated Stone Volume	49.82 m³
Excavation Required	140.32 m³
Excavation Depth	1.67 m
Stone Type	19mm clear
Stone Void Space	40%
Module Type	ST36

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Ottawa, ON

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△	Preliminary Drawing	139FEB19	AW

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Appendix A - Bearing Capacity Tables

Cover		HS-25 (Unfactored)		HS-25 (Factored)		Cover		HS-25 (Unfactored)		HS-25 (Factored)	
English (in.)	Metric (mm)	English (ksf)	Metric (kPa)	English (ksf)	Metric (kPa)	English (in.)	Metric (mm)	English (ksf)	Metric (kPa)	English (ksf)	Metric (kPa)
24	610	1.89	90.45	4.75	227.43	67	1,702	1.12	53.75	2.07	99.11
25	635	1.82	86.96	4.53	216.90	68	1,727	1.13	53.91	2.07	99.11
26	660	1.75	83.78	4.34	207.80	69	1,753	1.13	54.08	2.06	98.63
27	686	1.69	80.88	4.16	199.18	70	1,778	1.13	54.26	2.06	98.63
28	711	1.63	78.24	3.99	191.04	71	1,803	1.14	54.46	2.06	98.63
29	737	1.58	75.82	3.84	183.86	72	1,829	1.14	54.67	2.06	98.63
30	762	1.54	73.62	3.70	177.16	73	1,854	1.15	54.90	2.06	98.63
31	787	1.50	71.60	3.57	170.93	74	1,880	1.15	55.13	2.06	98.63
32	813	1.46	69.75	3.45	165.19	75	1,905	1.16	55.38	2.06	98.63
33	838	1.42	68.06	3.34	159.92	76	1,930	1.16	55.64	2.06	98.63
34	864	1.39	66.51	3.24	155.13	77	1,956	1.17	55.90	2.06	98.63
35	889	1.36	65.10	3.14	150.34	78	1,981	1.17	56.18	2.06	98.63
36	914	1.33	63.80	3.05	146.03	79	2,007	1.18	56.46	2.07	99.11
37	940	1.31	62.62	2.97	142.20	80	2,032	1.19	56.76	2.07	99.11
38	965	1.29	61.54	2.90	138.85	81	2,057	1.19	57.06	2.07	99.11
39	991	1.26	60.55	2.83	135.50	82	2,083	1.20	57.37	2.08	99.59
40	1,016	1.25	59.65	2.76	132.15	83	2,108	1.20	57.69	2.08	99.59
41	1,041	1.23	58.84	2.70	129.28	84	2,134	1.21	58.02	2.09	100.07
42	1,067	1.21	58.09	2.67	127.84	85	2,159	1.22	58.35	2.09	100.07
43	1,092	1.20	57.42	2.60	124.49	86	2,184	1.23	58.69	2.10	100.55
44	1,118	1.19	56.81	2.55	122.09	87	2,210	1.23	59.04	2.11	101.03
45	1,143	1.18	56.26	2.50	119.70	88	2,235	1.24	59.39	2.11	101.03
46	1,168	1.16	55.77	2.46	117.79	89	2,261	1.25	59.75	2.12	101.51
47	1,194	1.16	55.33	2.42	115.87	90	2,286	1.26	60.11	2.13	101.98
48	1,219	1.15	54.94	2.39	114.43	91	2,311	1.26	60.48	2.13	101.98
49	1,245	1.14	54.59	2.36	113.00	92	2,337	1.27	60.86	2.14	102.46
50	1,270	1.13	54.29	2.33	111.56	93	2,362	1.28	61.24	2.15	102.94
51	1,295	1.13	54.03	2.30	110.12	94	2,388	1.29	61.62	2.16	103.42
52	1,321	1.12	53.80	2.27	108.69	95	2,413	1.30	62.01	2.17	103.90
53	1,346	1.12	53.62	2.25	107.73	96	2,438	1.30	62.41	2.18	104.38
54	1,372	1.12	53.46	2.23	106.77	97	2,464	1.31	62.81	2.19	104.85
55	1,397	1.11	53.34	2.21	105.82	98	2,489	1.32	63.21	2.20	105.34
56	1,422	1.11	53.24	2.19	104.86	99	2,515	1.33	63.62	2.21	105.82
57	1,448	1.11	53.18	2.17	103.90	100	2,540	1.34	64.03	2.22	106.29
58	1,473	1.11	53.14	2.16	103.42	101	2,565	1.35	64.45	2.23	106.77
59	1,499	1.11	53.12	2.14	102.46	102	2,591	1.35	64.87	2.24	107.25
60	1,524	1.11	53.13	2.13	101.98	103	2,616	1.36	65.29	2.25	107.73
61	1,549	1.11	53.16	2.12	101.51	104	2,642	1.37	65.72	2.27	108.69
62	1,575	1.11	53.21	2.11	101.03	105	2,667	1.38	66.15	2.28	109.17
63	1,600	1.11	53.28	2.10	100.55	106	2,692	1.39	66.58	2.29	109.65
64	1,626	1.11	53.37	2.09	100.07	107	2,718	1.40	67.02	2.30	110.12
65	1,651	1.12	53.48	2.08	99.59	108	2,743	1.41	67.45	2.31	110.60
66	1,676	1.12	53.61	2.08	99.59	109	2,769	1.42	67.90	2.33	111.56
67	1,702	1.12	53.75	2.07	99.11	110	2,794	1.43	68.34	2.34	112.04
68	1,727	1.13	53.91	2.07	99.11	111	2,819	1.44	68.79	2.35	112.52
69	1,753	1.13	54.08	2.06	98.63	112	2,845	1.45	69.24	2.36	113.00
70	1,778	1.13	54.26	2.06	98.63	113	2,870	1.46	69.69	2.38	113.96
71	1,803	1.14	54.46	2.06	98.63	114	2,896	1.47	70.15	2.39	114.43

