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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.: D07-12-18-0205

MAY 2021 – REV 3

SITE SERVICING STUDY AND STORMWATER MANAGEMENT REPORT
FOR
2165 ROBERTSON ROAD

HUNTINGTON PROPERTIES OTTAWA INC. 2165 ROBERTSON ROAD

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FOR
2165 ROBERTSON ROAD
MAY 2021 – REV 3

CITY OF OTTAWA
PROJECT NO.: 18-1062

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 ***559 m²*** commercial restaurant building on the south end of the property fronting towards Robertson Road with associated asphalt parking lots and a 1-storey ***1092 m²*** industrial building located at the north end of the property. 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:

Robertson Road:

- 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. The remainder of stormwater runoff is directed towards an existing ditch along the north side of Robertson Road, tributary to Stillwater 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 (MECP). The MECP has been contacted to determine the approval requirements however, no response was received. City of Ottawa staff to identify whether an ECA will be required.

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)

- **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 commercial building 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/9.3m^2/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 **Water Supply Guidelines***
*** Industrial Max. Daily and Max. Hourly peaking factors per* **Water Supply Guidelines**.
-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_2O / kPa)
Average Daily Demand	14.1	38.9 / 381.5
Max Day + Fire Flow (3,000 L/min)	21.2 + 3,000	34.9 / 342.3
Peak Hour	38.2	33.9 / 332.5

1) Water demand calculation per ***Water Supply Guidelines***. See ***Appendix B*** for detailed calculations.
2) Boundary conditions supplied by the City of Ottawa for the demands indicated in the correspondence; assumed ground elevation 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;
- Occupancy type – Limited Combustibility; and
- Sprinkler Protection – Supervised sprinkler system.

The above assumptions result in an estimated fire flow of approximately ***2,000 L/min*** for Building A and ***3,000 L/min*** for Building B, 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

	Commercial (BLDG A)	Industrial (BLDG B)
Required Fire Flow Estimate	66 L/s (4,000 L/min)	50 L/s (3,000 L/min)
Hydrants within 75 m	2	2
Hydrants between 75-150 m	2	1
Maximum Flow Available *	315 L/s (18,926 L/min)	252 L/s (15,141 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 5, 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 @ 4,000L/min (kPa)	Peak Hour (kPa)
2	406.1	288.2	357.1
3	408.0	290.1	358.9
4	406.2	271.6	357.2
5	404.7	319.4	355.6
6	406.6	321.4	357.6
7	408.1	322.8	359.0
11	411.3	326.1	362.3
12	398.5	313.2	349.4
9	398.5	313.2	349.4
14	401.7	329.1	352.7
15	405.1	332.5	356.0
* 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 via a 150 mm diameter service connected directly to the existing internal 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/9.3m^2/d
Infiltration and Inflow Allowance	0.05 L/s/ha (Dry Weather) 0.28 L/s/ha (Wet Weather) 0.33 L/s/ha (Total)
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	$Q = \frac{1}{n} A R^{2/3} S^{1/2}$
Minimum Sewer Size	200 mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5 m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6 m/s
Maximum Full Flowing Velocity	3.0 m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012. *Existing design criteria extracted from the Subdivision Agreement for the Stittsville Business Park.*	

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	0.29
Estimated Peak Dry Weather Flow	1.15
Estimated Peak Wet Weather Flow	1.47

The estimated peak wet weather sanitary flow, based on the ***Site Plan*** prepared by SJL Lawrence Architect Inc., included in ***Drawings/Figures,*** is ***1.47 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 ***1.47 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 Stillwater 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 Stillwater 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

	Flow to Roberson Road Ditch (EX2)	Flow to Railroad Corridor Ditch (EX1)
Area	**Time of Concentration (min)**	**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 ***0.031 ha*** and has a runoff coefficient of ***0.72***. 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)	4.8	0.0	13.8	0.0
Total	**4.8**	**0.0**	**13.8**	**0.0**

As shown by ***Table 10*** and ***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. 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 proposed buildings will not provide rooftop storage. Runoff will be directed to the drainage swale along the east side of the property. 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)	0.3	0.0	0.7	0.0
Attenuated Areas (B1)	65.4	78.2	208.9	203.5
Total	**65.7**	**78.2**	**209.7**	**203.5**

It was estimated that approximately ***203.5 m^3*** of storage is required in the area directing flow to the railroad corridor ditch to attenuate the release rate to ***209.7 L/s. 204.8 m^3*** is provided. 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 via 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 ***110.6 m^3*** and extended detention volume of ***44.2 m^3.*** The pond has been designed to provide ***121.2 m^3*** of permanent pool volume at an elevation of ***92.20 m*** and ***71.1 m^3*** of extended detention volume at an elevation of ***92.45 m***. 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 ***203.5 m^3*** 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 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 ***2,000 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 ***1.47 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 ***13.8 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 ***204.8 m^3*** 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.

Reviewed by,
David Schaeffer Engineering Ltd.

Per: Alison J. Gosling, P. Eng

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

18-1062 19/12/2018

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

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

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

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

4.3 Development Servicing Report: Wastewater

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

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

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

4.4 Development Servicing Report: Stormwater Checklist

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

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

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

4.5 Approval and Permit Requirements: Checklist

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

4.6 Conclusion Checklist

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

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

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 Tc=10minutes
- 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

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@dsel.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 Tc=10minutes
- 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

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

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

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phone: (613) 836-0856 ext.532

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

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

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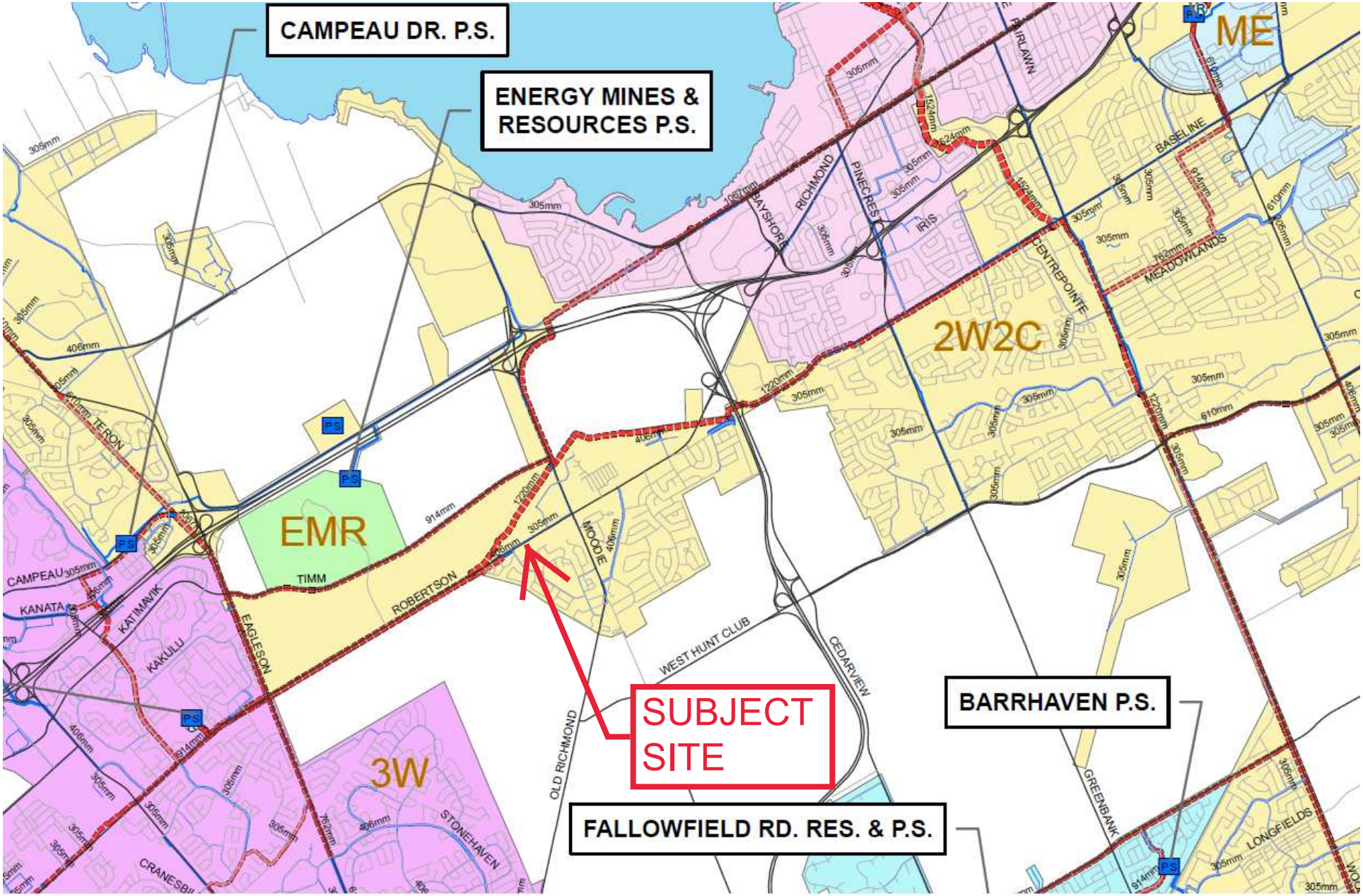
email: bchow@DSEL.ca

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

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david schaeffer engineering ltd.

