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SITE SERVICING AND STORMWATER MANAGEMENT REPORT

FOR

RIOCAN HOLDINGS INC.
1309 CARLING AVENUE – PHASE I

CITY OF OTTAWA

PROJECT NO.: 18-1028
CITY APPLICATION NO.: D07-12-18-0170

JULY 2019 – REV. 3

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FOR
1309 CARLING AVENUE – PHASE I
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FOR
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by RioCan Holdings Inc. to prepare a Site Servicing and Stormwater Management report in support of the application for Site Plan Control (SPC) for Phase I of the Westgate Shopping Centre redevelopment at 1309 Carling Avenue.

The subject property is located within the City of Ottawa urban boundary, in the Kitchissippi ward. As illustrated in ***Figure 1,*** below, the subject property is bounded by Highway 417 to the northwest, Carling Avenue to the south and Merivale Road to the east. The subject property measures approximately 3.7 ha and is zoned Arterial Mainstreet Use (AM). Approximately 1.1 ha of Hydro lands are located along the northwest property line and extend into a portion of the subject property.

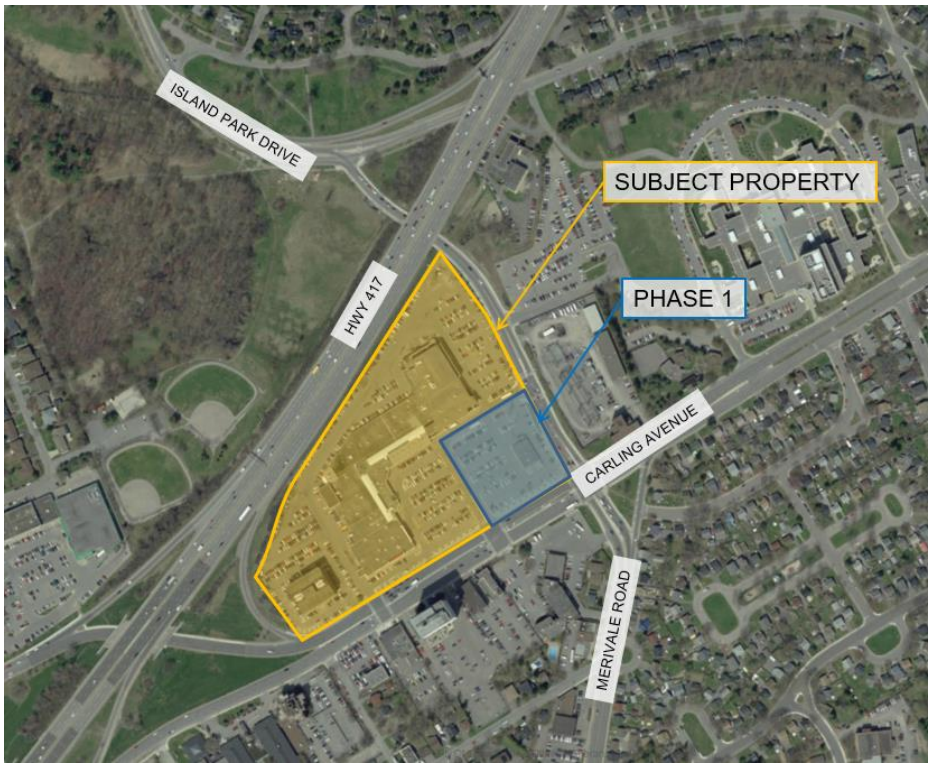

Figure 1: Site Location

An Assessment of Adequacy of Public Services report (***2016 AES***) was prepared by David Schaeffer Engineering Ltd. and approved for the ultimate development in 2016. The previously approved ***2016 AES*** contemplated ***1,877 m²*** of commercial space and ***187*** residential units for the Phase I development and ***8,942 m²*** of commercial space and ***1,183*** residential units for the Ultimate development.

The proposed SPC would allow for the Phase I development of a 24-storey residential /commercial building fronting onto both Carling Avenue and Merivale Road within ***0.69 ha*** of the subject site. The proposed development would include approximately ***1,612 m²*** of ground level retail with associated aboveground and underground parking, with access from the existing mall drive aisles. The residential component is comprised of approximately ***213 units***. No change in floor area is proposed to the existing ***15,484 m²*** commercial building. A copy of the proposed site plan prepared by RLA Architecture is included in ***Drawings/Figures***.

The Ultimate development contemplates the addition of two 22-storey residential/commercial buildings and two 36-storey residential buildings to be constructed in two additional phases. The Ultimate development would include approximately ***9,399 m²*** of ground level retail and associated underground parking, with access from both Carling Avenue and Merivale Road. The residential component is comprised of approximately ***1,212 units***.

The objective of this report is to provide sufficient detail to demonstrate that both the proposed Phase I development and the contemplated Ultimate development are supported by proposed services in accordance with the ***2016 AES***.

1.1 Existing Conditions

The existing site includes a commercial mall and restaurant, as well as, associated parking consisting of asphalt parking lots. The elevations range between 74.01 m and 75.09 m with a minimal grade change of approximate 0.35% from the Northeast to the Southwest corner of the Phase I limits.

Sewer and watermain mapping collected from the City of Ottawa and the *Sewer CCTV Inspection Report* (***CCTV Report)*** prepared by Clean Water Works Inc. indicate that the following services exist across the property frontages, within the adjacent municipal right-of-ways:

Merivale Road

- 1220 mm diameter concrete lined steel watermain;
- 1050 mm diameter concrete Cave Creek Collector sanitary sewer;
- 375 mm PVC local storm sewer;
- 2100 mm concrete storm tunnel, tributary to Ottawa River which is approximately 3.8 km downstream;

- 2100 mm concrete storm tunnel, tributary to Ottawa River which is approximately 3.5 km downstream.

Carling Avenue

- 1220 mm diameter concrete lined steel watermain;
- 406 mm diameter PVC watermain;
- 250 mm diameter PVC sanitary sewer;
- 900 mm diameter concrete Cave Creek Collector sanitary sewer;
- 750 mm diameter concrete storm sewer;
- 1800 mm concrete storm tunnel, tributary to Ottawa River approximately 3.8 km downstream
- 2100 mm concrete storm tunnel tributary to Ottawa River which is approximately 3.5 km downstream.

1.2 Required Permits / Approvals

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

The proposed development and stormwater management system qualifies for an exemption from an Environmental Compliance Application under Section 53 of the Ontario Water Resources Act.

1.3 Pre-consultation

Pre-consultation correspondence, along with the servicing guidelines checklist, is located in ***Appendix A***.

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

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

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

  - **Technical Bulletin ISTB-2018-01**
    City of Ottawa, March 21, 2018.
    (ISTB-2018-01)

  - **Technical Bulletin ISTB-2018-04**
    City of Ottawa, June 27, 2018.
    (*ISTB-2018-04)*

- **Ottawa Design Guidelines – Water Distribution**
  City of Ottawa, July 2010.
  (Water Supply Guidelines)

  - **Technical Bulletin ISD-2010-2**
    City of Ottawa, December 15, 2010.
    (*ISD-2010-2*)

  - **Technical Bulletin ISDTB-2014-02**
    City of Ottawa, May 27, 2014.
    (ISDTB-2014-02)

  - **Technical Bulletin ISDTB-2018-02**
    City of Ottawa, March 21, 2018.
    (ISDTB-2018-02)

- **Design Guidelines for Sewage Works,**
  Ministry of the Environment, 2008.
  (MOE* Design Guidelines*)

- **Stormwater Planning and Design Manual,**
  Ministry of the Environment, March 2003.
  (SWMP Design Manual)

- **Ontario Building Code Compendium**
  Ministry of Municipal Affairs and Housing Building Development Branch, January 1, 2010 Update.
  (OBC)

- **Geotechnical Investigation Proposed Site Redevelopment Westgate Mall Phase 1, Ottawa, Ontario,**
  Golder Associates Ltd., November 2018.
  (Geotechnical Report)

- **Assessment of Adequacy of Public Services for RIOCAN Management Inc. 1309 & 1335 Carling Avenue,**
  David Schaeffer Engineering Inc. Project #:15-793, May 2016.
  (2016 AES)

- **Sewer CCTV Inspection Report**
  Clean Water Works Inc., December 3, 2015.
  (CCTV Report)

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2W2C pressure zone, as shown by the Pressure Zone map in ***Appendix B***. The site is currently serviced by the existing 406 mm diameter watermain within the Carling Avenue right-of-way.

The existing development is currently serviced by a looped 203 mm diameter watermain, with two connections to the existing 406 mm diameter watermain within Carling Avenue. Refer to drawing ***EX-1*** for the existing site servicing layout.

3.2 Water Supply Servicing Design

The existing 203 mm diameter watermain, currently servicing the existing commercial building on site, is located within the footprint of the proposed Phase I development. It is proposed that the existing watermain be realigned to provide servicing to the existing and Phase I development whilst maintaining the connections to the existing 406 mm diameter watermain within Carling Avenue.

In accordance with the *Conceptual Master Servicing Plan* included in ***Drawings/Figures***, the Phase I development is proposed to be serviced by the realigned 200 mm diameter watermain. The realignment will occur within the subject site with the proposed building being connected via a 200 mm diameter water service connection from the existing watermain. Refer to drawing ***SSP-1*** for a detailed servicing layout.

In accordance with City of Ottawa technical bulletin ***ISDTB-2014-02***, a redundant service connection will be required due to an estimated design flow of greater than 50 m^3/day, for the Phase I development. As indicated by drawings ***SSP-1***, a redundant connection to the existing 406 mm diameter watermain within Carling Avenue is provided via the existing looped 203 mm diameter watermain within the subject site. Existing valves within the looped watermain network will provide isolation to the Phase I development should any maintenance be required.

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

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential 1 Bedroom/Bachelor Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	280 L/d/P
Residential Maximum Daily Demand	3.0 x Average Daily * (Phase I) 2.5 x Average Daily * (Ultimate)
Residential Maximum Hourly	4.5 x Average Daily * (Phase I) 5.5 x Average Daily * (Ultimate)
Commercial Retail	2.5 $L/m^2/d$
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150 mm diameter
Minimum Depth of Cover	2.4 m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350 kPa and 480 kPa
During normal operating conditions pressure must not drop below	275 kPa
During normal operating conditions pressure must not exceed	552 kPa
During fire flow operating pressure must not drop below	140 kPa

Daily Average based on Appendix 4-A from **Water Supply Guidelines*
*** Residential Max. Daily and Max. Hourly peaking factors per MOE Guidelines for Drinking-Water Systems Table 3-3 for 0 to 500 persons.*
-Table updated to reflect ISD-2010-2 and ISTB-2018-02.

Table 2 and ***Table 3,*** below, summarizes the estimated water supply demand and boundary conditions for the proposed Phase I and contemplated Ultimate developments and are based on the ***Water Supply Guidelines***.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions – Phase I Development

	Phase I		
Design Parameter	**Estimated Demand[1] (L/min)**	**Boundary Condition[2] (m H_2O / kPa)**	
		Connection 1[2]	**Connection 2[3]**
Average Daily Demand	99.4	134.9/598.4	134.9/589.6
Max Day + Fire Flow	249.7+ 12,000 = 12,249.7	121.2/464.0	120.8/451.3
Peak Hour	389.1	126.1/512.1	126.1/503.3

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 73.9 m. See ***Appendix B.***
3) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 74.8 m. See ***Appendix B.***

Table 3
Water Demand and Boundary Conditions
Proposed Conditions – Ultimate Development

Design Parameter	Ultimate		
	Anticipated Demand[1] (L/min)	Boundary Condition (m H_2O / kPa)	
		Connection 1[2]	Connection 2[3]
Average Daily Demand	433.8	134.7/596.4	134.7/587.6
Max Day + Fire Flow	1,066.5 + 20,000 = 21,066.5	112.5/378.7	111.5/360.0
Peak Hour	2,335.4	126/511.1	126/502.3

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 73.9 m. See ***Appendix B.***
3) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 74.8 m. See ***Appendix B.***

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

Fire flow requirements were updated from the ***2016 AES*** in accordance with City of Ottawa Technical Bulletin ***ISTB-2018-02***. The following assumptions were assumed:

- Type of construction – Non-Combustible Construction;
- Occupancy type – Limited Combustibility; and
- Sprinkler Protection – Supervised Sprinkler System.

The above assumptions result in an estimated fire flows for each phase, as shown in ***Table 4,*** below, noting that actual building materials selected will affect the estimated flow. A certified fire protection system specialist will need to be employed to design the buildings fire suppression systems and confirm the actual fire flow demand.

Table 4
FUS - Estimated Fire flow Summary

Phase	Estimated Demand (L/min)
Phase I	12,000
Phase II	16,000
Phase III - Center	20,000
Phase III – West	17.000
Phase III – East	16.000

The above assumptions result in an estimated fire flow of approximately ***12,000 L/min*** for the Phase I development and a maximum fire flow of ***20,000 L/min*** for the Ultimate development.

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

Based on the latest site plan, water demands decreased by approx. 1% from demands indicated in the previous boundary conditions. The boundary condition indicated that pressures are above the desired range. As such, it is anticipated updated boundary conditions are not required.

3.2.1. EPANet Water Modelling

EPANet was utilized to evaluate pipe sizing and the availability of pressures throughout the system during average day demand, max day plus fire flow and peak hour demands. The static model determines pressures based on the available head obtained from the boundary conditions provided by the City of Ottawa.

The model utilizes the Hazen-Williams equation to determine pressure drop, while the pipe properties, including friction factors, have been selected in accordance with Table 4.4 of the ***Water Supply Guidelines***. The model was prepared to assess the available pressure at the building, as well as, the pressures the watermain provides to the fire hydrant during fire flow conditions.

Table 5, below, summarizes the EPANet analysis. ***Appendix B*** contains output reports and model schematics for each scenario.

Table 5
Model Simulation Output Summary

Location	Average Day (kPa)	Max Day + Fire Flow (kPa)	Peak Hour (kPa)
N1	620.6	295.4	534.0
N2 (HYD)	617.4	292.2	530.8
N3	619.7	312.7	533.1
N4	616.1	323.3	529.3
N4a	617.5	324.9	530.9
N5	620.6	383.1	534.1
N6	623.2	472.2	536.9

As demonstrated by ***Table 5***, the model indicates that pressure within the watermain network exceed the required range identified by the ***Water Supply Guidelines***. As a result, buildings will need to be equipped with pressure reducing valves.

3.3 Water Supply Conclusion

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

As demonstrated by ***Table 2***, which is based on the City's model, the municipal system exceeds the required ***Water Supply Guidelines*** pressure range. As a result, buildings will need to be equipped with pressure reducing valves.

DSEL employed a daily consumption rate of 280 L/person/day to align with the revised wastewater rates identified by City of Ottawa Technical Bulletin ***ISTB-2018-01***. As a result, DSEL is submitting for a deviation from the ***Water Supply Guidelines***.

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the Cave Creek Collector Sewer catchment area, as shown by the City sewer mapping included in ***Appendix C***. The existing site consists of a commercial mall, currently contributing wastewater to the internal 250 mm diameter sanitary sewer network. The internal 250 mm diameter sanitary sewer network outlets to the existing 900 mm diameter sanitary sewer within Carling Avenue and is tributary to an existing 1050 mm diameter sanitary sewer, the Cave Creek Collector, located approximately 50 m downstream of the site within the Merivale Road right-of-way.

4.2 Wastewater Design

The proposed development will use an internal sanitary sewer system to convey flow to the municipally owned sewers. As indicated by the ***2016 AES*** and illustrated by drawing ***SSP-1***, the Phase I development will be serviced by the 1050 mm diameter sanitary sewer within Merivale Road via a 250 mm diameter sanitary sewer. No changes to the existing internal sanitary sewer network is proposed during Phase I.

In accordance with the *Conceptual Master Servicing Plan* included in ***Drawings/Figures***, future phases will utilize independent connections to the proposed internal sanitary sewer network. As a result, the proposed Phase 1 sanitary sewer network was adequately sized for future phases, including depth, in order to ensure adequate cover in further stages of the development. Refer to ***Appendix C*** for the detailed sanitary sewer sizing calculation sheet.

Table 6, below***,*** summarizes the ***City Standards*** employed in the design of the proposed wastewater sewer system.

Table 6
Wastewater Design Criteria

Design Parameter	Value
Residential 1 Bedroom/Bachelor Apartment	1.4 P/unit
Residential 2 Bedroom Apartment	2.1 P/unit
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	280 L/d/per
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0 Harmon's Correction Factor 0.8
Commercial Floor Space	5 $L/m^2/d$
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012 and City of Ottawa ISTB-2018-01.	

Table 7, below, demonstrates the estimated peak flow from the proposed development. See ***Appendix C*** for associated calculations.

Table 7
Summary of Estimated Peak Wastewater Flow

Phase	Design Parameter	Total Flow (L/s)
Phase I	Estimated Average Dry Weather Flow	3.25
	Estimated Peak Dry Weather Flow	7.43
	Estimated Peak Wet Weather Flow	7.46
Ultimate	Estimated Average Dry Weather Flow	8.27
	Estimated Peak Dry Weather Flow	28.13
	Estimated Peak Wet Weather Flow	28.31

The estimated sanitary peak wet weather flow for the Phase I development based on the site statistics provided by RLA Architecture is ***7.93 L/s***.

As indicated by the ***2016 AES***, the anticipated peak wet weather wastewater discharge from the Phase I development is ***9.52 L/s*** and from the Ultimate development is ***33.4 L/s***. Due to the close proximity to the Cave Creek Collector and the complexity of the drainage area, the impacts from the estimated flow from the site required further review by the City in order to confirm capacity and resulting HGL within the existing collector. The City determined the Cave Creek Collector sewer has sufficient capacity to accommodate the anticipated Phase I and Ultimate development. Correspondence with the City is included in ***Appendix C.***

Based on **Table 7** above, proposed and Ultimate flows have been reduced by approximately 28% and 18% respectively since initial communication with the City. The analysis provided by the City therefore indicates that sufficient capacity is available in the local sewers to accommodate the proposed Phase I and contemplated Ultimate developments.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Cave Creek Collector sewer. Due to the proximity of the Cave Creek Collector, the existing capacity was confirmed with the City of Ottawa staff. Based on the analysis prepared by City staff, sufficient capacity is available in the local sewers to accommodate the proposed Phase I and Ultimate development.

The proposed sanitary sewer has been designed to accommodate future phases in accordance with the ***2016 AES***.

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 development within this area are under the approval authority of the City of Ottawa.

Flows that influence the watershed in which the subject property is located are further reviewed by the principal authority. The subject property is located within the Ottawa River watershed and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in ***Appendix A***.

The existing commercial building and associated parking areas are currently serviced by the existing 600 mm diameter storm sewer within Carling Avenue and the existing 2100 mm diameter storm sewer within Merivale Road via an internal storm sewer network. Portions of the exiting storm sewer network are proposed to be removed or relocated during the Phase I development, as shown by the *Conceptual Master Servicing Plan* and drawing ***EX-1*** included in ***Drawings/Figures***.

5.2 Post-development Stormwater Management Target – Phase I

Stormwater management requirements for the proposed Phase I development were reviewed in accordance with the ***2016 AES***, where the proposed development is required to:

- Attenuate all storms up to and including the City of Ottawa 100-year design event on site to an equivalent rate of ***97.5 L/s/ha***;
- Based on correspondence with the RVCA, quality controls are not required for the proposed development due to the site's distance from the outlet. Correspondence with the RVCA is included in ***Appendix A***.

As indicated by the *Post-Development Drainage Boundaries – Phase I* figure included in ***Appendix D***, the Phase I development is located within 0.64 ha of previously contemplated Area A1 and within 0.05 ha of previously contemplated Area A2. ***Table 8,*** below, summarizes the allowable release rates for the Phase I development based on the established release rates identified in the ***2016 AES***.

Table 8
Stormwater Allowable Release Rate Summary – Phase I

Area ID	Total Area (ha)	5-Year Release Rate (L/s)	100-Year Release Rate (L/s)
A1-1	0.64	62.4	62.4
A2-1	0.05	4.9	4.9
Total	**0.69**	**67.3**	**67.3**

As demonstrated by ***Table 8***, the allowable release rate for the Phase I development is ***67.3 L/s***. Refer to ***Appendix D*** for associated calculations and *Post-Development Drainage Boundaries – Phase I* figure.

5.3 Proposed Stormwater Management System

To meet the stormwater objectives the proposed development will utilize a combination of surface and subsurface storage. As identified by the ***2016 AES,*** stormwater will outlet from the proposed development to the existing 1350 mm diameter storm sewer within the Merivale Road right-of-way.

The private stormwater sewer system has been sized to convey an uncontrolled 5-year storm runoff rate in accordance with the ***2016 AES*** and has been sized to support stormwater runoff from the future phases. Detailed layout and sizing are illustrated by ***SSP-1*** and the storm sewer calculation sheet included in ***Appendix D***.

Runoff from the drive aisle area west of the development (***Area C1***) will be directed to a catchbasin system; ***12.0 m^3*** of storage will be provided by subsurface storage using a Soleno Stormchamber underground storage system or an approved equivalent. Attenuation will be provided by an ***85 mm ICD*** located on the outlet side of maintenance structure STM101A. Runoff from the parking area and building rooftop (***Area C2+BLDA***) will be directed to a catchbasin system; ***58.4 m^3*** of storage will be provided by surface ponding. An additional ***208.0 m^3*** of storage will be provided via two ***104.0 m^3*** Soleno Stormchamber underground storage systems or an approved equivalent. Attenuation will be provided by a ***Tempest LMF65 ICD*** or an approved equivalent located on the outlet side of maintenance structure STM105. (Refer to ***Appendix D*** for associated calculations and system details.)

Runoff from the landscaped area north east of the development (***Area C3***) will be directed to a catchbasin system; ***29.8 m^3*** of storage will be provided by surface ponding. Attenuation will be provided by a ***Tempest LMF70 ICD*** or an approved equivalent located on the outlet side of catchbasin CB3.