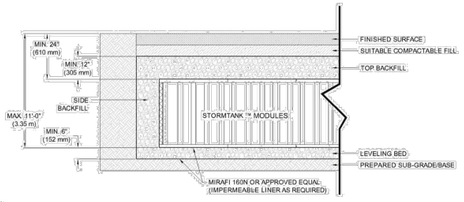
Notes:

1. *Additional load ratings and associated bearing capacities may be applicable on a case by case basis. Please contact your local Brentwood Representative.*

Appendix B - Acceptable Fill Materials

Material Location	Description	AASHTO M43 Designation	ASTM D2321 Class	Compaction/Density
Finished Surface	Topsoil, hardscape, stone, concrete or asphalt per engineer of record.	N/A	N/A	Prepare per engineered plans.
Suitable Compactable Fill	Granular well graded soil/aggregate, typically road base or earthen fill, maximum 4" particle size.	56, 57, 6, 67, 68 Earth	I & II III (Earth Only)	Place in max. 12" lifts to a min. 90% standard proctor density.
Top Backfill	Crushed angular stone placed between modules and road base or earthen fill.	56, 57, 6, 67, 68	I & II	Plate compacted to provide evenly distributed layers.
Side Backfill	Crushed angular stone placed between earthen wall and modules.	56, 57, 6, 67, 68	I & II	Place in uniform 12" lifts around the system
Leveling Bed	Crushed angular stone placed to provide level surface for installation of modules.	56, 57, 6, 67, 68	I & II	Plate vibrated to achieve level surface.

* See Appendix C - Material Placement for limitations



Notes:

2. *All stone must be angular stone meeting ASTM D2321. Recycled concrete may be utilized when meeting acceptable gradation and ASTM standards.*
3. *The sub-grade is to be prepared to meet bearing and compaction requirements. Please see engineer of record's design.*
4. *Storage of materials such as construction materials, equipment, soils, etc. over the StormTank® system is strictly **prohibited**.*
5. *Please contact a Geotechnical Engineer and the Brentwood representative prior to utilization of any material not listed above.*

Appendix C - Material Placement Guidelines

Material Location	Placement Methods	Tired Equipment Limitations	Tracked Equipment Limitations	Roller Limitations
Finished Surface	Numerous methods may be utilized. Material dumping onto system should be limited unless otherwise noted.	Asphalt can be dumped into pavers.		Vibratory rollers may only be utilized if compacted cover exceeds 24" (610 mm) or for pavement installation.
Suitable Compactable Fill	Utilize an excavator, skid loader or dozer to place material. (Max. gross operating load of 6,000 lbs. [2,721 kg] or less).	No DUMPING by dump trucks. No wheel loads until approved by Engineer of Record.	SMALL DOZERS ONLY (Max. gross operating load of 6,000 lbs. [2,721 kg] or less).	Static rollers ONLY are permitted until compacted cover exceeds 24" (610 mm).
Top Backfill	Utilize excavator bucket or stone conveyor, positioned off of system, to uniformly backfill on top of the modules. No DUMPING directly onto modules by dump trucks.	No DUMPING by dump trucks. No wheel loads until approved by Engineer of Record.	Utilize an excavator or skid loader (Max. gross operating load of 6,000 lbs. [2,721 kg] once a min. 12" (305 mm) has been placed and compacted.	No rollers allowed at this time.
Side Backfill	Utilize excavator bucket or stone conveyor, positioned off of system, to uniformly backfill around modules. Stone to be placed in max. 12" (305 mm) lifts until stone reaches top of modules.	No equipment is permitted on the modules during the side backfilling process.		
Leveling Bed	No limitations			