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

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/m^2/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/m^2/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

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david schaeffer engineering ltd.

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

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

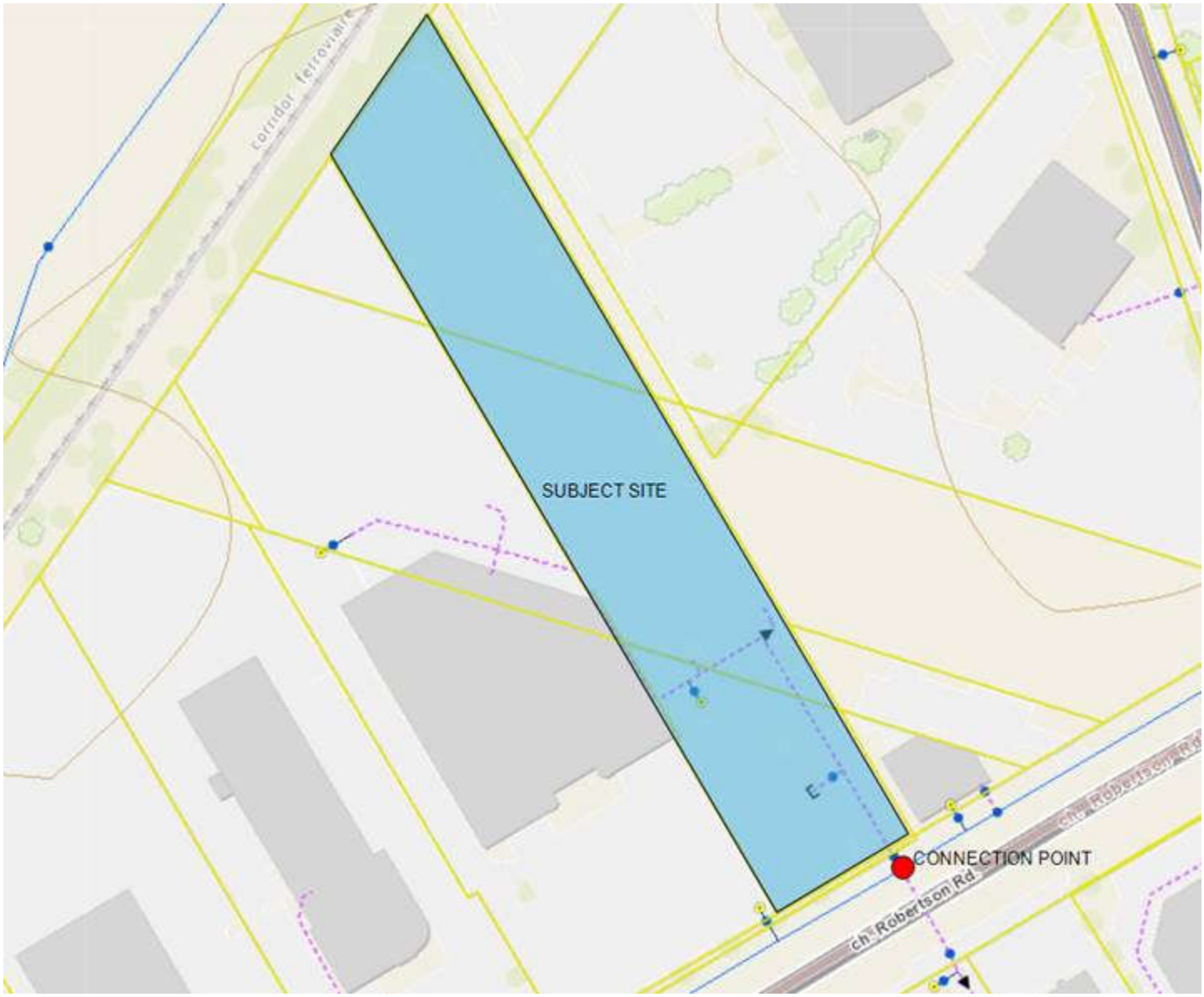
2. Type of development:
   The proposed development involves the construction of two 1-storey buildings. One building will be a restaurant and the other building will be a showroom & warehouse.

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

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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,

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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

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

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/m^2/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/m^2/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

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
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'

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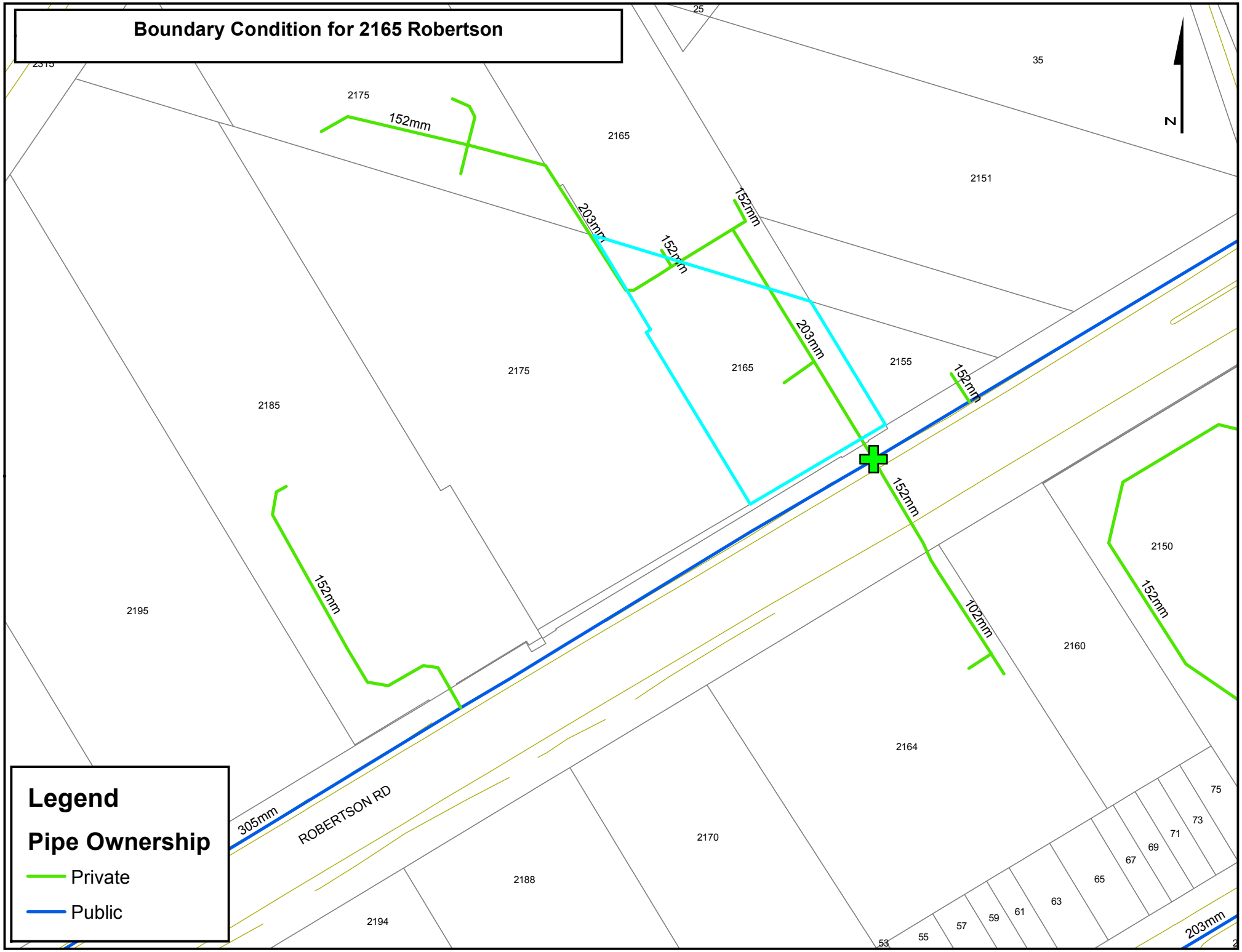

Boundary Condition for 2165 Robertson
N
2175
152mm
2165
2151
203mm
152mm
152mm
203mm
2175
2165
2155
152mm
2185
152mm
152mm
2195
102mm
2150
152mm
2160
2164
ROBERTSON RD
305mm
2170
2188
2194
75
73
71
69
67
65
63
61
59
57
55
53
203mm
Legend
Pipe Ownership
Private
Public