Uncontrolled areas (***UN1*** and ***UN2***), as shown by drawing ***SWM-1,*** will be released uncontrolled to municipal right-of-ways and are compensated for in areas with controls.

Table 9, below, summarizes post-development flow rates.

Table 9
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Required Storage	100-Year Available Storage
	(L/s)	(m^3)	(L/s)	(m^3)	(m^3)
Unattenuated Areas (UN1)	14.8	0.0	28.1	0.0	0.0
Unattenuated Areas (UN2)	4.1	0.0	8.8	0.0	0.0
Attenuated Areas (C1)	11.8	4.5	17.2	11.8	11.9
Attenuated Area (C2+BLDA)	1.8	132.5	3.9	255.0	264.5
Attenuated Area (C3)	5.7	0.8	6.1	28.6	29.8
Total	**38.1**	**137.8**	**64.1**	**295.4**	**306.2**

It is calculated that ***295.4 m^3*** of storage will be required on site to attenuate flow to the established release rate of ***67.3 L/s***; ***306.2 m^3*** of surface and subsurface storage is provided. Detailed storage calculations are included in ***Appendix D***.

5.4 Foundation Drainage

Based on coordination with the mechanical engineer, foundation drainage will be collected and pumped to the 250mm foundation service lateral located at the north-west corner of the building. Refer to drawing ***SSP-1***.

The foundation drainage will discharge to a storm sewer connected downstream of proposed storm inlet controls. Refer to ***Geotechnical Investigation*** prepared by ***Golder Associates Ltd.*** for details.

5.5 Stormwater Quality Control

The ***RVCA*** was contacted to establish stormwater quality control requirements for the subject site. Correspondence located in ***Appendix A*** indicates that quality controls are not required.

The subject development proposes an increase in landscape and roof area and a decrease in surface parking from existing site conditions. Stormwater from roof areas is considered to be clean as it will not interact with parking areas before discharging to the municipal system.

5.6 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 the previously approved ***2016 AES***. The post-development allowable release rate for the Phase I development was calculated as ***67.3 L/s***. It is calculated that ***295.4 m^3*** of storage will be required to meet this release rate; ***306.2 m^3*** is provided.

Based on consultation with the RVCA, stormwater quality controls are not required.

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

6.0 UTILITIES

Gas and Hydro services currently exist within the Caring Avenue and Merivale Road right-of-ways. Utility servicing will be coordinated with the individual utility companies prior to site development.

Special considerations will need to be taken with development within the Hydro corridor. The proposed development will be coordinated and approved by the utility company having jurisdiction.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. During construction the extent of erosion losses is exaggerated due to the removal of vegetation and the top layer of soil becoming agitated.

Prior to topsoil stripping, earthworks or underground construction, erosion and sediment controls will be implemented and will be maintained throughout construction.

Silt fence will be installed around the perimeter of the site and will be cleaned and maintained throughout construction. Silt fence will remain in place until the working areas have been stabilized and re-vegetated.

Catch basins will have SILTSACKs or an approved equivalent installed under the grate during construction to protect from silt entering the storm sewer system.

A mud mat will be installed at the construction access in order to prevent mud tracking onto adjacent roads.

Erosion and sediment controls must be in place during construction. The following recommendations to the contractor will be included in contract documents:

- Limit extent of exposed soils at any given time;
- Re-vegetate exposed areas as soon as possible;
- Minimize the area to be cleared and grubbed;
- Protect exposed slopes with plastic or synthetic mulches;
- Install silt fence to prevent sediment from entering existing ditches;
- No refueling or cleaning of equipment near existing watercourses;
- Provide sediment traps and basins during dewatering;
- Install filter cloth between catch basins and frames;
- Plan construction at proper time to avoid flooding; and
- Establish material stockpiles away from watercourses, so that barriers and filters may be installed.

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

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

8.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained by RioCan Holdings Inc. to prepare a Site Servicing and Stormwater Management Report in support of the Site Plan Control (SPC) application for the Phase I development at 1309 Carling Avenue. The preceding report outlines the following:

- Based on boundary conditions provided by the City, residual pressures exceed the required range identified by the Water Supply Guidelines; pressure reducing valves are required;
- The FUS method for estimating fire flow indicated ***12,000 L/min*** is required for the Phase I development and ***20,000 L/min*** for the Ultimate development. As indicated by the boundary conditions provided by the City, the municipal system is capable of providing the required flow;
- The proposed Phase I development is estimated to have a peak wet weather flow of ***7.46 L/s***; Based on coordination with City staff, sufficient capacity is available in the local sewers to support the Phase I development;
- 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 the previously approved ***2016 AES***. The post-development allowable release rate for the Phase I development was calculated as ***67.3 L/s***;
- Stormwater objectives will be met through retention via surface and subsurface storage, it is calculated that ***295.3 m^3*** of onsite storage will be required to attenuate flow to the established release rate above; ***306.2 m^3*** is provided;
- Based on consultation with the RVCA, stormwater quality controls are not required due to the distance to the outlet.

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David Schaeffer Engineering Ltd.

Per: Robert D. Freel, P. Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

18-1028 06/11/2018

4.1 General Content

☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures, EX-1
☒	Plan showing the site and location of all existing services.	Figure 1, EX-1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0, Section 5.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3, Appendix A
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1, EX-1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GP-1
☐	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
☐	Proposed phasing of the development, if applicable.	N/A
☐	Reference to geotechnical studies and recommendations concerning servicing.	Section 2.1
☐	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	Drawings/Figures

4.2 Development Servicing Report: Water

☐	Confirm consistency with Master Servicing Study, if available	N/A
☒	Availability of public infrastructure to service proposed development	Section 3.1
☒	Identification of system constraints	Section 3.1
☒	Identify boundary conditions	Section 3.1, 3.2, Appendix B
☒	Confirmation of adequate domestic supply and pressure	Section 3.2, 3.2.1, 3.3

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

☒	Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.	Section 3.2, Appendix B
☐	Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.	N/A
☐	Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design	N/A
☐	Address reliability requirements such as appropriate location of shut-off valves	N/A
☐	Check on the necessity of a pressure zone boundary modification	N/A
☒	Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range	Section 3.2, 3.2.1, 3.3
☐	Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.	Section 3.2, SSP-1
☐	Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.	N/A
☒	Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.	Section 3.2, Appendix B
☐	Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.	Section 3.2.1, Appendix B

4.3 Development Servicing Report: Wastewater

☒	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
☐	Confirm consistency with Master Servicing Study and/or justifications for deviations.	Section 4.2
☐	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
☒	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1, EX-1
☒	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2, Appendix C
☒	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
☒	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2, SSP-1
☐	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

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

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

4.4 Development Servicing Report: Stormwater Checklist

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

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

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	Section 5.4
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 7.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

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

4.6 Conclusion Checklist

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

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

Robert Freel

From: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Sent: November-05-15 12:20 PM
To: Robert Freel
Subject: RE: 1309 Carling Avenue - RVCA

Hello Bobby,
Based on the distance to the receiver, the RVCA will not be advising that quality controls for stormwater are required on the site. It is however a large site with a lot of surface parking. Any efforts to reduce the TSS load should be explored and would be supported.
Jocelyn

Jocelyn Chandler M.Pl. MCIP, RPP
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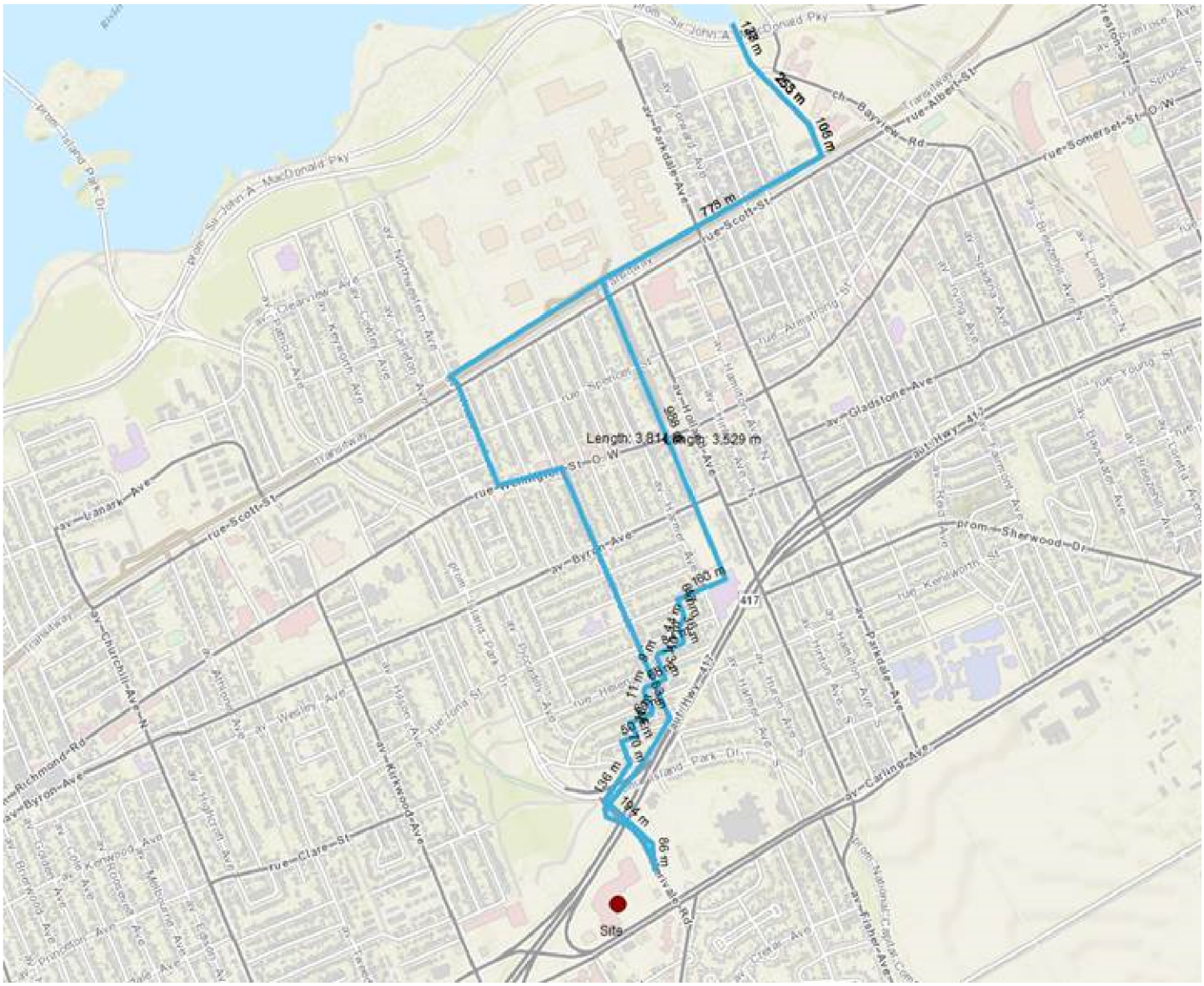
mail: Box 599 3889 Rideau Valley Dr., Manotick, ON K4M 1A5
courier: 3889 Rideau Valley Dr., Nepean, ON K2C 3H1

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: Tuesday, November 03, 2015 2:34 PM
To: Jocelyn Chandler <jocelyn.chandler@rvca.ca>
Subject: 1309 Carling Avenue - RVCA

Good afternoon Jocelyn,

We are working to complete some due diligence work on a property at 1309 Carling Avenue. Based on the information available it appears that the existing storm sewers servicing the site travel 3.5 – 3.8 km before discharging to the Ottawa River as shown by the figure below. The contemplated plan involves a phased redevelopment of the commercial property into a residential/commercial mixed-use development.

Can you provide any requirements relating to quality?



Thanks,

Bobby Freel, P.Eng.
Project Manager / Intermediate Designer

DSEL
david schaeffer engineering ltd.

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email: rfreel@DSEL.ca

APPENDIX B

Water Supply

RIOCAN
Westgate Centre
Existing Site Conditions

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

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	**m^3/d**	**L/min**	**m^3/d**	**L/min**	**m^3/d**	**L/min**
Commercial floor space	2.5	$L/m^2/d$	15,484	38.71	26.9	58.1	40.3	104.5	72.6
Office	75	$L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
		Total I/CI Demand		38.7	26.9	58.1	40.3	104.5	72.6
		Total Demand		**38.7**	**26.9**	**58.1**	**40.3**	**104.5**	**72.6**

Westgate Centre
Proposed Site Conditions - Phase I

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

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4	13	19
1 Bedroom	1.4	135	189
2 Bedroom	2.1	65	137
3 Bedroom	3.1		0
Average	1.8		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	345	96.6	67.1	289.8	201.3	434.7	301.9

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
Ex. Commercial	2.5	$L/m^2/d$	15484	38.71	26.9	58.1	40.3	104.5	72.6
Commercial	2.5	$L/m^2/d$	1612	4.03	2.8	6.0	4.2	10.9	7.6
Ammenity floor space	2.5	$L/m^2/d$	480	1.20	0.8	1.8	1.3	3.2	2.3
Restaurant *	125	L/9.3m2/d	192	2.58	1.8	3.9	2.7	7.0	4.8
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				46.5	32.3	69.8	48.5	125.6	87.2
Total Demand				**143.1**	**99.4**	**359.6**	**249.7**	**560.3**	**389.1**

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

Westgate Centre
Proposed Site Conditions - Ultimate

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

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4	13	19
1 Bedroom	1.4	135	189
2 Bedroom	2.1	65	137
3 Bedroom	3.1		0
Average	1.8	996	1793

	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	2138	598.6	415.7	1496.6	1039.3	3292.5	2286.5

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Commercial floor space	2.5	$L/m^2/d$	9,399	23.50	16.3	35.2	24.5	63.4	44.1
Restaurant *	125	L/9.3m2/d	192	2.58	1.8	3.9	2.7	7.0	4.8
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				26.1	18.1	39.1	27.2	70.4	48.9
Total Demand				**624.7**	**433.8**	**1535.7**	**1066.5**	**3362.9**	**2335.4**

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

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

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

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	21305.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	25689.4	L/min	
	26000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**22100.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%	
Reduction	**-11050**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Wood Frame	>45m	0	0	0	0%	
S	Wood Frame	>45m	0	0	0	0%	
E	Wood Frame	30.1m-45m	30	1	30	5%	
W	Wood Frame	>45m	0	0	0	0%	
		% Increase				**5%**	*value not to exceed 75%*

Increase	**1105.0**	**L/min**	

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

Total Fire Flow

Fire Flow	12155.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	12000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

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	21740.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	25950.3	L/min	
	26000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**22100.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%	
Reduction	**-11050**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Non-Combustible	10.1m-20m	45	2	90	14%	
S	Wood Frame	>45m	0	0	0	0%	
E	Wood Frame	>45m	0	0	0	0%	
W	Non-Combustible	20.1m-30m	30	7	210	10%	
		% Increase				**24%**	*value not to exceed 75%*

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

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

Total Fire Flow

Fire Flow	16354.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	16000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

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	26775.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	28799.0	L/min	
	29000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**24650.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%	
Reduction	**-12325**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Non-Combustible	>45m	0	0	0	0%	
S	Wood Frame	>45m	0	0	0	0%	
E	Wood Frame	10.1m-20m	68	36	2448	15%	
W	Non-Combustible	10.1m-20m	68	36	2448	15%	
		% Increase				**30%**	*value not to exceed 75%*

Increase	**7395.0**	**L/min**	

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

Total Fire Flow

Fire Flow	19720.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	20000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

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	20000.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	24890.2	L/min	
	25000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**21250.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%	
Reduction	**-10625**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Non-Combustible	>45m	0	0	0	0%	
S	Wood Frame	10.1m-20m	69	22	1518	15%	
E	Wood Frame	10.1m-20m	45	36	1620	15%	
W	Non-Combustible	>45m	0	0	0	0%	
		% Increase				**30%**	*value not to exceed 75%*

Increase	**6375.0**	**L/min**

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

Total Fire Flow

Fire Flow	17000.0	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 RLA Architecture.
-Calculations based on Fire Underwriters Survey - Part II

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	27313.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	29086.9	L/min	
	29000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**24650.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%	
Reduction	**-12325**	**L/min**

4. Increase for Separation Distance

	Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N	Non-Combustible	>45m	0	0	0	0%	
S	Wood Frame	>45m	0	0	0	0%	
E	Wood Frame	>45m	0	0	0	0%	
W	Non-Combustible	10.1m-20m	45	36	1620	15%	
		% Increase				**15%**	*value not to exceed 75%*

Increase	**3697.5**	**L/min**

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

Total Fire Flow

Fire Flow	16022.5	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	16000.0	**L/min**	*rounded to the nearest 1,000 L/min*

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

Westgate Centre
Boundary Condition Unit Conversion

Boundary Conditions Unit Conversion

Phase I Development

Grnd Elev	73.9				74.8		
Connection 1				Connection 2			
	m H_2O	**PSI**	**kPa**		**m H_2O**	**PSI**	**kPa**
Avg. Day	**134.9**	86.8	598.4	Avg. Day	**134.9**	85.5	589.6
Peak Hour	**126.1**	74.3	512.1	Peak Hour	**126.1**	73.0	503.3
Max Day + FF	**121.2**	67.3	464.0	Max Day + FF	**120.8**	65.4	451.3

Ultimate Development

Grnd Elev	73.9				74.8		
Connection 1				Connection 2			
	m H_2O	**PSI**	**kPa**		**m H_2O**	**PSI**	**kPa**
Avg. Day	**134.7**	86.5	596.4	Avg. Day	**134.7**	85.2	587.6
Peak Hour	**126**	74.1	511.1	Peak Hour	**126**	72.8	502.3
Max Day + FF	**112.5**	54.9	378.7	Max Day + FF	**111.5**	52.2	360.0

Minor Loss Coefficients

Fitting	Loss Coefficient
Globe valve, fully open	10
Angle valve, fully open	5
Swing check valve, fully open	2.5
Gate valve, fully open	0.2
Short-radius elbow	0.9
Medium-radius elbow	0.8
Long-radius elbow	0.6
45 degree elbow	0.4
Closed return bend	2.2
Standard tee - flow through run	0.6
Standard tee - flow through branch	1.8
Square Entrance	0.5
Exit	1

*Minor loss coefficients based on EPANET 2 USERS MANUAL, dated September 2000

Pipe Diameter vs. "C" Factor

Pipe Diameter (m)	C-Factor
150	100
200 to 250	110
300 to 600	120
Over 600	130

Node Pressures

Kpa	Pressure (kPa)	Pressure (m H20)
Max	552	56.3
Rec Max	480	49.0
Rec Min	350	35.7
Min	275	28.1

Location	Average Day (L/min)	Max Day + Fire Flow (L/min)	Peak Hour (L/min)
1	0.0	12000.0	0.0
2 (FYHYD)	0.0	0.0	0.0
3	0.0	0.0	0.0
4	99.4	249.7	389.1
4a	0.0	0.0	0.0
5	26.9	40.3	72.6
6	0.0	0.0	0.0

Location	Average Day (kPa)	Max Day + Fire Flow (kPa)	Peak Hour (kPa)
N1	620.6	295.4	534.0
N2 (FYHYD)	617.4	292.2	530.8
N3	619.7	312.7	533.1
N4	616.1	323.3	529.3
N4a	617.5	324.9	530.9
N5	620.6	383.1	534.1
N6	623.2	472.2	536.9

Charlotte Kelly

From: Baker, Adam <adam.baker@ottawa.ca>
Sent: October 24, 2018 2:00 PM
To: Alison Gosling
Cc: Oram, Cody; Charlotte Kelly
Subject: RE: 18-1028 1309 Carling Avenue - Boundary Condition Request
Attachments: 1309 Carling Aug 2018.pdf

Hello,

Please see attached water boundary conditions:

The following are boundary conditions, HGL, for hydraulic analysis at 1309 Carling (zone 2W) assumed to be connected to the 406mm on Carling (see attached PDF for location).

Phase 1

Minimum HGL = 126.1m, same at both connections

Maximum HGL = 134.9m, same at both connections. The maximum pressure is estimated to be above 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required

MaxDay + FireFlow (200 L/s) = 121.2m, connection 1

MaxDay + FireFlow (200 L/s) = 120.8m, connection 2

Ultimate Phase

Minimum HGL = 126.0m, same at both connections

Maximum HGL = 134.7m, same at both connections. The maximum pressure is estimated to be above 80 psi. A pressure check at completion of construction is recommended to determine if pressure control is required

MaxDay + FireFlow (333 L/s) = 112.5m, connection 1

MaxDay + FireFlow (333 L/s) = 111.5m, connection 2

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.

Thanks,

Adam Baker, EIT
Engineering Intern
Planning, Infrastructure and Economic Development Department - Services de la planification, de l'infrastructure et du développement économique
Development Review - South Branch
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West Ottawa, ON | 110, avenue. Laurier Ouest. Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 26552, Adam.Baker@ottawa.ca

From: Alison Gosling <AGosling@dsel.ca>
Sent: Friday, August 31, 2018 11:26 AM
To: Baker, Adam <adam.baker@ottawa.ca>
Cc: Oram, Cody <Cody.Oram@ottawa.ca>; Charlotte Kelly <CKelly@dsel.ca>
Subject: RE: 18-1028 1309 Carling Avenue - Boundary Condition Request

Thank you Adam.

