

**SITE SERVICING STUDY AND
STORMWATER MANAGEMENT
REPORT**

FOR

**HUNTINGTON PROPERTIES OTTAWA
INC.
2165 ROBERTSON ROAD**

CITY OF OTTAWA

PROJECT NO.: 18-1062
APPLICATION FILE NO.: D07-12-XX-XXXX

DECEMBER 2018 – REV 1
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FOR
2165 ROBERTSON ROAD**

HUNTINGTON PROPERTIES OTTAWA INC. 2165 ROBERTSON ROAD

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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained by Huntington Properties Limited to prepare a Site Servicing Study and Stormwater Management report in support of their application for a Site Plan Control (SPC) at 2165 Robertson Road.

The subject property is located within the City of Ottawa urban boundary, in the College Ward (Ward 8). As illustrated in **Figure 1**, below, the subject property is located on the north side of Robertson Road, and south-east of Moodie Drive. Comprised of a single parcel, the subject property measures approximately **1.13 ha** and is zoned Arterial Mainstreet (AM[287]).



Figure 1: Site Location

The proposed SPC would allow for the development of a 1-storey **1092 m²** industrial building located at the north end of the property, and a 1-storey **232 m²** restaurant on the

south end of the property fronting towards Robertson Road with associated asphalt parking lots. A copy of the architectural Site plan is included in ***Drawings/Figures***.

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

1.1 Existing Conditions

The existing site is a gravel paved parking lot. The elevations range between 92.73 m and 93.83 m with a grade change of approximate 0.5 m from the north to the south corner of the property.

Sewer and watermain mapping, along with as-built information collected from the City of Ottawa indicate the following existing infrastructure within the adjacent right-of-way:

Carling Avenue:

- 300 mm diameter asbestos lined concrete sanitary sewer; and
- 305 mm diameter watermain.

An existing 300 mm diameter sanitary sewer tributary to the Nepean Collector, as well as, an existing 305 mm watermain are located within Robertson Road. The subject site currently directs the majority of the stormwater runoff north, towards the existing ditch on the adjacent property while the rest of the stormwater runoff is directed towards an existing ditch along the north side of Robertson Road towards Still Water Creek.

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.

As a result of the site stormwater proposed to discharge into a ditch and not a storm sewer, OWRA s.53 approval is required from the Ministry of the Environment, Conservation and Parks (MOECP). The MOECP has been contacted to determine the approval requirements. Correspondence with the MOECP and the City of Ottawa is included in ***Appendix A***.

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 Stillwater watershed, and is therefore subject to review by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in ***Appendix A***.

1.3 Pre-consultation

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

2.0 GUIDELINES, PREVIOUS STUDIES, AS-BUILTS 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.
(MOECP Design Guidelines)
- **Stormwater Planning and Design Manual,**
Ministry of the Environment, March 2003.
(MOE SWM Manual)

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

 - **Water Supply for Public Fire Protection**
Fire Underwriters Survey, 1999.
(FUS)

 - **Geotechnical Investigation, PG4694-1**
Paterson Group, November 16, 2018.
(Geotechnical 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, located in **Appendix B**. A local 305 mm diameter watermain exists within the Robertson Road right-of-way.

An internal network of 203 mm diameter and 152 mm diameter watermains exists within the subject property and are used to service the existing building on 2175 Robertson Road, as well as, existing hydrants located on the property.

Table 1, below, summarizes the estimated existing water demand for 2175 Robertson Road.

Table 1
Summary of Existing Water Demand

Design Parameter	Existing Demand ¹ (L/min)
Average Daily Demand	22.0
Max Day	33.0
Peak Hour	59.3
1) Water demand calculation per Water Supply Guidelines . See Appendix B for detailed calculations.	

Refer to **EX-1**, accompanying this report, for the existing watermain locations.

3.2 Water Supply Servicing Design

It is proposed that the existing watermain network remain operational. A proposed 200 mm diameter watermain will connect to the existing internal 200 mm diameter watermain, in order to service the proposed industrial building. The proposed restaurant will be serviced through a 150 mm diameter service, connecting to the existing 200 mm diameter internal watermain. Servicing details for the proposed connection are shown in drawing **SSP-1**, which accompanies this report.

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

Table 2
Water Supply Design Criteria

Design Parameter	Value
Restaurant	125 L/seat/d
Light Industrial Daily Demand**	35,000 L/gross ha/d
Industrial Maximum Daily Demand	1.5 x avg. day
Industrial 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 <i>Water Supply Guidelines</i> ** Industrial Max. Daily and Max. Hourly peaking factors per <i>Water Supply Guidelines</i> . -Table updated to reflect ISD-2010-2	

Table 3, below, summarizes the estimated water supply demand and boundary conditions for the proposed development based on the *Water Supply Guidelines*.

Table 3
Summary of Water Demand and Boundary Conditions

Design Parameter	Estimated Demand ¹ (L/min)	Boundary Condition ² (m H ₂ O / kPa)
Average Daily Demand	25.3	38.9 / 381.5
Max Day + Fire Flow (3,000 L/min)	38.0 + 3,000	34.9 / 342.3
Max Day + Fire Flow (6,000 L/min)	38.0 + 6,000	33.4 / 327.6
Peak Hour	68.4	33.9 / 332.5
1) Water demand calculation per <i>Water Supply Guidelines</i> . 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 93.61m. See Appendix B . 3) Estimated water demand does not include existing building demands.		

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

Using the method in the *ISTB-2018-02*, an estimation of fire flow had been established. The following parameters were established by S.J. Lawrence Architect Inc:

- Type of construction – Non-combustible Construction for the proposed industrial building and wood frame construction for the proposed restaurant;
- Occupancy type – Limited Combustibility; and

- Sprinkler Protection – Supervised sprinkler for the proposed industrial building and non-sprinkler for the proposed restaurant.

The above assumptions result in an estimated fire flow of approximately **6,000 L/min** for the proposed restaurant and **3,000 L/min** for the proposed industrial building, noting that actual building materials selected will affect the estimated flow.

As specified by City of Ottawa Technical Bulletin **ISTB-2018-02**, the maximum fire flow capacity of a fire hydrant is to be reviewed to ensure a sufficient number of hydrants are available within 150 m to service the proposed development.

Table 4
Maximum Flow from Local Fire Hydrants

	Industrial Building (BLDG A)	Restaurant (BLDG B)
Required Fire Flow Estimate	50 L/s (3,000 L/min)	100 L/s (6,000 L/min)
Hydrants within 75 m	2	2
Hydrants between 75-150 m	1	2
Maximum Flow Available *	252 L/s (15,141 L/min)	315 L/s (18,926 L/min)
Sufficient Hydrants to Provide RFF?	YES	YES
*Based on Table 18.5.4.3 of the City of Ottawa Technical Bulletin ISTB-2018-02, approximately 5,700 L/min (95 L/s) is available from a hydrant located less than 75 m from the building and 3,800 L/min (63 L/s) is available from a hydrant located between 75 m and 150 m from the building.		

As demonstrated by **Table 4**, above, there are a sufficient number of hydrants to support the proposed development.

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

The City provided both the anticipated minimum and maximum water pressures, as well as, the estimated water pressure during fire flow demand for the proposed development. Correspondence with the City is included in **Appendix B**.

3.2.1 EPANet Water Modelling

EPANet was utilized to determine 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. Boundary conditions for the proposed development are included in **Appendix B**.

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 to the proposed building, as well as, the residual pressure during fire flow conditions.

Table 4, below, summarizes the output reports and model schematics for each scenario.

**Table 5
Model Simulation Output Summary**

Location/Node ID	Average Day (kPa)	Max Day + Fire Flow @ 3,000L/min (kPa)	Max Day + Fire Flow @ 6,000L/min (kPa)	Peak Hour (kPa)
BLDG A (Node 2)	381.4	304.2	260.1	332.3
HYD BLDG A (Node 4)	380.4	272.9	259.1	331.3
HYD BLDG B (Node 5)	379.0	321.1	158.3	329.8
EX HYD (Node 11)	387.1	329.2	233.5	338.0
EX BLDG (Node 13)	377.4	319.5	223.8	328.2
BLDG B (Node 14)	378.3	330.8	294.5	329.2

* For hydrant locations see **Appendix A** as well as **SSP-1** accompanying this report.

The model indicates that there is sufficient pressure to service the proposed buildings during average day, peak hour and max day + fire flow for both fire flow scenarios. The recommended pressure ranges outlined in the **Water Supply Guidelines** shown in **Table 2** are respected during all scenarios.

3.3 Water Supply Conclusion

It is proposed to service the development through the addition of a 200 mm diameter watermain to the existing 200 mm diameter internal watermain network and through a 150 mm diameter service connected to the existing internal 200 mm diameter watermain.

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

Based on the EPANET model, pressures requirements from the **Water Supply Guidelines** are respected during average day, peak hour and max day + fire flow scenarios.

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

4.0 WASTEWATER SERVICING

4.1 Existing Wastewater Services

The subject site lies within the Nepean Collector catchment area, as shown by the City sewer mapping included in **Appendix C**. An existing 300 mm diameter sanitary sewer within Robertson Road is available to service the proposed development.

4.2 Wastewater Design

It is proposed that the development be serviced through an internal sanitary sewer network that will connect to the existing 300 mm diameter sanitary sewer within Robertson Road, refer to drawing **SSP-1**, accompanying this report for sanitary layout and connection points. Wastewater flow from the development is proposed to ultimately discharge into the Nepean Collector Sewer within the local sanitary sewer system.

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
Restaurant	125 L/seat/d
Infiltration and Inflow Allowance	0.33 L/s/ha
Industrial - Light	35,000 L/gross ha/d
Industrial Peaking Factor	6.5 per City of Ottawa Sewer Design Guidelines Appendix 4B
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
<small>Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012. Existing design criteria extracted from the Subdivision Agreement for the Stittsville Business Park.</small>	

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

Design Parameter	Proposed Building Flow (L/s)
Estimated Average Dry Weather Flow	0.42
Estimated Peak Dry Weather Flow	1.55
Estimated Peak Wet Weather Flow	1.92

The estimated peak wet weather sanitary flow, based on the **Site Plan** prepared by SJL Lawrence Architect Inc., included in **Drawings/Figures**, is **1.92 L/s**.

In order to assess the available capacity of the local municipal sanitary sewers, a sanitary analysis was conducted for the sanitary sewers located across the frontage of the subject property within the Robertson Road right-of-way, up to the location where the 300 mm diameter sanitary sewer running within Robertson Road discharge to the existing 450 mm diameter sanitary sewer within Moodie Drive. The catchment area serviced by the Robertson Road sanitary sewer was identified and evaluated by reviewing existing developments and zoning within the area. Refer to the sanitary drainage plan in **Appendix C**, for the extents of the existing sanitary sewer analysis.

Based on the sanitary analysis, the most restrictive section of the local sewer system is located in front of 2130 Robertson Road, with a residual capacity of **2.2 L/s**; detailed calculations are included in **Appendix C**.

The analysis above indicates that sufficient capacity is available in the local sewers to accommodate the proposed development.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Nepean Collector sewer. The proposed development is estimated to generate a peak wet weather flow **1.92 L/s**, to be directed to the existing 300 mm diameter municipal sanitary sewer within Robertson Road.

Based on the sanitary analysis completed, there is a residual capacity of **2.2 L/s** within the most controlling section of sewer, therefore, there is sufficient capacity within the existing infrastructure to accommodate the flow estimated to discharge from the proposed development.

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

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the rear portion of the subject property currently flows overland, north towards the rail corridor drainage ditch located along the rear of the site. The swale is tributary to the Still Water Creek, which outlets to the Ottawa River, located approximately 3.9 km downstream from the site. A small portion of the site drains to the existing ditch within the Robertson Road ROW which conveys flow east and west on Robertson Road, eventually discharging to the Still Water Creek.

Flows that influence the watershed in which the subject property is located are further reviewed by the Rideau Valley Conservation Authority (RVCA). Consultation with the RVCA is located in **Appendix A**.

The Airport Method and the SCS Method were analyzed in an effort to appropriately select the method in which time of concentration is calculated. The Airport Method is intended for developments that are primarily flat and asphalt and the SCS Method is intended for small urban basins under 2000 acres. Calculated time of concentrations are summarized in **Table 8**, below.

Table 8
Summary of Calculated Time of Concentration

Area	Flow to Roberson Road Ditch (EX2) Time of Concentration (min)	Flow to Railroad Corridor Ditch (EX1) Time of Concentration (min)
Airport Method	10.7	29.8
SCS Method	6.4	22.3

Based on the time of concentration analysis, the Airport Method is to be utilized due to the type of development and to provide a conservative estimate of existing peak storm flow rates.

The estimated pre-development peak flows directed to the Robertson Road ditch and the railroad corridor ditch for the 2, 5, and 100-year are summarized in **Table 9**, below:

Table 9
Summary of Existing Peak Storm Flow Rates

	Flow to Roberson Road Ditch	Flow to Railroad Corridor Ditch
City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)	Estimated Peak Flow Rate (L/s)
2-year	27.4	73.8
5-year	37.1	99.3
100-year	79.5	211.6

5.2 Post-development Stormwater Management Target

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

- Maintain existing storm flows (2-year post to 2-year pre, 100-year post to 100-year pre) based on the pre-development Rational Method Coefficient, employing the City of Ottawa IDF parameters for storms with a calculated time of concentration for the rear lot and discharge into the existing rail corridor swale;
- Maintain existing storm flows (2-year post to 2-year pre, 100-year post to 100-year pre) based on the pre-development Rational Method Coefficient, employing the City of Ottawa IDF parameters for storms with a calculated time of concentration for the front lot and discharge into the existing road side ditch along Robertson Road;
- Attenuate on site all storms up to and including the City of Ottawa 100-year design event; and
- Include quality controls to an enhanced level of treatment (80% TSS removal) for the existing drainage ditch north of the subject site; correspondence with the RVCA is included in **Appendix A**.

Table 10, below, summarizes the allowable release rates for the site based on the information above.

Table 10
Allowable Release Rates

	Flow to Roberson Road Ditch	Flow to Railroad Corridor Ditch	Total
City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)	Estimated Peak Flow Rate (L/s)	Estimated Peak Flow Rate (L/s)
2-year	27.4	73.8	101.2
100-year	79.5	211.6	291.1

5.3 Proposed Stormwater Management System – To Robertson Road Ditch

It is proposed to have a portion of the site, along Robertson Road, be unattenuated with runoff from this area directed to the existing ditch that runs along the north side of Robertson Road. The existing area from the subject property contributing to this ditch measures **0.190 ha** and has a runoff coefficient of **0.70**. The proposed area measures **0.026 ha** and has a runoff coefficient of **0.58**. Refer to drawings **SWM-1** as well as the **Pre-development Drainage Area Plan Figure**, accompanying this report, for both existing and proposed drainage areas discharging to the existing Robertson Road ditch.

Table 11, below, summarizes post-development flow rates for the runoff discharging to the Robertson Road ditch.

Table 11
Stormwater Flow Rate Summary – To Robertson Road Ditch

Control Area	2-Year Release Rate	2-Year Storage	100-Year Release Rate	100-Year Required Storage
	(L/s)	(m ³)	(L/s)	(m ³)
To Robertson Road (U1)	3.2	0.0	9.3	0.0
Total	3.2	0.0	9.3	0.0

As shown by **Table 11**, the proposed development flow for both the 2-year and 100-year storm events to the existing ditch from the subject site decreases compared to the pre-development conditions summarized in **Table 10**. As the discharge from the site to the Robertson Road ditch decreases compared to pre-development flow rates, on site storage for the area draining to the Robertson Road ditch is not required.