Huntington Properties
Ex. Building at 2175 Robertson Rd

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

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	**m^3/d**	**L/min**	**m^3/d**	**L/min**	**m^3/d**	**L/min**
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 9.3m^2

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

Institutional / Commercial / Industrial Demand

				Avg. Daily		Max Day		Peak Hour	
Property Type	**Unit Rate**		**Units**	**m^3/d**	**L/min**	**m^3/d**	**L/min**	**m^3/d**	**L/min**
Commercial floor space	2.5	$L/m^2/d$		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/9.3m2/d	559	7.51	5.2	11.3	7.8	20.3	14.1
Industrial - Light	35,000	L/gross ha/d	0.367	12.84	8.9	19.3	13.4	34.7	24.1
Industrial - Heavy	55,000	L/gross ha/d	-	0.00	0.0	0.0	0.0	0.0	0.0
		Total I/CI Demand		20.4	14.1	30.5	21.2	55.0	38.2
		Total Demand		**20.4**	**14.1**	**30.5**	**21.2**	**55.0**	**38.2**

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

$$F = 220C\sqrt{A}$$ L/min

*Where **F** is the fire flow, **C** is the Type of construction and **A** is the Total floor area*

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	559.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	4161.2	L/min	
	4000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%
Fire Flow	**3400.0 L/min**

3. Reduction for Sprinkler Protection

Sprinklered - Supervised	-50%
Reduction	**-1700 L/min**

4. Increase for Separation Distance

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

Increase	**680.0**	**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	2380.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section 4*
	2000.0	**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: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	1092.0	m^2	*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 4*
	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

Minor Loss Coefficients

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

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

Pipe Diameter vs. "C" Factor

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

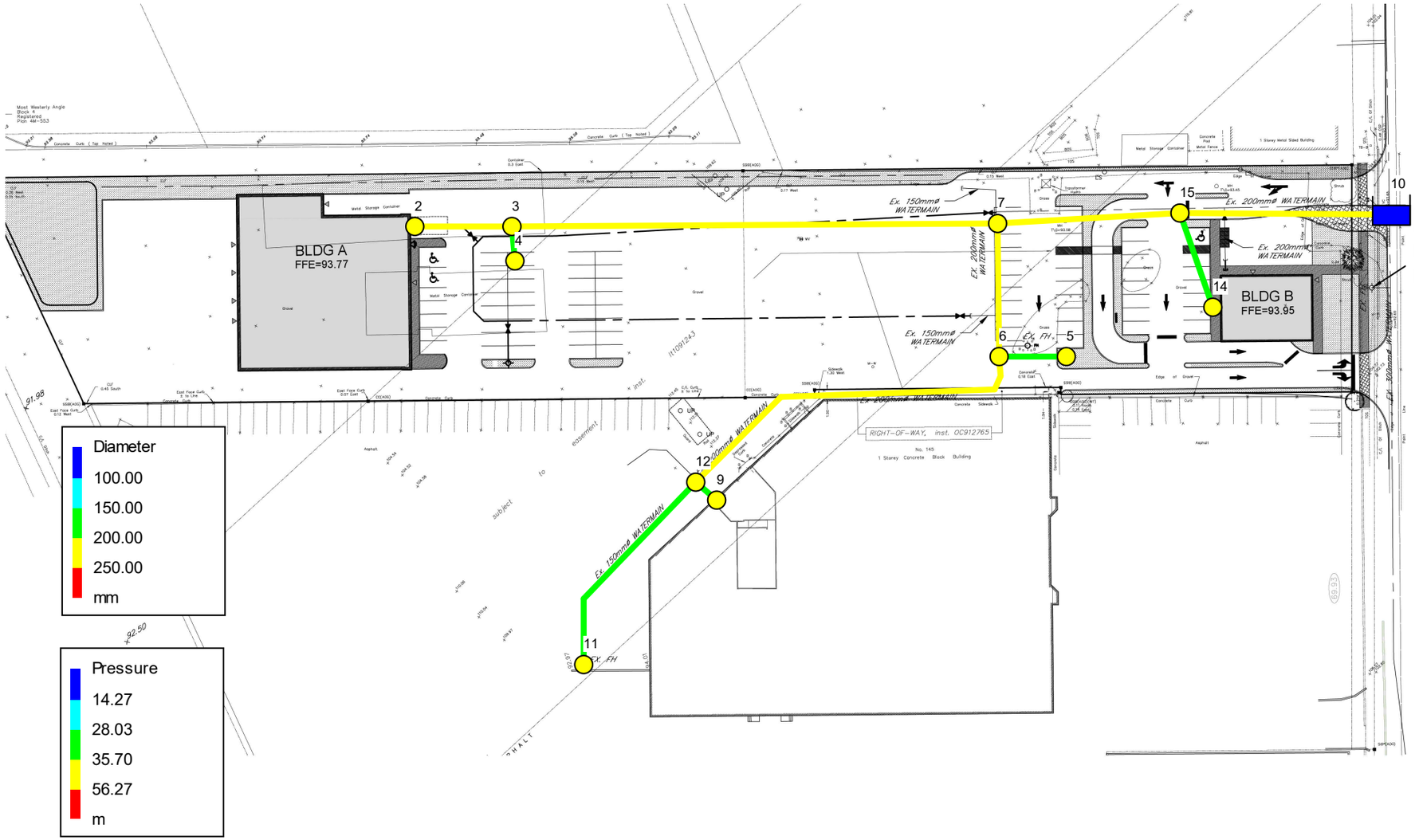
Node Pressures

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

Location	Average Day (kPa)	Max Day + Fire Flow (kPa)	Peak Hour (kPa)	
2	406.1	288.2	357.1	
3	408.0	290.1	358.9	
4	406.2	271.6	357.2	*Fire Hydrant
5	404.7	319.4	355.6	*Fire Hydrant
6	406.6	321.4	357.6	
7	408.1	322.8	359.0	
11	411.3	326.1	362.3	*Fire Hydrant
12	398.5	313.2	349.4	
9	398.5	313.2	349.4	
14	401.7	329.1	352.7	
15	405.1	332.5	356.0	

AVERAGE DAY

Day 1, 12:00



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: 2021-05-21_EPANet-AVG.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
5	3	4	1.7	150
6	7	15	28.3	200
7	7	6	27.1	200
9	6	5	5.6	150
10	12	6	71.05	200
11	12	11	45.87	150
13	12	9	5.17	150
14	15	10	48.4	200
15	15	14	18.4	150
2	7	3	96	200
3	3	2	23.9	200

Node Results:

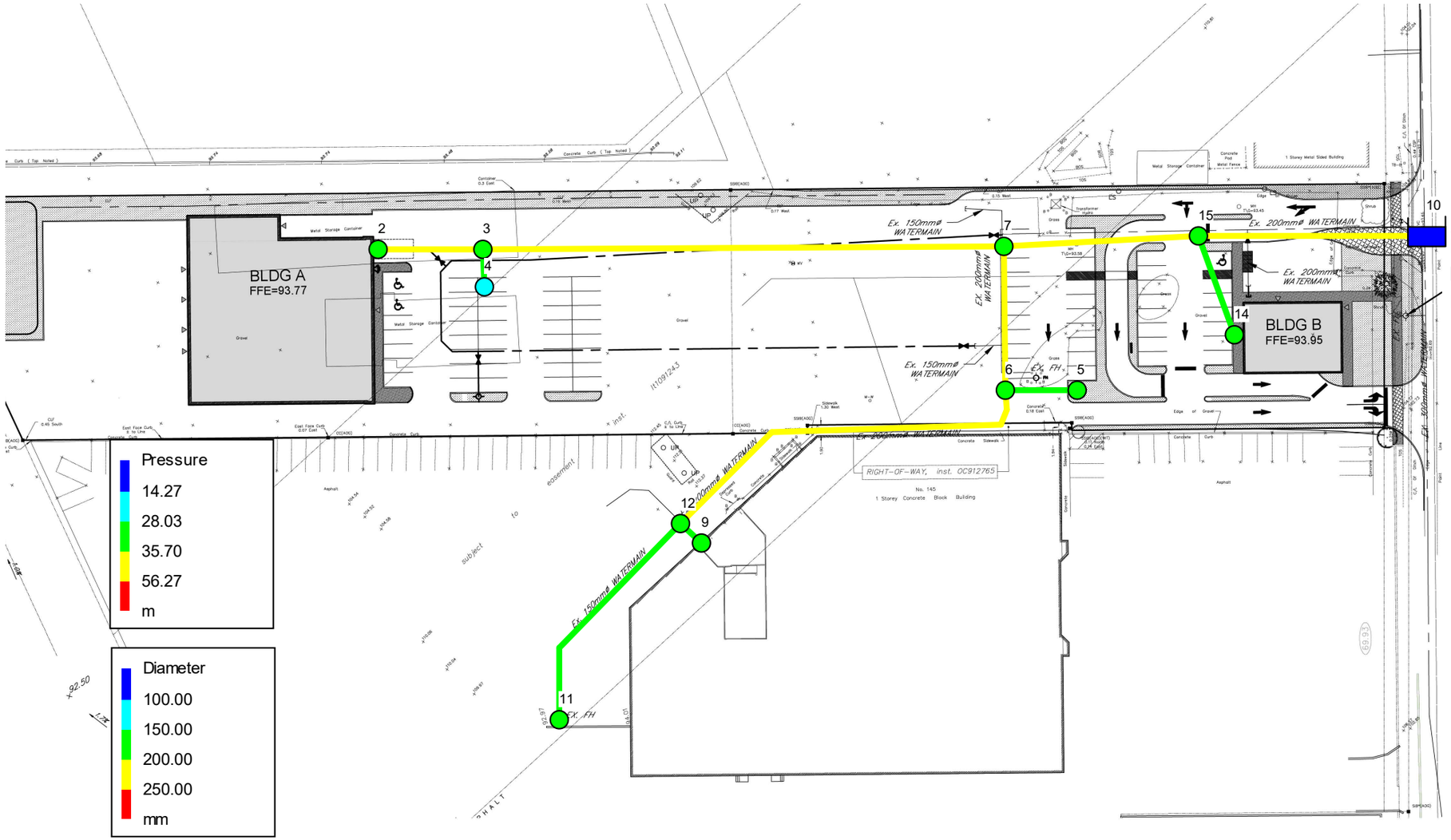
Node ID	Demand LPM	Head m	Pressure m	Quality	
2	8.90	132.50	41.40	0.00	
3	0.00	132.50	41.59	0.00	
4	0.00	132.50	41.41	0.00	
5	0.00	132.50	41.25	0.00	
6	0.00	132.50	41.45	0.00	
7	0.00	132.50	41.60	0.00	
11	0.00	132.50	41.93	0.00	
12	0.00	132.50	40.62	0.00	
9	22.00	132.50	40.62	0.00	
14	5.20	132.50	40.95	0.00	
15	0.00	132.50	41.29	0.00	
10	-36.10	132.50	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
5	0.00	0.00	0.00	Open
6	-30.90	0.02	0.00	Open
7	22.00	0.01	0.00	Open
9	0.00	0.00	0.00	Open
10	-22.00	0.01	0.00	Open
11	0.00	0.00	0.00	Open
13	22.00	0.02	0.02	Open
14	-36.10	0.02	0.01	Open
15	5.20	0.00	0.00	Open
2	8.90	0.00	0.00	Open
3	8.90	0.00	0.00	Open

MAX DAY + FIRE FLOW

Day 1, 12:00



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: 2021-05-21_EPANet-MAX.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
5	3	4	1.7	150
6	7	15	28.3	200
7	7	6	27.1	200
9	6	5	5.6	150
10	12	6	71.05	200
11	12	11	45.87	150
13	12	9	5.17	150
14	15	10	48.4	200
15	15	14	18.4	150
2	7	3	96	200
3	3	2	23.9	200

Node Results:

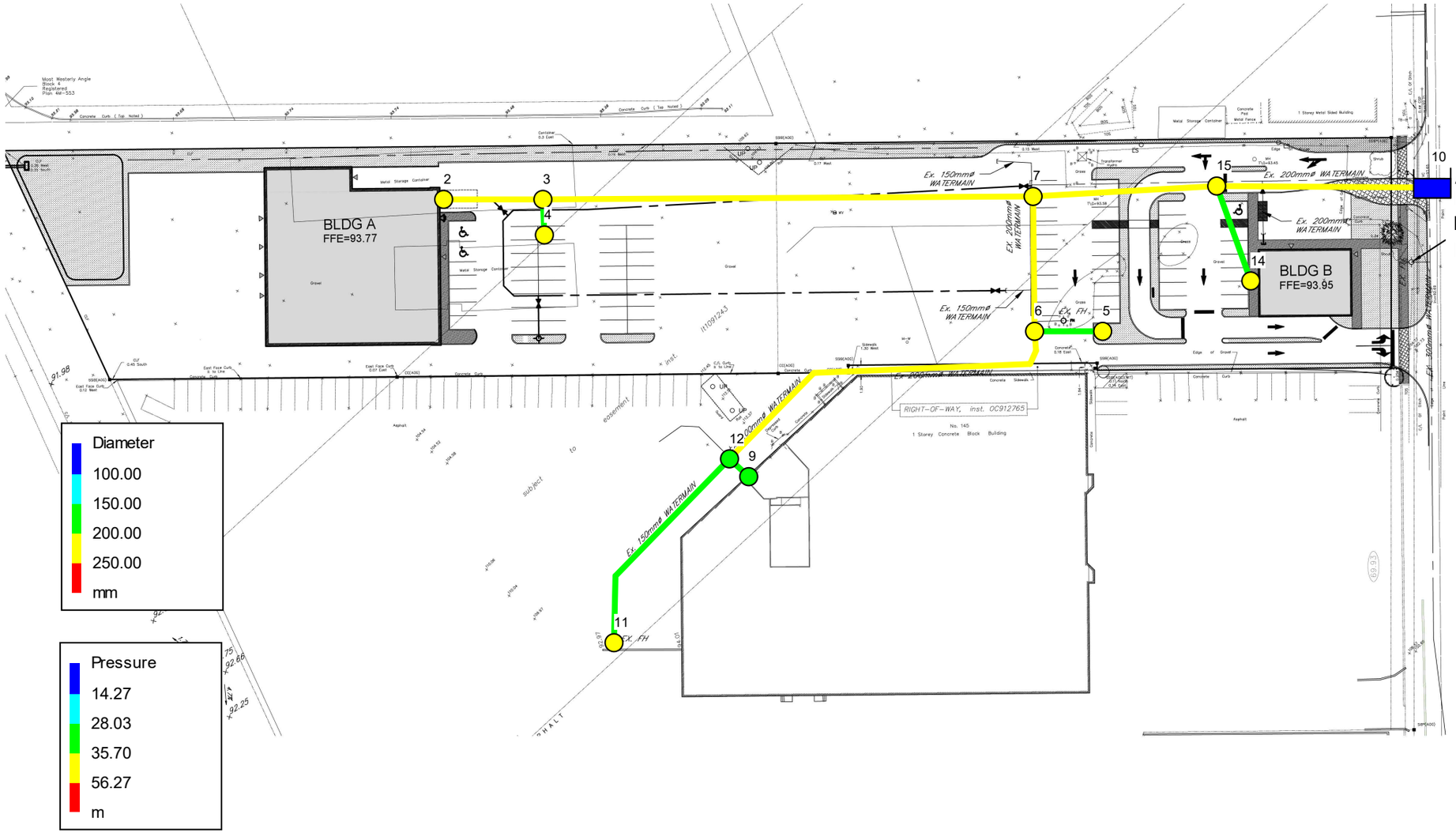
Node ID	Demand LPM	Head m	Pressure m	Quality	
2	13.40	120.48	29.38	0.00	
3	0.00	120.48	29.57	0.00	
4	4000.00	118.78	27.69	0.00	
5	0.00	123.81	32.56	0.00	
6	0.00	123.81	32.76	0.00	
7	0.00	123.81	32.91	0.00	
11	0.00	123.81	33.24	0.00	
12	0.00	123.81	31.93	0.00	
9	33.00	123.81	31.93	0.00	
14	7.80	125.10	33.55	0.00	
15	0.00	125.10	33.89	0.00	
10	-4054.20	127.00	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
5	4000.00	3.77	997.19	Open
6	-4046.40	2.15	45.35	Open
7	33.00	0.02	0.01	Open
9	0.00	0.00	0.00	Open
10	-33.00	0.02	0.00	Open
11	0.00	0.00	0.00	Open
13	33.00	0.03	0.04	Open
14	-4054.20	2.15	39.30	Open
15	7.80	0.01	0.00	Open
2	4013.40	2.13	34.78	Open
3	13.40	0.01	0.00	Open