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca

From: Baker, Adam [mailto:adam.baker@ottawa.ca]
Sent: Friday, August 31, 2018 10:51 AM
To: Alison Gosling <AGosling@dsel.ca>
Cc: Oram, Cody <Cody.Oram@ottawa.ca>; Charlotte Kelly <CKelly@dsel.ca>
Subject: RE: 18-1028 1309 Carling Avenue - Boundary Condition Request

Hello,

Please see attached water boundary conditions for 1309 Carling Avenue:

Phase 1

Minimum HGL = 126.1m, same at both connections

Charlotte Kelly

From: Alison Gosling
Sent: October 22, 2018 2:22 PM
To: Baker, Adam
Cc: Charlotte Kelly
Subject: 18-1028 1309 Carling Avenue - Boundary Condition Request
Attachments: wtr-2018-10-22_18-1028.pdf

Good afternoon Adam,

Based on the updated site statistics, the proposed water demand has increased by approximately 20%. As a result, we would like to request updated water boundary conditions for Carling Avenue using the following proposed development demands:

1. Location of Service / Street Number: 1309 Carling Avenue

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

- The proposed Phase 1 development is a mixed use condominium consisting of approximately ***210*** residential units and an additional ***2,307 m²*** of amenity/commercial space. Please note that the existing ***15,485 m²*** mall will remain in Phase I.
- The Ultimate development contemplates an additional 4 buildings consisting of approximately ***1206*** residential units and ***9,373 m²*** of amenity/commercial space.
- It is proposed that the development will have a dual connection to be serviced from the existing 406 mm diameter watermain within Carling Avenue, as shown by the map below.
- City of Ottawa Technical Bulletin ISTB-2018-02 has been used to calculate an estimated fire demand of ***12,000 L/min*** for the Phase 1 development and ***20,000 L/min*** for the Ultimate development. Refer to attached for the detailed calculations.

3.

	Phase I		Ultimate	
	L/min	L/min	L/min	L/min
Avg. Daily	100.1	1.67	434.1	7.24
Max Day	254.0	4.23	1069.1	17.82
Peak Hour	394.9	6.58	2342.2	39.04

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

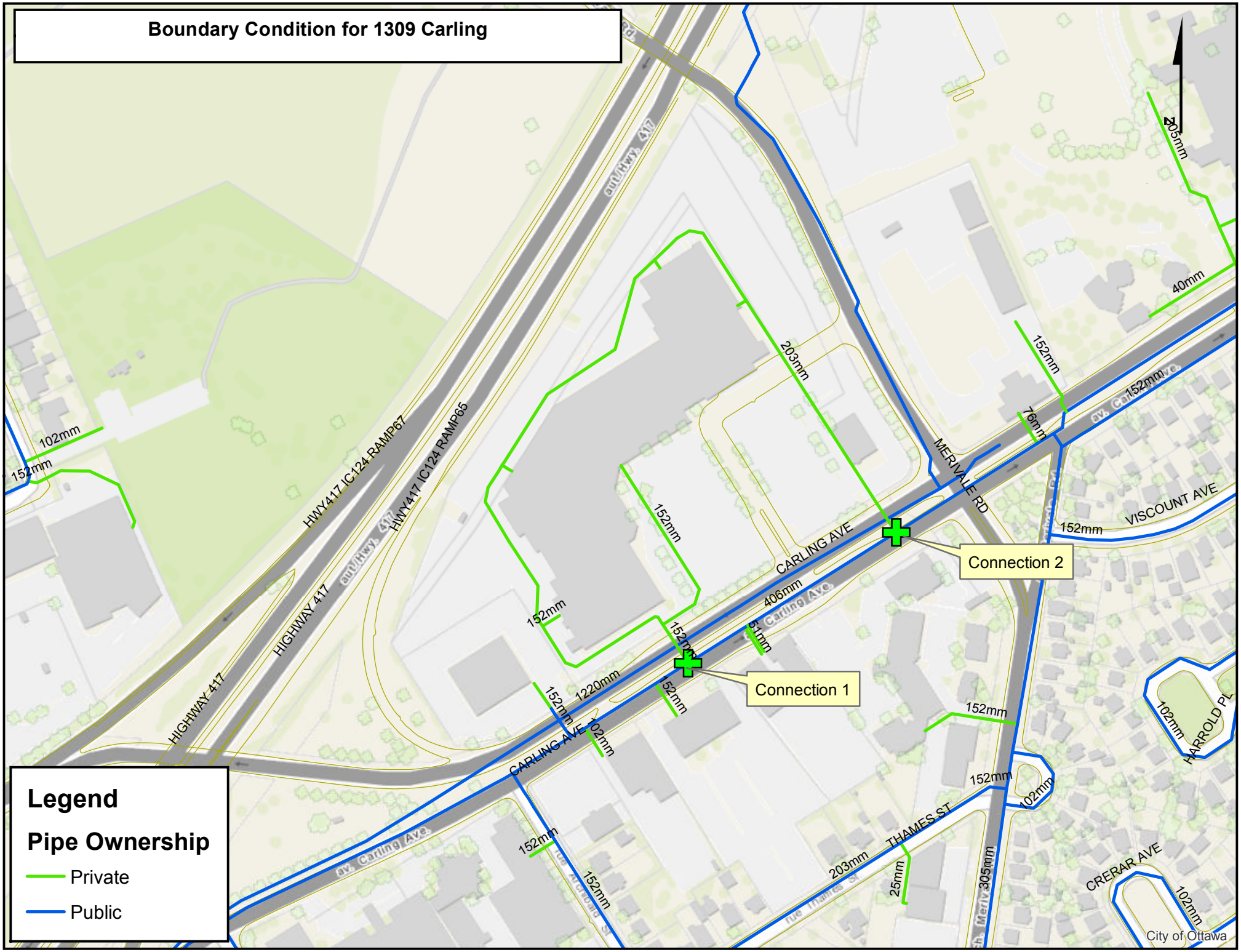
Thank you,

Alison Gosling, E.I.T.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

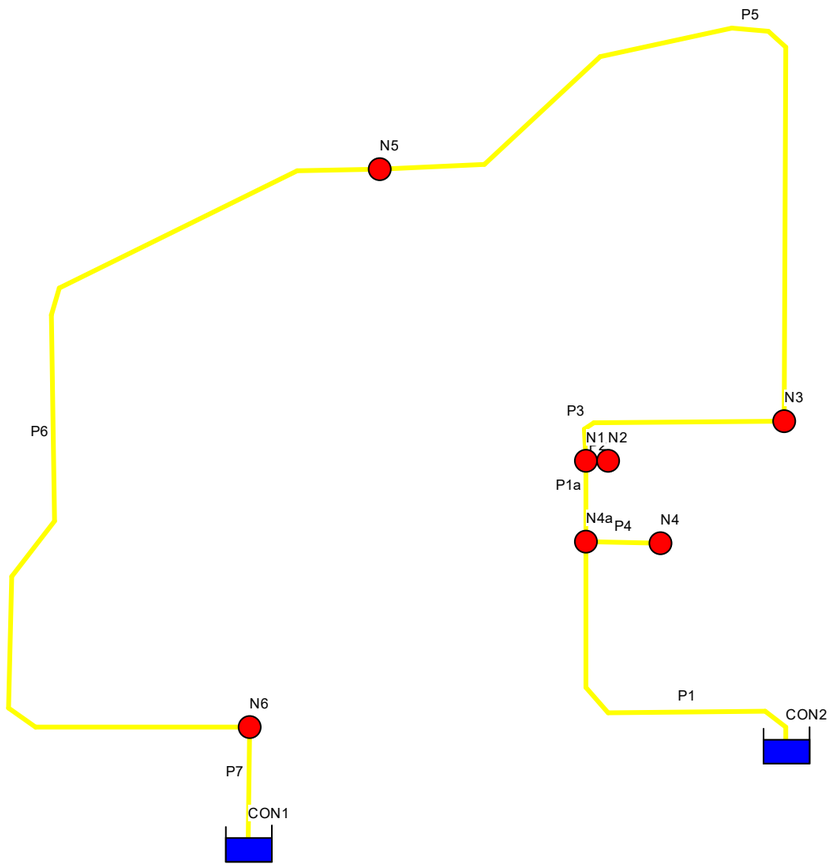
120 Iber Road, Unit 103
Stittsville, ON K2S 1E9

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@dsel.ca


Boundary Condition for 1309 Carling
Legend
Pipe Ownership
Private
Public
Connection 1
Connection 2
CARLING AVE
MERIVALE RD
HIGHWAY 417
HWY417 IC124 RAMP67
HWY417 IC124 RAMP65
VISCOUNT AVE
THAMES ST
CRERAR AVE
HARROLD PL
406mm
1220mm
305mm
203mm
152mm
102mm
76mm
40mm
25mm
City of Ottawa

1309 CARLING AVE- PHASE I - AVERAGE DEMAND

Day 1, 12:00 AM



BOUNDARY CONDITIONS

AVG DAY = 134.9m

PEAK HOUR = 126.1m

CONNECTION 1

MAX DAY + FIRE FLOW = 121.2m

CONNECTION 2

MAX DAY + FIRE FLOW = 120.8m

EPANET 2

```
******************************************************************
*                          E P A N E T                           *
*                   Hydraulic and Water Quality                  *
*                   Analysis for Pipe Networks                   *
*                        Version 2.0                             *
******************************************************************

Input File: 2019-07_EPANET MODEL_PHASE1_AVGDAY.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P2	N1	N2	5.22	150
P3	N1	N3	59.4	200
P4	N4a	N4	9.1	200
P5	N3	N5	212	200
P6	N5	N6	260	200
P7	N6	CON1	32.38	200
P1	CON2	N4a	100	200
P1a	N4a	N1	24	200

Node Results:

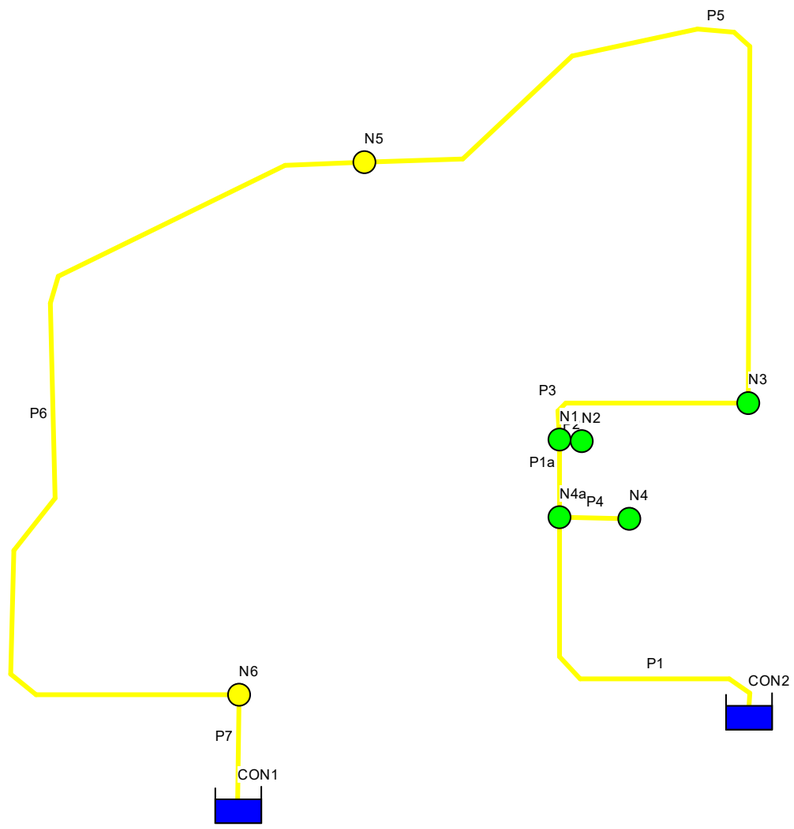
Node ID	Demand LPM	Head m	Pressure m	Quality	
N1	0.00	134.90	63.26	0.00	
N2	0.00	134.90	62.94	0.00	
N5	26.90	134.90	63.26	0.00	
N6	0.00	134.90	63.53	0.00	
N3	0.00	134.90	63.17	0.00	
N4	99.40	134.90	62.80	0.00	
N4a	0.00	134.90	62.95	0.00	
CON1	-42.95	134.90	0.00	0.00	Reservoir
CON2	-83.35	134.90	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
P2	0.00	0.00	0.00	Open
P3	-16.05	0.01	0.00	Open
P4	99.40	0.05	0.06	Open
P5	-16.05	0.01	0.00	Open
P6	-42.95	0.02	0.01	Open
P7	-42.95	0.02	0.01	Open
P1	83.35	0.04	0.03	Open
P1a	-16.05	0.01	0.00	Open

1309 CARLING AVE- PHASE I - MAX DAY + FIRE FLOW

Day 1, 12:00 AM



BOUNDARY CONDITIONS

AVG DAY = 134.9m

PEAK HOUR = 126.1m

CONNECTION 1

MAX DAY + FIRE FLOW = 121.2m

CONNECTION 2

MAX DAY + FIRE FLOW = 120.8m

Pressure	Diameter
14.27	20.00
28.03	150.00
35.70	200.00
56.27	250.00
m	mm

EPANET 2

```
*********************************************************************
*                           E P A N E T                             *
*                    Hydraulic and Water Quality                    *
*                    Analysis for Pipe Networks                     *
*                         Version 2.0                               *
*********************************************************************
```

Input File: 2019-03_EPANET MODEL_PHASE1_MAXDAYDAY.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P2	N1	N2	5.22	150
P3	N1	N3	59.4	200
P4	N4a	N4	9.1	200
P5	N3	N5	212	200
P6	N5	N6	260	200
P7	N6	CON1	32.38	200
P1	CON2	N4a	100	200
P1a	N4a	N1	24	200

Node Results:

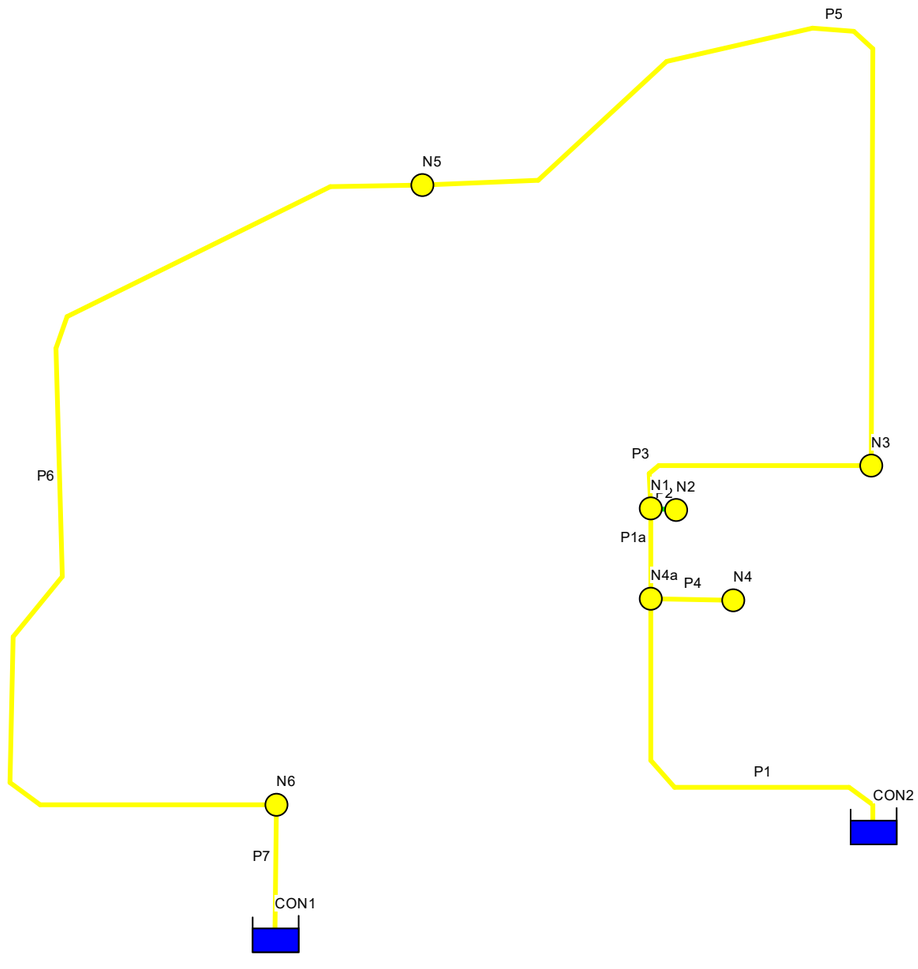
Node ID	Demand LPM	Head m	Pressure m	Quality	
N1	12000.00	101.75	30.11	0.00	
N2	0.00	101.75	29.79	0.00	
N5	40.30	110.69	39.05	0.00	
N6	0.00	119.50	48.13	0.00	
N3	0.00	103.61	31.88	0.00	
N4	249.70	105.06	32.96	0.00	
N4a	0.00	105.07	33.12	0.00	
CON1	-3796.86	121.20	0.00	0.00	Reservoir
CON2	-8493.14	120.80	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
P2	0.00	0.00	0.00	Open
P3	-3756.56	1.99	31.28	Open
P4	249.70	0.13	0.37	Open
P5	-3756.56	1.99	33.38	Open
P6	-3796.86	2.01	33.88	Open
P7	-3796.86	2.01	52.57	Open
P1	8493.14	4.51	157.34	Open
P1a	8243.44	4.37	138.00	Open

1309 CARLING AVE- PHASE I - PEAK HOUR DEMAND

Day 1, 12:00 AM



BOUNDARY CONDITIONS

AVG DAY = 134.9m

PEAK HOUR = 126.1m

CONNECTION 1

MAX DAY + FIRE FLOW = 121.2m

CONNECTION 2

MAX DAY + FIRE FLOW = 120.8m

Pressure
14.27
28.03
35.70
56.27
m

Diameter
20.00
150.00
200.00
250.00
mm

```
*************************************************************************
*                            E P A N E T                                *
*                     Hydraulic and Water Quality                       *
*                     Analysis for Pipe Networks                        *
*                          Version 2.0                                  *
*************************************************************************

Input File: 2019-03_EPANET MODEL_PHASE1_PEAKHOUR.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
P2	N1	N2	5.22	150
P3	N1	N3	59.4	200
P4	N4a	N4	9.1	200
P5	N3	N5	212	200
P6	N5	N6	260	200
P7	N6	CON1	32.38	200
P1	CON2	N4a	100	200
P1a	N4a	N1	24	200

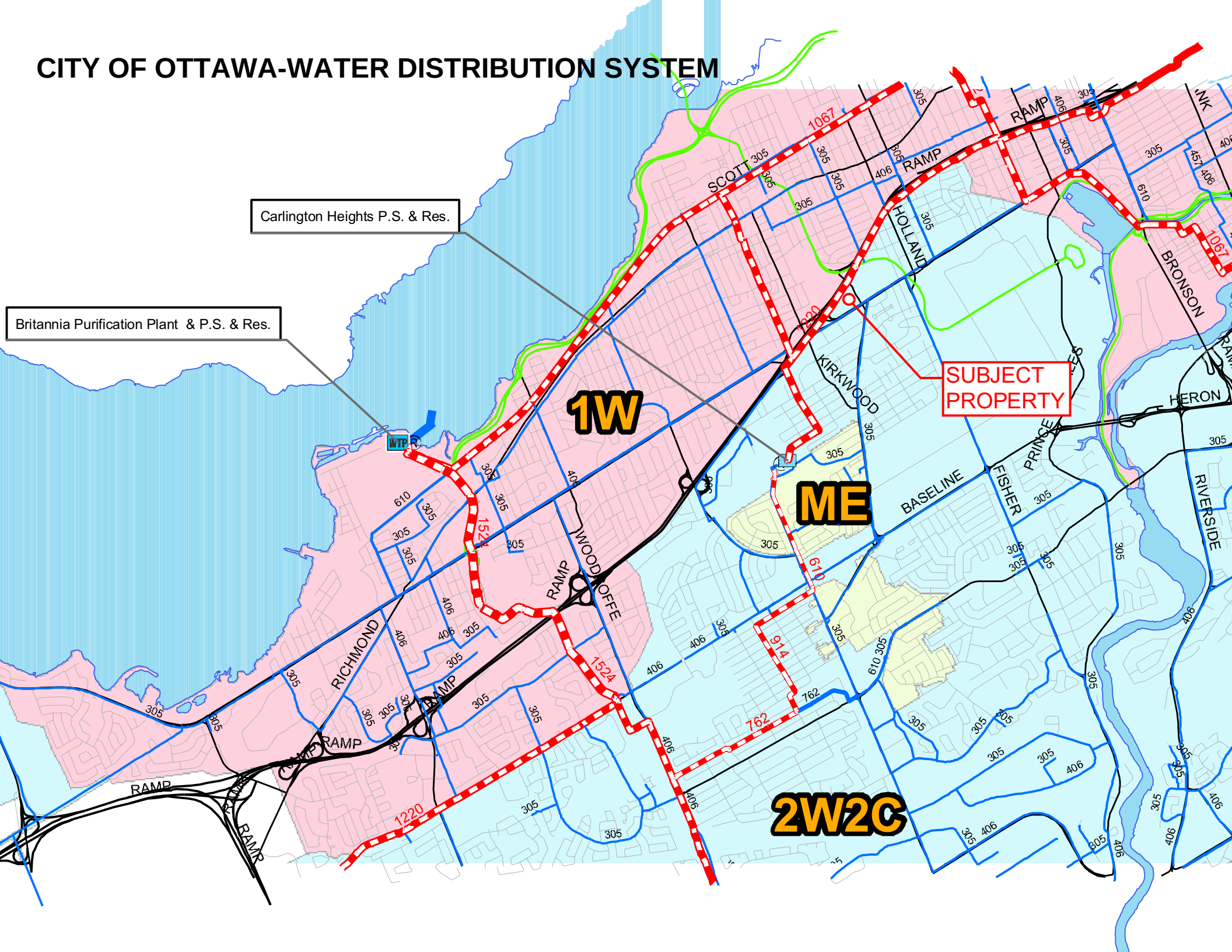
Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
N1	0.00	126.07	54.43	0.00	
N2	0.00	126.07	54.11	0.00	
N5	72.60	126.08	54.44	0.00	
N6	0.00	126.10	54.73	0.00	
N3	0.00	126.07	54.34	0.00	
N4	389.10	126.06	53.96	0.00	
N4a	0.00	126.07	54.12	0.00	
CON1	-151.12	126.10	0.00	0.00	Reservoir
CON2	-310.58	126.10	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	VelocityUnit m/s	Headloss m/km	Status
P2	0.00	0.00	0.00	Open
P3	-78.52	0.04	0.02	Open
P4	389.10	0.21	0.87	Open
P5	-78.52	0.04	0.02	Open
P6	-151.12	0.08	0.08	Open
P7	-151.12	0.08	0.11	Open
P1	310.58	0.16	0.31	Open
P1a	-78.52	0.04	0.02	Open

CITY OF OTTAWA-WATER DISTRIBUTION SYSTEM



APPENDIX C

Wastewater Collection

RIOCAN
Westgate Centre
Existing Conditions

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

Site Area 3.740 **ha**

Extraneous Flow Allowances

Infiltration / Inflow	**1.05**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5 $L/m^2/d$	15,484	1.79
Hospitals	900 L/bed/d		0.00
School	70 L/student/d		0.00
Ex. Industrial - Light**	35,000 L/gross ha/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	**1.79**
Peak Institutional / Commercial Flow	2.69
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**2.69**

** 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	**1.79 L/s**
Total Estimated Peak Dry Weather Flow Rate	**2.69 L/s**
Total Estimated Peak Wet Weather Flow Rate	**3.74 L/s**

Residential demands, Harmon's Correction Factor, Extraneous Flow Rates and Commercial Peaking Factor established by the City of Ottawa Technical Bulletin ISTB-2018-01. Commercial demands established by City of Ottawa Sewer Design Guidelines Appendix 4A.