5.4 Proposed Stormwater Management System – To Railroad Corridor Ditch

The proposed development provides quantity and quality controls through the use of a modified constructed wetland. The design of the modified constructed wetland used **Section 4.6.6, Table 4.9**, from the **MOE SWM Manual** as a guide. As the wetland is sized for a smaller area, 1.1 Ha instead of the minimum of 5 ha, there are some criteria summarized in the **MOE SWM Manual** that were not achievable.

The proposed buildings will not provide rooftop storage and will direct runoff to the drainage swale along the east of the subject. Surface drainage is to be directed to the modified constructed wetland via the proposed curb cuts and grass swale. Refer to drawings **SWM-1**, as well as, the **Pre-development Drainage Area Plan Figure**, accompanying this report, for both existing and proposed drainage areas discharging to the railroad corridor ditch. The ditch has been sized to convey the uncontrolled 100-year storm event to the wetland facility, refer to **Appendix D** for calculations.

The modified constructed wetland will contain a ditch inlet catch basin (DICB) equipped with a **210 mm ICD**, a **335 mm ICD** to control flow to the allowable release rate before discharging to the existing railroad corridor ditch via a **450 mm diameter** HDPE culvert.

Table 12, below, summarizes post-development flow rates for the runoff discharging to the railroad corridor ditch.

Table 12
Stormwater Flow Rate Summary – To Railroad Corridor Ditch

Control Area	2-Year Release Rate	2-Year Storage	100-Year Release Rate	100-Year Required Storage
	(L/s)	(m ³)	(L/s)	(m ³)
Unattenuated Areas (U2)	0.2	0.0	0.5	0.0
Attenuated Areas (B1)	65.8	78.4	209.6	204.3
Total	66.0	78.4	210.1	204.3

It was estimated that approximately **204.3 m³** of storage is required in the area directing flow to the railroad corridor ditch to attenuate the release rate to **210.1 L/s**, as outlined in Section 5.2; storage calculations are contained within **Appendix D**.

5.4.1 Stormwater Quality Control

To provide the required quality control of 80% TSS Removal, stormwater runoff from the site is proposed to be directed a grass swales and a modified constructed wetland before discharging to the existing railroad corridor ditch.

Based on the **MOE SWM Manual** and the drainage area directed to the wetland, the wetland requires a permanent pool volume of **110.6m³** and extended detention volume of **44.2m³**. The pond has been designed to provide **121.2m³** of permanent pool volume at an elevation of **92.20m** and **71.1m³** of extended detention volume at an elevation of **92.45m**. The extended detention volume is measured from the permanent pool elevation to the 2nd quantity control orifice.

Based on the **MOE SWM Manual**, the modified constructed wetland should be planted with vegetation that promotes an extended detention time to allow for the reduction of TSS.

5.4.2 Stormwater Management System Maintenance/Best Management Practices

The following maintenance and best management practices will be implemented for the proposed development:

- It is recommended that regular maintenance of the site stormwater management system, including annual cleaning of catchbasin sumps, ICDs, inlets, outlets, and limiting the use of salt, sand and gravel in parking lots during the winter months, in addition to spring sweeping of parking areas be implemented;
- Recommend that grit be used rather than sodium de-icing solutions during winter months;

-
- The modified constructed wetland and grass swales will need to be inspected regularly and sediment accumulation removed as required;
 - Any material storage (if required) on-site is to be provided adequate protection to ensure any spills do not enter the stormwater storage system.

5.5 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm, in accordance with City of Ottawa, **City Standards**.

The proposed front yard release rate is decreased from the pre-development release rate from the subject property to the existing ditch along Robertson Road, no storage is anticipated to be required for this area.

Based on consultation with the City of Ottawa, the post-development allowable release rate for the area draining to the railroad corridor ditch was calculated as **211.6 L/s**. It is calculated that approximately **204.3 m³** of storage provided by the modified constructed wetland in the area directing flow to the railroad corridor ditch will be required to meet the established release rate.

Based on consultation with the RVCA, quality controls are required to an enhanced level of treatment (80% TSS removal) for the proposed development. Quality controls will be provided by the permanent pool and extended detention volume within the wetland.

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

6.0 UTILITIES

Gas, Bell, Cable and Hydro services currently exist within the Robertson Road Road right-of-way. Utility servicing will be coordinated with the individual utility companies prior to site development.

7.0 EROSION AND SEDIMENT CONTROL

Soil erosion occurs naturally and is a function of soil type, climate and topography. The extent of erosion losses is exaggerated during construction where vegetation has been removed and the top layer of soil becomes agitated.

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

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

Catch basins will have SILTSACKS or an approved equivalent filter fabric 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 Huntington Properties Limited to prepare a Site Servicing Study and Stormwater Management report in support of the application for a Site Plan Control (SPC) at 2165 Robertson Road. The preceding report outlines the following:

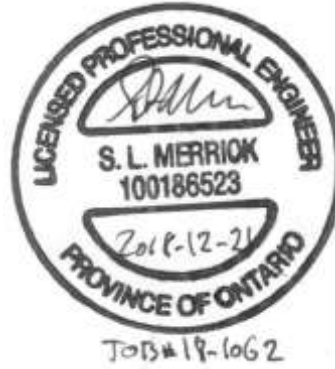
- Based on boundary conditions provided by the City, an EPANet analysis was completed and there is sufficient pressure to service the proposed development, as well as, the existing neighbouring building within the City's required pressure range;
- The FUS method for estimating fire flow indicated **3,000 L/min** is required for the proposed industrial building and **6,000 L/min** is required for the proposed restaurant; Based on the EPANet analysis, as well as, the maximum hydrant capacity as per *ISTB-2018-02*, the required fire flow demands of the development can be achieved;
- The development is estimated to have a peak wet weather flow of **1.92 L/s**. Based on the sanitary analysis conducted the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Based on consultation with the City of Ottawa staff, runoff from the front yard, discharging to the existing ditch within Robertson Road, will be required to attenuate post-development flows to an equivalent 2-year release rate of **27.4 L/s** and a 100-year release rate of **79.5 L/s**;
- It is anticipated that storage will not be required for the front yard area directing flow to the Robertson Road ditch, as the flow rate has been decreased from the pre-development flow rate to **9.3 L/s**;
- Based on consultation with the City of Ottawa staff, runoff from the area directing flow to the railroad corridor ditch, discharging to the existing ditch north of the property, will be required to attenuate post-development flows to an equivalent 2-year release rate of **73.8 L/s** and a 100-year release rate of **211.6 L/s**;
- Stormwater objectives are met through storm water retention via a modified constructed wetland. It is calculated that **204.3 m³** of storage will be provided in the area directing flow to the railroad corridor ditch to attenuate flow to the established release rate; and
- Based on coordination with the RVCA, quality controls to an enhanced level of treatment (80% TSS removal) is required, this is provided via a treatment train approach directing stormwater to landscaped areas, enhanced grass swales and a modified constructed wetland.

Prepared by,
David Schaeffer Engineering Ltd.

Reviewed by,
David Schaeffer Engineering Ltd.



Per: Brandon Chow



Per: Steven L. Merrick, P.Eng

APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

18-1062

19/12/2018

4.1 General Content		
<input type="checkbox"/>	Executive Summary (for larger reports only).	N/A
<input checked="" type="checkbox"/>	Date and revision number of the report.	Report Cover Sheet
<input checked="" type="checkbox"/>	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
<input checked="" type="checkbox"/>	Plan showing the site and location of all existing services.	EX-1
<input checked="" type="checkbox"/>	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
<input checked="" type="checkbox"/>	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
<input checked="" type="checkbox"/>	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defensible design criteria.	Section 2.1
<input checked="" type="checkbox"/>	Statement of objectives and servicing criteria.	Section 1.0
<input checked="" type="checkbox"/>	Identification of existing and proposed infrastructure available in the immediate area.	Sections 1.1, 3.1, 4.1, 5.1
<input type="checkbox"/>	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
<input checked="" type="checkbox"/>	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	GP-1
<input type="checkbox"/>	Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.	N/A
<input type="checkbox"/>	Proposed phasing of the development, if applicable.	N/A
<input checked="" type="checkbox"/>	Reference to geotechnical studies and recommendations concerning servicing.	Section 2.1
<input checked="" type="checkbox"/>	All preliminary and formal site plan submissions should have the following information: -Metric scale -North arrow (including construction North) -Key plan -Name and contact information of applicant and property owner -Property limits including bearings and dimensions -Existing and proposed structures and parking areas -Easements, road widening and rights-of-way -Adjacent street names	SP-1
4.2 Development Servicing Report: Water		
<input type="checkbox"/>	Confirm consistency with Master Servicing Study, if available	N/A
<input checked="" type="checkbox"/>	Availability of public infrastructure to service proposed development	Section 3.1
<input checked="" type="checkbox"/>	Identification of system constraints	Section 3.1
<input checked="" type="checkbox"/>	Identify boundary conditions	Section 3.2
<input checked="" type="checkbox"/>	Confirmation of adequate domestic supply and pressure	Section 3.2, 3.3

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

4.3 Development Servicing Report: Wastewater

<input checked="" type="checkbox"/>	Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).	Section 4.2
<input type="checkbox"/>	Confirm consistency with Master Servicing Study and/or justifications for deviations.	N/A
<input type="checkbox"/>	Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.	N/A
<input checked="" type="checkbox"/>	Description of existing sanitary sewer available for discharge of wastewater from proposed development.	Section 4.1, EX-1
<input checked="" type="checkbox"/>	Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)	Section 4.2, 4.3
<input checked="" type="checkbox"/>	Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix 'C') format.	Section 4.2, Appendix C
<input checked="" type="checkbox"/>	Description of proposed sewer network including sewers, pumping stations, and forcemains.	Section 4.2, SSP-1
<input type="checkbox"/>	Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).	N/A

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

4.4 Development Servicing Report: Stormwater Checklist

<input checked="" type="checkbox"/>	Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)	Section 5.1
<input checked="" type="checkbox"/>	Analysis of available capacity in existing public infrastructure.	Section 5.1, Appendix D
<input checked="" type="checkbox"/>	A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.	Drawings/Figures
<input checked="" type="checkbox"/>	Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.	Section 5.2
<input checked="" type="checkbox"/>	Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.	Section 5.2, 5.4
<input checked="" type="checkbox"/>	Description of the stormwater management concept with facility locations and descriptions with references and supporting information	Section 5.3
<input type="checkbox"/>	Set-back from private sewage disposal systems.	N/A
<input type="checkbox"/>	Watercourse and hazard lands setbacks.	N/A
<input type="checkbox"/>	Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.	N/A
<input type="checkbox"/>	Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.	N/A
<input checked="" type="checkbox"/>	Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).	Section 5.3
<input type="checkbox"/>	Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.	N/A
<input checked="" type="checkbox"/>	Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.	Section 5.1, 5.3
<input type="checkbox"/>	Any proposed diversion of drainage catchment areas from one outlet to another.	N/A
<input checked="" type="checkbox"/>	Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.	Section 5.2
<input type="checkbox"/>	If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100-year return period storm event.	N/A
<input type="checkbox"/>	Identification of potential impacts to receiving watercourses	N/A
<input type="checkbox"/>	Identification of municipal drains and related approval requirements.	N/A

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

4.5 Approval and Permit Requirements: Checklist

<input checked="" type="checkbox"/>	Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement ct. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.	Section 5.1
<input type="checkbox"/>	Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.	N/A
<input type="checkbox"/>	Changes to Municipal Drains.	N/A
<input type="checkbox"/>	Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)	N/A

4.6 Conclusion Checklist

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

Brandon Chow

From: Brandon Chow
Sent: November 15, 2018 4:31 PM
To: 'Schaeffer, Gabrielle'
Cc: Dickinson, Mary
Subject: RE: 2165 Robertson Road
Attachments: ex-ditch_rail-corridor.pdf

Hi Gabrielle,

After visiting the site and reviewing existing topo information in detail, it was determined that the portion of the site that sheet flows to the rail corridor, drains to the ditch that flows north-east. The ditch flows north-east and eventually drains to Still Water Creek. As the drainage from the site does not flow through the existing culvert to the west, an analysis on the culvert is not required for this development.

We will use the below criteria to establish allowable release rates for the site.

- Maintain existing storm flows (2yr-post to 2yr-pre, 100yr-post to 100yr-pre)
- Pre-development run-off coefficient
- Calculated time of concentration with a minimum $T_c=10$ minutes
- On-site pre-development drainage areas to each outlet (rail corridor ditch and Robertson Road ditch)

Thank you,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL

David Schaeffer Engineering Ltd.

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

phone: (613) 836-0856 ext.532

fax: (613) 836-7183

email: bchow@DSEL.ca

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From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Sent: November 6, 2018 10:42 AM
To: Brandon Chow <BChow@dsel.ca>
Cc: Dickinson, Mary <mary.dickinson@ottawa.ca>
Subject: RE: 2165 Robertson Road

Hi Brandon,

I have added my comments below in dark blue.

Regards,

Gabrielle

From: Brandon Chow <BChow@dse.ca>
Sent: Monday, November 05, 2018 5:05 PM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Subject: 2165 Robertson Road

Good afternoon Gabrielle,

I would like to touch base with you regarding the proposed development at 2165 Robertson Rd. I'd like to confirm design criteria as our client would like to move forward with this file. Based on the pre-consultation meeting you had with Adam Fobert from our office on April 10, 2018, can you confirm the requirement below?

- Maintain existing storm flows (2yr-post to 2yr-pre, 100yr-post to 100yr-pre)
- Pre-development run-off coefficient or a maximum equivalent 'C' of 0.5, whichever is less
- Calculated time of concentration with a minimum $T_c=10$ minutes
- If any works are required within the rail corridor, the developer will need to obtain a Utility Crossing Agreement with the City. Please note that for works within the rail corridor, the applicant will be required to obtain and maintain Commercial General Liability insurance issued on an occurrence basis for an amount not less than \$15,000,000.00.
- The City believes a direct submission Industrial/Private Sewage Works MECP ECA will be required due to multiple reasons: (1) the proposed building to the north will be a warehouse, therefore qualifies as an industrial use, (2) the lot is made up of 3 property parcels (albeit all with the same municipal address) therefore services more than one lot, and (3) the site stormwater will discharge into a ditch therefore it will not discharge into a storm sewer as required for the exemption. If you disagree with the City's ECA requirement assessment, please contact the MECP to confirm their requirements for this development.
- The applicant is to confirm if the proposed flows are within the existing capacity of the railway crossing culvert. The part of the current site appears to sheet drain to the rail corridor ditch, which crosses the old rail line and outlets into Stillwater Creek. The culvert is known as the Stillwater Creek Old CPR Culvert with structure number 118030. This is a medium culvert constructed in approximately 1930, made of stone and its structural type is a footing arch. City records show this culvert is an 8 foot span structure, however this should be verified on-site before being used in any analysis. Please see attached typical drawings for CPR culverts for structure with different spans. Again, this information is to be verified on-site.

Stormwater from the site will outlet to an existing ditch just north of the site which drains through a culvert to Still Water Creek. Please be sure to do a proper pre-development drainage area assessment specifying the on-site drainage area to each outlet (rail corridor ditch, and the Robertson Road ditch). The allowable release rates for each outlet is to be set in this manner.

The proposed development will be designed to service one property, as such, we believe the development would be exempt from an ECA requirement as per O.Reg. 525/98 section 3(a). See comment above regarding ECA requirements.

Can you provide your input? We will then consult with the MOE to confirm.

Thank you,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL

david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.532

fax: (613) 836-7183

email: bchow@DSEL.ca

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Brandon Chow

From: Eric Lalande <eric.lalande@rvca.ca>
Sent: October 25, 2018 9:53 AM
To: Brandon Chow
Subject: RE: 18-1062_2165 Robertson Rd - quality requirement

Hi Mr. Chow,

The quality control required for the development is 80% TSS removal through on-site measures as there are no intervening municipal facility providing quality protection and the distance to the outlet is < 2km

LIDs are encouraged where feasible. Let me know if you require anything else.