PEAK HOUR

Day 1, 12:00



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: 2021-05-21_EPANet-PEAK.net
```

Link - Node Table:

Link ID	Start Node	End Node	Length m	Diameter mm
5	3	4	1.7	150
6	7	15	28.3	200
7	7	6	27.1	200
9	6	5	5.6	150
10	12	6	71.05	200
11	12	11	45.87	150
13	12	9	5.17	150
14	15	10	48.4	200
15	15	14	18.4	150
2	7	3	96	200
3	3	2	23.9	200

Node Results:

Node ID	Demand LPM	Head m	Pressure m	Quality	
2	24.10	127.50	36.40	0.00	
3	0.00	127.50	36.59	0.00	
4	0.00	127.50	36.41	0.00	
5	0.00	127.50	36.25	0.00	
6	0.00	127.50	36.45	0.00	
7	0.00	127.50	36.60	0.00	
11	0.00	127.50	36.93	0.00	
12	0.00	127.50	35.62	0.00	
9	59.30	127.50	35.62	0.00	
14	14.10	127.50	35.95	0.00	
15	0.00	127.50	36.29	0.00	
10	-97.50	127.50	0.00	0.00	Reservoir

Link Results:

Link ID	Flow LPM	Velocity m/s	Unit Headloss m/km	Status
5	0.00	0.00	0.00	Open
6	-83.40	0.04	0.03	Open
7	59.30	0.03	0.02	Open
9	0.00	0.00	0.00	Open
10	-59.30	0.03	0.01	Open
11	0.00	0.00	0.00	Open
13	59.30	0.06	0.12	Open
14	-97.50	0.05	0.04	Open
15	14.10	0.01	0.01	Open
2	24.10	0.01	0.00	Open
3	24.10	0.01	0.00	Open

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J. Moffat, P.Eng.
E. Pérusse, P.Eng., ing.
R. Boivin, P.Eng., ing.
R. Leonard, P.Eng.
M. Sarasin, P.Eng.

Executive Consultants
A. Bogdanowicz, P.Eng.
M.G. Carriere, C.E.T.
R.J. McIntyre, P.Eng.

February 9, 2021

VIA E-MAIL

Robertson Road Property Limited Partnership
c/o Huntington Properties
1306 Wellington Street, Suite 200
Ottawa, Ontario
K1Y 3B2

ATTENTION: MS. LISA WESTPHAL, PROJECT MANAGER

SUBJECT: 2165 ROBERTSON ROAD
MECHANICAL SITE PLAN WORK
OUR PROJECT NO. 2018-700-1

To Whom it may Concern:

This letter is to confirm that the sprinkler system for this project will be designed to be fully supervised in accordance with the Ontario Building Code and NFPA-13.

Yours very truly,

GOODKEY, WEEDMARK & ASSOCIATES LIMITED

Robert Lefebvre, P.Eng., LEED® AP
Partner
Senior Mechanical Engineer

RL/kr

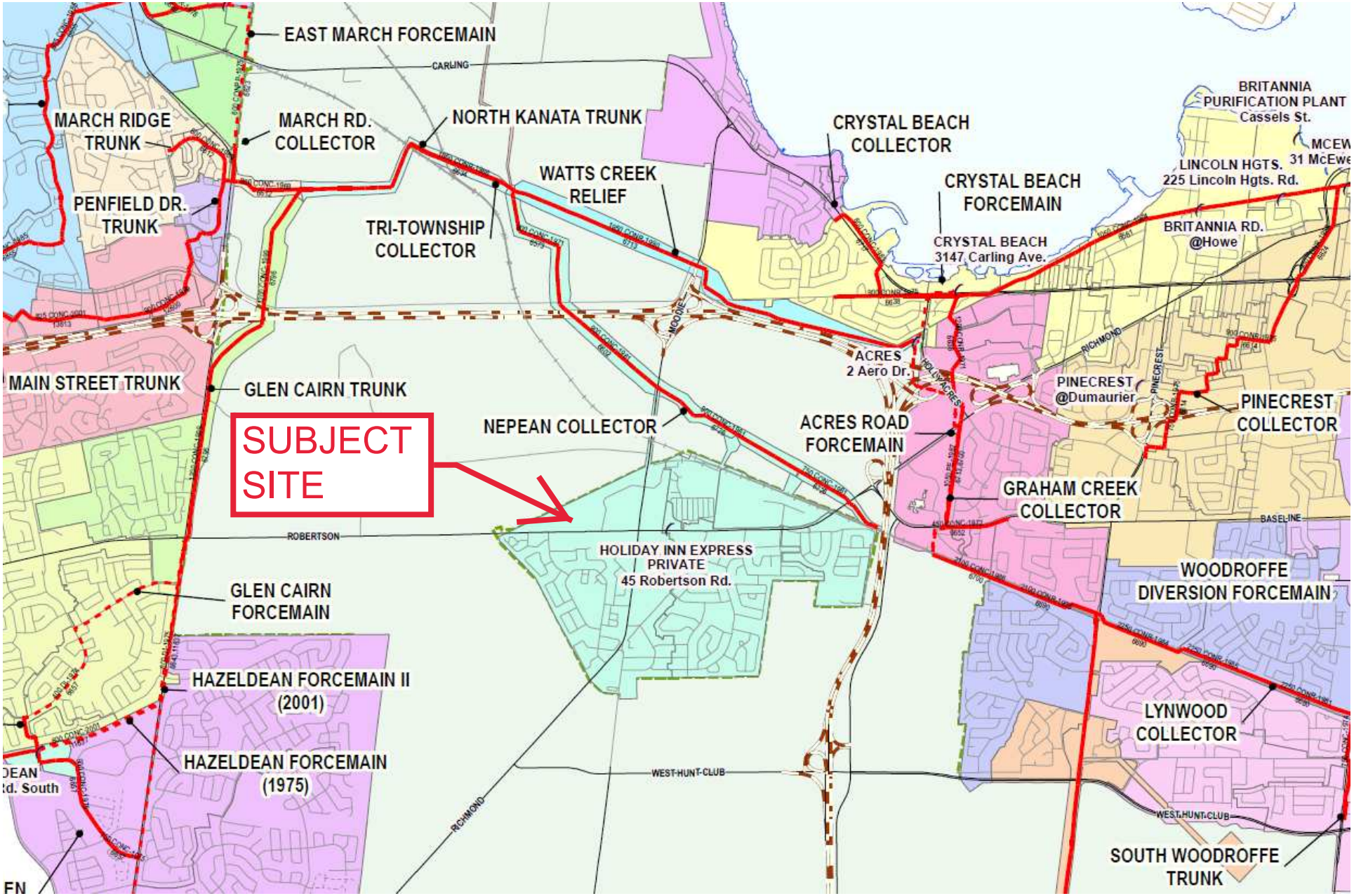
e.c.: Alison Gosling (David Schaeffer Engineering Ltd.)

Goodkey Weedmark 65 years 1956 – 2021

APPENDIX C

Wastewater Collection

CITY OF OTTAWA – SANITARY TRUNK SEWERS AND COLLECTION AREAS



Huntington Properties
2165 Robertson Road
Proposed Site Conditions

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

Site Area 1.130 **ha**

Extraneous Flow Allowances

Infiltration / Inflow (Dry)	**0.06**	**L/s**
Infiltration / Inflow (Wet)	**0.32**	**L/s**
Infiltration / Inflow (Total)	**0.37**	**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
Restaurant	125	L/9.3m2/d	559	0.09
Industrial - Light**	35,000	L/gross ha/d	0.367	0.15
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow	**0.24**
Peak Institutional / Commercial Flow	0.13
Peak Industrial Flow**	0.97
Peak I/C/I Flow	**1.10**

** 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	**0.29 L/s**
Total Estimated Peak Dry Weather Flow Rate	**1.15 L/s**
Total Estimated Peak Wet Weather Flow Rate	**1.47 L/s**

EXISTING SANITARY SEWER CALCULATION SHEET

CLIENT: **HUNTINGTON PROPERTIES**
LOCATION: **2165 ROBERTSON ROAD**

FILE REF: **18-1062**

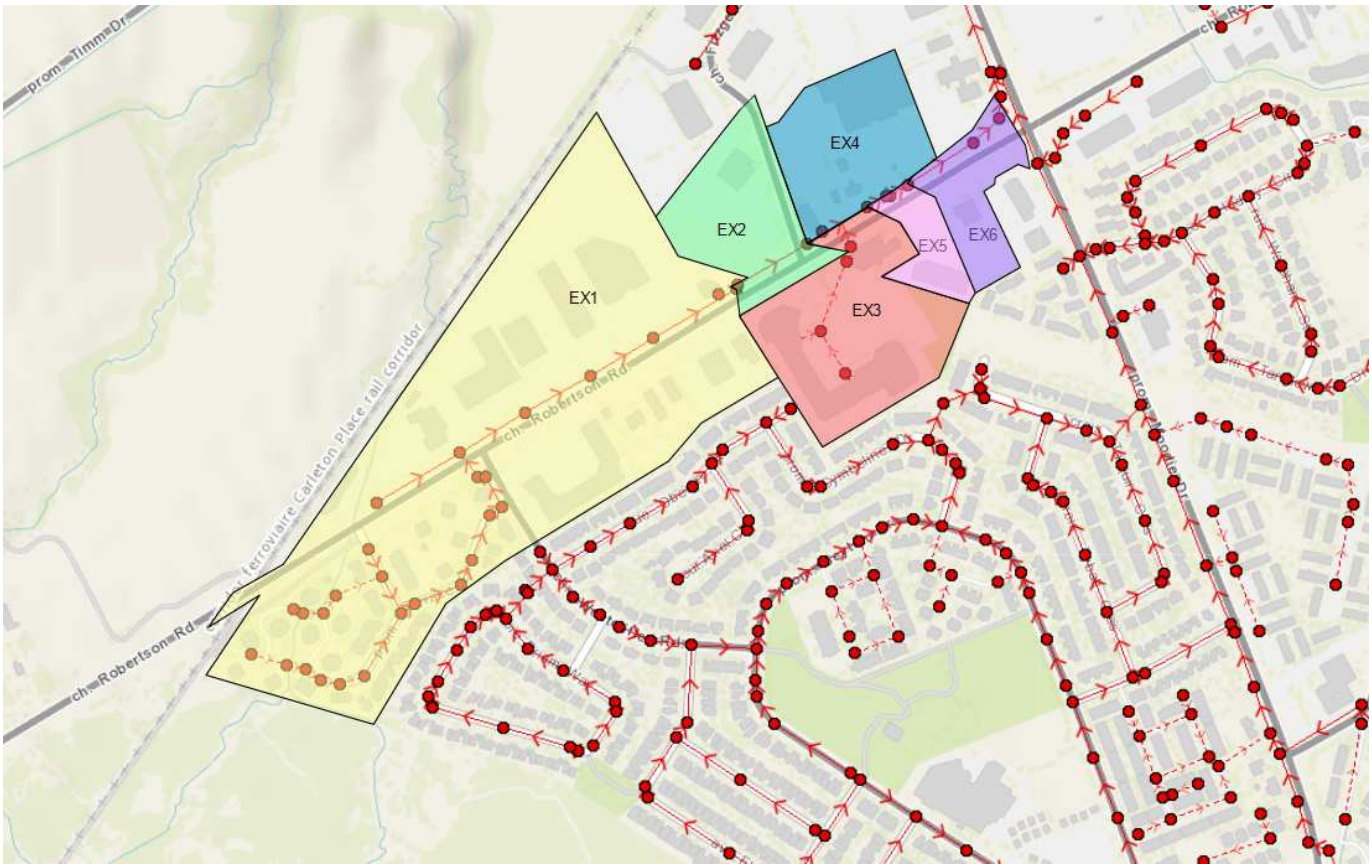
DATE: **21-May-21**

DESIGN PARAMETERS

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

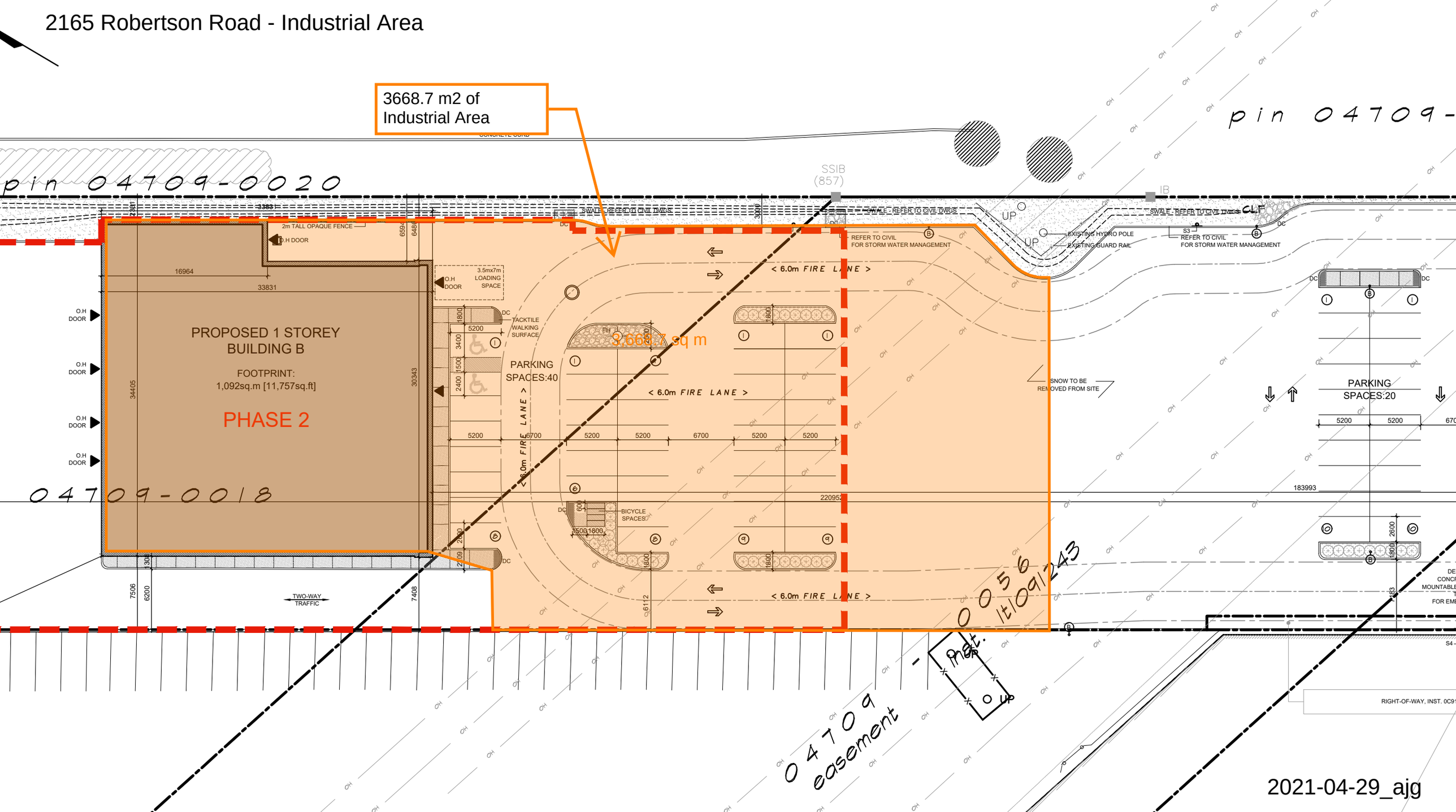
Location			Residential Area and Population									Commercial		Institutional		Industrial		Infiltration				Pipe Data								
Area ID	Up	Down	Area	Number of Units by type				Pop.	Cumulative		Peak. Fact.	Q_{res}	Area	Accu. Area	Area	Accu. Area	Area	Accu. Area	Q_{C+I+I}	Total Area	Accu. Area	Infiltration Flow	Total Flow	DIA	Slope	Length	$A_{hydraulic}$	R	Velocity	Q_{cap}	Q / Q full
			(ha)	Singles	Semi's	Town's	Apt's**		Area (ha)	Pop.	(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)
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		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