Westgate Centre
Proposed Site Conditions - Phase 1

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

Site Area 0.690 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.03 L/s**
Infiltration / Inflow (Wet)	**0.19 L/s**
Infiltration / Inflow (Total)	**0.23 L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4	13	19
1 Bedroom	1.4	135	189
2 Bedroom	2.1	65	137
3 Bedroom	3.1		0
Average	1.8		0

Total Pop	**345**
Average Domestic Flow	**1.12 L/s**
Peaking Factor	**3.66**
Peak Domestic Flow	**4.09 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate	No. of Units	Avg Wastewater (L/s)
Ex. Commercial*	5 $L/m^2/d$	15,484	1.79
Commercial*	5 $L/m^2/d$	1,612	0.19
Ammenity floor space*	5 $L/m^2/d$	480	0.06
Restaurant***	125 $L/9.3m^2/d$	192	0.06
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	**2.09**
Peak Institutional / Commercial Flow	3.14
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**3.14**

** 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	**3.25 L/s**
Total Estimated Peak Dry Weather Flow Rate	**7.43 L/s**
Total Estimated Peak Wet Weather Flow Rate	**7.46 L/s**

Residential demands, Harmon's Correction Factor, Extraneous Flow Rates and Commercial Peaking Factor established by the City of Ottawa Technical Bulletin ISTB-2018-01. Commercial demands established by City of Ottawa Sewer Design Guidelines Appendix 4A.

RIOCAN
Westgate Centre
Proposed Site Conditions - Ultimate

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

Site Area	3.700	**ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.19**	**L/s**
Infiltration / Inflow (Wet)	**1.04**	**L/s**
Infiltration / Inflow (Total)	**1.22**	**L/s**

Domestic Contributions

Unit Type	Unit Rate	Units	Pop
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse	2.3		0
Apartment			
Bachelor	1.4	13	19
1 Bedroom	1.4	135	189
2 Bedroom	2.1	65	137
3 Bedroom	3.1		0
Average	1.8	996	1793

Total Pop	**2138**	
Average Domestic Flow	**6.93**	**L/s**
Peaking Factor	**3.66**	
Peak Domestic Flow	**25.36**	**L/s**

Institutional / Commercial / Industrial Contributions

Property Type	Unit Rate		No. of Units	Avg Wastewater (L/s)
Commercial floor space*	5	$L/m^2/d$	9,399	1.09
Restaurant***	125	$L/9.3m^2/d$	221	0.07
School	70	L/student/d		0.00
Ex. Industrial - Light**	35,000	L/gross ha/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	**1.16**
Peak Institutional / Commercial Flow	1.73
Peak Industrial Flow**	0.00
Peak I/C/I Flow	**1.73**

** 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	**8.27**	**L/s**
Total Estimated Peak Dry Weather Flow Rate	**28.13**	**L/s**
Total Estimated Peak Wet Weather Flow Rate	**28.31**	**L/s**

Residential demands, Harmon's Correction Factor, Extraneous Flow Rates and Commercial Peaking Factor established by the City of Ottawa Technical Bulletin ISTB-2018-01. Commercial demands established by City of Ottawa Sewer Design Guidelines Appendix 4A.

RIOCAN
Westgate Centre
Proposed Site Conditions - Ultimate

CLIENT: **RIOCAN INC.**
LOCATION: **Westgate Mall**
FILE REF: **18-1028**
DATE: **20-Mar-19**

DESIGN PARAMETERS

Avg. Daily Flow Res.	280	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.33	L/s/ha
Avg. Daily Flow Comm	50,000	L/ha/d	Peak Fact. Comm.	1.5	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	50,000	L/ha/d	Peak Fact. Instit.	1.5	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indust	35,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population										Commercial		Institutional		Industrial			Infiltration				Pipe Data							
Area ID	Up	Down	Area	Number of Units				Pop.	Cumulative		Peak.	Q_{res}	Area	Accu.	Area	Accu.	Area	Accu.	Q_{C+I+I}	Total	Accu.	Infiltration	Total	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
				by type					Area	Pop.	Fact.			Area		Area		Area		Area	Area	Flow	Flow								
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
	SAN2*	SAN1	4.090				636	1145.0	4.090	1145.0	3.76	13.96	0.27	0.27		0.00		0.00	0.2	4.360	4.360	1.221	15.41	200	1.00	45.5	0.031	0.050	1.04	32.8	0.47
	SAN1	EX.MH	0.690				213	383.0	4.780	1528.0	3.67	18.19	0.23	0.23		0.00		0.00	0.2	0.921	0.921	0.258	34.06	250	1.00	43.6	0.049	0.063	1.21	59.5	0.57

Apartment and Commercial SAN2 to SAN1 flows based on Master Plan prepared by RLA, dated May 3rd, 2016.

Charlotte Kelly

To: Alison Gosling
Subject: RE: 1309 Carling - Cave Creek Collector Model

From: Oram, Cody [mailto:Cody.Oram@ottawa.ca]
Sent: Thursday, June 30, 2016 9:48 AM
To: Alison Gosling <agosling@dsel.ca>
Cc: Robert Freel <rfreel@dsel.ca>; O'Connor, Ann <Ann.O'Connor@ottawa.ca>
Subject: RE: 1309 Carling - Cave Creek Collector Model

Hi Alison,

I received confirmation from our modeling group that they ran the numbers in the model and have no issues with the impact on the existing system. Good news!

Regards,

Cody Oram, P.Eng.
Project Manager, Development Review
(Urban Services) Outer
Gestionnaire de projets
(Secteur urbain) Exterieur

PLANNING AND GROWTH MANAGEMENT URBANISME ET GESTION DE LA CROISSANCE

City of Ottawa | ville d'Ottawa
613.580.2424 ext/poste 13422

From: Alison Gosling [mailto:agosling@dsel.ca]
Sent: Wednesday, June 29, 2016 2:33 PM
To: Oram, Cody
Cc: Robert Freel
Subject: RE: 1309 Carling - Cave Creek Collector Model

Hey Cody,

I just wanted to follow and see if there were any modelling results based on the information provided below.

Please feel free to call and discuss.

Thanks,

Alison Gosling
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@DSEL.ca

From: Oram, Cody [mailto:Cody.Oram@ottawa.ca]
Sent: June-08-16 3:13 PM
To: Alison Gosling <agosling@dsel.ca>
Cc: 'Robert Freel' <rfreel@dsel.ca>
Subject: RE: 1309 Carling - Cave Creek Collector Model

Thank you Alison,
I've forwarded the information for comment. I'll let you know when I've received feedback.
Cody

From: Alison Gosling [mailto:agosling@dsel.ca]
Sent: Wednesday, June 08, 2016 3:07 PM
To: Oram, Cody
Cc: 'Robert Freel'
Subject: RE: 1309 Carling - Cave Creek Collector Model

Hi Cody,

Here is our most recent Servicing Plan.

Please let us know if you have any questions.

Alison Gosling
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@DSEL.ca

From: Oram, Cody [mailto:Cody.Oram@ottawa.ca]
Sent: June-08-16 3:04 PM
To: Alison Gosling <agosling@dsel.ca>

Cc: Robert Freel <rfreel@dsel.ca>
Subject: RE: 1309 Carling - Cave Creek Collector Model

Hi Alison,

Can you send me a PDF of the current Site Servicing Plan showing the connection locations.

Thanks,
Cody

From: Alison Gosling [mailto:agosling@dsel.ca]
Sent: Wednesday, June 08, 2016 2:08 PM
To: Robertson, Syd; Oram, Cody
Cc: Robert Freel
Subject: RE: 1309 Carling - Cave Creek Collector Model

Good afternoon Syd and Cody,

Below are the proposed sanitary flows from the various phases of development at the subject site.

Based on the Site Plan issued on May 3, 2016, the ultimate number of units and the number of units per phase has been updated.

The wastewater flow rates have been revised to accommodate the change in units and are summarized below. Please note that the flow during each phase represents the cumulative flow for the site (1309 Carling) at that time.

Phase	I	II	III	1335 Carling
	L/s	L/s	L/s	L/s
Avg. Daily	3.37	4.56	9.66	2.81
Max Day	8.47	13.35	32.31	4.22
Peak Hour	9.52	14.39	33.35	5.27

Regards,

Alison Gosling
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.542
fax: (613) 836-7183
email: agosling@DSEL.ca

From: Robertson, Syd [mailto:Syd.Robertson@ottawa.ca]
Sent: June-03-16 1:21 PM
To: Robert Freel
Cc: Oram, Cody
Subject: RE: 1309 Carling - Cave Creek Collector Model

Hi Bobby:

The Water Resources Group now have the model operational so please provide the proposed sanitary flows, from the various phases of development at the subject site, to enable the City to test the impact on the Cave Creek Collector.

Thanks,

Syd Robertson, C.E.T.
Project Manager, Infrastructure Approvals
Planning & Growth Management Department
Development Review Services Branch, Urban Services Unit
613-580-2424 ext: 27916

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: June 02, 2016 10:05 AM
To: Robertson, Syd
Subject: FW: 1309 Carling - Cave Creek Collector Model

Hi Syd,

As discussed we are following up on the Cave Creek Collector analysis. Feel free to give me a call should you have any question.

Thank you,

Bobby Freel, 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.558
cell: (613) 314-7675
email: rfreel@DSEL.ca

From: Robert Freel [mailto:rfreel@dsel.ca]
Sent: June-02-16 9:57 AM

To: 'Oram, Cody'
Subject: RE: 1309 Carling - Cave Creek Collector Model

Hi Cody,

Just wanted to follow up on the sanitary analysis study, any news?

Thanks,

Bobby Freel, 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.558
cell: (613) 314-7675
email: rfreel@DSEL.ca

From: Oram, Cody [mailto:Cody.Oram@ottawa.ca]
Sent: May-13-16 10:46 AM
To: Robert Freel
Subject: 1309 Carling - Cave Creek Collector Model

Hi Bobby,

We anticipate receiving the completed study and model within a week or so. I will continue to check back in and let you know when we've received it.

Regards,
Cody

Cody Oram, P.Eng.
Project Manager, Development Review
(Urban Services) Outer
Gestionnaire de projets
(Secteur urbain) Exterieur

PLANNING AND GROWTH MANAGEMENT URBANISME ET GESTION DE LA CROISSANCE

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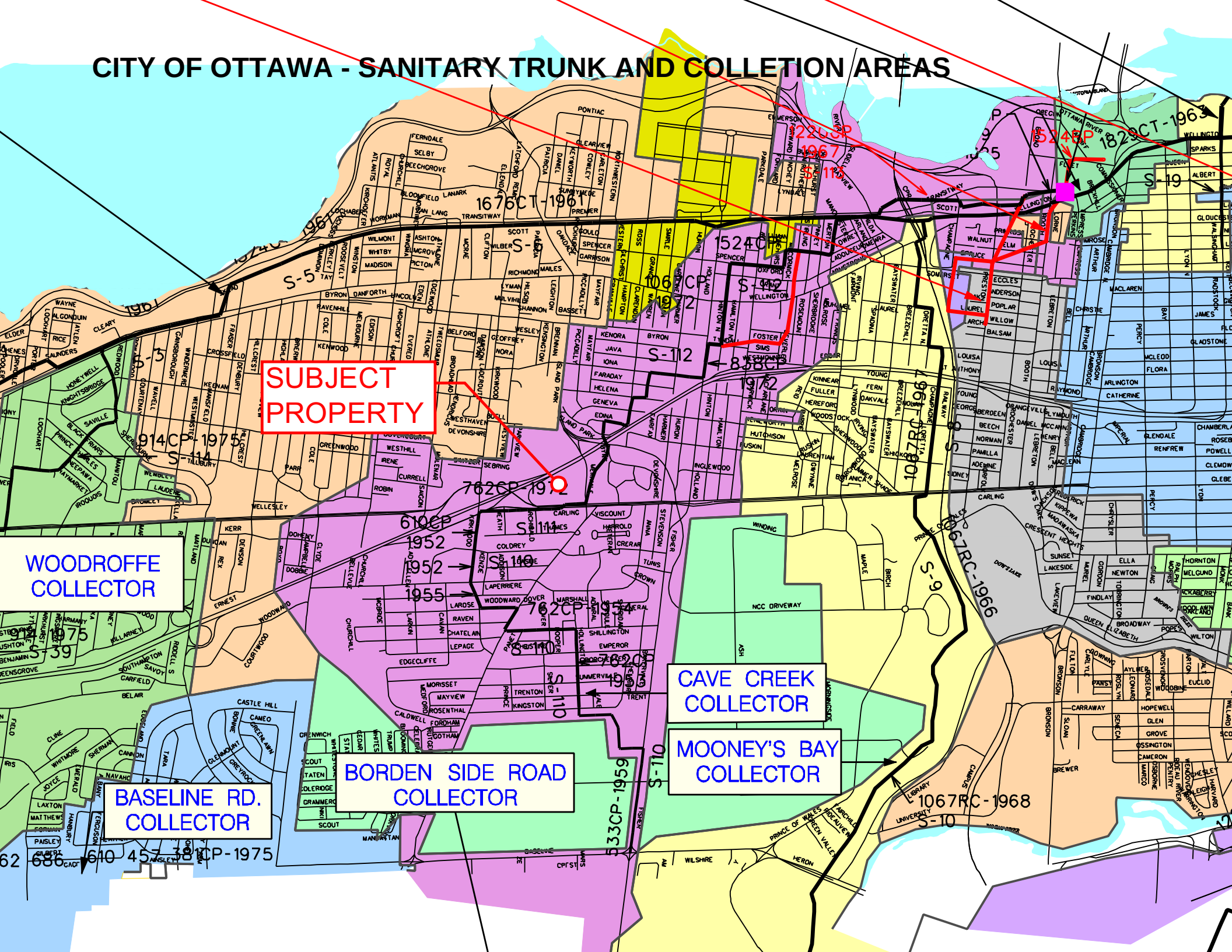
CITY OF OTTAWA - SANITARY TRUNK AND COLLETION AREAS



APPENDIX D

Stormwater Management

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

2016 AES Approved RELEASE RATE

				5-year		100-year	
Area ID	Total Area (ha)	C	t_c (min)	i (mm/hr)	Q (L/s)	i (mm/hr)	Q (L/s)
A1	3.69	0.50	20.0	70.3	360.0	70.3	360.0
A2	1.09	0.50	20.0	70.3	106.2	70.3	106.2
EX-1	0.34	0.20	20.0	70.3	13.2	120.0	22.5
Total	**5.12**				**479.4**		**488.7**

Target Flow Rate

				5-year		100-year	
Area ID	Total Area (ha)	C	t_c (min)	i (mm/hr)	Q (L/s)	i (mm/hr)	Q (L/s)
A1-1	0.64	0.50	20.0	70.3	62.4	70.3	62.4
A2-1	0.05	0.50	20.0	70.3	4.9	70.3	4.9
Total	**0.69**				**67.3**		**67.3**

Estimated Post Development Peak Flow from Unattenuated Areas

UN1	Imp.	Perv.	Total
Area	0.063	0.000	0.063
C	0.9	0.2	0.90

Area ID UN1
Total Area 0.063 ha
C 0.90 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
12.2	93.7	14.8	14.8	0.0	0.0	160.4	28.1	28.1	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)

UN2	Imp.	Perv.	Total
Area	0.014	0.016	0.030
C	0.9	0.2	0.53

Area ID UN2
Total Area 0.030 ha
C 0.53 Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
12.2	93.7	4.1	4.1	0.0	0.0	160.4	8.8	8.8	0.0	0.0

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

Estimated Post Development Peak Flow from Attenuated Areas

Area ID C1

C1	Imp.	Perv.	Total
Area	0.074	0.000	0.074
C	0.9	0.2	0.90

Total Subsurface Storage (m^3) 12.0

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage (m)	Ponding (m^2)	h_o (m)	delta d (m)	V* (m^3)	V_{acc}** (m^3)	$Q_{release}$† (L/s)	$V_{drawdown}$ (hr)
Orifice INV	71.95		0.00			0.0	0.0	0.00
U/G STORAGE INV	72.49		0.54	0.54	4.0	4.0	11.3	0.10
U/G STORAGE S/L	72.95		1.00	0.46	4.0	7.9	15.3	0.14
U/G STORAGE OBV	73.35		1.40	0.41	4.0	11.9	18.2	0.18
T/L	74.43		2.48	1.08	0.0	11.9	24.1	0.14

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

Orifice Location **STM101A** **Dia** 85
Total Area 0.074 ha
C 0.90 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	5-year					100-year				
t_c (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)
1	203.5	37.8	11.8	26.0	1.6	351.4	72.5	17.2	55.3	3.3
5	141.2	26.2	11.8	14.4	4.3	242.7	50.1	17.2	32.9	9.9
10	104.2	19.4	11.8	7.5	4.5	178.6	36.9	17.2	19.6	11.8
15	83.6	15.5	11.8	3.7	3.3	142.9	29.5	17.2	12.3	11.0
20	70.3	13.0	11.8	1.2	1.5	120.0	24.8	17.2	7.5	9.0
25	60.9	11.3	11.3	0.0	0.0	103.8	21.4	17.2	4.2	6.3
30	53.9	10.0	10.0	0.0	0.0	91.9	19.0	17.2	1.7	3.1
35	48.5	9.0	9.0	0.0	0.0	82.6	17.0	17.2	0.0	0.0
40	44.2	8.2	8.2	0.0	0.0	75.1	15.5	17.2	0.0	0.0
45	40.6	7.5	7.5	0.0	0.0	69.1	14.3	17.2	0.0	0.0
50	37.7	7.0	7.0	0.0	0.0	64.0	13.2	17.2	0.0	0.0
55	35.1	6.5	6.5	0.0	0.0	59.6	12.3	17.2	0.0	0.0
60	32.9	6.1	6.1	0.0	0.0	55.9	11.5	17.2	0.0	0.0
65	31.0	5.8	5.8	0.0	0.0	52.6	10.9	17.2	0.0	0.0
70	29.4	5.5	5.5	0.0	0.0	49.8	10.3	17.2	0.0	0.0
75	27.9	5.2	5.2	0.0	0.0	47.3	9.8	17.2	0.0	0.0
80	26.6	4.9	4.9	0.0	0.0	45.0	9.3	17.2	0.0	0.0
85	25.4	4.7	4.7	0.0	0.0	43.0	8.9	17.2	0.0	0.0
90	24.3	4.5	4.5	0.0	0.0	41.1	8.5	17.2	0.0	0.0
95	23.3	4.3	4.3	0.0	0.0	39.4	8.1	17.2	0.0	0.0
100	22.4	4.2	4.2	0.0	0.0	37.9	7.8	17.2	0.0	0.0

5-year $Q_{attenuated}$ **11.83 L/s** **100-year $Q_{attenuated}$** **17.22 L/s**
5-year Max. Storage Required **4.5 m^3** **100-year Max. Storage Required** **11.8 m^3**
Est. 5-year Storage Elevation **72.55 m** **Est. 100-year Storage Elevation** **73.34 m**

Area ID C2+BLDA

C2+BLDA	Imp.	Perv.	Total
Area	0.421	0.019	0.441
C	0.9	0.2	0.87

Total Subsurface Storage (m^3) 208.0

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)
Orifice INV	71.60		0.00			0.0	0	0.00
U/G STORAGE INV	72.49		0.89	0.89	68.6	68.6	1.3	14.67
U/G STORAGE S/L	72.95		1.35	0.46	68.6	137.3	1.8	21.19
U/G STORAGE OBV	73.35		1.75	0.41	68.6	205.9	3.2	17.88
T/L	74.08	0.4	2.48	0.73	0.1	206.0	4.7	12.18
0.10m Ponding	74.18	234.4	2.58	0.10	8.1	214.2	6.1	9.75
0.21m Ponding	74.29	725.3	2.69	0.11	50.3	264.5	6.2	11.85

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† $Q_{release}$ = Release rate calculated from Tempest LMF Curve