Thanks,

Eric Lalande, MCIP, RPP

Planner, Rideau Valley Conservation Authority
613-692-3571 x1137

From: Brandon Chow <BChow@dsel.ca>
Sent: Wednesday, October 24, 2018 1:06 PM
To: Eric Lalande <eric.lalande@rvca.ca>
Subject: 18-1062_2165 Robertson Rd - quality requirement

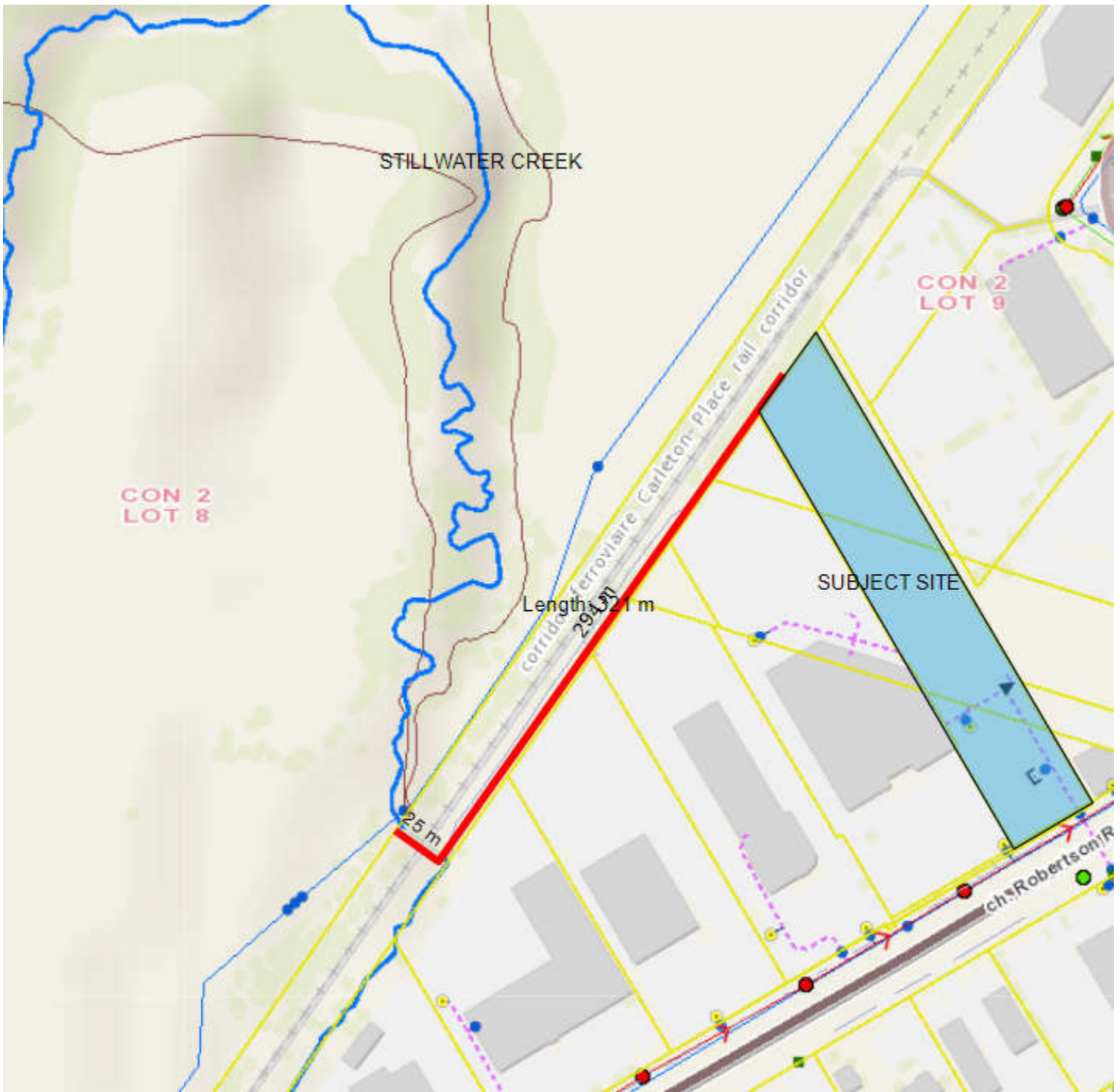
Good afternoon,

We would like to touch base with you regarding a development we are working on located at 2165 Robertson Road.

The existing site consists of gravel parking. Stormwater from the site travels approximately 320m and drains through an existing arch culvert that outlets to Stillwater Creek.

The proposed development involves the construction of two 1-storey warehouse/showroom buildings with associated parking. Stormwater from the site will be attenuated to match pre-development flows per City of Ottawa requirements and will discharge to the Stillwater Creek.

Can you provide any comments regarding quality controls required for this site?



Thank you,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.532

fax: (613) 836-7183
email: bchow@DSEL.ca

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Brandon Chow

From: Brandon Chow
Sent: November 15, 2018 4:04 PM
To: 'Emily.Diamond@ontario.ca'
Subject: 2165 Robertson Road - ECA Requirement

Good Afternoon Emily,

We wanted to touch base with you regarding a proposed development we are working on located at 2165 Robertson Road.

The subject lands are zoned as Arterial Mainstreet Zone. There is a hydro easement that runs through the property for the existing overhead Hydro line. The existing site is comprised of a gravel surface and is currently being used for parking/storage.

The proposed development includes the construction of a small restaurant building as well as a warehouse/showroom building.

Proposed sanitary flows for the site will discharge to the existing 300mm sanitary sewer within Robertson Road. Stormwater from the site will be attenuated to the release rate based on City of Ottawa requirements and will drain north to the existing rail corridor ditch which flows north-east.

We understand that an Environmental Compliance Approval will be required under OWRA S.53. as the stormwater from the site will be discharging to a ditch.

Can you provide your input or confirm our assumptions above in regards to ECA requirements for the proposed development?



Thank you,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL

david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.532

fax: (613) 836-7183

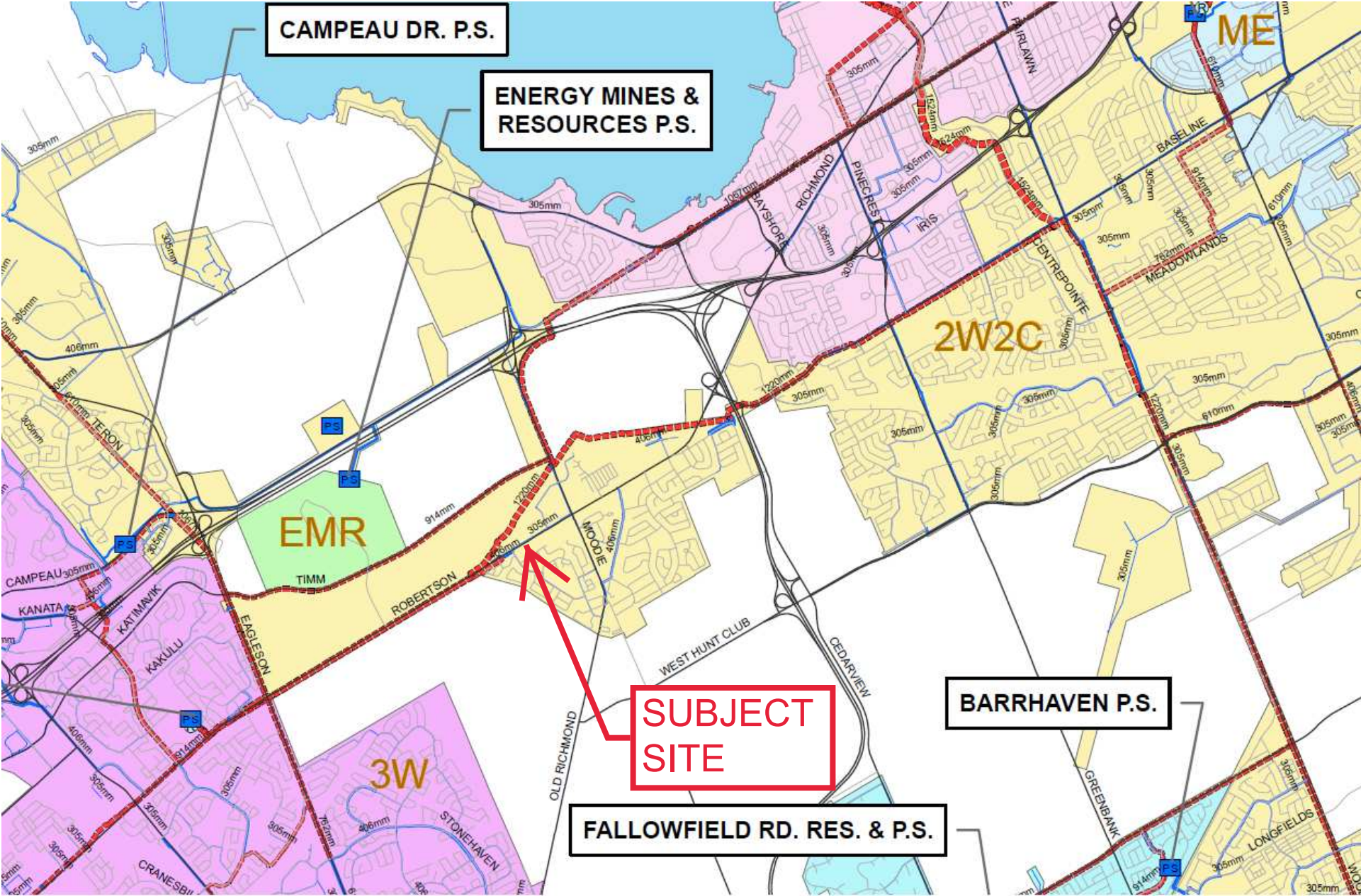
email: bchow@DSEL.ca

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APPENDIX B

Water Supply

CITY OF OTTAWA – WATER DISTRIBUTION SYSTEM



Brandon Chow

From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Sent: November 26, 2018 9:38 AM
To: Brandon Chow
Subject: RE: 2165 Robertson Road - Boundary condition request
Attachments: 2165 Robertson Nov 2018.pdf

Hi Brandon,

The following are boundary conditions, HGL, for hydraulic analysis at 2165 Robertson (zone 2W) assumed to be connected to the 305mm on Robertson (see attached PDF for location).

Minimum HGL = 127.5m
Maximum HGL = 132.5m
MaxDay + FireFlow (50L/s) = 128.5m
MaxDay + FireFlow (100L/s) = 127.0m

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.

Regards,
Gabrielle

From: Brandon Chow <BChow@dsel.ca>
Sent: Monday, November 12, 2018 4:57 PM
To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>
Subject: RE: 2165 Robertson Road - Boundary condition request

Hi Gabrielle,

See the updated water demands attached and below.

	L/min	L/s
Avg. Daily	56.4	0.94
Max Day	84.7	1.41
Peak Hour	152.4	2.54

Thanks,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL

David Schaeffer Engineering Ltd.

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

phone: (613) 836-0856 ext.532

fax: (613) 836-7183

email: bchow@DSEL.ca

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From: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>

Sent: November 8, 2018 2:23 PM

To: Brandon Chow <BChow@dsel.ca>

Subject: RE: 2165 Robertson Road - Boundary condition request

Hi Brandon,

- Please revise the existing and proposed domestic demand calculations.
- The rate used for commercial floor space is not appropriate for the both the small retail space in Building B (per the site plan provided) and the existing building at 2175 Robertson Road. The commercial floor space rate used (2.5 L/m²/d) is for Shopping Centres (i.e. malls).
- At the pre-consultation meeting, the applicant explained that the current use at 2175 Robertson Road is a call centre/employment building. A more appropriate rate for 2175 Robertson Road would be Other Commercial = 28,000 L/gross ha/d.
- The Light Industrial rate is not by floor area as used in your calculations (3.5 L/m²/d), but rather by gross hectare. Since most (80%) of Building B is used as a warehouse, a more appropriate rate would be the Light Industrial parameter of 35,000 L/gross ha/d. Since the whole site is not being used for light industrial you can apply the rate to the parts of the site used for light industrial (Building B uses including parking and truck turning areas).
- Although Appendix 4A of the Ottawa Sewer Design Guidelines is not meant to be used for water demand calculations, I understand why consultants like to use it, and is generally accepted. The use of the restaurant seating rate is acceptable.
- FUS calculations are also acceptable. A mechanical letter for the fully supervised sprinkler system will be required at the time of submission.
- Also, the domestic demands in your email and the calculation sheet do not match.

Once I have your revised domestic calculations, I will request boundary conditions.

Regards,
Gabrielle

From: Brandon Chow <BChow@dsel.ca>

Sent: Wednesday, November 07, 2018 4:44 PM

To: Schaeffer, Gabrielle <gabrielle.schaeffer@Ottawa.ca>

Subject: RE: 2165 Robertson Road - Boundary condition request

Hi Gabrielle,

There's been an update to the proposed construction for the restaurant building. See attached an updated FUS calculation.

Can you provide boundary conditions based on a fire flow of 6,000 L/min? Demands haven't changed.

	L/min	L/s
Avg. Daily	13.4	0.22
Max Day	20.1	0.34
Peak Hour	36.2	0.60

Thank you,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL

david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.532
fax: (613) 836-7183
email: bchow@DSEL.ca

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From: Brandon Chow
Sent: November 6, 2018 4:03 PM
To: 'gabrielle.schaeffer@Ottawa.ca' <gabrielle.schaeffer@Ottawa.ca>
Subject: 2165 Robertson Road - Boundary condition request

Good afternoon Gabrielle,

We would like to request water boundary conditions for 2165 Robertson Road using the following proposed development demands.