	EX SAN MH11	EX SAN MH12	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	1.80	45.7	0.071	0.075	1.84	129.7	0.23

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

2165 Robertson Road - Industrial Area



APPENDIX D

Stormwater Management

EX1
0.943
0.70
DRAINAGE TO
RAIL CORRIDOR DITCH

EX2
0.190
0.70
DRAINAGE TO
ROBERTSON ROAD DITCH

ROBERTSON ROAD

RIGHT-OF-WAY, inst. OC912765

No. 145
1 Storey Concrete Block Building

1 Storey Metal Sided Building

Most Westerly Angle Block 1 Registered Plan 4M-553

LEGEND

	DRAINAGE DIVIDE
	OVERLAND FLOW ROUTE
EX1	DRAINAGE AREA ID
1.000	AREA IN Ha
0.70	RATIONAL METHOD RUNOFF COEFFICIENT

DSEL
david schaeffer engineering ltd
SMART SUBDIVISIONS™

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

z:\projects\18-1062_huntington_2165 robertson rd\b_design\b2_drawings\b2-2_main (dsel)\spa_sub1\2018-12-19_1062_spa_bnc_recover.dwg

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

1) Time of Concentration per Federal Aviation Administration

Existing Drainage Charateristics 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

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

tc, 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 Charateristics 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	0.031	ha
C	0.72	Rational Method runoff coefficient

	Imp.	Perv.	Total
Area	0.023	0.008	0.031
C	0.9	0.2	0.72

	2-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	76.8	4.8	4.8	0.0	0.0	178.6	13.8	13.8	0.0	0.0

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

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	4.8	0.0	13.8	0.0	0.0
Attenutated Areas	0.0	0.0	0.0	0.0	0.0
Total	**4.8**	**0.0**	**13.8**	**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 Charateristics 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

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

tc, 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 Charateristics 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

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

	2-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	76.8	0.3	0.3	0.0	0.0	178.6	0.7	0.7	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, A3**
Available Storage

5-YEAR	Imp.	Perv.	Total
Area	0.961	0.135	1.096
C	0.9	0.2	0.81

100-YEAR	Imp.	Perv.	Total
Area	0.961	0.135	1.096
C	1.125	0.25	1.02

Stage Attenuated Areas Storage Summary

		Surface Storage			Surface and Subsurface Storage			
	Stage	Ponding	h_o	delta d	V	V_{acc}	$Q_{release}$†	$V_{drawdown}$
	(m)	(m^2)	(m)	(m)	(m^3)	(m^3)	(L/s)	(hr)
Orifice 1 INV	92.20	256	0.00			0.0	0.0	0.00
Orifice 2 INV	92.45	310	0.25	0.25	70.6	70.6	46.0	0.43
	92.55	336	0.35	0.10	32.3	102.9	128.5	0.22
Top of Storage Area	92.80	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 1.096 ha
C 0.81 Rational Method runoff coefficient *Note: Rational Method Coefficient "C" increased by 25% for 100-year calculations*

	2-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10	76.8	189.4	65.4	124.0	74.4	178.6	543.6	208.9	334.7	200.8
15	61.8	152.3	65.4	86.9	78.2	142.9	435.0	208.9	226.1	203.5
20	52.0	128.3	65.4	62.9	75.5	120.0	365.2	208.9	156.3	187.5
25	45.2	111.4	65.4	46.0	69.0	103.8	316.2	208.9	107.2	160.9
30	40.0	98.7	65.4	33.3	60.0	91.9	279.7	208.9	70.8	127.4
35	36.1	88.9	65.4	23.5	49.4	82.6	251.4	208.9	42.5	89.2
40	32.9	81.0	65.4	15.6	37.5	75.1	228.8	208.9	19.9	47.7
45	30.2	74.6	65.4	9.2	24.8	69.1	210.2	208.9	1.3	3.5
50	28.0	69.1	65.4	3.7	11.2	64.0	194.7	208.9	0.0	0.0
55	26.2	64.5	64.5	0.0	0.0	59.6	181.5	208.9	0.0	0.0
60	24.6	60.6	60.6	0.0	0.0	55.9	170.2	208.9	0.0	0.0
65	23.2	57.1	57.1	0.0	0.0	52.6	160.3	208.9	0.0	0.0
70	21.9	54.0	54.0	0.0	0.0	49.8	151.6	208.9	0.0	0.0
75	20.8	51.3	51.3	0.0	0.0	47.3	143.9	208.9	0.0	0.0
80	19.8	48.9	48.9	0.0	0.0	45.0	137.0	208.9	0.0	0.0
85	18.9	46.7	46.7	0.0	0.0	43.0	130.8	208.9	0.0	0.0
90	18.1	44.7	44.7	0.0	0.0	41.1	125.2	208.9	0.0	0.0