Notes:

1. *Storage of materials such as construction materials, equipment, soils, etc. over the StormTank® system is strictly **prohibited**.*
2. *Please contact a Brentwood representative/distributor prior to utilization of any equipment not listed above.*
3. *During paving operations it may be necessary to utilize dump operations for paving equipment. Additional precautions should be utilized to limit the dump distance and prevent rutting of the road base.*
4. *It is recommended that all backfilling operations be completed with low ground pressure vehicles such as mini excavators, skid steers, etc.* **All** *equipment is to access system by a level approach to the system.*

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SINGLE STACK MODULE SYSTEM

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Estimated Stone Volume	49.82 m³
Excavation Required	140.32 m³
Excavation Depth	1.67 m
Stone Type	19mm clear
Stone Void Space	40%
Module Type	ST36

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Ottawa, ON

REV.	Record of Changes	Date	By
△	Preliminary Drawing	139FEB19	AW

Page Name: Supplementary Notes

Drawn by: AW | Checked By: Name

Scale: NTS | Date: 19FEB19

Sheet: **07 OF 07**

ANSI B Size Page (Horizontal)

STORMTANK®
A Brentwood Brand

TECH BULLETIN

Revision 2 **12/6/2015**

StormTank® Module "Debris Row"

Background:

StormTank® was developed with free flow in mind, as the modules are designed to require no internal walls or partitions to promote the ability to inspect and clean a system. Because stormwater typically contains suspended solids; Brentwood has developed the Debris Row as an inexpensive means to improve the stormwater treatment, while improving cleanability of the system.

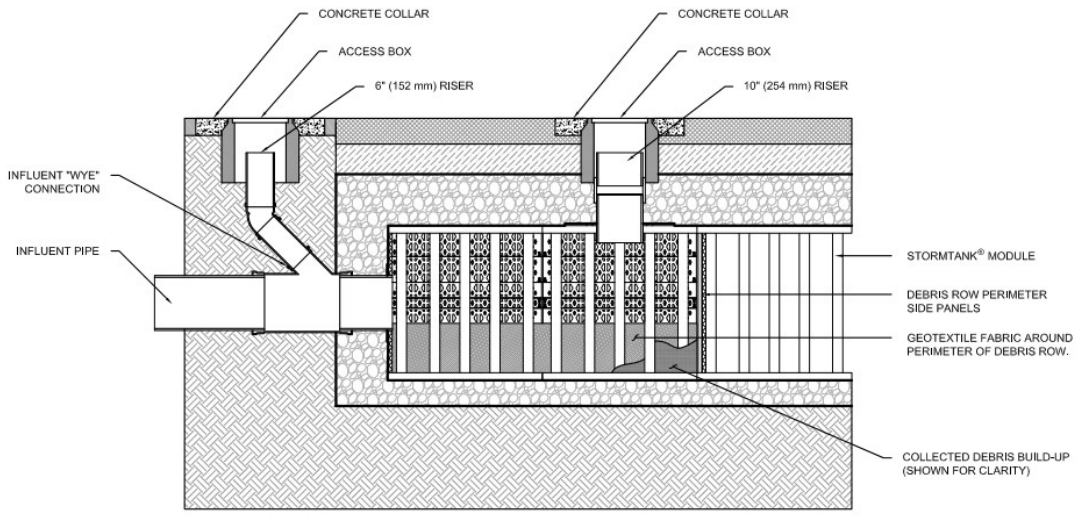
Functionality:

The Debris Row is an easy way to improve your basin's functionality and longevity. By gathering all debris and sediment in a section of modules; inspection time and maintenance costs are greatly reduced, while the longevity and storage capacity of the remaining basin are not impacted by sediment buildup. The Debris Row is constructed by installing a predetermined number of side panels, based on the inlet pipe diameter, and a 12" tall layer of geotextile fabric. The fabric provides filtration of low flows while the remaining side panel retains most large scale debris, while providing an integrated means of overflow.