Orifice Location **STM105** **Dia** LMF65
Total Area 0.441 ha
C 0.87 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	5-year					100-year				
t_c	i	Q_{actual}‡	$Q_{release}$	Q_{stored}	V_{stored}	i	Q_{actual}‡	$Q_{release}$	Q_{stored}	V_{stored}
(min)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)	(mm/hr)	(L/s)	(L/s)	(L/s)	(m^3)
1	203.5	216.6	1.8	214.8	12.9	351.4	430.0	3.9	426.1	25.6
5	141.2	150.2	1.8	148.5	44.5	242.7	297.0	3.9	293.1	87.9
10	104.2	110.9	1.8	109.1	65.5	178.6	218.5	3.9	214.6	128.8
15	83.6	88.9	1.8	87.1	78.4	142.9	174.9	3.9	171.0	153.9
20	70.3	74.8	1.8	73.0	87.6	120.0	146.8	3.9	142.9	171.5
25	60.9	64.8	1.8	63.0	94.6	103.8	127.1	3.9	123.2	184.8
30	53.9	57.4	1.8	55.6	100.1	91.9	112.4	3.9	108.5	195.4
35	48.5	51.6	1.8	49.9	104.7	82.6	101.1	3.9	97.2	204.1
40	44.2	47.0	1.8	45.3	108.6	75.1	92.0	3.9	88.1	211.4
45	40.6	43.2	1.8	41.5	112.0	69.1	84.5	3.9	80.6	217.7
50	37.7	40.1	1.8	38.3	114.9	64.0	78.3	3.9	74.4	223.2
55	35.1	37.4	1.8	35.6	117.5	59.6	73.0	3.9	69.1	228.0
60	32.9	35.1	1.8	33.3	119.8	55.9	68.4	3.9	64.5	232.3
65	31.0	33.0	1.8	31.3	121.9	52.6	64.4	3.9	60.5	236.1
70	29.4	31.3	1.8	29.5	123.9	49.8	60.9	3.9	57.0	239.6
75	27.9	29.7	1.8	27.9	125.6	47.3	57.8	3.9	53.9	242.8
80	26.6	28.3	1.8	26.5	127.2	45.0	55.1	3.9	51.2	245.6
85	25.4	27.0	1.8	25.2	128.7	43.0	52.6	3.9	48.7	248.3
90	24.3	25.8	1.8	24.1	130.0	41.1	50.3	3.9	46.4	250.7
95	23.3	24.8	1.8	23.0	131.3	39.4	48.3	3.9	44.4	252.9
100	22.4	23.8	1.8	22.1	132.5	37.9	46.4	3.9	42.5	255.0

5-year $Q_{attenuated}$ 1.76 L/s **100-year $Q_{attenuated}$ 3.88 L/s**
5-year Max. Storage Required 132.5 m^3 **100-year Max. Storage Required 255.0 m^3**
Est. 5-year Storage Elevation 72.91 m **Est. 100-year Storage Elevation 74.27 m**

Estimated Post Development Peak Flow from Attenuated Areas

Area ID **C3**

C3	Imp.	Perv.	Total
Area	0.008	0.071	0.079
C	0.9	0.2	0.27

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)
Orifice INV	72.44		0.00			0.0	0	0.00
Storage Pipe SL	72.57		0.13	0.13	0.0	0.0	1.5	0.00
Storage Pipe OBV	72.69		0.25	0.13	0.0	0.0	2.2	0.00
T/L	74.19	0.4	1.75	1.50	0.2	0.2	5.6	0.01
0.11m Ponding	74.30	83.9	1.86	0.11	3.3	3.5	6	0.16
0.26m Ponding	74.46	261.4	2.02	0.16	26.3	29.8	6.1	1.36

* V=Incremental storage volume
**V_{acc}=Total surface and sub-surface
† $Q_{release}$ = Release rate calculated from Tempest LMF Curve

Orifice Location **CB3** **Dia** LMF70
Total Area 0.079 ha
C 0.27 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual}‡ (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}‡ (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
1	203.5	12.0	5.7	6.3	0.4	351.4	83.8	6.1	77.7	4.7
5	141.2	8.3	5.7	2.6	0.8	242.7	57.9	6.1	51.8	15.5
10	104.2	6.1	5.7	0.5	0.3	178.6	42.6	6.1	36.5	21.9
15	83.6	4.9	4.9	0.0	0.0	142.9	34.1	6.1	28.0	25.2
20	70.3	4.1	4.1	0.0	0.0	120.0	28.6	6.1	22.5	27.0
25	60.9	3.6	3.6	0.0	0.0	103.8	24.8	6.1	18.7	28.0
30	53.9	3.2	3.2	0.0	0.0	91.9	21.9	6.1	15.8	28.5
35	48.5	2.9	2.9	0.0	0.0	82.6	19.7	6.1	13.6	28.6
40	44.2	2.6	2.6	0.0	0.0	75.1	17.9	6.1	11.8	28.4
45	40.6	2.4	2.4	0.0	0.0	69.1	16.5	6.1	10.4	28.0
50	37.7	2.2	2.2	0.0	0.0	64.0	15.3	6.1	9.2	27.5
55	35.1	2.1	2.1	0.0	0.0	59.6	14.2	6.1	8.1	26.8
60	32.9	1.9	1.9	0.0	0.0	55.9	13.3	6.1	7.2	26.1
65	31.0	1.8	1.8	0.0	0.0	52.6	12.6	6.1	6.5	25.2
70	29.4	1.7	1.7	0.0	0.0	49.8	11.9	6.1	5.8	24.3
75	27.9	1.6	1.6	0.0	0.0	47.3	11.3	6.1	5.2	23.3
80	26.6	1.6	1.6	0.0	0.0	45.0	10.7	6.1	4.6	22.3
85	25.4	1.5	1.5	0.0	0.0	43.0	10.2	6.1	4.2	21.2
90	24.3	1.4	1.4	0.0	0.0	41.1	9.8	6.1	3.7	20.0
95	23.3	1.4	1.4	0.0	0.0	39.4	9.4	6.1	3.3	18.9
100	22.4	1.3	1.3	0.0	0.0	37.9	9.0	6.1	2.9	17.7

5-year $Q_{attenuated}$ **5.67 L/s** **100-year $Q_{attenuated}$** **6.10 L/s**
5-year Max. Storage Required **0.8 m^3** **100-year Max. Storage Required** **28.6 m^3**
Est. 5-year Storage Elevation **74.21 m** **Est. 100-year Storage Elevation** **74.45 m**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Required Storage (m^3)	100-Year Release Rate (L/s)	100-Year Required Storage (m^3)	100-Year Available Storage (m^3)
Unattenuated Areas (UN1)	14.8	0.0	28.1	0.0	0.0
Unattenuated Areas (UN2)	4.1	0.0	8.8	0.0	0.0
Attenutated Area (C1)	11.8	4.5	17.2	11.8	11.9
Attenutated Areas (C2+BLDA)	1.8	132.5	3.9	255.0	264.5
Attenutated Area (C3)	5.7	0.8	6.1	28.6	29.8
Total	**38.1**	**137.8**	**64.1**	**295.4**	**306.2**

RioCan Holdings Inc.
1309 Carling Avenue
Storm Sewer Calculation Sheet - Phase I

										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)**	**(-)**
C1	STM101	STM101A	0.074	0.90	0.07	0.07	10.0	104.2	19.4	250	0.50	33.2	0.049	0.063	0.86	42.0	0.6	0.46
	STM101A	STM102			0.00	0.07	10.6	100.9	18.7	250	0.50	37.4	0.049	0.063	0.86	42.0	0.7	0.45
							11.4											
Ultimate	STM102	STM103	4.410	0.85	3.73	3.80	11.4	97.5	1028.1	900	0.50	45.7	0.636	0.225	2.01	1280.1	0.4	0.80
							11.8											
BLDG A	BLDA	STM105	0.279	0.90	0.25	0.25	10.0	104.2	72.7	300	1.00	13.9	0.071	0.075	1.37	96.7	0.2	0.75
C2	STM105	STM103	0.162	0.82	0.13	0.38	10.2	103.3	109.9	375	0.50	19.3	0.110	0.094	1.12	124.0	0.3	0.89
							10.5											
UN2	STM103	STM104	0.030	0.53	0.02	4.20	11.8	95.8	1116.4	900	0.50	40.2	0.636	0.225	2.01	1280.1	0.3	0.87
	STM104	EX. STMMH	0.000	0.00	0.00	4.20	12.1	94.3	1099.7	900	0.50	18.2	0.636	0.225	2.01	1280.1	0.2	0.86
							12.2											
C3	CB'L'1	CB3	0.079	0.27	0.02	0.02	10.0	104.2	6.1	250	0.50	17.1	0.049	0.063	0.86	42.0	0.3	0.15
	CB3	EX. BOX CBMH1			0.00	0.02	10.3	102.5	6.0	250	0.50	4.0	0.049	0.063	0.86	42.0	0.1	0.14
							10.4											

Ultimate area (EX-1, A2, and A1 as indicated by the Post Development Drainage Boundaries - Ph1 figure included in Appendix D), with an assumed rational method coefficient of 0.85, is included in Section STM102 to ensure on-site storm sewers are sufficiently sized for the Ultimate development.

UN1	Imp.	Perv.	Total
Area	0.065	0.000	0.065
C	0.9	0.2	0.90

C1	Imp.	Perv.	Total
Area	0.074	0.000	0.074
C	0.9	0.2	0.90

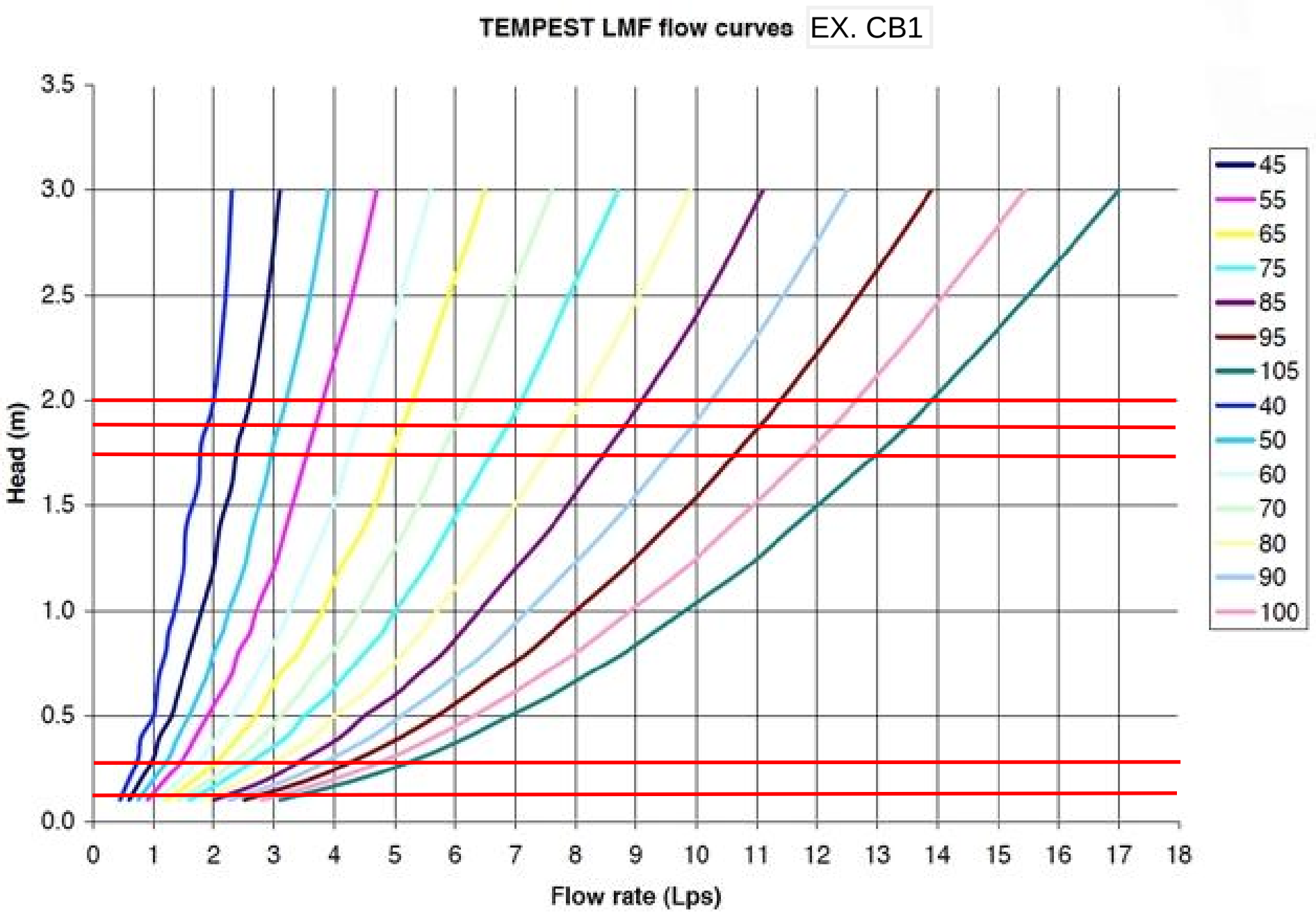
UN2	Imp.	Perv.	Total
Area	0.014	0.016	0.030
C	0.9	0.2	0.53

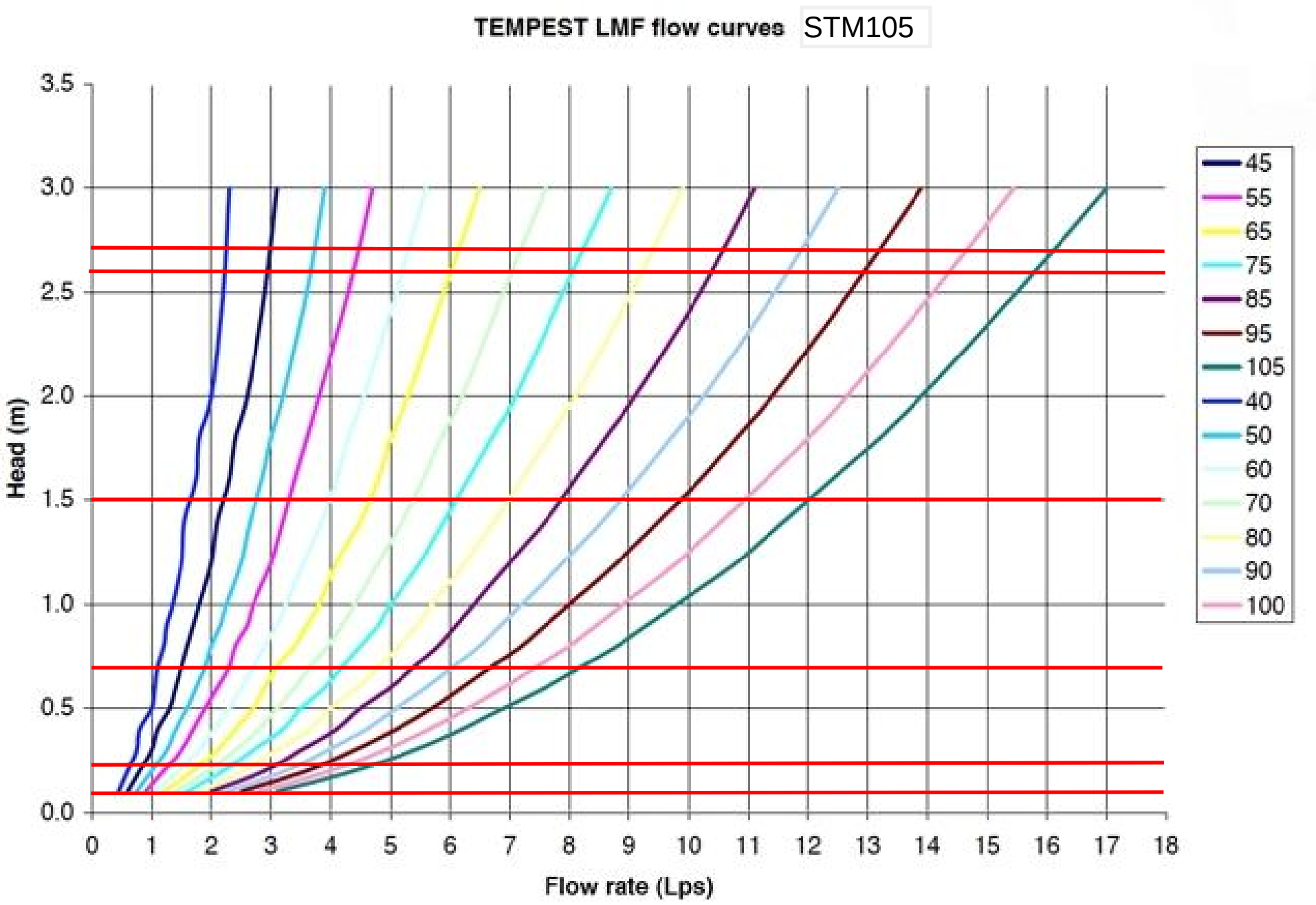
BLDA	Imp.	Perv.	Total
Area	0.279	0.000	0.279
C	0.9	0.2	0.90

C2	Imp.	Perv.	Total
Area	0.142	0.019	0.162
C	0.9	0.2	0.82

C3	Imp.	Perv.	Total
Area	0.008	0.071	0.079
C	0.9	0.2	0.27

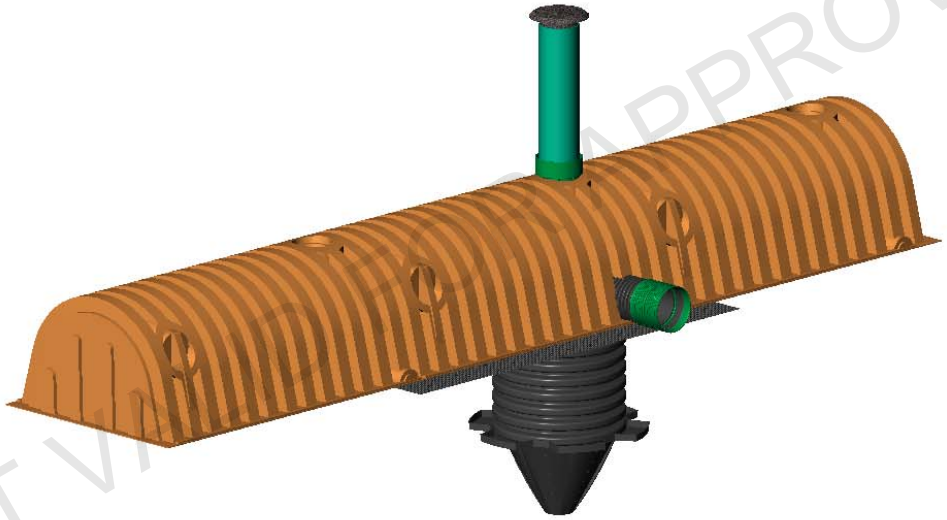
Ultimate	Imp.	Perv.	Total
Area	4.070	0.340	4.410
C	0.90	0.20	0.85


TEMPEST LMF flow curves
EX. CB1
Head (m)
Flow rate (Lps)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
45
55
65
75
85
95
105
40
50
60
70
80
90
100


TEMPEST LMF flow curves
STM105
Head (m)
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
Flow rate (Lps)
45
55
65
75
85
95
105
40
50
60
70
80
90
100

SC05646 SOLENO STORMCHAMBER SC-34 SYSTEM 3 CHAMBERS 12m³

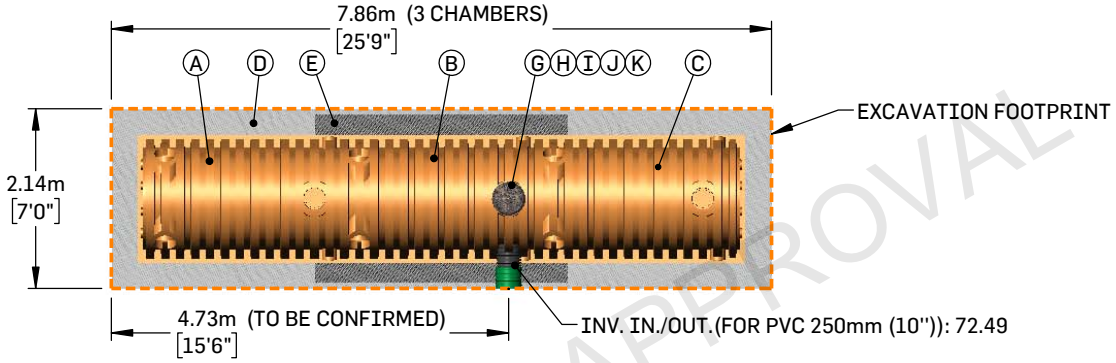
PROJECT: 1309 CARLING AVE. - 1A
JOB LOCATION:
CONTACT:
OWNER/ENGINEERING FIRM/CONTRACTOR NAME:

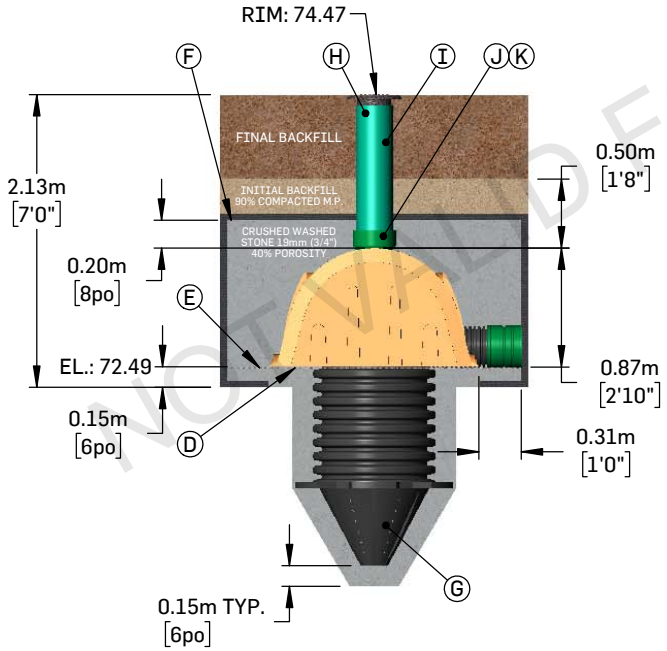


1. INSTALLATION MUST BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
2. SYSTEM IS DESIGNED TO WITHSTAND TRAFFIC LOAD CSA CL-625 AND AASHTO H-20.
3. THE SYSTEM MUST BE MINIMALLY BACKFILLED WITH 150 mm (6'') OF CRUSHED STONE AND 300 mm (12'') OF GRANULAR MATERIAL COMPACTED AT 90% P.M.
4. STORMCHAMBER GEOGRID FOR FOUNDATION STABILIZATION IS CONSIDERED UNDER ALL THE CHAMBERS. HEAVY DUTY GEOGRID IS ONLY LOCATED UNDER THE CHAMBERS WITH WATER INTAKE AND THOSE WITH SEDIMENT TRAP.