95	17.4	42.9	42.9	0.0	0.0	39.4	120.1	208.9	0.0	0.0
100	16.7	41.3	41.3	0.0	0.0	37.9	115.4	208.9	0.0	0.0
105	16.1	39.8	39.8	0.0	0.0	36.5	111.1	208.9	0.0	0.0
110	15.6	38.4	38.4	0.0	0.0	35.2	107.2	208.9	0.0	0.0

2-year $Q_{attenuated}$ **65.40 L/s** **100-year $Q_{attenuated}$** **208.91 L/s**
2-year Max. Storage Required **78.2 m^3** **100-year Max. Storage Required** **203.5 m^3**
Est. 5-year Storage Elevation **92.47 m** **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	0.3	0.0	0.7	0.0	0.0
Attenutated Areas	65.4	78.2	208.9	203.5	204.8
Total	**65.7**	**78.2**	**209.7**	**203.5**	**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		0.484	0.86	0.42	0.42	10.0	178.6	206.5	300	5	0	0.025	0.25	93	0.450	3.059	0.15	0.56	250.8	2.8	0.82
Area A2		0.369	0.79	0.29	0.71	12.8	156.6	307.8	410	3	0	0.025	0.25	71	0.504	2.593	0.19	0.67	338.6	1.8	0.91

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

	Imp.	Perv.	Total
Area	0.763	0.094	0.857
C	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 (m^2)**	**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 m3/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%
Enhanced 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
Normal 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
Basic 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	600	780.0

	ICD 1	ICD 2	ICD 3
Invert (m)	92.2	92.45	
Diamter (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 Coefficier	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	39.00	522.00	25.13	352.30	231.10	0.65	74.21	0.40	148.15	0.00	0.00	0.05	105.90	328.27
92.90	1.30	39.00	561.00	27.07	379.37	258.18	0.70	77.02	0.45	157.14	0.00	0.00	0.10	299.28	533.44
92.95	1.35	39.00	600.00	29.02	408.40	287.20	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)*Depth^1.5

Where C = Weir Coefficient

DRAWINGS / FIGURES

PLAN OF SURVEY OF

PART OF LOT 9
CONCESSION 2 (OTTAWA FRONT)
GEOGRAPHIC TOWNSHIP OF NEPEAN
CITY OF OTTAWA
PREPARED BY ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
COMPLETED ON AUGUST 13, 2008.

pin 04709-0020

pin 04709-0064

pin 04709-0063

pin 04709-0021

pin 04709-0018

pin 04709-0017

pin 04709-0042

pin 04709-0056 - subject to easement

PROPOSED 1 STOREY
BUILDING B

FOOTPRINT:
1,092sq.m [11,757sq.ft]

PHASE 2

PROPOSED 1 STOREY
BUILDING A

FOOTPRINT:
559sq.m [6,017sq.ft]

EXISTING METAL
STORAGE
CONTAINER

EXISTING 1 STOREY
METAL SIDED BUILDING

EXISTING 1 STOREY
CONCRETE BLOCK BUILDING

PARKING
SPACES:40

PARKING
SPACES:20

PARKING
SPACES:27

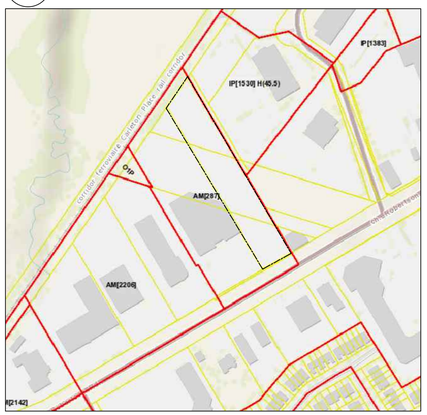
< 6.0m FIRE LANE >

< FIRE LANE >

BAR SCALE

3 6 9 12 18 24 36 48

01 SITE PLAN
A1.0 SCALE:1:400



SIGN LEGEND

SYMBOL	DESCRIPTION
S1	STOP SIGN – REFER TO IMAGE BELOW FOR DETAILS
S2	DESIGNATED ACCESSIBLE PARKING SPACE. REFER TO CITY STANDARD FOR PAINTED SYMBOL
S3	FIRE ROUTE SIGN (AS PER DETAIL) – MIN. 1 SIGN EVERY 45m ALONG FIRE ROUTE
S4	ONE WAY
S5	WRONG WAY SIGN

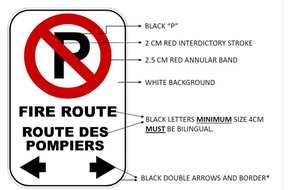
2. STOP Sign

40 25 20

STOP

Ra-1	60 cm x 60 cm
Ra-101	75 cm x 75 cm
Ra-1101	120 cm x 120 cm
Font	Highway Gothic C
Colour	Legend & Border – White Reflective Background – Red Reflective

GUIDELINES FOR FIRE ROUTE SIGNAGE



AT LEAST (30 X 45) CM

LIGHTING LEGEND

A EXTERIOR WALL MOUNTED LIGHT FIXTURE

B EXTERIOR POLE MOUNTED LIGHT FIXTURE

C EXTERIOR WALL MOUNTED LIGHT PACK

D EXTERIOR SOFFIT LIGHT

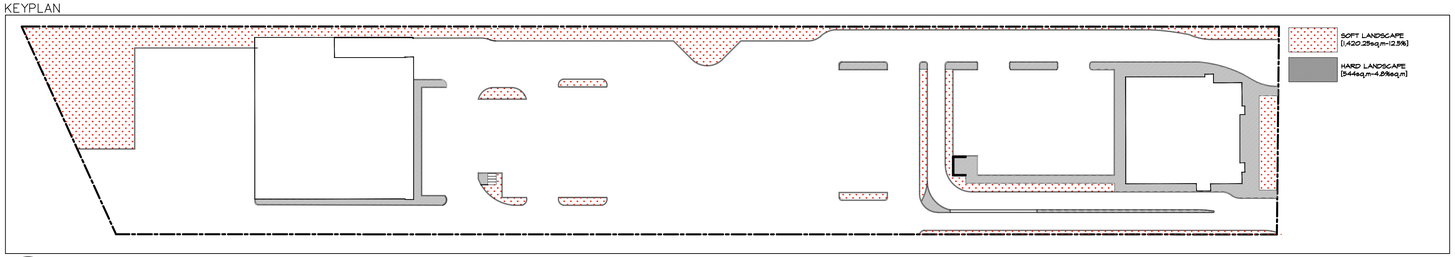
*REFER TO ELECTRICAL DRAWINGS

OCCUPANCY & BUILDING AREAS	
BUILDING A	
E, D & A OCCUPANCY (RESTAURANT/OFFICE/RETAIL)	559sq.m
BUILDING B	
E OCCUPANCY (WHOLESALE SHOWROOM/OFFICE)	158.7sq.m
F3 OCCUPANCY (EQUIPMENT STORAGE)	933.3sq.m

LEGEND

- NEW OVERHEAD DOOR
- NEW DOOR/ENTRANCE
- PROPOSED RIVERSTONE MULCH
- EXISTING VEGETATION REFER TO LANDSCAPE DWGS
- BICYCLE PARKING SPACE (1.8mx0.6m)
- NO PARKING LINES
- PROPOSED PRECAST CONCRETE PAVERS
- PROPOSED SOD – REFER TO LANDSCAPE DWGS
- NEW BARGUT CONCRETE SIDEWALK