1. Location of Service / Street Number:
2165 Robertson Road
2. Type of development:
The proposed development involves the construction of two 1-storey buildings. One building will be a restaurant and the other building will be a showroom & warehouse.
3. Connection point:
200m watermain connected at 300mm watermain within Robertson Road (see image reference below)
4. Fire flow required for the proposed development:
3,000 L/min (see attached)
5. Anticipated water demands are summarized below. See calculations attached. (Table below includes estimated demand for ex. building at 2175 Robertson):

	L/min	L/s
Avg. Daily	13.4	0.22
Max Day	20.1	0.34
Peak Hour	36.2	0.60



Thank you,

Brandon Chow
Project Coordinator / Intermediate Designer

DSEL

david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext.532

fax: (613) 836-7183

email: bchow@DSEL.ca

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Huntington Properties
Ex. Building at 2175 Robertson Rd

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



Domestic Demand

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

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	0	0.0	0.0	0.0	0.0	0.0	0.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Other Commercial	28,000 L/gross ha/d	1.1	31.64	22.0	47.5	33.0	85.4	59.3
Office	75 L/9.3m ² /d	-	0.00	0.0	0.0	0.0	0.0	0.0
Restaurant*	125 L/seat/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			31.6	22.0	47.5	33.0	85.4	59.3
Total Demand			31.6	22.0	47.5	33.0	85.4	59.3

* Estimated number of seats at 1seat per 9.3m²

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



Domestic Demand

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

	Pop	Avg. Daily		Max Day		Peak Hour	
		m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Total Domestic Demand	0	0.0	0.0	0.0	0.0	0.0	0.0

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate	Units	Avg. Daily		Max Day		Peak Hour	
			m ³ /d	L/min	m ³ /d	L/min	m ³ /d	L/min
Commercial floor space	2.5 L/m ² /d	-	0.00	0.0	0.0	0.0	0.0	0.0
Office	75 L/9.3m ² /d	-	0.00	0.0	0.0	0.0	0.0	0.0
Restaurant	125 L/seat/d	40	5.00	3.5	7.5	5.2	13.5	9.4
Industrial - Light	35,000 L/gross ha/d	0.9	31.50	21.9	47.3	32.8	85.1	59.1
Industrial - Heavy	55,000 L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand			36.5	25.3	54.8	38.0	98.6	68.4
Total Demand			36.5	25.3	54.8	38.0	98.6	68.4



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 1092.0 m² Total floor area based on FUS Part II section 1

Fire Flow	5816.0 L/min
	6000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Limited Combustible -15%

Fire Flow	5100.0 L/min
------------------	---------------------

3. Reduction for Sprinkler Protection

Sprinklered - Supervised -50%

Reduction	-2550 L/min
------------------	--------------------

4. Increase for Separation Distance

Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N Non-Combustible	>45m	34		0	0	0%
S Non-Combustible	>45m	34		0	0	0%
E Non-Combustible	>45m	34		0	0	0%
W Non-Combustible	>45m	34		0	0	0%
	% Increase					0% value not to exceed 75%

Increase	0.0 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	2550.0 L/min	fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section
	3000.0 L/min	rounded to the nearest 1,000 L/min

- Notes:**
 -Type of construction, Occupancy Type and Sprinkler Protection information provided by S.J. Lawrence Architect Inc.
 -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: Wood Frame

C 1.5 Type of Construction Coefficient per FUS Part II, Section 1
A 232.0 m² Total floor area based on FUS Part II section 1

Fire Flow 5026.4 L/min
5000.0 L/min rounded to the nearest 1,000 L/min

Adjustments

2. Reduction for Occupancy Type

Combustible 0%

Fire Flow **5000.0 L/min**

3. Reduction for Sprinkler Protection

Non-Sprinklered 0%

Reduction **0 L/min**

4. Increase for Separation Distance

Cons. of Exposed Wall	S.D	Lw	Ha	LH	EC	
N Wood Frame	10.1m-20m	13		1	13	12%
S Wood Frame	>45m	13		0	0	0%
E Wood Frame	20.1m-30m	18		1	18	8%
W Wood Frame	>45m	18		0	0	0%
% Increase						20% value not to exceed 75%

Increase **1000.0 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.

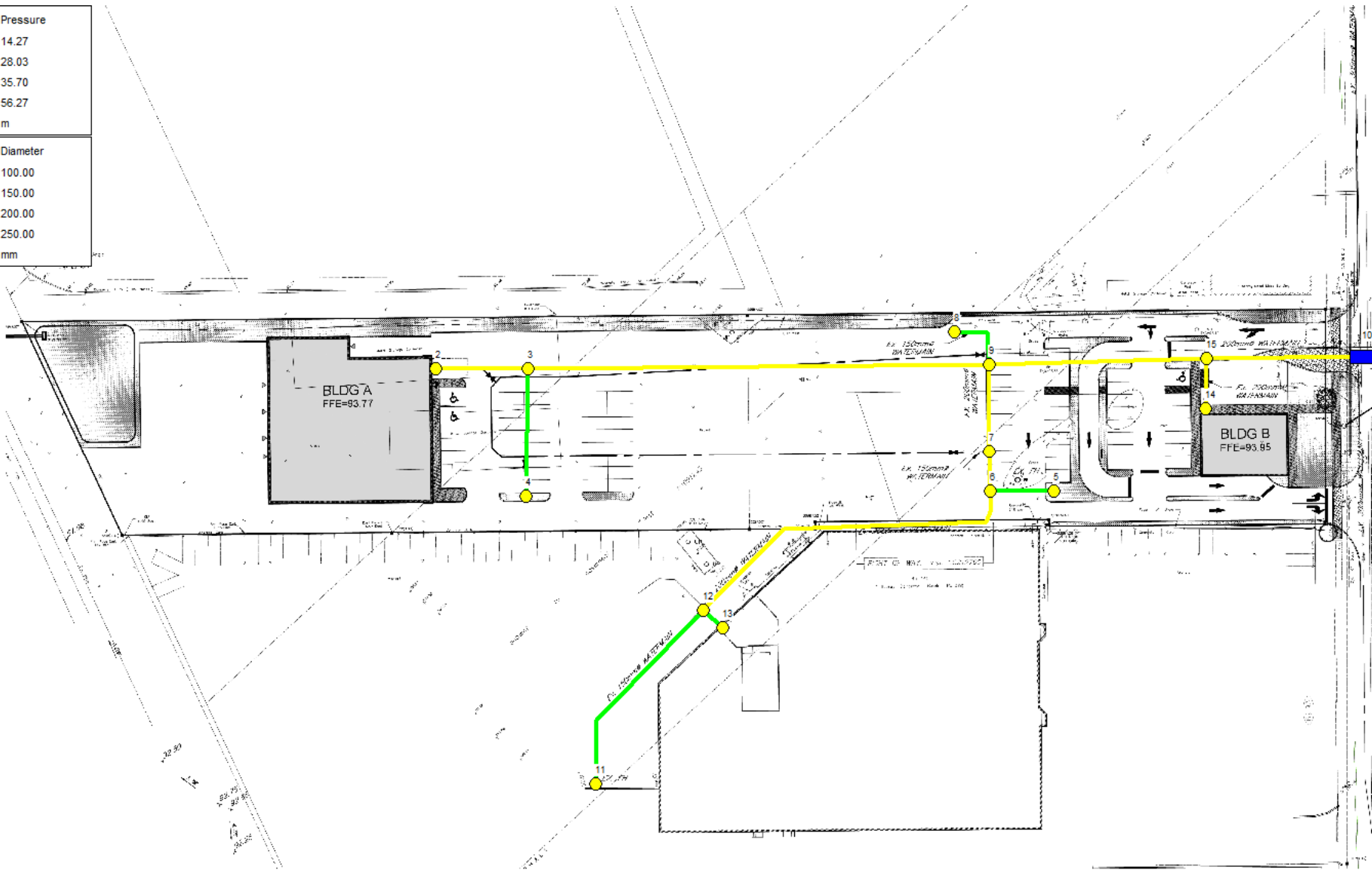
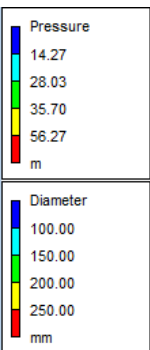
EC = Exposure Charge

Total Fire Flow

Fire Flow 6000.0 L/min fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 1
6000.0 L/min rounded to the nearest 1,000 L/min

Notes:
 -Type of construction, Occupancy Type and Sprinkler Protection information provided by S.J. Lawrence Architect Inc.
 -Calculations based on Fire Underwriters Survey - Part II

Average Day Figure



Avg. Day 132.5
Max + FF(3000L/min) 128.5
Max + FF(6000L/min) 127.0
Peak Hour 127.5

```

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

Input File: 2018-12-19_EPANet.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	9	8	11.3	150
5	3	4	26.88	150
6	9	15	44.57	200
7	9	7	20	200
8	7	6	8.33	200
9	6	5	12.76	150
10	12	6	71.05	200
11	12	11	45.87	150
13	12	13	5.17	150
14	15	10	32.15	200
15	15	14	12.18	200
2	9	3	95.63	200
3	3	2	17.49	200

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	21.90	132.50	38.88	0.00
3	0.00	132.50	39.24	0.00
4	0.00	132.50	38.78	0.00
5	0.00	132.50	38.63	0.00
6	0.00	132.50	38.49	0.00
7	0.00	132.50	38.44	0.00
8	0.00	132.50	38.84	0.00
9	0.00	132.50	38.71	0.00
11	0.00	132.50	39.46	0.00
12	0.00	132.50	38.64	0.00
13	31.30	132.50	38.47	0.00
14	3.50	132.50	38.56	0.00

2018-12-19_EPANet-AVGDAY.rpt

15	0.00	132.50	38.84	0.00	
10	-56.71	132.50	0.00	0.00	Reservoir

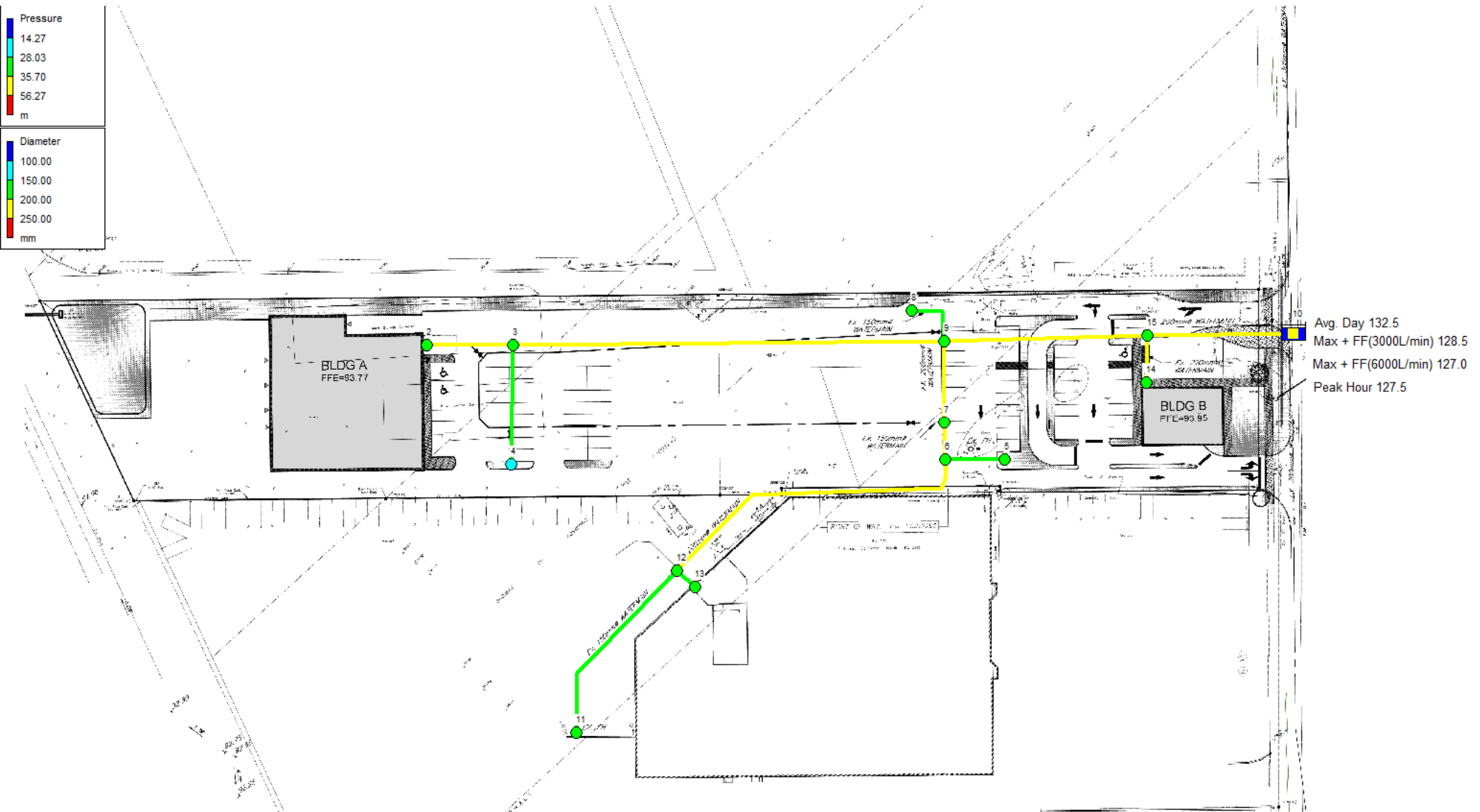


Page 2

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	0.00	0.00	0.00	Open
5	0.00	0.00	0.00	Open
6	-53.21	0.03	0.01	Open
7	31.30	0.02	0.01	Open
8	31.30	0.02	0.01	Open
9	0.00	0.00	0.00	Open
10	-31.30	0.02	0.00	Open
11	0.00	0.00	0.00	Open
13	31.30	0.03	0.03	Open
14	-56.71	0.03	0.01	Open
15	3.50	0.00	0.00	Open
2	21.90	0.01	0.00	Open
3	21.90	0.01	0.00	Open

Max Flow + FF @ 3,000L/min (BLDG A)



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

Input File: 2018-12-19_EPANet.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	9	8	11.3	150
5	3	4	26.88	150
6	9	15	44.57	200
7	9	7	20	200
8	7	6	8.33	200
9	6	5	12.76	150
10	12	6	71.05	200
11	12	11	45.87	150
13	12	13	5.17	150
14	15	10	32.15	200
15	15	14	12.18	200
2	9	3	95.63	200
3	3	2	17.49	200

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	32.80	124.63	31.01	0.00
3	0.00	124.63	31.37	0.00
4	3000.00	121.54	27.82	0.00
5	0.00	126.60	32.73	0.00
6	0.00	126.60	32.59	0.00
7	0.00	126.60	32.54	0.00
8	0.00	126.60	32.94	0.00
9	0.00	126.60	32.81	0.00
11	0.00	126.60	33.56	0.00
12	0.00	126.60	32.74	0.00
13	46.70	126.60	32.57	0.00
14	5.20	127.66	33.72	0.00

15 0.00 127.66 34.00 0.00
 10 -3084.70 128.50 0.00 0.00 Reservoir

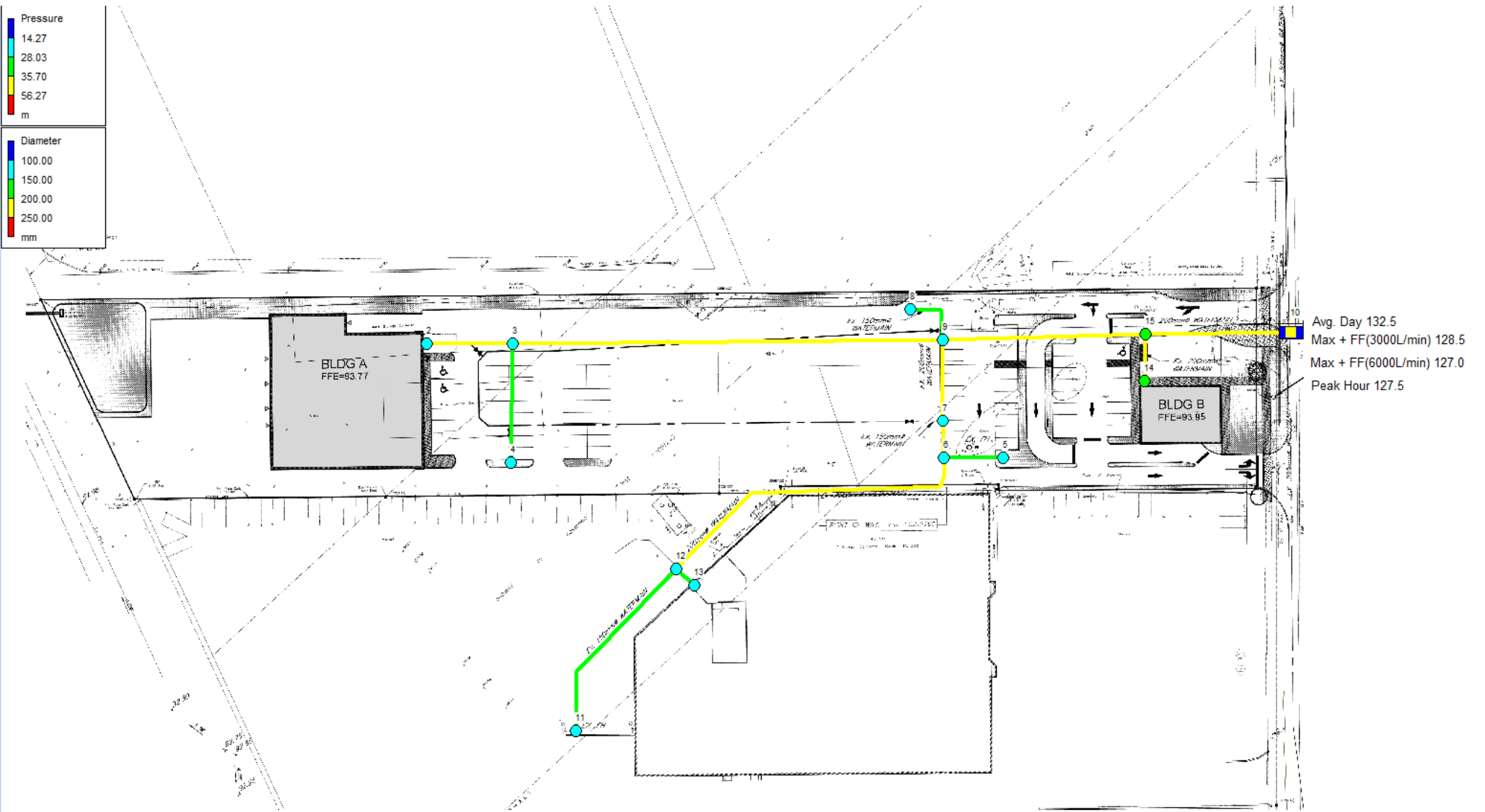


Page 2

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	0.00	0.00	0.00	Open
5	3000.00	2.83	115.02	Open
6	-3079.50	1.63	23.84	Open
7	46.70	0.02	0.01	Open
8	46.70	0.02	0.01	Open
9	0.00	0.00	0.00	Open
10	-46.70	0.02	0.01	Open
11	0.00	0.00	0.00	Open
13	46.70	0.04	0.07	Open
14	-3084.70	1.64	26.04	Open
15	5.20	0.00	0.00	Open
2	3032.80	1.61	20.59	Open
3	32.80	0.02	0.00	Open

Max Flow + FF @ 6,000L/min (BLDG B)