THIS DRAWING IS NOT VALID FOR APPROVAL. DETAILED DRAWINGS WILL BE SUBMITTED FOR APPROVAL AFTER RECEPTION OF PURCHASE ORDER.

SC05646 SOLENO STORMCHAMBER SC-34 SYSTEM 3 CHAMBERS 12m³



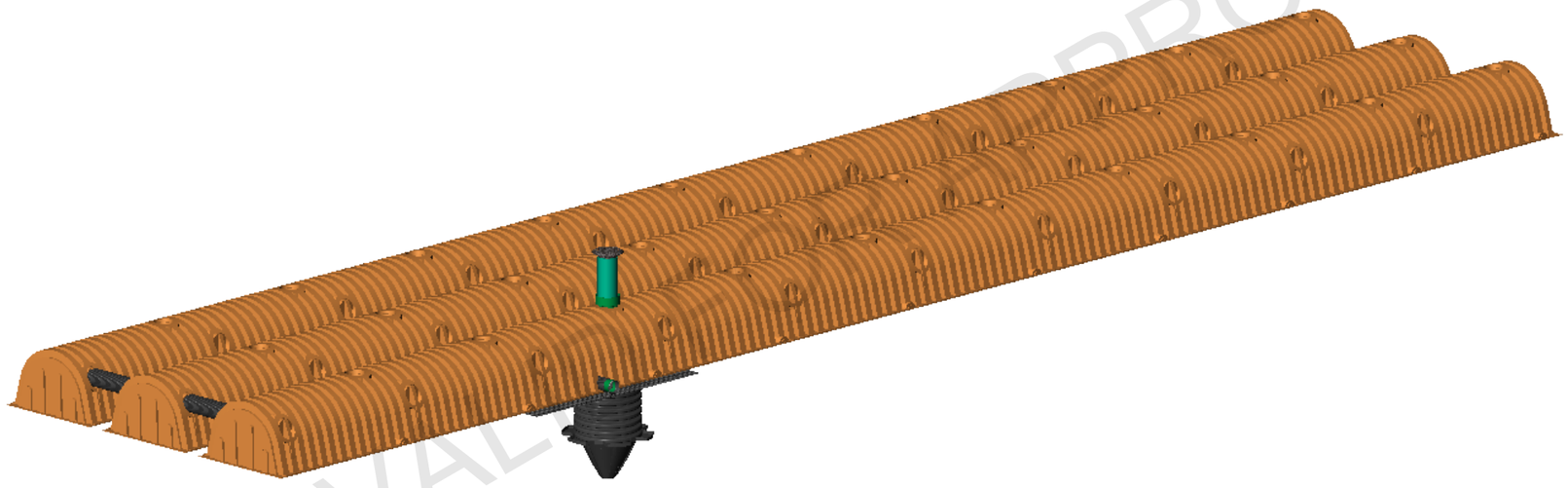


PART	DESCRIPTION	QTY
A	START CHAMBER SC-34	1
B	MIDDLE CHAMBER SC-34 WITH WELDED INLET/OUTLET FOR PVC 250mm (10") DR35	1
C	END CHAMBER SC-34	1
D	LIGHTWEIGHT STABILIZATION NETTING	1
E	HEAVYWEIGHT STABILIZATION NETTING	1
F	SOLENO TX-90 SEPARATION NONWOVEN GEOTEXTILE, ABOVE AND ON THE SIDES	1
G	SEDIMENT TRAP	1
H	ADJUSTABLE FRAME AND COVER 250mm (10")	1
I	PVC PIPE ACCESS WELL 250mm (10") (PROVIDED BY OTHERS)	-
J	MANHOLE ADAPTER FOR PVC 250mm (10") DR35	1
K	PVC TRANSITION GASKET 250mm (10")	1

THIS DRAWING IS NOT VALID FOR APPROVAL. DETAILED DRAWINGS WILL BE SUBMITTED FOR APPROVAL AFTER RECEPTION OF PURCHASE ORDER.

SC05647 SOLENO STORMCHAMBER SC-34 SYSTEM 30 CHAMBERS 104m³

PROJECT: 1309 CARLING AVE. - PHASE 1 - 2B
JOB LOCATION:
CONTACT:
OWNER/ENGINEERING FIRM/CONTRACTOR NAME:



1. INSTALLATION MUST BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
2. SYSTEM IS DESIGNED TO WITHSTAND TRAFFIC LOAD CSA CL-625 AND AASHTO H-20.
3. THE SYSTEM MUST BE MINIMALLY BACKFILLED WITH 150 mm (6'') OF CRUSHED STONE AND 300 mm (12'') OF GRANULAR MATERIAL COMPACTED AT 90% P.M.
4. STORMCHAMBER GEOGRID FOR FOUNDATION STABILIZATION IS CONSIDERED UNDER ALL THE CHAMBERS. HEAVY DUTY GEOGRID IS ONLY LOCATED UNDER THE CHAMBERS WITH WATER INTAKE AND THOSE WITH SEDIMENT TRAP.

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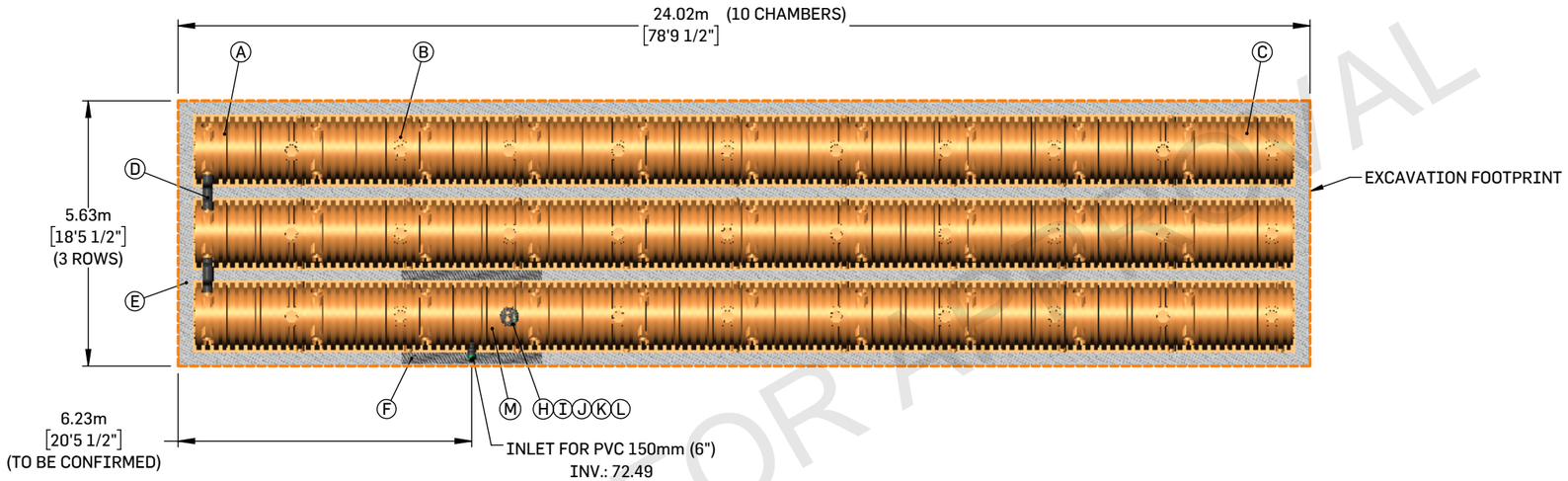
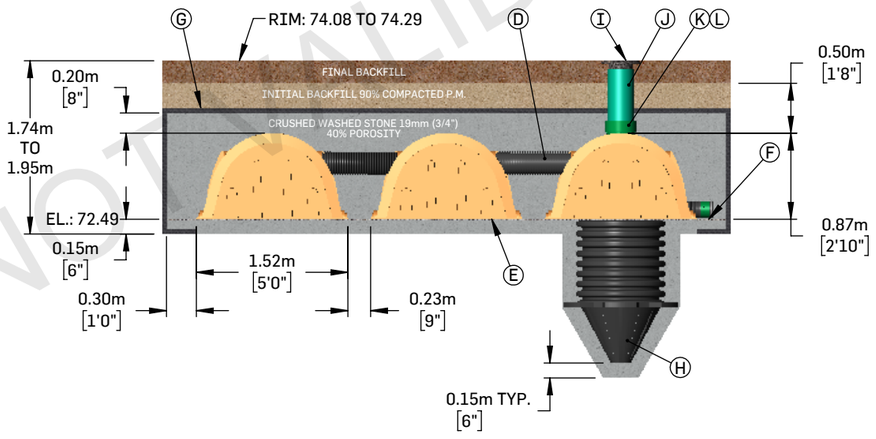
SC05647 SOLENO STORMCHAMBER SC-34 SYSTEM 30 CHAMBERS 104m³





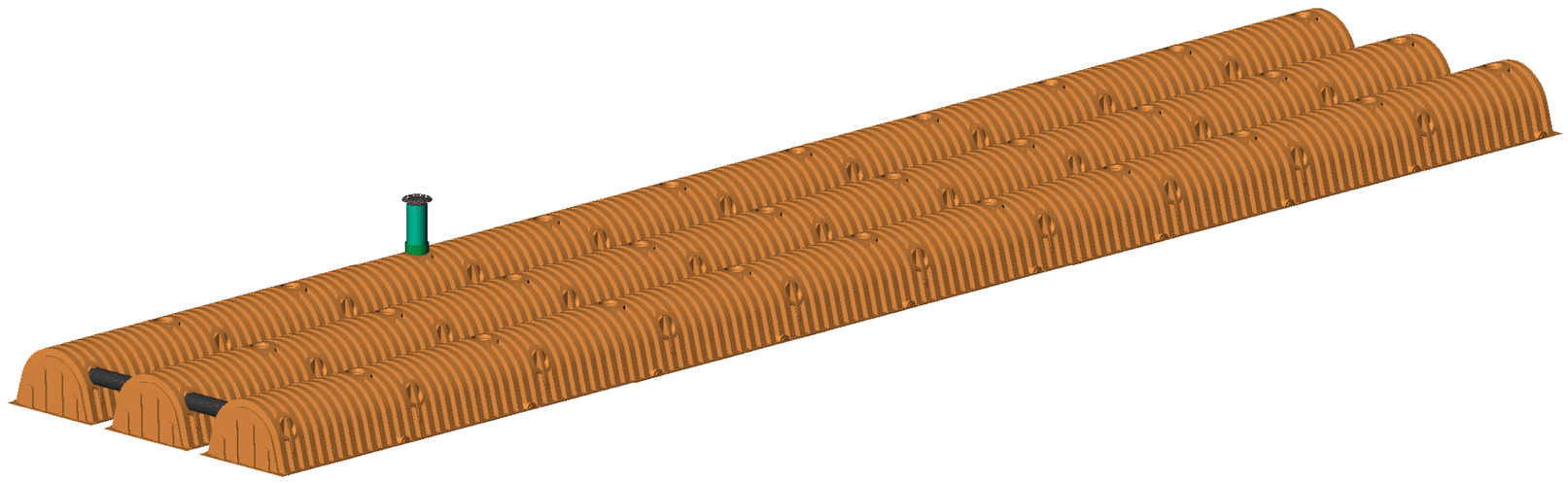
PART	DESCRIPTION	QTY
A	START CHAMBER SC-34	3
B	MIDDLE CHAMBER SC-34	23
C	END CHAMBER SC-34	3
D	CONNECTING PIPE SOLFLO MAX 200mm (8") LENGTH 1.5m (60")	2
E	LIGHTWEIGHT STABILIZATION NETTING	1
F	HEAVYWEIGHT STABILIZATION NETTING	1
G	SOLENO TX-90 SEPARATION NONWOVEN GEOTEXTILE, ABOVE AND ON THE SIDES	1
H	SEDIMENT TRAP	1
I	ADJUSTABLE FRAME AND COVER 250mm (10")	1
J	PVC PIPE ACCESS WELL 250mm (10") (PROVIDED BY OTHERS)	-
K	MANHOLE ADAPTER FOR PVC 250mm (10") DR35	1
L	PVC TRANSITION GASKET 250mm (10")	1
M	MIDDLE CHAMBER SC-34 WITH WELDED INLET FOR PVC 150mm (6") DR35	1

THIS DRAWING IS NOT VALID FOR APPROVAL. DETAILED DRAWINGS WILL BE SUBMITTED FOR APPROVAL AFTER RECEPTION OF PURCHASE ORDER.

2019-07-15

SC05648 SOLENO STORMCHAMBER SC-34 SYSTEM 30 CHAMBERS 104m³

PROJECT: 1309 CARLING AVE. - PHASE 1 - 2A
JOB LOCATION:
CONTACT:
OWNER/ENGINEERING FIRM/CONTRACTOR NAME:



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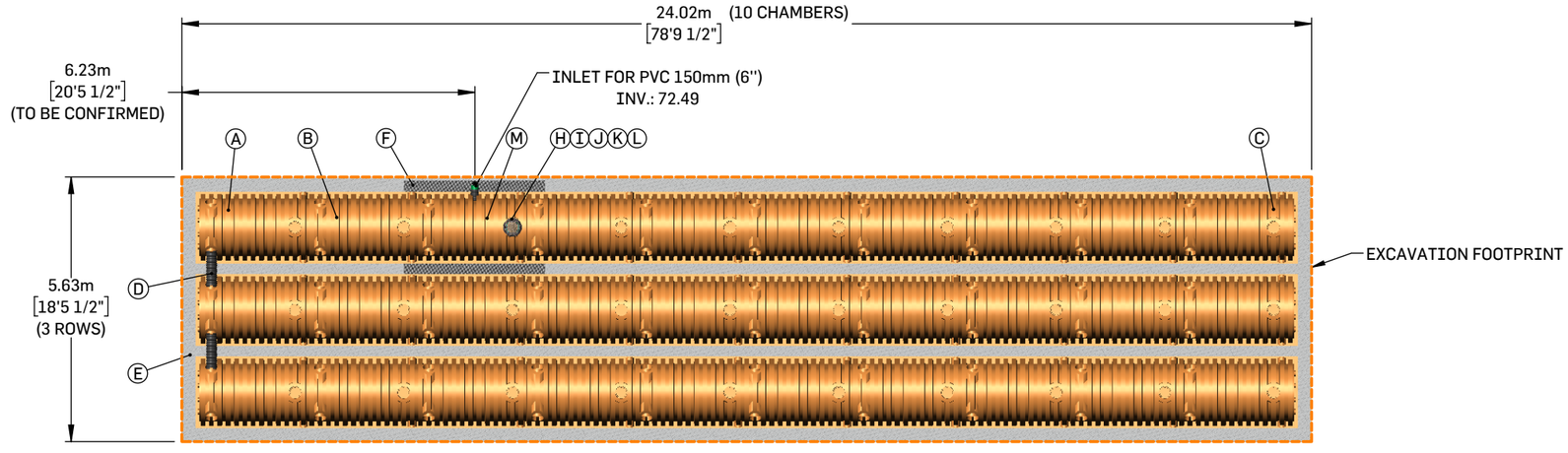
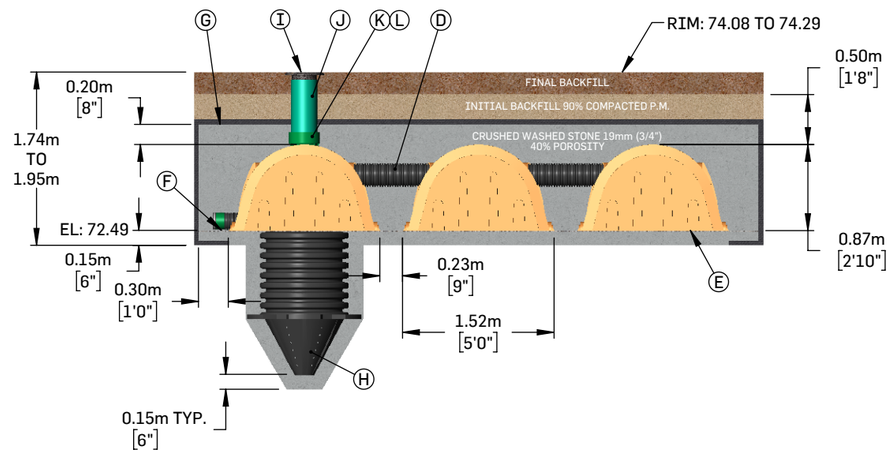
3. THE SYSTEM MUST BE MINIMALLY BACKFILLED WITH 150 mm (6'') OF CRUSHED STONE AND 300 mm (12'') OF GRANULAR MATERIAL COMPACTED AT 90% P.M.
4. STORMCHAMBER GEOGRID FOR FOUNDATION STABILIZATION IS CONSIDERED UNDER ALL THE CHAMBERS. HEAVY DUTY GEOGRID IS ONLY LOCATED UNDER THE CHAMBERS WITH WATER INTAKE AND THOSE WITH SEDIMENT TRAP.

APPROVAL : _____

SC05648 SOLENO STORMCHAMBER SC-34 SYSTEM 30 CHAMBERS 104m³

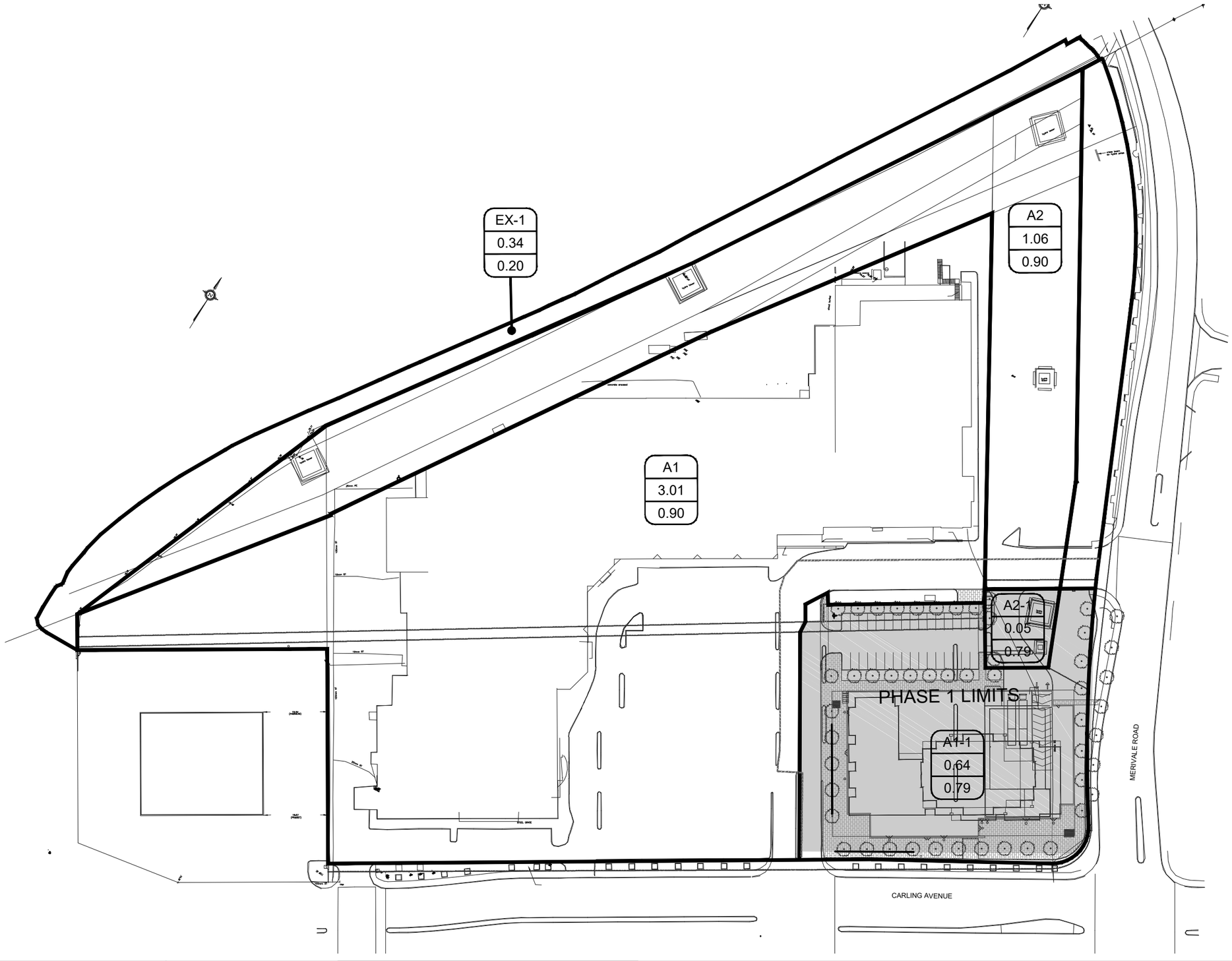




PART	DESCRIPTION	QTY
A	START CHAMBER SC-34	3
B	MIDDLE CHAMBER SC-34	23
C	END CHAMBER SC-34	3
D	CONNECTING PIPE SOLFLO MAX 200mm (8") LENGTH 1.5m (60")	2
E	LIGHTWEIGHT STABILIZATION NETTING	1
F	HEAVYWEIGHT STABILIZATION NETTING	1
G	SOLENO TX-90 SEPARATION NONWOVEN GEOTEXTILE, ABOVE, UNDER AND ON THE SIDES	1
H	SEDIMENT TRAP	1
I	ADJUSTABLE FRAME AND COVER 250mm (10")	1
J	PVC PIPE ACCESS WELL 250mm (10") (PROVIDED BY OTHERS)	-
K	MANHOLE ADAPTER FOR PVC 250mm (10") DR35	1
L	PVC TRANSITION GASKET 250mm (10")	1
M	MIDDLE CHAMBER SC-34 WITH WELDED INLET FOR PVC 150mm (6") DR35	1

APPROVAL : _____

2019-07-15



DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™

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

POST DEVELOPMENT DRAINAGE BOUNDARIES - PH1
1309 CARLING AVE.