Inspection & Maintenance:

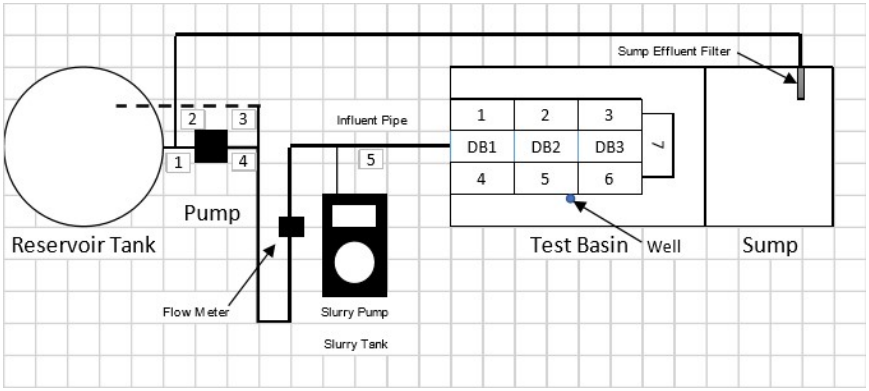
Inspection and maintenance are completed utilizing the Sediment Bay's custom access ports. Visual inspection can be completed through the 10" diameter vacuum port or a closed circuit television camera can be inserted through the 6" saddle connection to the inflow pipe. Maintenance is completed by utilizing a high pressure nozzle, inserted through the saddle connection, and moving the built up debris towards the suction hose, inserted through the vacuum port.

Cross-Section:



Testing:

To evaluate the performance of a Debris Row, Brentwood setup a mock full scale installation test rig. A 12" influent connection was utilized to a three unit debris row on stone bed. To this connection, a slurry pump setup was utilized. To generate the flow, a reservoir tank was setup to initially feed a flow pump with flow meter. After the testing rig filled, this reservoir was shut off and the system was fed via the sump in the test rig. The slurry mix of AGSCO #110 Silica Sand was injected at a rate of 21 mg/L.



Results:

This test has illustrated two things. The first is the hydraulic performance that showed runoff entering the system initially fills the stone base, prior to the entire footprint of the water rising uniformly.

Secondly, the test showed the removal efficiency of a Debris Row, based upon the footprint area of the treatment area.

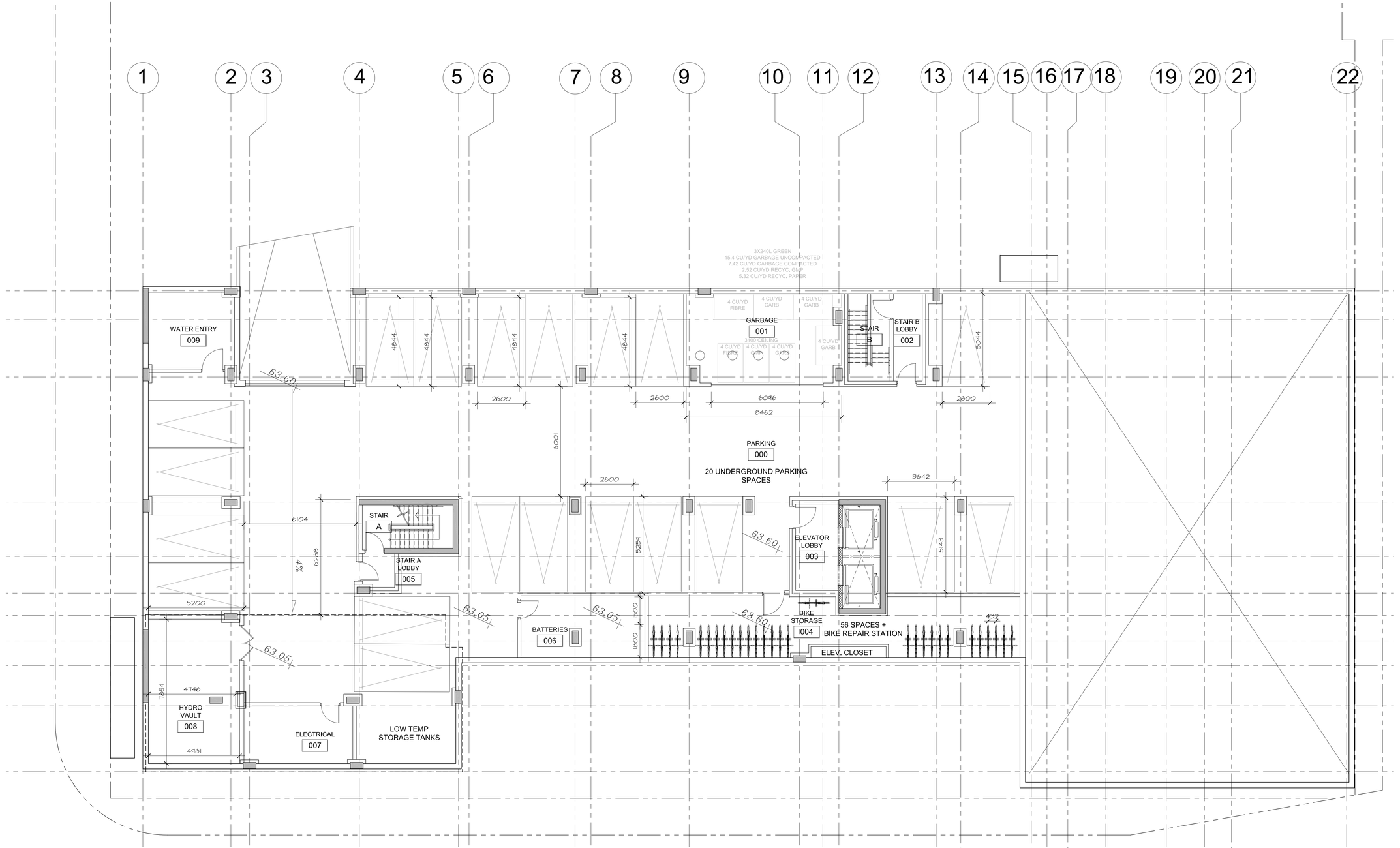
Three Module Debris Row Configuration			
Treatment Flow Rate (gpm/sf)	Treatment Flow Rate (cfs/sf)	Flow Rate (cfs)	Removal Efficency (%)
7.0	0.022	0.299	97.0
14.3	0.045	0.611	97.3
20.6	0.065	0.881	96.5
26.9	0.085	1.150	96.1