```

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

Input File: 2018-12-19_EPANet.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	9	8	11.3	150
5	3	4	26.88	150
6	9	15	44.57	200
7	9	7	20	200
8	7	6	8.33	200
9	6	5	12.76	150
10	12	6	71.05	200
11	12	11	45.87	150
13	12	13	5.17	150
14	15	10	32.15	200
15	15	14	12.18	200
2	9	3	95.63	200
3	3	2	17.49	200

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	32.80	120.13	26.51	0.00
3	0.00	120.13	26.87	0.00
4	0.00	120.13	26.41	0.00
5	6000.00	110.01	16.14	0.00
6	0.00	116.85	22.84	0.00
7	0.00	117.80	23.74	0.00
8	0.00	120.13	26.47	0.00
9	0.00	120.13	26.34	0.00
11	0.00	116.84	23.80	0.00
12	0.00	116.84	22.98	0.00
13	46.70	116.84	22.81	0.00
14	5.20	123.96	30.02	0.00

15	0.00	123.96	30.30	0.00	
10	-6084.70	127.00	0.00	0.00	Reservoir

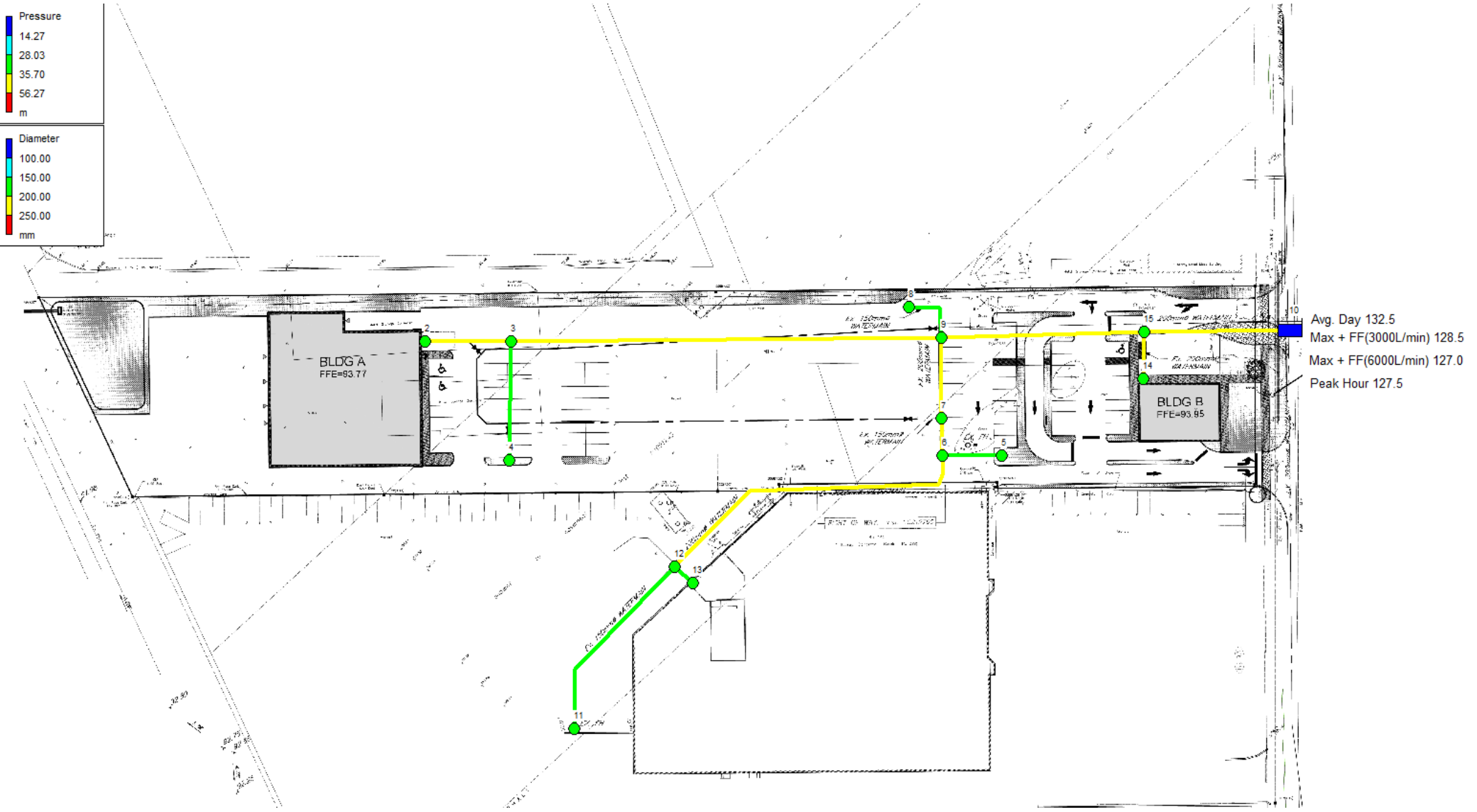


Page 2

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
1	0.00	0.00	0.00	Open
5	0.00	0.00	0.00	Open
6	-6079.50	3.23	86.06	Open
7	6046.70	3.21	116.44	Open
8	6046.70	3.21	114.36	Open
9	6000.00	5.66	535.81	Open
10	-46.70	0.02	0.01	Open
11	0.00	0.00	0.00	Open
13	46.70	0.04	0.07	Open
14	-6084.70	3.23	94.48	Open
15	5.20	0.00	0.00	Open
2	32.80	0.02	0.00	Open
3	32.80	0.02	0.00	Open

Peak Hour Figure



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

Input File: 2018-12-19_EPANet.net

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
1	9	8	11.3	150
5	3	4	26.88	150
6	9	15	44.57	200
7	9	7	20	200
8	7	6	8.33	200
9	6	5	12.76	150
10	12	6	71.05	200
11	12	11	45.87	150
13	12	13	5.17	150
14	15	10	32.15	200
15	15	14	12.18	200
2	9	3	95.63	200
3	3	2	17.49	200

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality
2	59.10	127.49	33.87	0.00
3	0.00	127.49	34.23	0.00
4	0.00	127.49	33.77	0.00
5	0.00	127.49	33.62	0.00
6	0.00	127.49	33.48	0.00
7	0.00	127.49	33.43	0.00
8	0.00	127.49	33.83	0.00
9	0.00	127.49	33.70	0.00
11	0.00	127.49	34.45	0.00
12	0.00	127.49	33.63	0.00
13	84.00	127.49	33.46	0.00
14	9.40	127.50	33.56	0.00

15	0.00	127.50	33.84	0.00
10	-152.50	127.50	0.00	0.00 Reservoir



Page 2

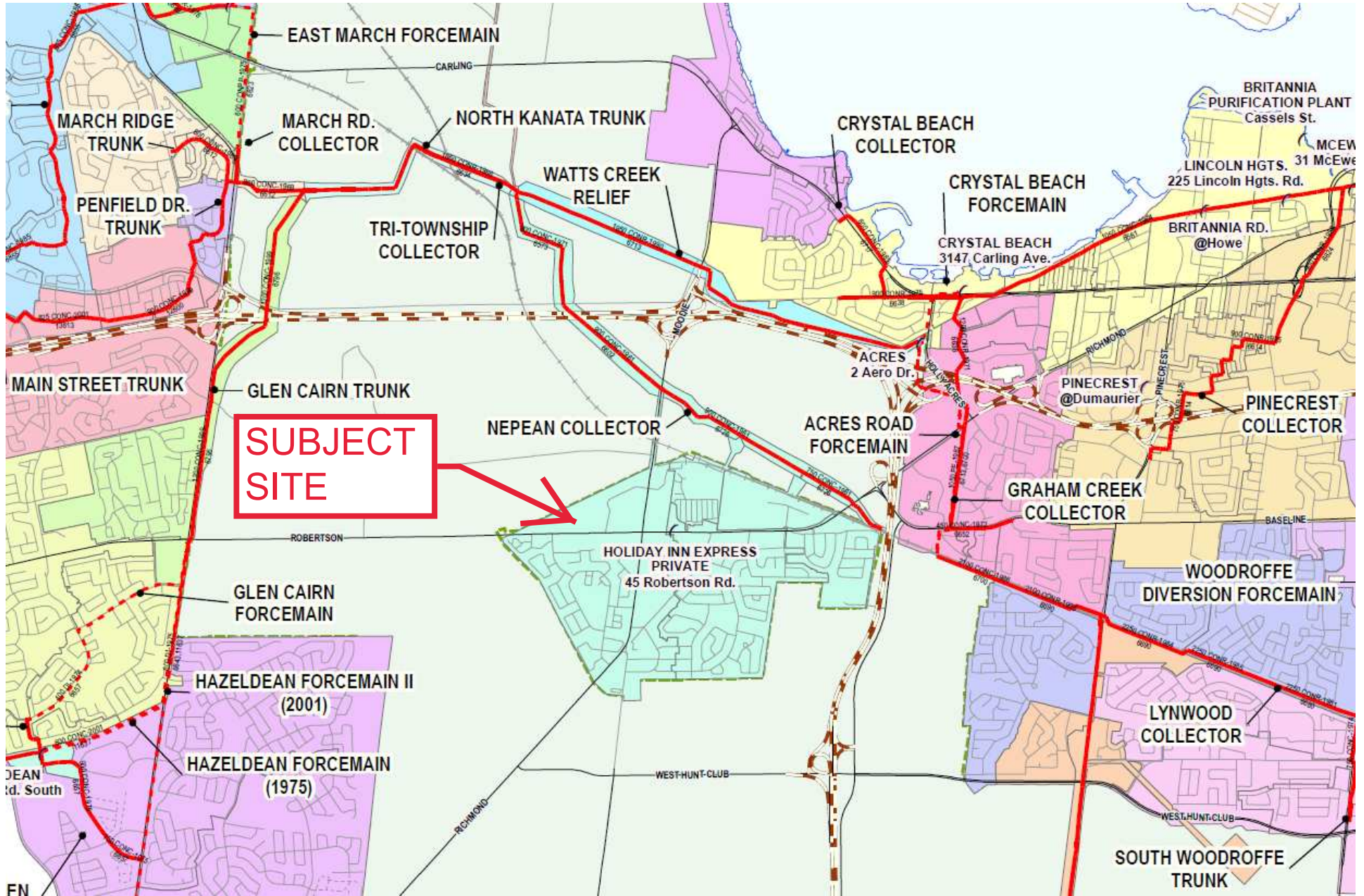
Link Results:

Link ID	Flow LPM	Velocity m/s	Headloss m/km	Status
1	0.00	0.00	0.00	Open
5	0.00	0.00	0.00	Open
6	-143.10	0.08	0.07	Open
7	84.00	0.04	0.03	Open
8	84.00	0.04	0.03	Open
9	0.00	0.00	0.00	Open
10	-84.00	0.04	0.03	Open
11	0.00	0.00	0.00	Open
13	84.00	0.08	0.22	Open
14	-152.50	0.08	0.09	Open
15	9.40	0.00	0.00	Open
2	59.10	0.03	0.01	Open
3	59.10	0.03	0.01	Open

APPENDIX C

Wastewater Collection

CITY OF OTTAWA – SANITARY TRUNK SEWERS AND COLLECTION AREAS



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



Site Area 1.130 ha

Extraneous Flow Allowances

Infiltration / Inflow 0.37 L/s

Domestic Contributions

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

Total Pop 0

Average Domestic Flow 0.00 L/s

Peaking Factor 3.80

Peak Domestic Flow 0.00 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		0.00
Hospitals	900 L/bed/d		0.00
Restaurant	125 L/seat/d	40	0.06
Ex. Industrial - Light**	35,000 L/gross ha/d		0.00
Industrial - Light**	35,000 L/gross ha/d	0.900	0.36
Industrial - Heavy**	55,000 L/gross ha/d		0.00

Average I/C/I Flow 0.42

Peak Institutional / Commercial Flow 0.09

Peak Industrial Flow** 1.46

Peak I/C/I Flow 1.55

* assuming a 12 hour commercial operation

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

Total Estimated Average Dry Weather Flow Rate	0.42 L/s
Total Estimated Peak Dry Weather Flow Rate	1.55 L/s
Total Estimated Peak Wet Weather Flow Rate	1.92 L/s