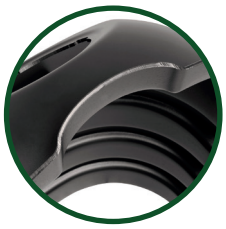
PROJ NO.:	18-1028
DRAWN BY:	CMK
DATE:	OCTOBER 2018
SCALE:	1:1200
FIGURE NO.:	SWM-2

z:\projects\18-1028_riocan_westgate-phase-1\b_design\b2_drawings\b2-2_main (dsel)\spa_sub1\cad\spa_2018-10-30_1028_cmk.dwg

STORMTANK® THE PREMIER MULTI-SOLUTION PROVIDER

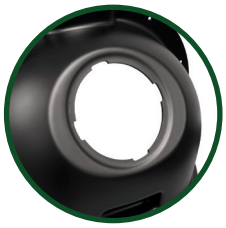
The Shield

Brentwood's StormTank Shield provides a low-cost solution for stormwater pretreatment by reducing pollutant discharge through gross sediment removal and oil/water separation. Once the Shield is installed, any contaminants with a density less than water are prevented from exiting the inlet. This improves treatment efficiency by increasing the flow length and time of concentration vital to particle settling.



Anti-Siphon Vent

Vortexes and siphoning are prevented by the built-in vent, which requires no additional parts or connections.

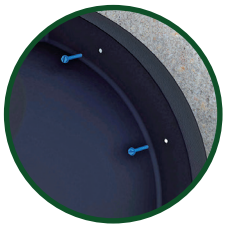


Access Port

The access port and slim profile simplify the cleaning process and ensure that nothing obstructs the discharge.

Hand Grip

The built-in hand grip makes the Shield easy to handle during the installation process.



Easy Installation

Pre-drilled mounting holes allow the Shield to be easily fastened over the outlet pipe. Conveniently available in 18-, 24-, and 30-inch sizes.

MADE IN THE USA

Additional StormTank Products:

The Module

The Brentwood StormTank Module is a subsurface stormwater storage unit load-rated for use under surfaces such as parking lots, athletic fields, and parks.

The Pack

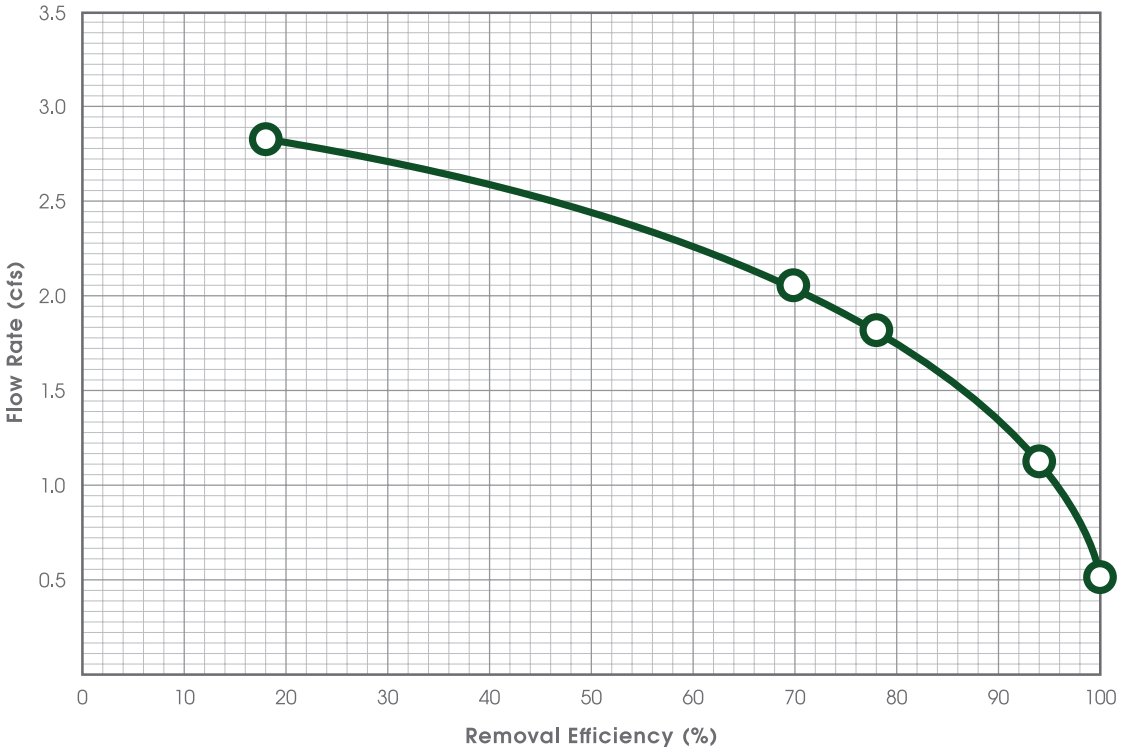
The StormTank Pack is the light-duty solution for subsurface stormwater management.

BRENTWOOD®

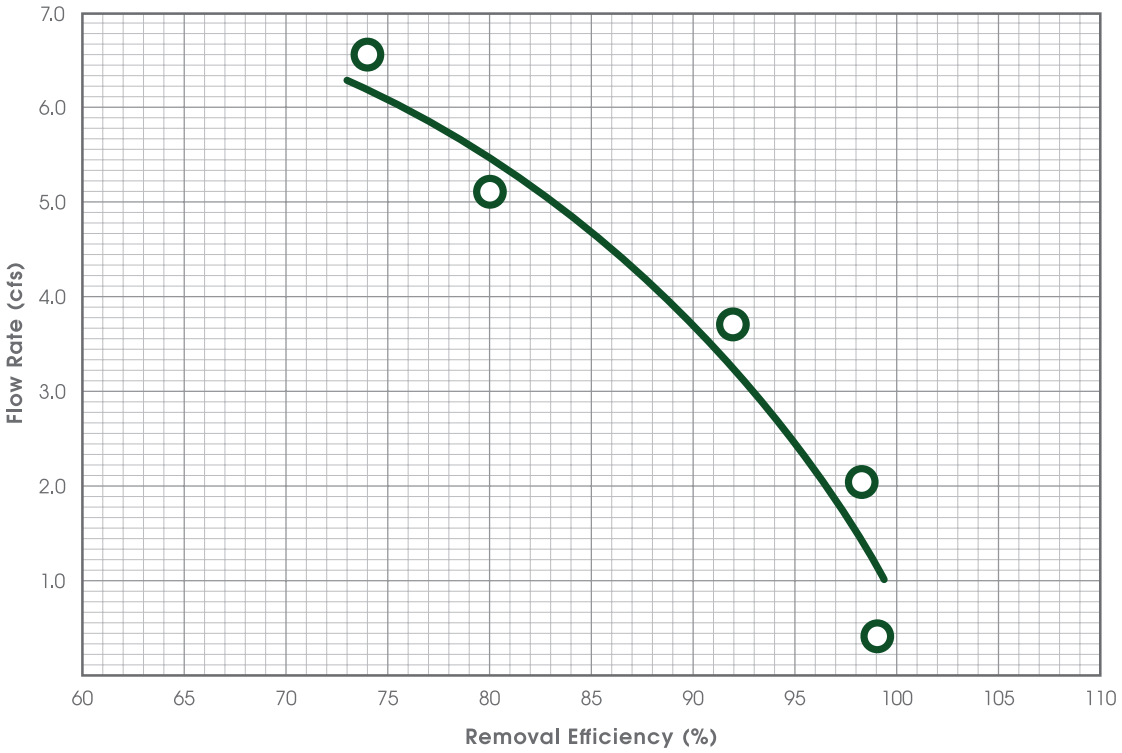
BRENTWOOD INDUSTRIES, INC.
brentwoodindustries.com
stormtank@brentw.com
+1.610.374.5109

REMOVAL EFFICIENCY CURVES

STKS-18, 4'x2' Tank, 1/16" Particles @ 200 mg/L

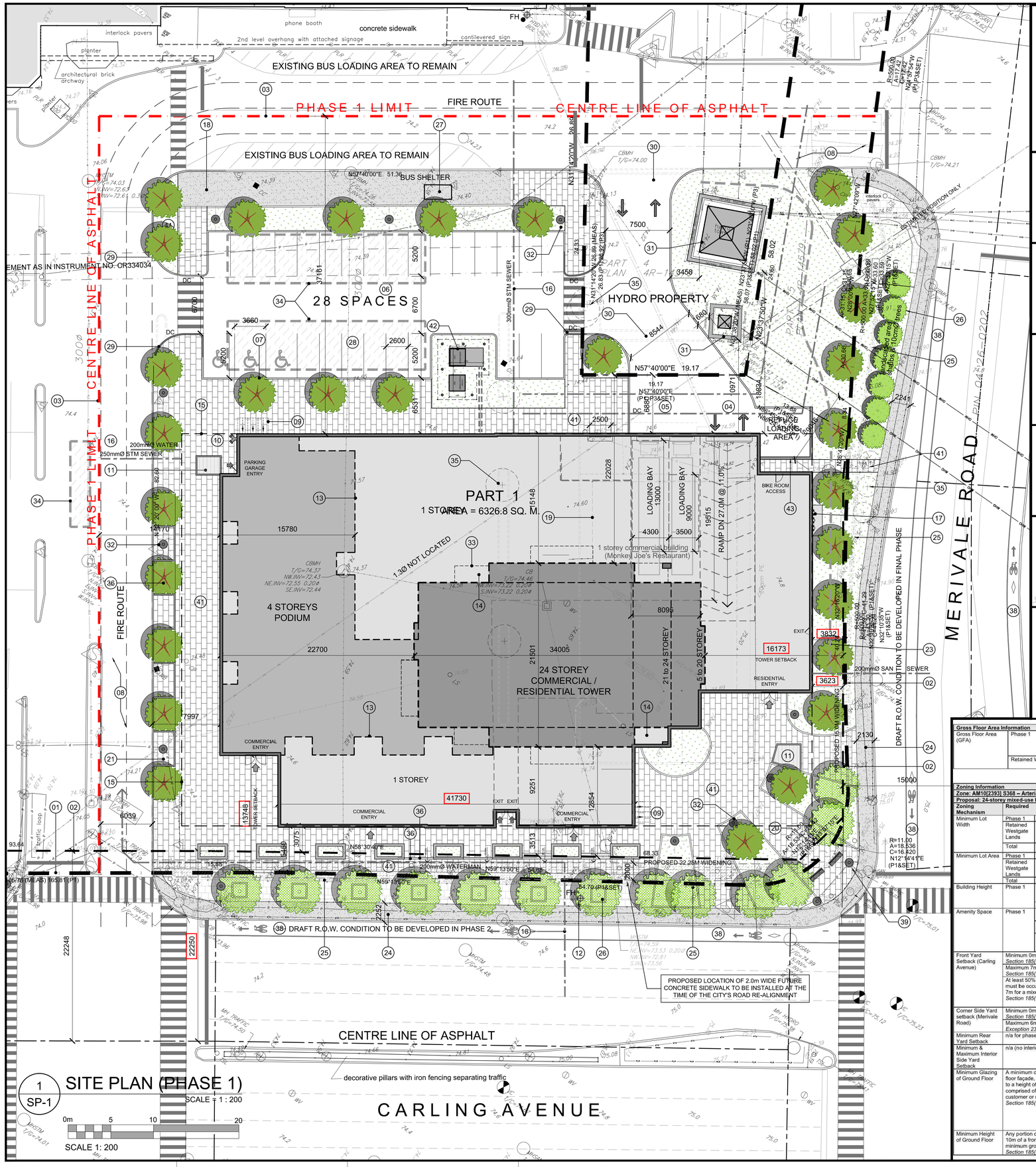


STKS-24, 4'x4' Tank, 1/16" Particles @ 200 mg/L



BRENTWOOD®

DRAWINGS / FIGURES



KEY MAP

LEGAL DESCRIPTION

TOPOGRAPHIC PLAN of
LOTS 45, 46, 50 TO 57 INCLUSIVE AND
PART OF LOT 49
REGISTERED PLAN NO. 348 AND PART OF
LOT 48, NO. 311 AND PART OF LOTS 22 & 23
CONCESSION 1 (OTTAWA FRONT)
(GEOGRAPHIC TOWNSHIP OF NEPEAN)
CITY OF OTTAWA

PROJECT DEVELOPER

RioCan
Real Estate Investment Trust
2300 Yonge Street, Suite 500,
Toronto Ontario M4P 1E4
Tel: 416-866-3033; 1-800-465-2733
Fax: 416-866-3020
E-Mail: Ctruong@riocan.com

URBAN PLANNER

FoTenn Consultants Inc.
223 McLeod Street
Ottawa, ON Canada, K2P 0Z8
Tel.: (613) 730-5709
Fax: (613) 730-1136
E-Mail: morris@fotenn.com

CIVIL ENGINEER

David Schaeffer Engineering ltd.
120 Iber Road, Unit 203
Stittsville, ON K2S 1E9
Tel: (613) 836-0856
Fax: (613) 836-7183
Email: rfreel@DSEL.ca

LANDSCAPE ARCHITECT

James B. Lennox & Associates Inc.
Landscape Architects
3332 Carling Ave.
Ottawa, Ontario K2H 5A8
Tel: 613-722-5168
Fax: 1-866-343-3942
Email: JL@jbla.ca

SURVEYOR

Stantec
1331 Clyde Avenue, Suite 400
Ottawa ON K2C 3G4
Phone: (613) 724-4096
Cell: (613) 762-7068
E-Mail: BWebster@stantec.com

DRAWING NOTES

1. PROPERTY LINE
2. PROPOSED ROAD WIDENING
3. PHASING LINE
4. PARKING GARAGE ENTRY DRIVEWAY / RAMP WITH TRENCH DRAIN
5. GARBAGE / LOADING BAY ENTRY
6. COMMERCIAL / VISITOR ASPHALT PARKING LOT
7. 150mm BARRIER CURB
8. EXISTING SITE ENTRY TO REMAIN
9. BICYCLE PARKING SPACES (0.6 x 1.8M) WITH RACK
10. SIAMESE CONNECTION
11. AIR INTAKE / EXHAUST GRILL
12. EXISTING FIRE HYDRANT
13. OUTLINE OF PODIUM LEVELS ABOVE
14. OUTLINE OF TOWER LEVELS ABOVE
15. OUTLINE OF UNDERGROUND PARKING LEVELS
16. PROPOSED LOCATION OF UNDERGROUND UTILITIES
17. GAS REGULATOR / METER EQUIPMENT AREA
18. EX. CONCRETE SIDEWALK WITH STREET CURB
19. EXISTING 1 STOREY BUILDING TO BE REMOVED
20. 5.0 x 5.0m SITE TRIANGLE
21. TREE WITH GRATE - SEE LANDSCAPE PLAN
22. SITE FURNITURE - SEE LANDSCAPE PLAN
23. SWALE - SEE CIVIL PLAN
24. EXISTING CITY SIDEWALK
25. EXISTING WALL / FENCE TO BE REMOVED
26. EXISTING CITY TREES TO REMAIN
27. EXISTING BUS STOP / SHELTER TO REMAIN
28. STANDARD PARKING SPACE 2.6 x 5.2 m
29. DEPRESSED CURB
30. EXISTING PARTING LOT / CURBS / ISLANDS / LIGHTS POLES,.. TO BE REMOVED
31. EXISTING HYDRO TOWER WITH CONCRETE BARRIERS AT BASE
32. LIGHT STANDARD
33. BALCONY ABOVE
34. STORM WATER STORAGE SYSTEM
35. EXISTING TREE TO BE REMOVED
36. LOW STEP, MAXIMUM HEIGHT 190mm
37. EXISTING BLACK METAL CITY BENCH
38. BICYCLE LANE
39. STREET / SIDEWALK LIGHTING
40. DISABLED PARKING SPACE 3.66 x 5.2 m
41. 2.0M WIDE PEDESTRIAN - HARD SURFACE WALK
42. HYDRO TRANSFORMER / EQUIPMENT
43. RETAINING WALL, UNDER 0.6 m

PROJECT INFORMATION

ZONING	AM10[2393] S368
SITE AREA	36,896 sq. m. (397,145) sq. ft.
BUILDING HEIGHT	AREA 'A' = 24 STOREYS AREA 'B' = 36 STOREYS
AMENITY AREA - 6m² PER UNIT	1,218 sq. m.

PROJECT STATISTICS - PHASE 1 ONLY

SITE AREA		7,191.2 sq. m. (77,405) sq. ft.
BUILDING HEIGHT	(77.0 M)	24 STOREYS

GROSS BUILDING - AREAS (CITY OF OTTAWA'S DEFINITION)

PARKING LEVELS (2 LEVELS U/G)		0.0 sq. m, (000) sq. ft.
GROUND FLOOR		1,804.1 sq. m. (19,419) sq. ft.
2nd to 4th FLOOR	3 x 1,045.0 sq. m. 3 x (11,248) sq. ft.	3,135.0 sq. m, (33,744) sq, ft.
5th FLOOR		0.0 sq. m, 000 sq. ft.
6th to 10th FLOOR	5 x 510.9 sq. m. 5 x (5,499) sq. ft.	2,554.4 sq. m, (27,495) sq. ft.
11th to 20th FLOOR	10 x 515.05 sq. m. 10 x (5,544) sq. ft.	5,150.5 sq. m, (5,544.0) sq. ft.
21st & 22nd FLOOR	2 x 460.6 sq. m. 2 x (4,958) sq. ft.	921.2 sq. m, (9,916) sq. ft.
23rd & 24th FLOOR	2 x 393.8 sq. m. 2 x (4,239) sq. ft.	787.6 sq. m, (8,478) sq. ft.
MECHANICAL FLOOR		0.0 sq. m, (000) sq. ft.
TOTAL AREA		14,532.8 sq. m, (154,492) sq. ft.

UNIT STATISTICS

STUDIO UNIT	13
1 BEDROOM UNIT	135
2 BEDROOM UNIT	65
TOTAL	213
COMMERCIAL RETAIL	1,612.3 sq. m, (17,355) sq. ft.
COMMERCIAL RESTAURANT	191.8 sq. m, (2,065) sq. ft.

AMENITY AREA

EXTERIOR COMMUNAL AT GRADE	1,000.0 sq. m, 10,764 sq. ft.
5th FLOOR COMMUNAL AMENITY ROOM	480.0 sq. m, 5,167 sq. ft.
5th FLOOR COMMUNAL ROOF TOP PATIO	645.0 sq. m, 6,943 sq. ft.
PRIVATE BALCONIES	1,505.0 sq. m, 16,200 sq. ft.
TOTAL =	3,630.0 sq. m, 39,073 sq. ft.
REQUIRED - 6.0M² PER UNIT (213) =	1,278.0 sq. m, 13,756 sq. ft.
REQUIRED COMMUNAL @ 50% =	639.0 sq. m, 6,878 sq. ft.

LOT COVERAGE

PAVED SURFACE =	1,848.9 sq. m.	25.7%
BUILDING FOOTPRINT =	2,830.0 sq. m.	39.3%
LANDSCAPE OPEN SPACE =	2,512.3 sq. m.	35.0%
TOTAL =	7,191.2 sq. m.	100.0%

CAR PARKING - PROVIDED

RESIDENTIAL UNITS	0,68 per UNIT	119
RESIDENTIAL VISITOR	0,1 per UNIT	20
COMMERCIAL RETAIL	4 per 1,000 sq. ft.	72
COMMERCIAL CAFÉ		0
TOTAL		211
STANDARD PARKING SPACE	2,6 x 5,2 m	201
SMALL CAR PARKING SPACE	2.4 x 4.6 m	5
HANDICAPPED SPACE	3.66 x 5.2 m	5

IT IS THE RESPONSIBILITY OF THE APPROPRIATE CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE AND TO REPORT ALL ERRORS AND/OR OMISSIONS TO THE ARCHITECT.

ALL CONTRACTORS MUST COMPLY WITH ALL PERTINENT CODES AND BY-LAWS.

THIS DRAWING MAY NOT BE USED FOR CONSTRUCTION UNTIL SIGNED BY THE ARCHITECT.

DO NOT SCALE DRAWINGS.