Utilization:

Based upon these results, two conclusions can be made:

1. The height of geotextile fabric around the perimeter should equal the containment elevation. Therefore, if you are looking to retain 96% of debris during a 10 year storm, then the geotextile fabric shall be extended to that pounding elevation based on hydrographs or a minimum of 12", whichever is greater.
2. To retain determine the required number of modules (assuming treatment only through the base), the following equation shall apply: # of Modules = $Q_{treatment}$ / (4.5*0.085) or a minimum of three modules, whichever is greater.

DRAWINGS / FIGURES



OTTAWA COMMUNITY HOUSING
LOGEMENT COMMUNAUTAIRE D'OTTAWA

no.	date	revision
3	MAR 28, 2019	ISSUED FOR SPA RESPONSE **2**
2	FEB 22, 2019	ISSUED FOR SPA RESPONSE
1	DEC 21, 2018	ISSUED FOR SCHEMATIC DESIGN REVIEW

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and/or omissions to the architect.

All contractors must comply with all pertinent codes and by-laws.

Do not scale drawings.

This drawing may not be used for construction until signed.

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HOBIN ARCHITECTURE

PROJECT/LOCATION:
811 GLADSTONE AFFORDABLE HOUSING
811 GLADSTONE, OTTAWA ONTARIO

DRAWING TITLE:
PARKING LEVEL FLOOR PLAN
6 STOREY