EXISTING SANITARY SEWER CALCULATION SHEET

CLIENT: HUNTINGTON PROPERTIES
 LOCATION: 2165 ROBERTSON ROAD
 FILE REF: 18-1062
 DATE: 14-Dec-18

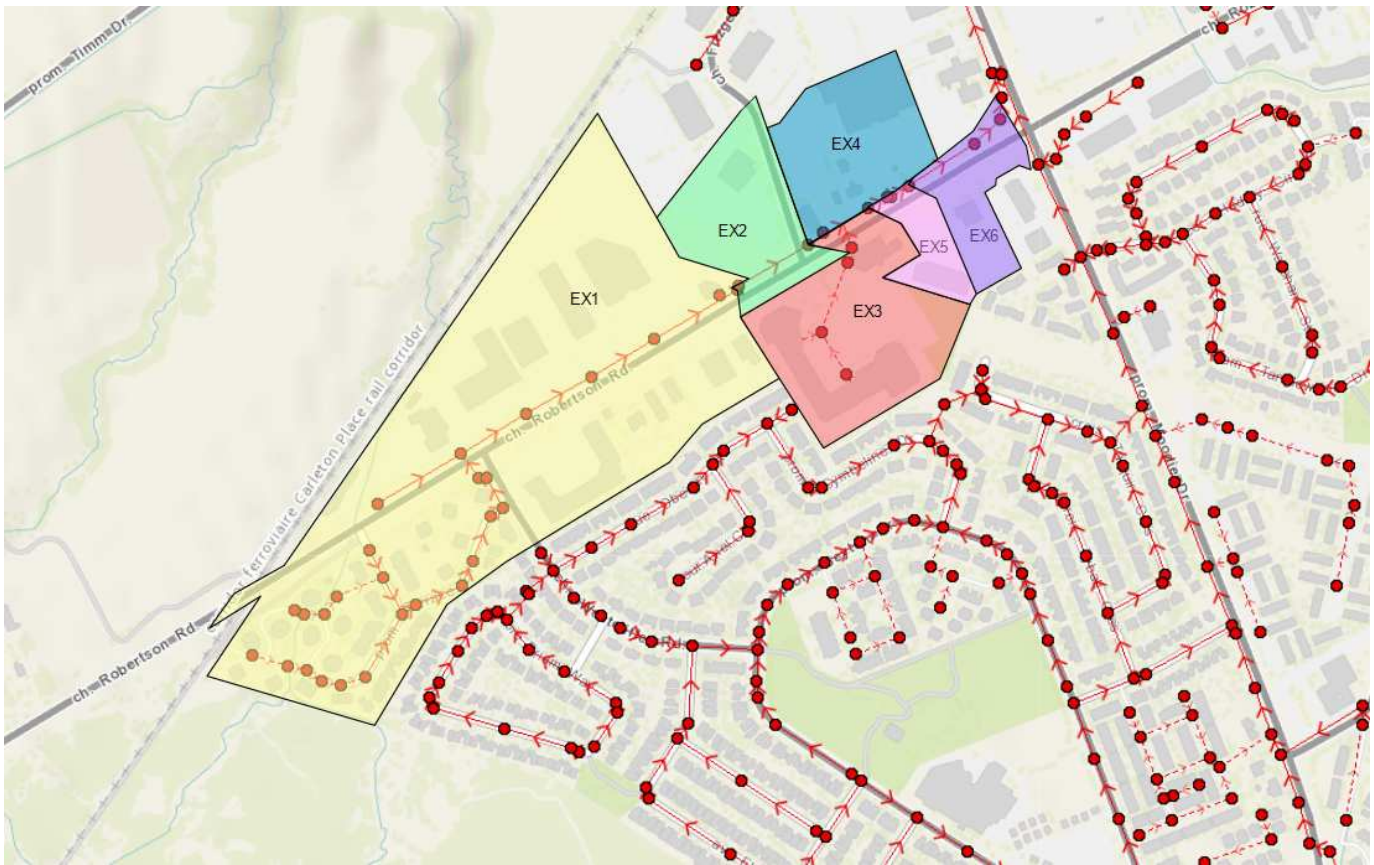
DESIGN PARAMETERS

Avg. Daily Flow Res. 280 L/p/d
 Avg. Daily Flow Comm 28,000 L/ha/d
 Avg. Daily Flow Instit. 28,000 L/ha/d
 Avg. Daily Flow Indust 35,000 L/ha/d
 Peak Fact. Res. Per Harmons: Min = 2.0, Max =3.8
 Peak Fact. Comm. (Q/Q_{TOTAL}>20%) 1.5
 Peak Fact. Instit. (Q/Q_{TOTAL}>20%) 1.5
 Peak Fact. Indust. per MOE graph
 Correction Factor K 0.8
 Infiltration / Inflow 0.33 L/s/ha
 1 Min. Pipe Velocity 0.60 m/s full flowing
 1 Max. Pipe Velocity 3.00 m/s full flowing
 Mannings N 0.013



Location			Residential Area and Population										Commercial		Institutional		Industrial		Infiltration					Pipe Data							
Area ID	Up	Down	Area (ha)	Number of Units by type				Pop.	Cumulative		Peak. Fact. (-)	Q _{res} (L/s)	Area (ha)	Accu. Area (ha)	Area (ha)	Accu. Area (ha)	Area (ha)	Accu. Area (ha)	Q _{c+H+} (L/s)	Total Area (ha)	Accu. Area (ha)	Infiltration Flow (L/s)	Total Flow (L/s)	DIA (mm)	Slope (%)	Length (m)	A _{hydraulic} (m ²)	R (m)	Velocity (m/s)	Q _{cap} (L/s)	Q / Q full (-)
				Singles	Semi's	Town's	Apt's**		Area (ha)	Pop.																					
EX1	EX SAN MH1	EX SAN MH2	5.180	10	20	120	60	520.0	5.180	520.0	3.37	5.68	14.81	14.81		0.00		0.00	7.2	19.990	19.990	6.597	19.48	300	0.30	168.3	0.071	0.075	0.75	53.0	0.37
	EX SAN MH2	EX SAN MH3	0.000					0.0	5.180	520.0	3.37	5.68	14.81	14.81		0.00		0.00	7.2	0.000	19.990	6.597	19.48	300	0.10	8.6	0.071	0.075	0.43	30.6	0.64
EX2	EX SAN MH3	EX SAN MH4	0.000					0.0	5.180	520.0	3.37	5.68	2.66	17.47		0.00		0.00	8.5	2.660	22.650	7.475	21.65	300	0.10	141.5	0.071	0.075	0.43	30.6	0.71
EX3	EX SAN MH4	EX SAN MH5	0.000					0.0	5.180	520.0	3.37	5.68	4.42	21.89		0.00		0.00	10.6	4.420	27.070	8.933	25.26	300	0.30	122.1	0.071	0.075	0.75	53.0	0.48
EX4	EX SAN MH5	EX SAN MH6	0.000					0.0	5.180	520.0	3.37	5.68	2.90	24.79		0.00		0.00	12.1	2.900	29.970	9.890	27.62	300	0.20	39.1	0.071	0.075	0.61	43.2	0.64
	EX SAN MH6	EX SAN MH7	0.000					0.0	5.180	520.0	3.37	5.68		24.79		0.00		0.00	12.1	0.000	29.970	9.890	27.62	300	0.50	7.4	0.071	0.075	0.97	68.4	0.40
EX5	EX SAN MH7	EX SAN MH8	0.000					0.0	5.180	520.0	3.37	5.68	0.88	25.67		0.00		0.00	12.5	0.880	30.850	10.181	28.34	300	0.10	36.0	0.071	0.075	0.43	30.6	0.93
EX6	EX SAN MH8	EX SAN MH9	0.000					0.0	5.180	520.0	3.37	5.68	1.58	27.25		0.00		0.00	13.2	1.580	32.430	10.702	29.63	300	0.20	135.6	0.071	0.075	0.61	43.2	0.69
	EX SAN MH9	EX SAN MH10	0.000					0.0	5.180	520.0	3.37	5.68		27.25		0.00		0.00	13.2	0.000	32.430	10.702	29.63	300	0.30	63.0	0.071	0.075	0.75	53.0	0.56
	EX SAN MH10	EX SAN MH11	0.000					0.0	5.180	520.0	3.37	5.68		27.25		0.00		0.00	13.2	0.000	32.430	10.702	29.63	300	0.20	39.2	0.071	0.075	0.61	43.2	0.69

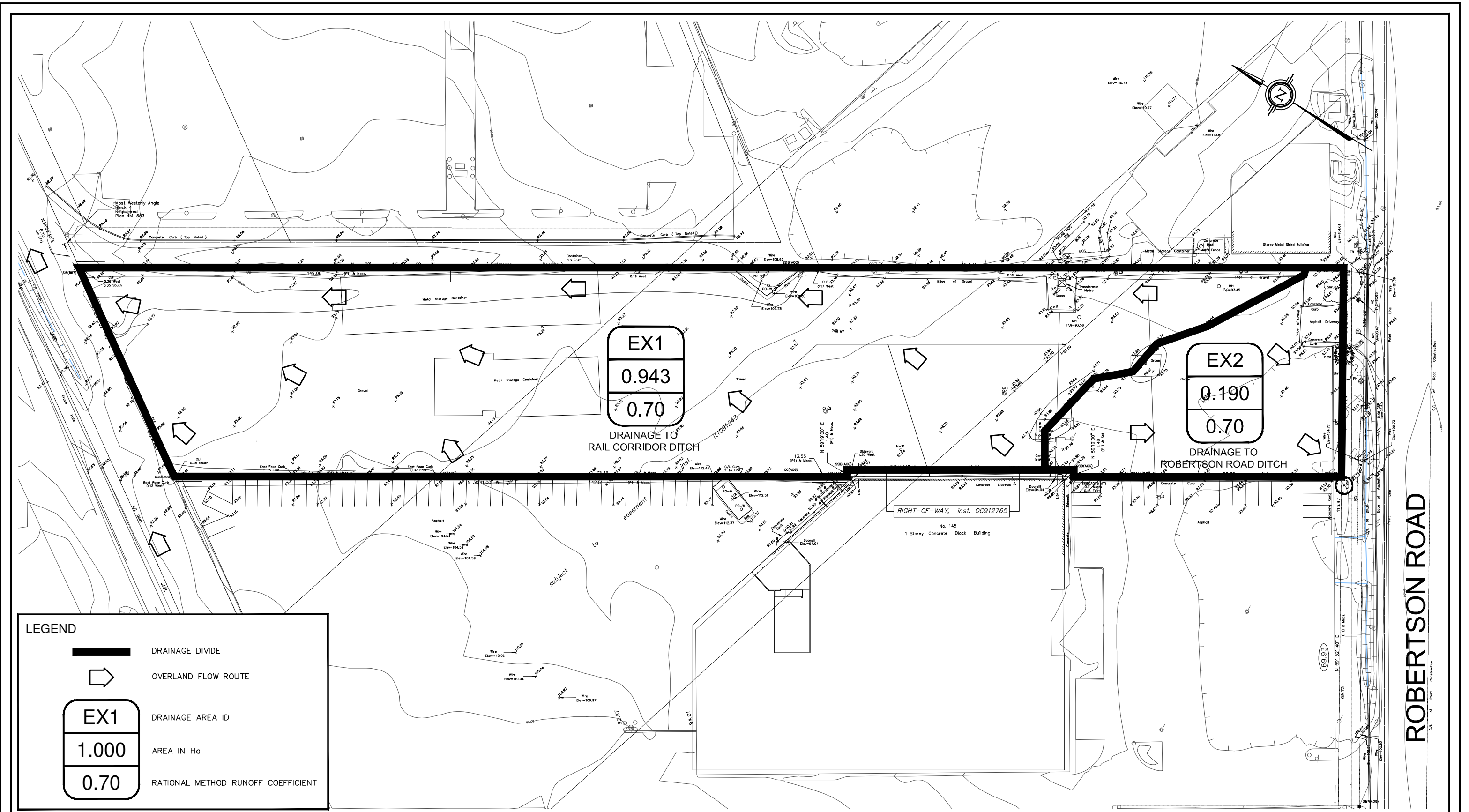
2165 Robertson Road - Sanitary Analysis





AREA ID	Total Area (Ha)	Residential Area (Ha)	Commercial Area (Ha)
EX1	19.99	5.18	14.81
EX2	2.66		2.66
EX3	4.42		4.42
EX4	2.90		2.90
EX5	0.88		0.88
EX6	1.58		1.58

APPENDIX D

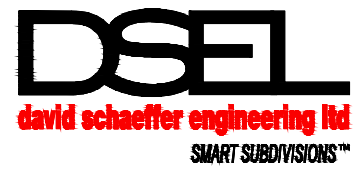
Stormwater Management



LEGEND

-  DRAINAGE DIVIDE
-  OVERLAND FLOW ROUTE
- | |
|-------|
| EX1 |
| 1.000 |
| 0.70 |

 DRAINAGE AREA ID
- AREA IN Ha
- RATIONAL METHOD RUNOFF COEFFICIENT



120 Iber Road, Unit 103
 Stittsville, ON K2S 1E9
 TEL: (613) 836-0856
 FAX: (613) 836-7183
 www.DSEL.ca

2165 ROBERTSON ROAD PRE-DEVELOPMENT DRAINAGE AREA PLAN

PROJECT No.:	18-1062
SCALE:	1:750
DATE:	DECEMBER 2018
FIGURE:	1

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



1) Time of Concentration per Federal Aviation Administration

Existing Drainage Characteristics From Internal Site

Area ID	EX2
Area	0.190 ha
C	0.70 Rational Method runoff coefficient
L	60.0 m
Up Elev	93.8 m
Dn Elev	93.3 m
Slope	0.8 %

5-Year	Imp.	Perv.	Total
Area	0.169	0.104	0.273
C	0.9	0.2	0.63

100-Year	Imp.	Perv.	Total
Area	0.169	0.104	0.273
C	1.125	0.25	0.79

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

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

Tc 10.7 min

2) Time of Concentration per SCS Method

Existing Drainage Characteristics From Internal Site

Area	0.943 ha
L	60.0 m
Up Elev	93.8 m
Dn Elev	93.3 m
Slope	0.8 %
CN (-)	91.0

$$t_c = \frac{100L^{0.8} \left[\left(\frac{1000}{CN} \right) - 9 \right]^{0.7}}{1900S^{0.5}}$$

L, length in ft
 CN, SCS runoff curve number
 S, average watershed slope in (%)

Tc 6.4 min

3) Estimated Peak Flow (Airport Method)

	2-year	5-year	100-year
i	74.1	100.5	172.1 mm/hr
Q	27.4	37.1	79.5 L/s

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

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



Target Flow Rate - Front Yard

	2-year	100-year
i	74.1	172.1 mm/hr
Q	27.4	79.5 L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID	U1
Total Area	0.026 ha
C	0.58 Rational Method runoff coefficient

	Imp.	Perv.	Total
Area	0.014	0.012	0.026
C	0.9	0.2	0.58

t _c (min)	2-year					100-year				
	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
10.0	76.8	3.2	3.2	0.0	0.0	178.6	9.3	9.3	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)

Summary of Release Rates and Storage Volumes

Control Area	2-Year Release Rate (L/s)	2-Year Required Storage (m ³)	100-Year Release Rate (L/s)	100-Year Required Storage (m ³)	100-Year Available Storage (m ³)
Unattenuated Areas	3.2	0.0	9.3	0.0	0.0
Attenuated Areas	0.0	0.0	0.0	0.0	0.0
Total	3.2	0.0	9.3	0.0	0.0

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



1) Time of Concentration per Federal Aviation Administration

Existing Drainage Characteristics From Internal Site

Area ID	EX1
Area	0.943 ha
C	0.70 Rational Method runoff coefficient
L	255.0 m
Up Elev	93.6 m
Dn Elev	92.7 m
Slope	0.3 %

5-Year	Imp.	Perv.	Total
Area	0.691	0.387	1.077
C	0.9	0.2	0.65

100-Year	Imp.	Perv.	Total
Area	0.691	0.387	1.077
C	1.125	0.25	0.81

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

t_c , in minutes

C, rational method coefficient, (-)

L, length in ft

S, average watershed slope in %

Tc 29.8 min

2) Time of Concentration per SCS Method

Existing Drainage Characteristics From Internal Site

Area	0.943 ha
L	255.0 m
Up Elev	93.6 m
Dn Elev	92.7 m
Slope	0.3 %
CN (-)	98.0

$$t_c = \frac{100L^{0.8} \left[\left(\frac{1000}{CN} \right) - 9 \right]^{0.7}}{1900S^{0.5}}$$

L, length in ft

CN, SCS runoff curve number

S, average watershed slope in (%)

Tc 22.3 min

3) Estimated Peak Flow (Airport Method)

	2-year	5-year	100-year
i	40.2	54.2	92.3 mm/hr
Q	73.8	99.3	211.6 L/s

Note:

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

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



Target Flow Rate

	2-year	100-year
i	40.2	92.3 mm/hr
Q	73.8	211.6 L/s

1) Time of Concentration per Federal Aviation Administration

Proposed Drainage Characteristics From Internal Site - Area A1 & A2

Area	1.106 ha
C	0.81 Rational Method runoff coefficient
L	272.0 m
Up Elev	93.79 m
Dn Elev	92.00 m
Slope	0.7 %

	Imp.	Perv.	Total
Area	0.965	0.141	1.106
C	0.9	0.2	0.81

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

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

T_c 17.9 min

Estimated Post Development Peak Flow from Unattenuated Areas

Area ID	U2
Total Area	0.006 ha
C	0.20 Rational Method runoff coefficient

5-YEAR	Imp.	Perv.	Total
Area	0.000	0.006	0.006
C	0.9	0.2	0.20

100-YEAR	Imp.	Perv.	Total
Area	0.000	0.006	0.006
C	1.125	0.25	0.25

t _c (min)	2-year					100-year				
	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)
17.9	55.7	0.2	0.2	0.0	0.0	128.5	0.5	0.5	0.0	0.0

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

Estimated Post Development Peak Flow from Attenuated Areas

Area ID A1 & A2
Available Storage

5-YEAR	Imp.	Perv.	Total
Area	0.959	0.141	1.100
C	0.9	0.2	0.81

100-YEAR	Imp.	Perv.	Total
Area	0.959	0.141	1.100
C	1.125	0.25	1.01

Stage Attenuated Areas Storage Summary

Stage	Surface Storage			Surface and Subsurface Storage			
	Ponding (m ²)	h _o (m)	delta d (m)	V* (m ³)	V _{acc} ** (m ³)	Q _{release} † (L/s)	V _{drawdown} (hr)
Orifice 1 INV	256	0.00			0.0	0.0	0.00
Orifice 2 INV	310	0.25	0.25	70.6	70.6	46.0	0.43
	336	0.35	0.10	32.3	102.9	128.5	0.22
Top of Storage Area	483	0.60	0.25	101.8	204.8	209.9	0.27

Note: Refer to Stage-Storage-Discharge Table in Appendix for Storage & Flow at 0.10m increments

Orifice Location DICB
Total Area 1.100 ha
C 0.81 Rational Method runoff coefficient

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

t _c (min)	2-year					100-year				
	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)	i (mm/hr)	Q _{actual} ‡ (L/s)	Q _{release} (L/s)	Q _{stored} (L/s)	V _{stored} (m ³)
10	76.8	190.1	65.8	124.3	74.6	178.6	545.6	209.6	336.0	201.6
15	61.8	152.9	65.8	87.1	78.4	142.9	436.6	209.6	227.0	204.3
20	52.0	128.8	65.8	63.0	75.6	120.0	366.5	209.6	156.9	188.3
25	45.2	111.8	65.8	46.0	69.0	103.8	317.3	209.6	107.7	161.6
30	40.0	99.1	65.8	33.3	60.0	91.9	280.7	209.6	71.1	128.0
35	36.1	89.2	65.8	23.5	49.3	82.6	252.3	209.6	42.8	89.8
40	32.9	81.3	65.8	15.5	37.3	75.1	229.6	209.6	20.0	48.1
45	30.2	74.8	65.8	9.1	24.4	69.1	211.0	209.6	1.4	3.8
50	28.0	69.4	65.8	3.6	10.8	64.0	195.4	209.6	0.0	0.0
55	26.2	64.8	64.8	0.0	0.0	59.6	182.2	209.6	0.0	0.0
60	24.6	60.8	60.8	0.0	0.0	55.9	170.8	209.6	0.0	0.0
65	23.2	57.3	57.3	0.0	0.0	52.6	160.9	209.6	0.0	0.0
70	21.9	54.2	54.2	0.0	0.0	49.8	152.1	209.6	0.0	0.0
75	20.8	51.5	51.5	0.0	0.0	47.3	144.4	209.6	0.0	0.0
80	19.8	49.1	49.1	0.0	0.0	45.0	137.5	209.6	0.0	0.0
85	18.9	46.9	46.9	0.0	0.0	43.0	131.2	209.6	0.0	0.0
90	18.1	44.9	44.9	0.0	0.0	41.1	125.6	209.6	0.0	0.0
95	17.4	43.1	43.1	0.0	0.0	39.4	120.5	209.6	0.0	0.0
100	16.7	41.4	41.4	0.0	0.0	37.9	115.8	209.6	0.0	0.0
105	16.1	39.9	39.9	0.0	0.0	36.5	111.5	209.6	0.0	0.0
110	15.6	38.5	38.5	0.0	0.0	35.2	107.6	209.6	0.0	0.0

2-year Q_{attenuated} 65.79 L/s
2-year Max. Storage Required 78.4 m³
Est. 5-year Storage Elevation 92.47 m

100-year Q_{attenuated} 209.57 L/s
100-year Max. Storage Required 204.3 m³
Est. 100-year Storage Elevation 92.80 m

Summary of Release Rates and Storage Volumes

Control Area	2-Year Release Rate (L/s)	2-Year Required Storage (m ³)	100-Year Release Rate (L/s)	100-Year Required Storage (m ³)	100-Year Available Storage (m ³)
Unattenuated Areas	0.2	0.0	0.5	0.0	0.0
Attenuated Areas	65.8	78.4	209.6	204.3	204.8
Total	66.0	78.4	210.1	204.3	204.8

Condition 1: City of Ottawa IDF 100-Year Storm Event

									Ditch Data												
	Area	C	Indiv AxC	Acc AxC	T _c	I	Q		depth	Side Slope	Bot. Width	Mannings	Slope	Length	A _{flow}	Wet. Per.	R	Velocity	Qcap	Time Flow	Q / Q full
	(ha)	(-)			(min)	(mm/hr)	(L/s)		(mm)	(X:1)	(m)	n	(%)	(m)	(m ²)	(m)	(m)	(m/s)	(L/s)	(min)	(-)
Area A1	0.370	0.81	0.30	0.30	10.0	178.6	148.7		250	5	0	0.025	0.25	93	0.313	2.550	0.12	0.49	154.2	3.1	0.96
Area A2	0.736	0.81	0.60	0.90	13.1	154.2	383.7		410	5	0	0.025	0.25	71	0.841	4.181	0.20	0.69	576.8	1.7	0.67

Note: Cross sections summarized above for Area A1 and A2 represent the critical cross section with

Area	Imp.	Perv.	Total
C	0.763	0.094	0.857
	0.9	0.2	0.82

Culvert Sizing - 100-Year Storm Event

Full Flowing Capacity - Mannings

n	0.013	Mannings n		
S _o	1.5	% slope of sewer		
D (mm)	A (m²)	R (m)	V (m/s)	Q (L/s)
450	0.159	0.113	2.20	349.2

<-- greater than 209.6 L/s controlled release rate

Note:

City of Ottawa SAN Sewers - Min = 0.6m/s Max = 3.0m/s

City of Ottawa STM Sewers - Min = 0.8m/s Max = 3.0m/s

Wet Pond Sizing Per MOE

Tributary Area	ha	1.106	
Estimated Imperviousness	(%)	85	
Permanent Pool Volume Requirements	m ³ /ha	140	<-- 40 m ³ /ha accounted for in ext. detention
Permanent Pool Required	m ³	110.60	
Extended Detention Required	m ³	44.24	

Table 3.2 Water Quality Storage Requirements based on Receiving Waters^{1, 2}

Protection Level	SWMP Type	Storage Volume (m ³ /ha) for Impervious Level			
		35%	55%	70%	85%
<i>Enhanced</i> 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
<i>Normal</i> 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
<i>Basic</i> 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

Source: Stormwater Management Planning and Design Manual prepared by the MOE, 2003

Increment	0.05
Pond Bottom	91.6
Perm. Pool	92.2

Elevation (m)	Δ Elev (sq.m)	Area (sq.m)	Δ Area (sq.m)
91.6	0	148	1241
92.2	0.6	256	180.0
92.55	0.95	336	228.6
92.8	1.2	483	588.0
92.95	1.35	665	1213.3

	ICD 1	ICD 2	ICD 3
Invert (m)	92.2	92.45	
Diameter (mm)	210	335	
Max Head (m)	0.75	0.50	
Max Flow (L/s)	79.7	165.6	

	Emergency Weir**
Invert (m)	92.8
Bottom Width	6
Weir Coefficient	1.58
Max Head (m)	0.15
Max Flow (L/s)	549

* Side slopes not considered

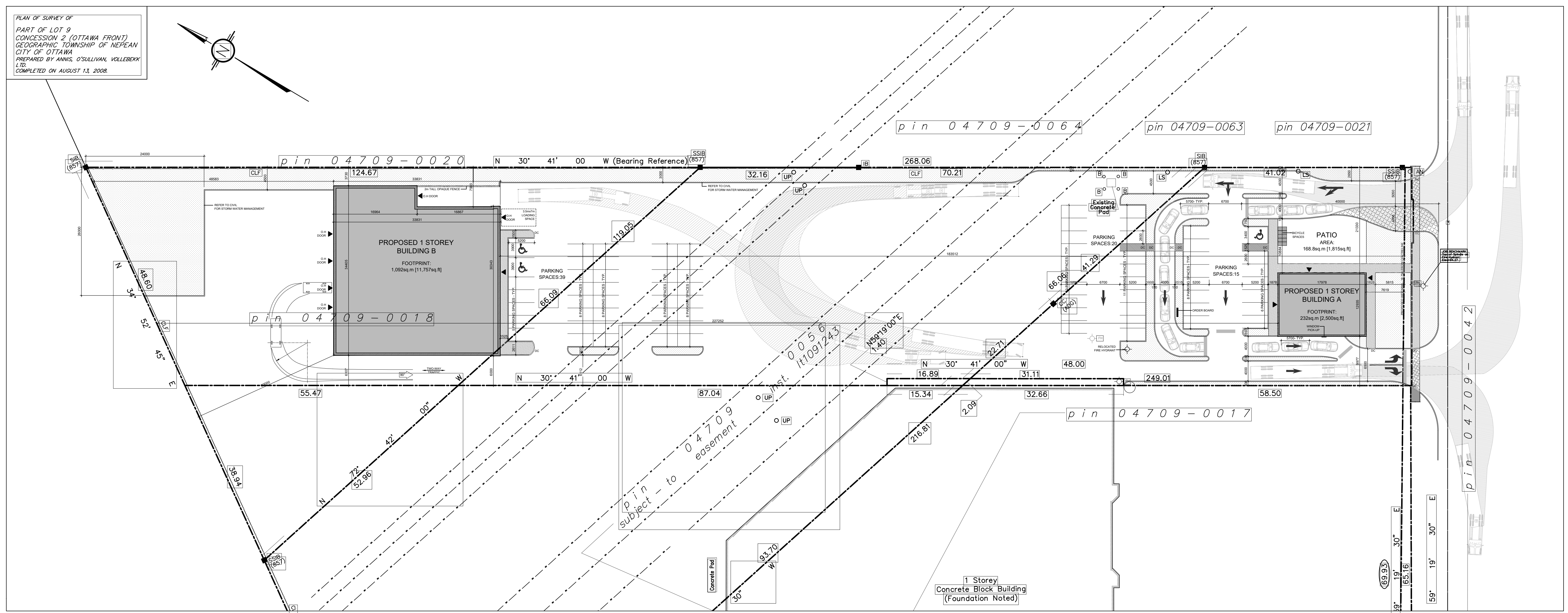
** Sized to convey uncontrolled 100-Year flow to the pond (383.7 L/s per Swale Design Sheet)

Elevation (m)	Depth (m)	Inc. Area (sq.m)	Cuml. Area (sq.m)	Inc. Volume (cu.m)	Cuml. Volume (cu.m)	Active Volume (cu.m)	ICD 1 Head (m)	ICD 1 Flow(1) (L/s)	ICD 2 Head (m)	ICD 2 Flow (1) (L/s)	ICD 3 Head (m)	ICD 3 Flow (L/s)	Emerg Weir Head (m)	Emerg Weir Flow (2) (L/s)	Total Flow (L/s)
91.60	0.00	148.00	148.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91.65	0.05	9.00	157.00	7.63	7.63		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91.70	0.10	9.00	166.00	8.07	15.70		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91.75	0.15	9.00	175.00	8.52	24.23		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91.80	0.20	9.00	184.00	8.97	33.20		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91.85	0.25	9.00	193.00	9.42	42.62		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91.90	0.30	9.00	202.00	9.87	52.50		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
91.95	0.35	9.00	211.00	10.33	62.82		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92.00	0.40	9.00	220.00	10.78	73.60		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92.05	0.45	9.00	229.00	11.23	84.82		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92.10	0.50	9.00	238.00	11.67	96.50		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92.15	0.55	9.00	247.00	12.12	108.63		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92.20	0.60	9.00	256.00	12.57	121.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92.25	0.65	11.43	267.43	13.09	134.29	13.09	0.05	20.58	0.00	0.00	0.00	0.00	0.00	0.00	20.58
92.30	0.70	11.43	278.86	13.66	147.94	26.74	0.10	29.11	0.00	0.00	0.00	0.00	0.00	0.00	29.11
92.35	0.75	11.43	290.29	14.23	162.17	40.97	0.15	35.65	0.00	0.00	0.00	0.00	0.00	0.00	35.65
92.40	0.80	11.43	301.71	14.80	176.97	55.77	0.20	41.17	0.00	0.00	0.00	0.00	0.00	0.00	41.17
92.45	0.85	11.43	313.14	15.37	192.34	71.14	0.25	46.03	0.00	0.00	0.00	0.00	0.00	0.00	46.03
92.50	0.90	11.43	324.57	15.94	208.29	87.09	0.30	50.42	0.05	52.38	0.00	0.00	0.00	0.00	102.80
92.55	0.95	11.43	336.00	16.51	224.80	103.60	0.35	54.46	0.10	74.08	0.00	0.00	0.00	0.00	128.53
92.60	1.00	29.40	365.40	17.54	242.33	121.14	0.40	58.22	0.15	90.72	0.00	0.00	0.00	0.00	148.94
92.65	1.05	29.40	394.80	19.01	261.34	140.14	0.45	61.75	0.20	104.76	0.00	0.00	0.00	0.00	166.51
92.70	1.10	29.40	424.20	20.48	281.81	160.62	0.50	65.09	0.25	117.13	0.00	0.00	0.00	0.00	182.22
92.75	1.15	29.40	453.60	21.95	303.76	182.56	0.55	68.27	0.30	128.30	0.00	0.00	0.00	0.00	196.57
92.80	1.20	29.40	483.00	23.42	327.17	205.98	0.60	71.30	0.35	138.58	0.00	0.00	0.00	0.00	209.89
92.85	1.25	60.67	543.67	25.67	352.84	231.64	0.65	74.21	0.40	148.15	0.00	0.00	0.05	105.90	328.27
92.90	1.30	60.67	604.33	28.70	381.54	260.34	0.70	77.02	0.45	157.14	0.00	0.00	0.10	299.28	533.44
92.95	1.35	60.67	665.00	31.73	413.27	292.07	0.75	79.72	0.50	165.64	0.00	0.00	0.15	549.36	794.72