NOTATION SYMBOLS:

- 00 — INDICATES DRAWING NOTES, LISTED ON EACH SHEET.
- 00 — INDICATES ASSEMBLIE TYPE; REFER TO TYPICAL ASSEMBLIES SCHEDULE.
- 00 — INDICATES WINDOW TYPE; REFER TO WINDOW ELEVATIONS AND DETAILS ON A900 SERIES.
- 000 — INDICATES DOOR TYPE; REFER TO DOOR SCHEDULE AND DETAILS ON A900 SERIES.
- 00 / 00 — DETAIL NUMBER / TITLE / SCALE
- DETAIL REFERENCE PAGE
- DETAIL CROSS REFERENCE PAGE

Gross Floor Area Information

Gross Floor Area (GFA)	Phase 1	Residential	12,548.7 m2
		Retail Tenant 1	1,649.8 m2
		Retail Tenant 2	221.2 m2
		Total	14,419.7 m2
	Retained Westgate Lands	Shopping Centre	11,073 m2
		Office	3,810 m2

Zoning Information

Zone: AM10[2393] S368 – Arterial Mainstreet, Subzone 10, Exception 2393, Schedule 368

Proposal: 24-storey mixed-use building with a two-storey underground parking garage

Zoning Mechanism		Required	Provided
Minimum Lot Width	Phase 1	No minimum	84.20 m
	Retained Westgate Lands	No minimum	144.29 m
	Total	No minimum	228.49 m
Minimum Lot Area	Phase 1	No minimum	7,191.2 m2
	Retained Westgate Lands	No minimum	29,704.8 m2
	Total	No minimum	36,896 m2
Building Height	Phase 1	Minimum 7.5m containing at least two storeys *Section 185(10)(e)(ii)*	77.0 m 24 storeys
		Maximum 24 storeys as per S.368	
Amenity Space	Phase 1	No. required private amenity space (terraces and balconies)	1,505 m2 See SP-1 stats for brake down
		639 square metres communal area (50% of 1,278m2)	2,125 m2 (480 m2 indoor and 1,645 m2 outdoor)
		1,278 square metres total required for a mixed-use building, with 9 or more dwelling units (6m2 x 213 DU = 1,278)	3,630 m2
Front Yard Setback (Carling Avenue)	Minimum 0m *Section 185(10)(b)(i)*		to property line 5.45 m to ROW 3.075 m
	Maximum 7m *Section 185(10)(g) and Exception 2393*		
	At least 50% of the frontage along the front lot line must be occupied by building walls located within 7m for a mixed-use building *Section 185(10)(b)(i) and (ii)(1) and Exception 2393*		79% of the Carling Avenue frontage for just the boundaries of Phase 1 is occupied by building walls.
Corner Side Yard setback (Merivale Road)	Minimum 0m *Section 185(10)(b)(i)*		3.50m
	Maximum 6m *Exception 2393*		
Minimum Rear Yard Setback	n/a for phase 1		n/a
Minimum & Maximum Interior Side Yard Setback	n/a (no interior side yards in Phase 1)		n/a
Minimum Glazing of Ground Floor	A minimum of 50% of the surface area of the ground floor façade, measured from the average grade up to a height of 4.5m, facing a public street must be comprised of transparent glazing and active customer or resident entrance access doors. *Section 185(10)(h)*		73% of the ground floor façade facing Carling Avenue is transparent glazing and active access doors. 51.0% of the ground floor façade facing Merivale Road is transparent glazing and active access doors.
Minimum Height of Ground Floor	Any portion of a mixed-use building located within 10m of a front lot line or corner lot line requires a minimum ground floor height of 4.5m *Section 185(10)(g)(i)*		6.7 to 6.9 m

Parking & Loading Information

Schedule 1A, Zoning By-law 2008-250: Area Y: Inner Urban Mainstreets

Performance Standard			Required	Proposed
Vehicular Parking	Phase 1	Minimum number of parking spaces for Dwelling Units in a mixed-use building is 0.5 per dwelling unit	101 spaces (213DU – 12DU = 201DU x 0.5 = 101)	121 spaces
		Minimum number of parking spaces for Visitors is 0.1 per dwelling unit	20 spaces (213DU – 12DU = 201DU x 0.1 = 20.1)	20 spaces
		Minimum number of parking spaces for shopping centre use is 1.7 per 100m2 of GFA	31 spaces Retail Space 1 (Total Retail GFA 1,804m2) =	72 spaces
		Minimum Number of spaces to be reserved for physically disabled persons (By-law 2003-530, Part C)	3 spaces	5 spaces
		Total number of parking spaces within Phase 1 Lands	152 spaces	213 spaces (185 spaces within 2-levels of U/G & 28 surface spaces)
	Retained Westgate Lands	Minimum number of parking spaces for shopping centre use is 1.7 per 100m2 of gross leasable floor area	188 spaces 11,073 m2 (gross leasable floor area of shopping centre use)	273 spaces
		Minimum number of parking spaces for office use is 1 per 100m2 of GFA	38 spaces 3,810 m2 (gross floor area of office use)	40 spaces
		Total	226 spaces	313 spaces
	Total (Phase 1 and Retained)		378 spaces	524 spaces
	Additional parking provided on leased hydro land		n/a	309 spaces
Bicycle Parking	Phase 1	Minimum number of parking spaces for Dwelling Units is 0.5 per dwelling unit	207 (0.5x 213DU = 107)	132 spaces
		Minimum number of parking spaces for Retail Uses is 1 per 250m2 of GFA	10 spaces	10 spaces
		Total number of bicycle parking spaces within Phase 1 Lands		142 spaces
	Retained Westgate Lands	Minimum number of parking spaces for Shopping Centre Use is 1 per 500m2 of GFA	22 spaces	20 spaces
		Minimum number of parking spaces for Office Use is 1 per 250m2 of GFA	15 spaces	10 spaces
	Total (Phase 1 and Retained)		37 spaces	167 spaces
Loading	Phase 1	Minimum number of loading spaces	n/a	2 spaces
	Retained Westgate Lands	Minimum number of loading spaces	2 spaces	3 spaces
	Total		2 spaces	5 spaces
	Minimum loading space width and length		3.5 x 9.0 m 4.3 x 13 m	3.5 x 9.0 m 4.3 x 13 m
	Minimum width of driveway accessing loading space		6.0 m	6.0 m

No.	DESCRIPTION	DATE
9	ISSUED FOR SPC ROUND #3 COMMENTS	July 17, 19
8	ISSUED FOR 33% REVIEW	June 7, 19
7	UPDATED ZONING STAT SHEETS	June 3, 19
6	ISSUED FOR SPC ROUND #1 COMMENTS	Mar, 22, 19
5	ISSUED FOR HYDRO EMI STUDY	Mar, 14, 19
4	ISSUED FOR CONSULTANT COORDINATION	Feb, 28, 19
3	ISSUED FOR COMMUNITY MEETING	Jan. 09, 19
2	ISSUED FOR SITE PLAN CONTROL	Oct. 31, 18
1	ISSUED FOR ZONING AMENDMENT	Dec. 21, 15

REVISIONS:

ARCHITECT SEAL: ONTARIO ASSOCIATION OF ARCHITECTS — RODERICK LAHEY — LICENCE 4375
SEAL DATE: STAMP DATE

NORTH ARROW:

CLIENT: RIOCAN

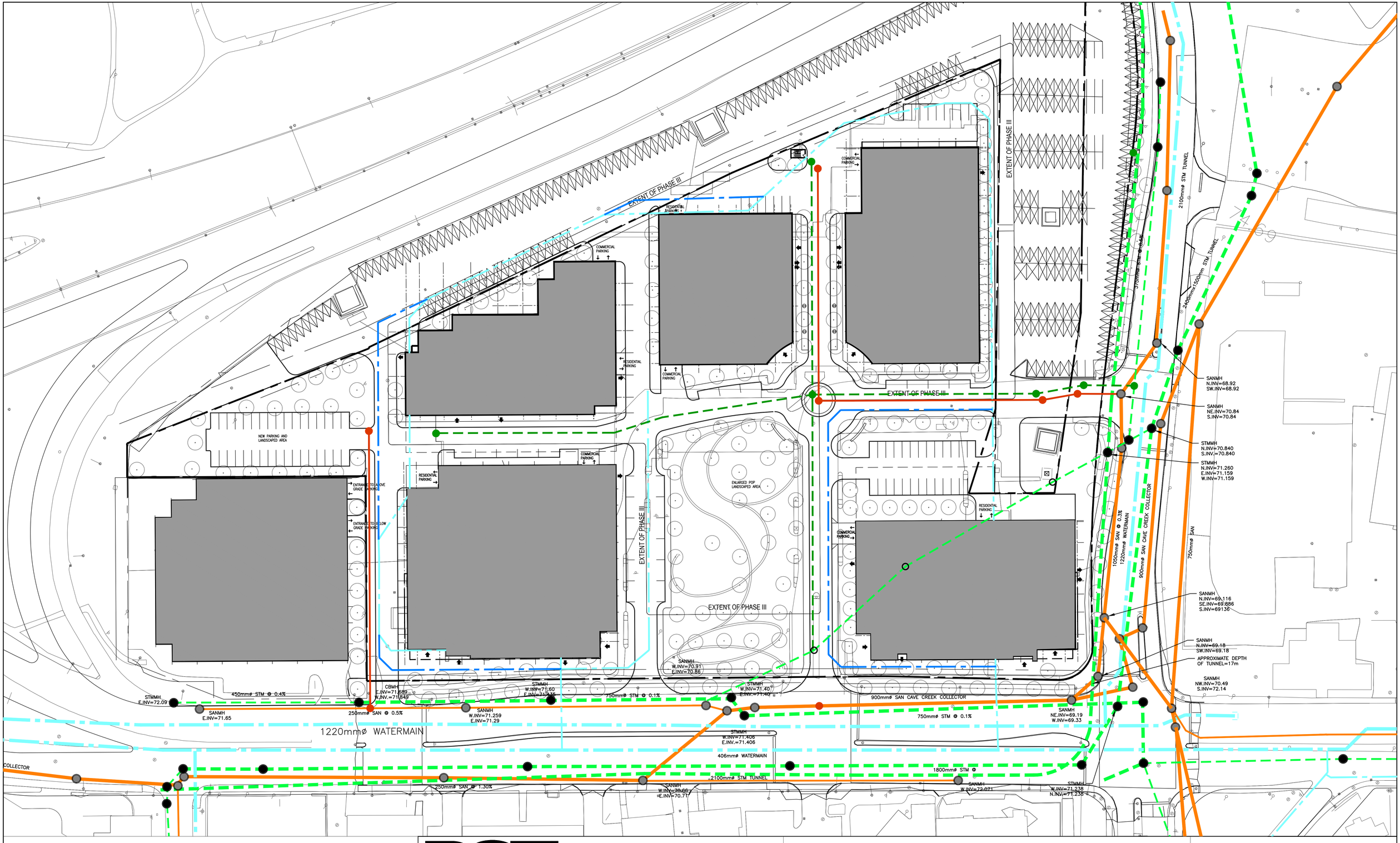
ARCHITECT: rla/architecture — roderick lahey architect inc.
56 beech street, ottawa, ontario K1S 3J6
t. 613.724.9932 f. 613.724.1209 rlaarchitecture.ca

PROJECT TITLE:
WESTGATE
1309 CARLING AVENUE
OTTAWA ONTARIO

SHEET TITLE:
SITE PLAN
PHASE 1
WESTGATE LANDS

DRAWN:	CHECKED:
RV	R.V.
SCALE: 1:200	SHEET No. SP-1
PROJECT No. 1807	

D07-12-18-0170



LEGEND:

- EXISTING WATERMAIN
- EXISTING SANITARY SEWER
- EXISTING STORM SEWER
- FUTURE WATERMAIN
- FUTURE SANITARY SEWER
- FUTURE STORM SEWER

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CONCEPTUAL MASTER SERVICING
WESTGATE SHOPPING CENTRE
1309 CARLING AVE.

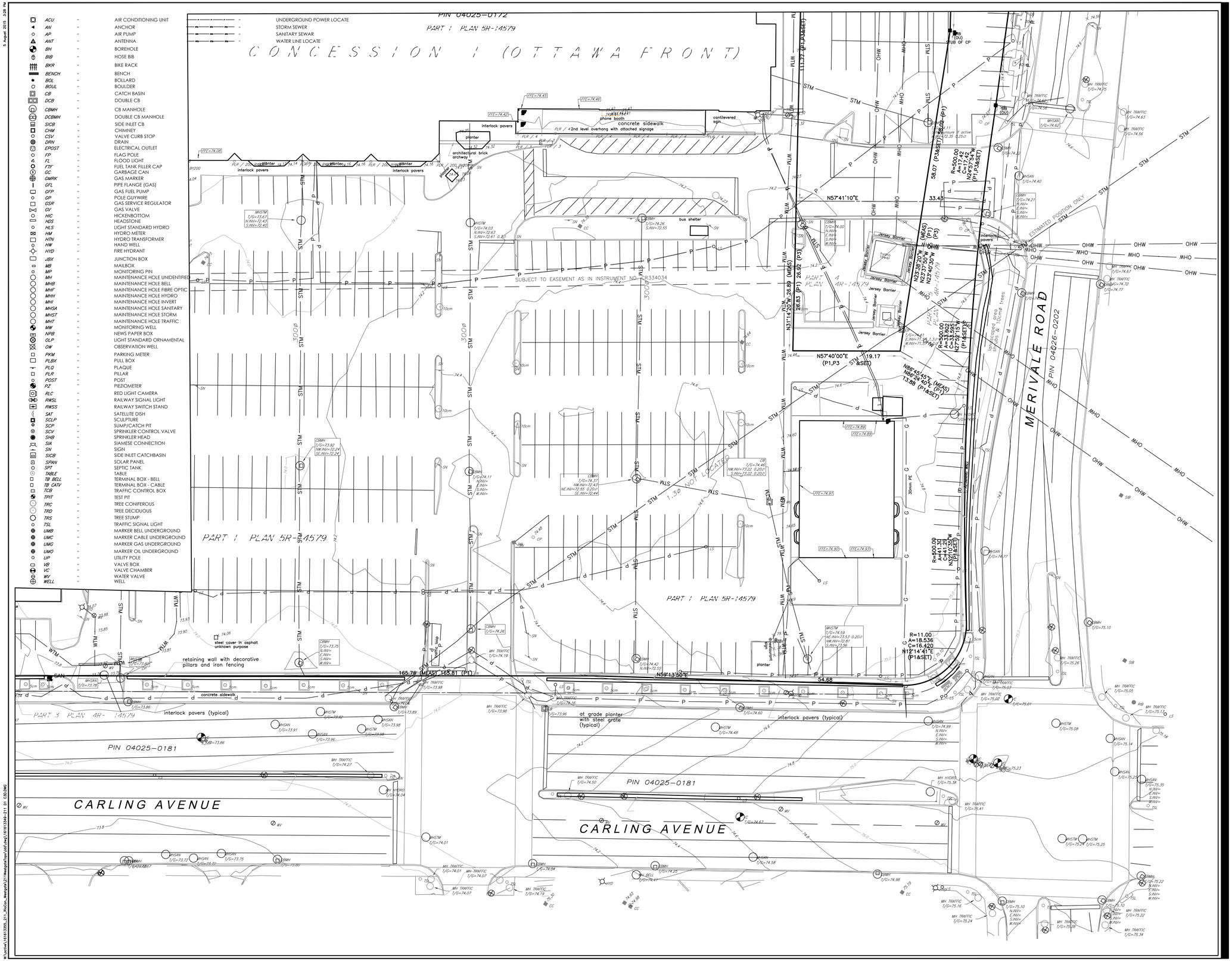
PROJECT No. :	793
SCALE:	1:500
DATE:	MAY 2016
DRAWING No.	CMS-1

5 August, 2015, 3:28 PM

W:\active\161613355_211_RivCon_Westpark\211Westpark\Dwg\MV\161613348-211 01 CSD.DWG

ACU	–	AIR CONDITIONING UNIT
AN	–	ANCHOR
AP	–	AIR PUMP
ANT	–	ANTENNA
BH	–	BOREHOLE
BIB	–	HOSE BIB
BKR	–	BIKE RACK
BENCH	–	BENCH
BOL	–	BOLLARD
BOUL	–	BOULDER
CB	–	CATCH BASIN
DCB	–	DOUBLE CB
CBMH	–	CB MANHOLE
DCBMH	–	DOUBLE CB MANHOLE
SICB	–	SIDE INLET CB
CHM	–	CHIMNEY
CSV	–	VALVE CURB STOP
DRN	–	DRAIN
EPOST	–	ELECTRICAL OUTLET
FP	–	FLAG POLE
FL	–	FLOOD LIGHT
FTF	–	FUEL TANK FILLER CAP
GC	–	GARBAGE CAN
GMRK	–	GAS MARKER
GFL	–	PIPE FLANGE (GAS)
GFP	–	GAS FUEL PUMP
GP	–	POLE GUYWIRE
GSR	–	GAS SERVICE REGULATOR
GV	–	GAS VALVE
HIC	–	HICKENBOTTOM
HDS	–	HEADSTONE
HLS	–	LIGHT STANDARD HYDRO
HM	–	HYDRO METER
HTN	–	HYDRO TRANSFORMER
HW	–	HAND WELL
HYD	–	FIRE HYDRANT
JBX	–	JUNCTION BOX
MB	–	MAILBOX
MP	–	MONITORING PIN
MH	–	MAINTENANCE HOLE UNIDENTIFIED
MHB	–	MAINTENANCE HOLE BELL
MHF	–	MAINTENANCE HOLE FIBRE OPTIC
MHH	–	MAINTENANCE HOLE HYDRO
MHI	–	MAINTENANCE HOLE INVERT
MHSA	–	MAINTENANCE HOLE SANITARY
MHST	–	MAINTENANCE HOLE STORM
MHT	–	MAINTENANCE HOLE TRAFFIC
MW	–	MONITORING WELL
NPB	–	NEWS PAPER BOX
OLP	–	LIGHT STANDARD ORNAMENTAL
OW	–	OBSERVATION WELL
PKM	–	PARKING METER
PLBX	–	PULL BOX
PLQ	–	PLAQUE
PLR	–	PILLAR
POST	–	POST
PZ	–	PIEZOMETER
RLC	–	RED LIGHT CAMERA
RWSL	–	RAILWAY SIGNAL LIGHT
RWSS	–	RAILWAY SWITCH STAND
SAT	–	SATELLITE DISH
SCLP	–	SCULPTURE
SCP	–	SUMP/CATCH PIT
SCV	–	SPRINKLER CONTROL VALVE
SHB	–	SPRINKLER HEAD
SIA	–	SIAMESE CONNECTION
SN	–	SIGN
SICB	–	SIDE INLET CATCHBASIN
SPAN	–	SOLAR PANEL
SPT	–	SEPTIC TANK
TABLE	–	TABLE
TB BELL	–	TERMINAL BOX - BELL
TB CATV	–	TERMINAL BOX - CABLE
TCB	–	TRAFFIC CONTROL BOX
TPIT	–	TEST PIT
TRC	–	TREE CONIFEROUS
TRD	–	TREE DECIDUOUS
TRS	–	TREE STUMP
TSL	–	TRAFFIC SIGNAL LIGHT
UMB	–	MARKER BELL UNDERGROUND
UMC	–	MARKER CABLE UNDERGROUND
UMG	–	MARKER GAS UNDERGROUND
UMO	–	MARKER OIL UNDERGROUND
UP	–	UTILITY POLE
VB	–	VALVE BOX
VC	–	VALVE CHAMBER
WV	–	WATER VALVE
WELL	–	WELL

	–	UNDERGROUND POWER LOCATE
	–	STORM SEWER
	–	SANITARY SEWAR
	–	WATER LINE LOCATE



Stantec

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Ottawa ON
Tel. 613.722.4420
www.stantec.com

TOPOGRAPHIC PLAN of

PART OF LOT 33 CONCESSION 1 (OTTAWA FRONT)

(GEOGRAPHIC TOWNSHIP OF NEPEAN

CITY OF OTTAWA

Scale 1:300

5 0 5 10 15 20 METRES

METRIC CONVERSION

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

BEARING NOTE

BEARINGS ARE GRID BEARINGS DERIVED FROM THE CAN-NET VRS NETWORK AND ARE REFERRED TO THE CENTRAL MERIDIAN 76°30' WEST LONGITUDE MTM ONTARIO COORDINATES SYSTEM, NAD83 (ORIGINAL) ZONE 9.

DISTANCES ON THIS PLAN MAY BE CONVERTED TO GROUND DISTANCES BY DIVIDING BY A COMBINED SCALE FACTOR OF 0.9999363.

VERTICAL DATUM NOTE

ELEVATIONS ARE OF GEODETIC ORIGIN AND ARE DERIVED FROM CONTROL MONUMENT 01919680315 HAVING AN ELEVATION OF 83.636.

LEGEND

■	DENOTES	FOUND MONUMENTS
□	"	SET MONUMENTS
IB	"	IRON BAR
IBØ	"	ROUND IRON BAR
SIB	"	STANDARD IRON BAR
SSIB	"	SHORT STANDARD IRON BAR
CC	"	CUT CROSS
CP	"	CONCRETE PIN
BM	"	BENCHMARK
CM	"	CONCRETE MONUMENT
HCM	"	HORIZONTAL CONTROL MONUMENT
NW	"	NAIL AND WASHER
PKN	"	PK NAIL
VCM	"	VERTICAL CONTROL MONUMENT
WIT	"	WITNESS
PIN	"	PROPERTY IDENTIFICATION NUMBER
MEAS	"	MEASURED
PROP	"	PROPORTIONED
OU	"	ORIGIN UNKNOWN
SG	"	STANTEC GEOMATICS LTD.
P1	"	PLAN 5R-14579
P2	"	PLAN 4R-20932
P3	"	PLAN 4R-23434
P4	"	PLAN OF SURVEY BY FAIRHALL MOFFETT WOODLAND OLS DATED JANUARY 6, 1987

NOTES

UNDERGROUND UTILITY LOCATES PROVIDED BY USL-1 UNDERGOUND SERVICE LOCATORS. THE POSITION OF UNDERGROUND UTILITIES, AS REPRESENTED BY THE USL-1 LOCATES, ARE APPROXIMATE. SEWER LINES ARE SHOWN AS DIRECT CONNECTION FROM CENTRE OF MANHOLE TO CENTRE OF MANHOLE AND DOES NOT TAKE INTO ACCOUNT OFFSET MANHOLE CHAMBERS, IF IN EXISTANCE.

THE END USER IS RESPONSIBLE FOR OBTAINING LOCATES PRIOR TO BREAKING GROUND.

DRAWN: DW CHECKED: BW PM: JL FIELD: WO DMPROJECT No.: 161613355-114