- PARKING STALL COUNT PER ROW
- NEW SIGN, REFER TO SIGN LEGEND
- STREET LIGHT
- HYDRO POST
- DESIGNATED ACCESSIBLE PARKING SPACE AS PER AODA STANDARDS
- TWO WAY TRAFFIC
- ONE WAY TRAFFIC
- DEPRESSED CURB (DC)
- PROPERTY LINE
- EXISTING FENCE
- MINIMUM SETBACKS (ZONING)
- EXISTING BUILDINGS
- NEW CONSTRUCTION
- *REFER TO LANDSCAPE DWGS

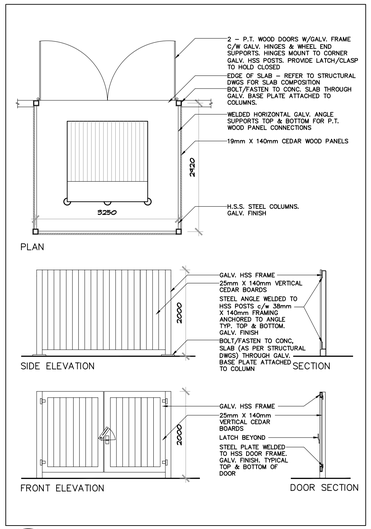
KEYPLAN



02 LANDSCAPE CALCULATIONS
A1.0 SCALE:1:600

ZONING

EXISTING ZONING	AM [287] ARTERIAL MAINSTREET ZONE		
	REQUIRED	PROPOSED BUILDING A	PROPOSED BUILDING B
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	7.02m	183.5m
INTERIOR YARD SETBACK (MIN)	NO MINIMUM	10.1m/9.2m	3.73m/6.0m
REAR YARD SETBACK (MIN)	NO MINIMUM	227.3m	30.0m
BUILDING HEIGHT (MAX)	30m, OR 9 STOREYS	±6.4m	±8.4m
WIDTH OF LANDSCAPE AREA AROUND PARKING LOT (MIN)	ABUTTING A STREET: 3m NOT ABUTTING A STREET: 1.5m	1.5m min.	1.8m min.
LANDSCAPE AREA (MIN)	15% OF THE AREA OF ANY PARKING LOT (1,833sq.m PARKING AREA)	6.2m (FRONT)	275sq.m REQUIRED 1,420.2sq.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	185 x10 REDUCED BY 20% = 15 SPACES 37x3.2 = 13 REQUIRED= 28 47 PROVIDED	102 = 10.9 x 3.4 = 37 SPACES REQUIRED. 40 PROVIDED
BICYCLE PARKING	1/250sq.m OF GFA	2 BICYCLE SPACE REQUIRED. 4 PROVIDED	4 BICYCLE SPACES REQUIRED. 4 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
DRIVE-THROUGH QUEUING SPACES	3m WIDE 5.7m LONG	PROVIDED	N/A
LOADING SPACE (TABLE 113A)	BUILDING A RESTAURANT/OFFICE/RETAIL OCCUPANCY OF 1,000sq.m GFA: NONE REQUIRED BUILDING B – LIGHT INDUSTRIAL USE OF 1,000–9,999sq.m GFA: 1 SPACE REQUIRED	N/A	1 SPACE PROVIDED
LOADING SPACE ACCESS	DRIVEWAY: –3.5m (SINGLE TRAFFIC LANE) –6m (DOUBLE TRAFFIC LANE) AISLE: –11m (LESS THAN 45 DEGREE ANGLE) –14m (45–60 DEGREE ANGLE) –17m (60–90 DEGREE ANGLE)	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



02 GARBAGE ENCLOSURE
A100 SCALE:1:64

CLIENT NAME:
Huntington PROPERTIES

NOTES:

1) ALL WORK TO BE IN COMPLIANCE WITH LOCAL BUILDING CODES, REGULATIONS AND BY-LAWS.

2) ADDITIONAL DRAWINGS MAY BE ISSUED FOR CLARIFICATION TO ASSIST PROPER EXECUTION OF WORK. SUCH DRAWINGS WILL HAVE THE SAME MEANING AND INTENT AS IF THEY WERE INCLUDED WITH PLANS IN CONTRACT DOCUMENTS.

3) DO NOT SCALE DRAWINGS.

4) ALL SUB-CONTRACTORS TO TAKE THEIR OWN ON-SITE MEASUREMENTS AND BE RESPONSIBLE FOR THEIR ACCURACY

5) NOTIFY SHAWN J. LAWRENCE ARCHITECT FOR ANY ERRORS AND/OR OMISSIONS PRIOR TO START OF WORK.

PHASING LEGEND
PHASE 1
PHASE 2

CLIENT
HUNTINGTON PROPERTIES
1506 HELLINGTON STREET WEST SUITE 200
OTTAWA, ON K1Y 3B2
T: 613.542.1818

PLANNER
FOTENN PLANNING + DESIGN
223 MCLEOD STREET,
OTTAWA, ON K2P 0Z8
T: 613.730.5709

LANDSCAPE ARCHITECT
JAMES B. LENNOX & ASSOCIATES INC.
3332 CARLING AVE.
OTTAWA, ON K2H 5A8

CIVIL ENGINEER
DSEL -DAVID SCHAEFFER ENGINEERING LTD.
120 IBER ROAD, UNIT 103
STITTSVILLE, ON K2S 1E9
T: 613.836.0856

M&E ENGINEERING:
GOODKEY WEEDMARK & ASSOCIATES LIMITED.
CONSULTING ENGINEERS
1688 WOODWARD DRIVE,
OTTAWA, ON K2C 3R8
T: 613.727.5111

SURVEYOR:
J.D BARNES LIMITED
2450 DON REID DRIVE, SUITE 204,
OTTAWA, ON K1H 1E1
T: 613.731.7244

SEAL:
ONTARIO ASSOCIATION OF ARCHITECTS
SHAWN JAMES LAWRENCE
LICENCE 4442

NORTH ARROW:
N

No.	DATE	REVISION
07	2021.05.25	ISSUED FOR MUNICIPAL REVIEW
06	2021.05.04	ISSUED FOR SITE PLAN CONTROL
05	2021.02.18	ISSUED FOR COORDINATION
04	2021.01.26	ISSUED FOR REVIEW
03	2021.01.08	ISSUED FOR REVIEW
02	2021.01.05	ISSUED FOR REVIEW
01	2020.12.02	ISSUED FOR REVIEW

S.J.LAWRENCE ARCHITECT INCORPORATED
18 DEAKIN STREET SUITE 205
OTTAWA, ONTARIO K2E 8S7
T: (613) 724.7710
F: (613) 724.7105
sjl@sjlarchitect.com

PROJECT:
ROBERTSON RD. DEVELOPMENT
2185 ROBERTSON ROAD, OTTAWA ON.

SHEET TITLE:
SITE PLAN

DRAWN BY: A.L.	CHECKED BY: S.J.L
PLOT DATE: 2021.05.25	PROJECT DATE: 2020.07.07
JOB NUMBER: SL-865-17	SCALE: AS SHOWN

SHEET NUMBER:
A1.0

APPLICATION No. D07-12-20-0205

PLAN # 17864