DRAWN BY:	DATE:	SCALE:
LE	DEC 12, 2018	1:100

PROJECT: 1818

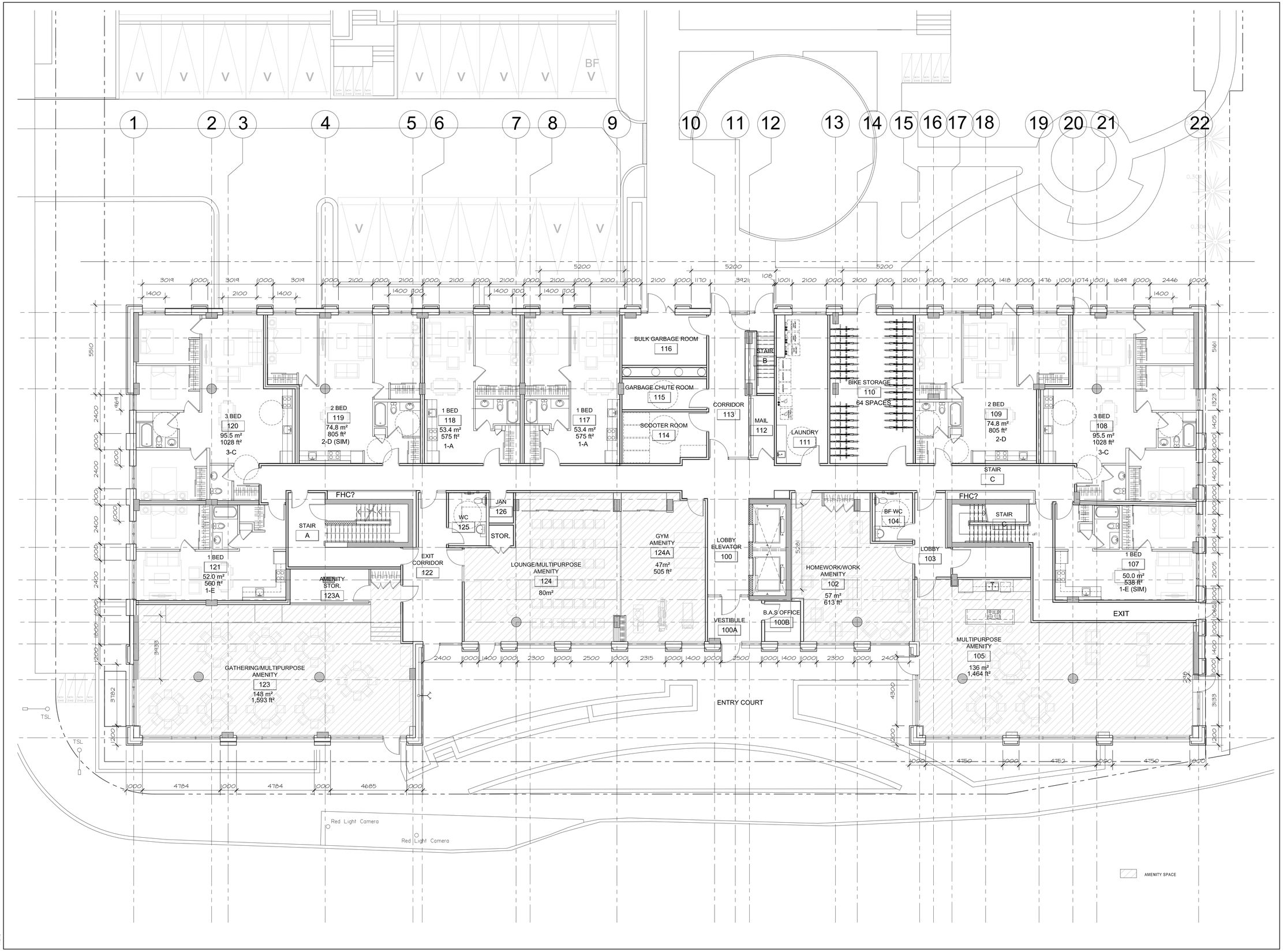
DRAWING NO.: A2.01

REVISION NO.:

D02-02-18-0107/ D07-12-18-0181

#17839

None
None



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HOBIN ARCHITECTURE

PROJECT/LOCATION:
811 GLADSTONE AFFORDABLE HOUSING
811 GLADSTONE, OTTAWA ONTARIO

DRAWING TITLE:
GROUND FLOOR PLAN
6 STOREY

DRAWN BY:	DATE:	SCALE:
LE	DEC 12, 2018	1:100

PROJECT: 1818

DRAWING NO.: A2.02

REVISION NO.:

D02-02-18-0107/ D07-12-18-0181

#17839

None
None

6 STOREY ELEVATION - SOUTH / GLADSTONE FACADE

6 STOREY ELEVATION - NORTH / INTERIOR COURTYARD FACADE

6 STOREY ELEVATION - EAST FACADE

6 STOREY ELEVATION - WEST / ROCHESTER FACADE

BV-1	BRICK MASONRY - TYPE 1
MP-1	METAL PANEL - TYPE 1
MP-2	METAL PANEL - TYPE 2
MP-3	METAL PANEL - TYPE 3
CB-1	CEMENT BOARD SIDING - TYPE 1
CB-2	CEMENT BOARD SIDING - TYPE 2
CONC	CONCRETE
PV	PHOTOVOLTAIC
CAN	CANOPY STEEL AND WOOD
GG	GLASS GUARD
WDSC	WOOD SCREEN
GL	GLAZING-PUNCHED WINDOW
CW	CURTAIN WALL

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HOBIN
ARCHITECTURE

PROJECT/LOCATION:
811 GLADSTONE
AFFORDABLE HOUSING
811 GLADSTONE, OTTAWA ONTARIO

DRAWING TITLE:
6 STOREY
ELEVATIONS

DRAWN BY:	DATE:	SCALE:
LE	DEC 3, 2018	1:150

PROJECT: 1818

DRAWING NO.: A3.01

REVISION NO.:

D02-02-18-0107/ D07-12-18-0181

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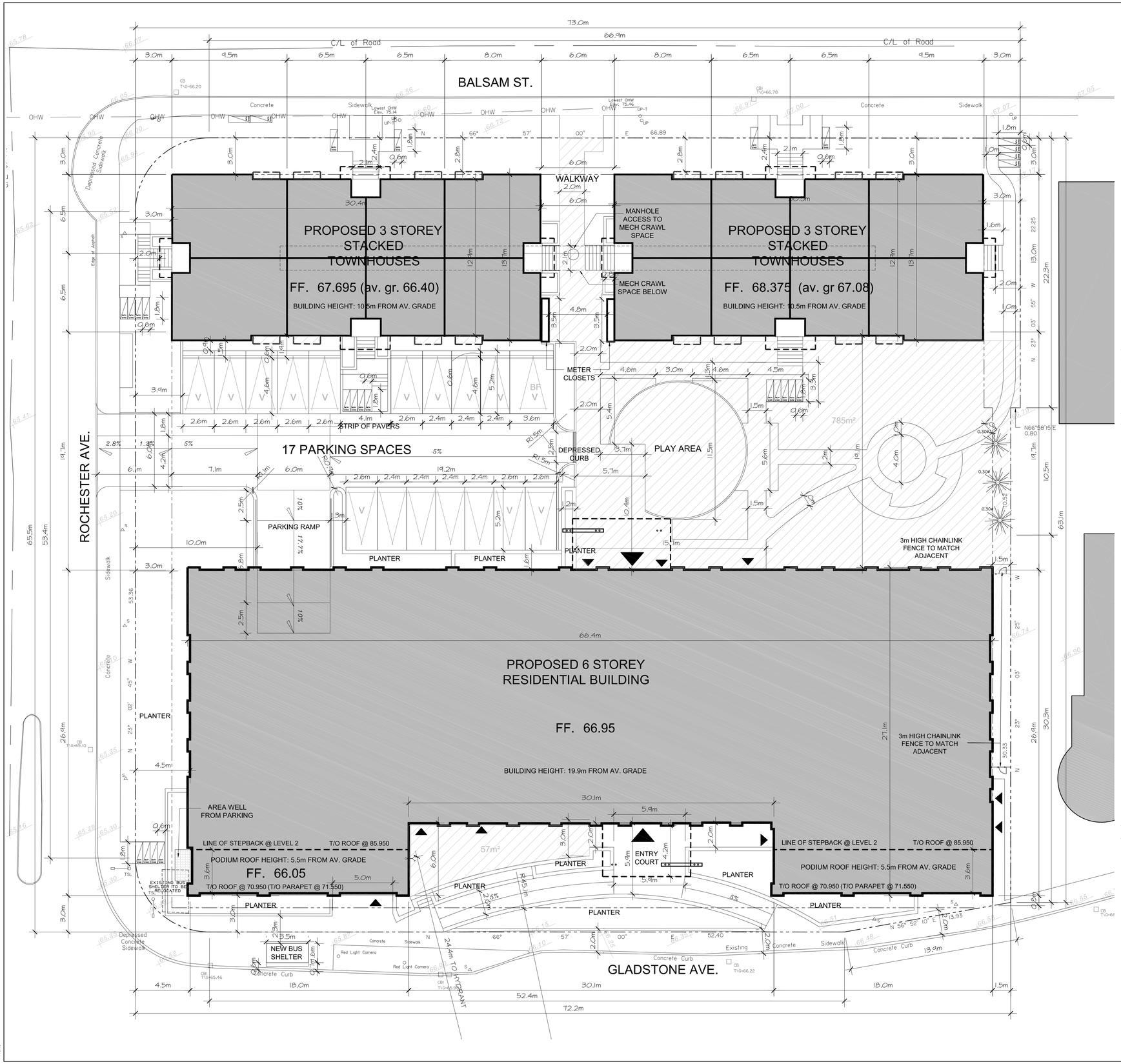
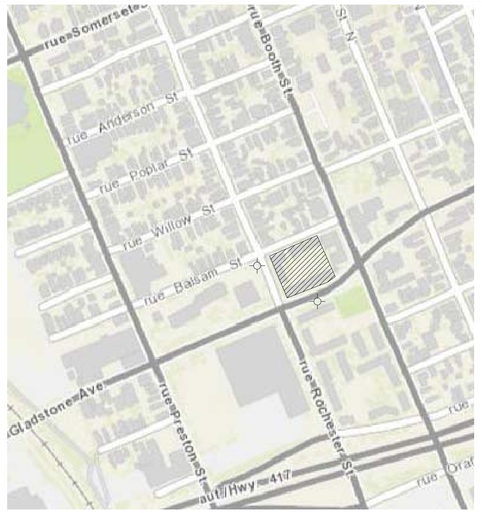
None
None