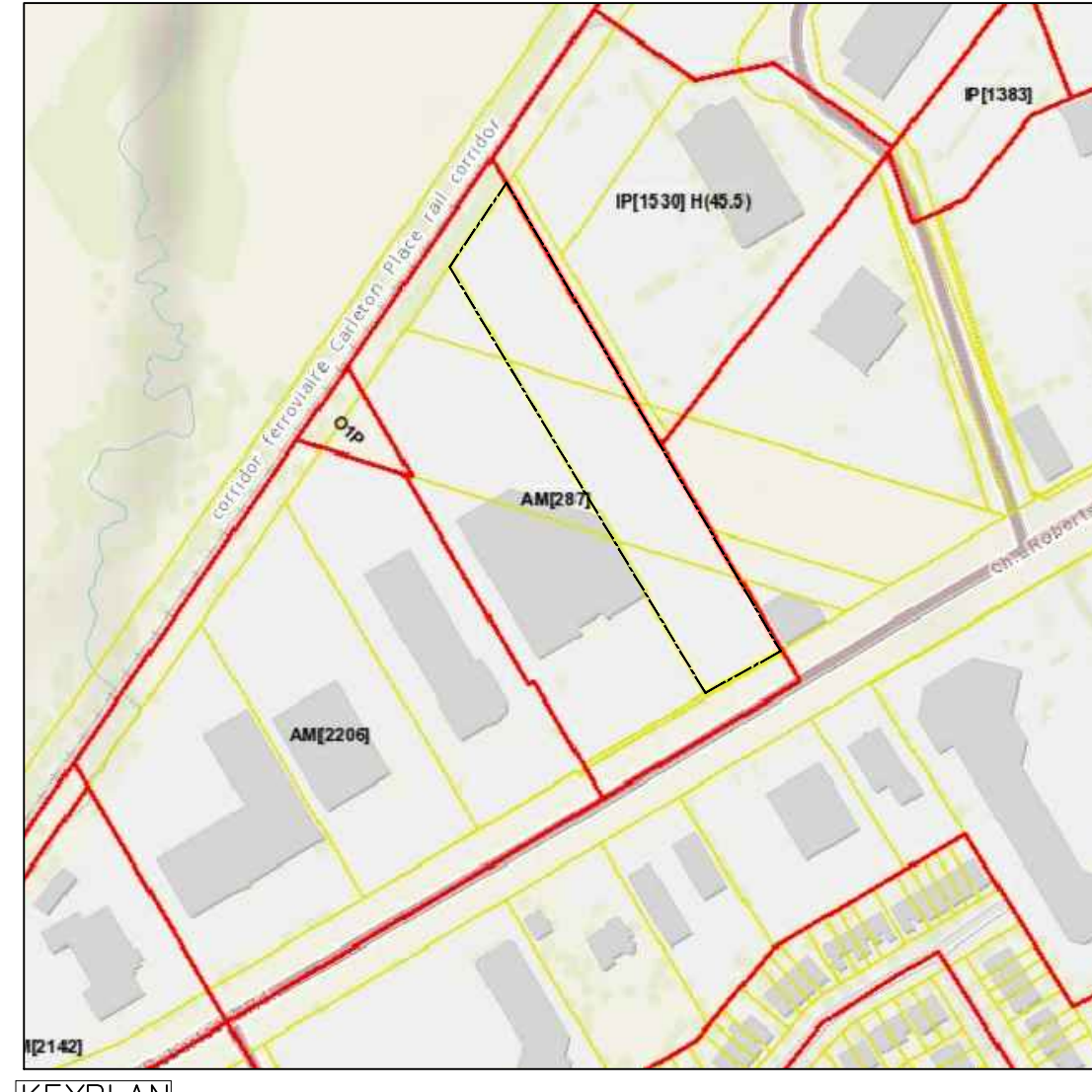
(1) ICD flow calculated as per City of Ottawa Sewer Design Guidelines 2012
 (2) Weir flow as per weir equation $Q = C * (Width - 0.1 * Depth)^{1.5} * Depth^{1.5}$
 Where C = Weir Coefficient

DRAWINGS / FIGURES

NOTES:
 1. ALL WORK TO BE ACCORDANCE WITH LOCAL BUILDING CODES, REGULATIONS AND BY-LAWS.
 2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS FROM THE CITY OF OTTAWA AND THE PROVINCE OF ONTARIO PRIOR TO THE START OF CONSTRUCTION.
 3. ALL DIMENSIONS TO FACE UNLESS OTHERWISE SPECIFIED.
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 20. ALL DIMENSIONS TO FACE UNLESS OTHERWISE SPECIFIED.



01 SITE PLAN
A100 SCALE: 1:300



APPROVED **REFUSED**

THIS _____ DAY OF _____ 20__

DERRICK MOODIE
 MANAGER, DEVELOPMENT REVIEW - WEST
 PLANNING, INFRASTRUCTURE & ECONOMIC
 DEVELOPMENT DEPARTMENT, CITY OF OTTAWA

Item	Industrial/Retail Complex- 2165 Robertson Road, Ottawa, ON	OBC Reference
1	Project Description: <input type="checkbox"/> New <input type="checkbox"/> Part 11 <input type="checkbox"/> Part 3 <input type="checkbox"/> Part 9 <input type="checkbox"/> Change of Use <input type="checkbox"/> Alteration 11.1 to 11.4 1.1.2. [A] 1.1.2. [A] & 9.10.1.3.	
2	Major Occupancy (s) Primary: E (Retail) Secondary: F3 (Storage)	3.1.2.1. (1) 9.10.2.
3	Building Area (m²) Existing 0m² New 1,092m² Total 1,092m²	1.4.1.2. [A] 1.1.1.2. [A]
4	Gross Area (m²) Existing 0m² New 1,092m² Total 1,092m²	1.4.1.2. [A] 1.1.1.2. [A]
5	Number of Storeys Above Grade 1 Below Grade 0	1.4.1.2. [A] & 3.2.1.1. 1.1.1.2. [A] & 9.10.4.
6	Height of Building (m) +/- 8.4m	3.2.2.10. & 3.2.5. 9.10.20.
7	Number of Streets/ Fire Fighter Access 1	3.2.2.20. -.83 9.10.2.
8	Building Classification	3.2.2.20. -.83 9.10.2.
9	Sprinkler System Proposed <input type="checkbox"/> Entire Building <input type="checkbox"/> Selected Compartments <input type="checkbox"/> Selected Floor Areas <input type="checkbox"/> Basement <input type="checkbox"/> In lieu of roof rating <input type="checkbox"/> Not Required	3.2.2.20. -.83 9.10.8.2. 3.2.1.5. 3.2.2.17. INDEX
10	Standpipe Required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.9. N/A
11	Fire Alarm Required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.4. 9.10.18.
12	Water Service/ Supply is adequate <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.5.7. N/A
13	High Building <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.6. N/A
14	Permitted Construction <input type="checkbox"/> Combustible <input checked="" type="checkbox"/> Non-Combustible Actual Construction <input type="checkbox"/> Combustible <input checked="" type="checkbox"/> Non-Combustible	3.2.2.20. -.83 9.10.6.
15	Mezzanine(s) Area (m²) N/A	3.2.1.1. (3)-(8) 9.10.4.1.
16	Occupant load based on <input type="checkbox"/> m²/person <input checked="" type="checkbox"/> Design of building 1 st Floor: Occupancy Load 43 Persons Group "F3" AREA = 933.3sq.m / 28 = 33 PEOPLE Group "D/E" AREA = 158.7sq.m / 14 = 11 PEOPLE TOTAL PEOPLE = 44 PEOPLE THEREFORE 2 MALE, 2 FEMALE W/C ARE REQUIRED.	3.1.1.7.1 9.9.1.3.
17	Barrier-free Design <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.8. 9.5.2.
18	Hazardous Substances <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.3.1.2. & 3.3.1.19 9.10.1.3. (4)
19	Required Fire Resistance Rating (FRR) Horizontal Assemblies <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Listed Design No. or Description (SG-2) FRR of Supporting Members <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Listed Design No. or Description (SG-2) FRR of Supporting Members <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Listed Design No. or Description (SG-2)	3.2.2.20. .83 & 3.2.1.4. 9.10.8. 9.10.9.
20	Spatial Separation Wall Area of EBF (m²) L.D. (m) L/H or H/L Permitted Max % of openings FRR (Hours) Listed Design or Description Construction Cladding Comb. NonComb. Comb. NonComb.	3.2.3. 9.10.14.

Item	Restaurant- 2165 Robertson Road, Ottawa, ON	OBC Reference
1	Project Description: <input type="checkbox"/> New <input type="checkbox"/> Part 11 <input type="checkbox"/> Part 3 <input type="checkbox"/> Part 9 <input type="checkbox"/> Change of Use <input type="checkbox"/> Alteration 11.1 to 11.4 1.1.2. [A] 1.1.2. [A] & 9.10.1.3.	
2	Major Occupancy (s) Primary: E (Restaurant for 30 people)	3.1.2.1. (1) 9.10.2.
3	Building Area (m²) Existing 0m² New 232m² Total 232m²	1.4.1.2. [A] 1.1.1.2. [A]
4	Gross Area (m²) Existing 0m² New 232m² Total 232m²	1.4.1.2. [A] 1.1.1.2. [A]
5	Number of Storeys Above Grade 1 Below Grade 0	1.4.1.2. [A] & 3.2.1.1. 1.1.1.2. [A] & 9.10.4.
6	Height of Building (m) +/- 5m	3.2.2.10. & 3.2.5. 9.10.20.
7	Number of Streets/ Fire Fighter Access 1	3.2.2.20. -.83 9.10.2.
8	Building Classification	3.2.2.20. -.83 9.10.2.
9	Sprinkler System Proposed <input type="checkbox"/> Entire Building <input type="checkbox"/> Selected Compartments <input type="checkbox"/> Selected Floor Areas <input type="checkbox"/> Basement <input type="checkbox"/> In lieu of roof rating <input type="checkbox"/> Not Required	3.2.2.20. -.83 9.10.8.2. 3.2.1.5. 3.2.2.17. INDEX
10	Standpipe Required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.9. N/A
11	Fire Alarm Required <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.4. 9.10.18.
12	Water Service/ Supply is adequate <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.5.7. N/A
13	High Building <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.2.6. N/A
14	Permitted Construction <input type="checkbox"/> Combustible <input checked="" type="checkbox"/> Non-Combustible Actual Construction <input type="checkbox"/> Combustible <input checked="" type="checkbox"/> Non-Combustible	3.2.2.20. -.83 9.10.6.
15	Mezzanine(s) Area (m²) N/A	3.2.1.1. (3)-(8) 9.10.4.1.
16	Occupant load based on <input type="checkbox"/> m²/person <input checked="" type="checkbox"/> Design of building 1 st Floor: Occupancy Load 30 Persons Group "E" AREA = 30 PEOPLE THEREFORE 1 MALE, 1 FEMALE W/C ARE REQUIRED. PROVIDE 1 UNIVERSAL W/C & 1 UNISEX.	3.1.1.7.1 9.9.1.3.
17	Barrier-free Design <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.8. 9.5.2.
18	Hazardous Substances <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	3.3.1.2. & 3.3.1.19 9.10.1.3. (4)
19	Required Fire Resistance Rating (FRR) Horizontal Assemblies <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Listed Design No. or Description (SG-2) FRR of Supporting Members <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Listed Design No. or Description (SG-2)	3.2.2.20. .83 & 3.2.1.4. 9.10.8. 9.10.9.
20	Spatial Separation Wall Area of EBF (m²) L.D. (m) L/H or H/L Permitted Max % of openings FRR (Hours) Listed Design or Description Construction Cladding Comb. NonComb. Comb. NonComb.	3.2.3. 9.10.14.

Occupancy & Building Areas	Value
Building A (Restaurant/Take-out)	232sq.m
Building B (Wholesale Showroom/Office)	158.7sq.m
F3 Occupancy (Equipment Storage)	933.3sq.m

Reference Bubble	Value
(A) 1/100	DRAWING NUMBER SHEET NUMBER
(2) 3/100	DRAWING NUMBER SHEET NUMBER
(3) 1/100	DRAWING NUMBER SHEET NUMBER
(116.1)	DOOR NUMBER
(W2)	CONSTRUCTION ASSEMBLY LABEL
(114)	CEILING FINISH HEIGHT
(4)	GRID REFERENCE
(174.2)	ELEVATION HEIGHT

Interior Elevation Bubble	Value
(1)	DRAWING NUMBER SHEET NUMBER
(2)	DRAWING NUMBER SHEET NUMBER
(3)	DRAWING NUMBER SHEET NUMBER
(116.1)	DOOR NUMBER
(W2)	CONSTRUCTION ASSEMBLY LABEL
(114)	CEILING FINISH HEIGHT
(4)	GRID REFERENCE
(174.2)	ELEVATION HEIGHT

Window Label	Value
(B)	BASEMENT
(G)	GROUND FLOOR
(S)	SECOND FLOOR
#	WINDOW NUMBER
(W)	EXTERIOR WALL
(I)	INTERIOR WALL
(R)	ROOF
(R)	ROOF

EXISTING ZONING	REQUIRED	PROPOSED BUILDING A	PROPOSED BUILDING B
AM [287] ARTERIAL MAINTENANCE ZONE			
LOT AREA (MIN)	[NO MINIMUM]	11,392sq.m	11,392sq.m
LOT WIDTH (MIN)	[NO MINIMUM]	44.24m	44.24m
FRONT YARD SETBACK (MIN)	[NO MINIMUM]	7.62m	183.5m
INTERIOR YARD SETBACK (MIN)	[NO MINIMUM]	21.3m/9.98m	3.73m/6.0m
REAR YARD SETBACK (MIN)	[NO MINIMUM]	227.3m	30.0m
BUILDING HEIGHT (MAX)	[30m, OR 9 STOREYS]	3.5m	18.4m
WIDTH OF LANDSCAPE AREA AROUND PARKING LOT (MIN)	ABUTTING A STREET: 3m NOT ABUTTING A STREET: 1.5m	1.5m	1.5m
LANDSCAPE AREA (MIN)	15% OF THE AREA OF ANY PARKING LOT (1,833sq.m)	6.2m (FRONT)	275sq.m REQUIRED 1,562sq.m PROVIDED
PARKING (AREA C)	RESTAURANT USE: 10/100sq.m WITH DRIVE-THROUGH CAN BE REDUCED BY 20% RETAIL USE: 3.4/100sq.m OF GFA	23 = 2.3 x 10 23.2 REDUCED BY 20% = 19 SPACES REQUIRED.	34 = 3.4 x 10 34 = 37 SPACES PROVIDED.
BICYCLE PARKING	1/250sq.m OF GFA	35 PROVIDED	39 PROVIDED
DRIVE-THROUGH	FOR RESTAURANT: 7 QUEUING SPACES BEFORE/AT ORDER BOARD AND A MIN. TOTAL OF 11 SPACES.	12 QUEUING SPACES PROVIDED	N/A
LOADING SPACE (TABLE 113A)	FOR LIGHT INDUSTRIAL USE, GFA 1000-1999sq.m: 1 FOR RETAIL STORE, GFA 350-1999sq.m: 1	N/A	1 REQUIRED 6 PROVIDED
LOADING SPACE ACCESS	DRIVEWAY: -3.5m (SINGLE TRAFFIC LANE) -6m (DOUBLE TRAFFIC LANE)	5.23m (SINGLE TRAFFIC LANE)	6m PROVIDED
LOADING SPACE LOCATION	-NOT IN REQUIRED FRONT YARD -MUST BE SCREENED BY MIN. 2m OPAQUE SCREEN.	N/A	SCREEN PROVIDED
LOADING SPACE DIMENSIONS	3.5 x 7m. VERTICAL CLEARANCE OF 4.2m.	N/A	PROVIDED

LAWRENCE ARCHITECT INCORPORATED

18 Deane Street, Suite 205
Ottawa, ON K2E 8B7

T: (613) 739-7778
F: (613) 739-7703
info@larchitect.com

ROBERTSON RD. DEVELOPMENT

2165 ROBERTSON ROAD
OTTAWA, ON.

SITE PLAN
 (REFER TO LANDSCAPE & MAE PLANS FOR FURTHER INFORMATION)

A100

PLAN NO.: D07-12-17-0146