PROJECT INFORMATION

ZONING BY-LAW 2008-250 (City of Ottawa)	TM & R4A
ADRESS:	811 GLADSTONE, OTTAWA ONTARIO
SITE AREA:	4,714.9 M²

ZONING	REQUIRED	PROVIDED
PERMITTED USES:	TM: APARTMENT R4A: STACKED DWELLING	6 STOREY APARTMENT STACKED TOWNHOMES
MINIMUM LANDSACPED AREA:	TM: NONE R4A: 30%	1653.3M² 35%
MIN LANDSCAPE BUFFER @ PARKING LOTS	3M (AT STREET) 1.5 (OTHER)	MIN BUFFER = 3.9M @ ROCHESTER
HEIGHT:	TM: 6 FLRS (20M) R4A: 11M	6 STOREY: 19.86M TOWNS: 10.43M
MINIMUM LOT WIDTH	TM: NONE R4A (STACKED): 22M	LOT WIDTH: 72.2M
MAX FRONT YARD (GLADSTONE):	2.0M	**0.8M**
MIN INTERIOR YARD:	**1.2M**	**1.5M**
MIN CORNER SIDE YARD (ROCHESTER):	**3.0M (5.0M ABOVE 15M)**	**3.0M**
MIN REAR YARD (BALSAM):	**TM: 4.5M (LANEWAY) R4A: (STACKED): 25% or 7.5M**	**3.0M**
PARKING REQUIRED (RES): (AFTER 12 UNITS)	**0.5/UNIT X 96 UNITS 48**	**4 (@GRADE)+20(GARAGE) TOTAL: 24**
PARKING REQUIRED (VIS): (AFTER 12 UNITS)	**0.1/UNIT X 128 UNITS 13**	**13 (@GRADE)**
BICYCLE PARKING:	**0.5/UNIT TOTAL: 70**	**25 EXTERIOR (6 Off Prop.) 64 GROUND FLOOR + 56 PARKING LEVEL TOTAL: 145 (6 Off Prop.)**
AMENITY AREA:	**6 SQM/UNIT X 140 834 M²**	**1,253 M² (468 M² INTERIOR 780 M² EXTERIOR) +22 M² PRIVATE**

BUILDING AREA:		UNIT COUNT
6 STOREY		
GROUND FLOOR:	1598.11 M²	8
TYPICAL FLOOR (X5)	1460.99 M²	20 (X5 FLOORS)
TOTAL:	8903.06 M²	
TOWNS:	3,172.64 M²	32
SITE TOTAL:	12,075.7 M²	140

UNIT STATISTICS

BACHELOR:	**15**	**(11%)**
1 BEDROOM:	**58**	**(42%)**
2 BEDROOM:	**38**	**(27%)**
3 BEDROOM:	**20**	**(14%)**
4 BEDROOM:	**8**	**(6%)**

0ft 5 10 15 20 30 40 50 60 70ft
0m 1 2 3 4 5 10 15 20m

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LEGEND:
- PROPERTY LINE
- V VISITOR PARKING
- DEPRESSED CURB
- ENTRANCE
- FIRE HYDRANT
- UP UTILITY POLE
- UP-T UTILITY POLE TOP (EXISTING)
- EXISTING SIGN
- CB/CBI CATCH BASIN/CATCH BASIN INLET
- CHAIN LINK FENCE WITH GATE
- SIAMESE CONNECTION
- TRAFFIC SIGNAL LIGHT
- OUTDOOR AMENITY AREA

NOTE: REFER TO LANDSCAPE PLAN FOR EXTERIOR FINISHES, PLANTING & SITE FURNITURE. REFER TO SITE SERVICING AND GRADING PLAN FOR RELEVANT INFO.

The Boundary information shown here has been derived from a plan of survey completed by Annis O'Sullivan Vollebekk Ltd on January 18, 2018 and updated on November 16, 2018 to show additional topographic features.

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HOBIN ARCHITECTURE

CLIENT: OTTAWA COMMUNITY HOUSING

PROJECT/LOCATION:
811 GLADSTONE AFFORDABLE HOUSING
811 GLADSTONE, OTTAWA ONTARIO

DRAWING TITLE:
SITE PLAN

DRAWN BY:	DATE:	SCALE:
LE	DEC 3, 2018	1:150

PROJECT: 1818

DRAWING NO.: A1.01

REVISION NO.:

D02-02-18-0107/ D07-12-18-0181

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GL	GLAZING-PUNCHED WINDOW
CW	CURTAIN WALL
MST	METAL STAIR - GALVANIZED
DR	DOOR

TOWNHOUSE ELEVATION - EAST FACADE

TOWNHOUSE ELEVATION - WEST / ROCHESTER FACADE

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HOBIN
ARCHITECTURE

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811 GLADSTONE
AFFORDABLE HOUSING
811 GLADSTONE, OTTAWA ONTARIO

DRAWING TITLE:
TOWNHOUSE
ELEVATIONS

DRAWN BY:	DATE:	SCALE:
LE	DEC 3, 2018	1:150

PROJECT: 1818

DRAWING NO.: A3.02

REVISION NO.:

D02-02-18-0107/ D07-12-18-0181

#17839

None
None