david schaeffer engineering ltd

120 Iber Road, Suite 103
Ottawa, Ontario K2S 1E9
Tel. (613)836-0856
Fax (613) 836-7183
www.DSEL.ca

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES

FOR

TORGAN GROUP DEVELOPMENT DUFORD AND ST. JOSEPH

CITY OF OTTAWA

PROJECT NO.: 16-897

AUGUST 2017 – REV 1

ASSESSMENT OF ADEQUACY OF PUBLIC SERVICES
FOR
TORGAN GROUP DEVELOPMENT

DUFORD AND ST. JOSEPH

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FOR
TORGAN GROUP DEVELOPMENT
DUFORD AND ST. JOSEPH
AUGUST 2017 – REV 1

CITY OF OTTAWA
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1.0 INTRODUCTION

David Schaeffer Engineering Limited (DSEL) has been retained to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-law Amendment (ZBLA) of a contemplated mixed use development at the south west corner of Duford Drive and St. Joseph Boulevard.

The subject property is located within the City of Ottawa urban boundary, in the Orleans ward. As illustrated in ***Figure 1***, the subject property is located at the south west corner of the intersection of Duford Drive, Place D'Orleans Drive and St. Joseph Boulevard. Comprised of a single parcel of land, the subject property measures approximately ***0.27ha*** and is zoned as Arterial Main Street (AM3).

Figure 1: Site Location

The proposed ZBLA would allow for the development of a 12-storey residential /commercial building fronting onto St. Joseph Boulevard. The contemplated development would include approximately 366m^2 of ground-level commercial space, a 275m^2 restaurant and 3 storeys of underground parking, with access from St. Joseph Boulevard. The residential component is comprised of approximately ***144 units***. A copy of the conceptual site plan is included in ***Drawings/Figures***.

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

1.1 Existing Conditions

The site consists of grassy undeveloped lands that contain a 450mm sanitary sewer and a 250mm watermain that bisect the site from Duford Drive to St. Joseph Boulevard. Overhead hydro and telecommunication wires exist along the St. Joseph Boulevard edge of the property, and anchors from these utility poles extend into the site. Extreme slopes (>10%) exist on Duford Drive and on the subject site.

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

St. Joseph Boulevard

- A 600mm diameter watermain exists within the St. Joseph Boulevard right-of-way
- A 400mm diameter watermain exists within the St. Joseph Boulevard right-of-way
- A 450mm diameter sanitary sewer exists within the St. Joseph Boulevard right-of-way
- A 250mm diameter sanitary sewer exists within the St. Joseph Boulevard right-of-way
- A 675mm diameter storm sewer exists within the northern side of the St. Joseph Boulevard right-of-way
- A 300mm diameter storm sewer exists at the corner of St, Joseph Boulevard and Duford Drive, which connects to the 600mm storm sewer within Duford Drive.
- A fire hydrant exists on the south side of St. Joseph Boulevard, approximately 30m from the subject property

Duford Drive

- A 250mm diameter watermain exists within the Duford Drive right-of-way
- A 450mm sanitary sewer exists within the Duford Drive right-of-way
- A 600mm storm sewer exists within the Duford Drive right-of-way

1.2 Required Permits / Approvals

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

The subject property contains existing trees. Development, which may require removal of existing trees, may be subject to the City of Ottawa Urban Tree Conservation By-law No. 2009-200.

The contemplated development is a single parcel of land that is not industrial and would outlet to a storm sewer. As a result, the stormwater management system is exempt from sections 53(1) and (3) of the Ontario Water Resources Act under Ontario Regulation 525/98.

It is contemplated to re-locate the existing sanitary and watermain bisecting the subject site to the City right-of-ways along Duford Drive and St. Joseph Boulevard. The relocation of the existing sanitary sewer will be subject to an MOECC ECA.

1.3 Pre-consultation

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

2.0 GUIDELINES, PREVIOUS STUDIES, AND REPORTS

2.1 Existing Studies, Guidelines, and Reports

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

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

- **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*)

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

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

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

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

3.0 WATER SUPPLY SERVICING

3.1 Existing Water Supply Services

The subject property lies within the City of Ottawa 2E pressure zone as shown by the Pressure Zone map in ***Appendix B***. A 250mm watermain exists from Duford Drive to St. Joseph Boulevard that bisects the subject property.

A local 600mm diameter watermain exists within the St. Joseph Boulevard right-of-way that services the 2E pressure zone. A 250mm diameter watermain exists within the Duford Drive right-of-way, which bisects the subject property and connects to the 600mm diameter watermain within St. Joseph Boulevard. Existing services in the surrounding areas are shown by the City Water Distribution Mapping in ***Appendix B***.

3.2 Water Supply Servicing Design

In accordance with City of Ottawa technical bulletin ISDTB-2014-02, redundant service connections are required due to an anticipated design flow of greater than 50 m^3/day. It is anticipated that the contemplated development will be serviced via a dual connection to the existing 250mm diameter watermain within Duford Drive. A valve would be placed between the two connections to allow for isolation of a single service in the event of a watermain disruption.

The 400mm watermain within St. Joseph Boulevard does not service the 2E pressure zone. In addition, the City of Ottawa does not typically support connections to large watermains such as the 600mm within St. Joseph Boulevard.

The existing 250mm watermain that bisects the site is contemplated to be rerouted around the subject property from Duford Drive to St. Joseph Boulevard through the Duford Drive right-of-way. A detailed design of the proposed relocation will be submitted for City approval during the site plan control process.

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

Table 1
Water Supply Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Residential Average Daily Demand	350 L/d/P
Residential Maximum Daily Demand	3.6 x Average Daily *
Residential Maximum Hourly	5.4 x Average Daily *
Restaurant Demand	125 L/seat/day
Commercial Retail	2.5 L/m^2/d
Commercial Office	75 L/9.3m^2/d
Commercial Maximum Daily Demand	1.5 x avg. day
Commercial Maximum Hour Demand	1.8 x max. day
Minimum Watermain Size	150mm diameter
Minimum Depth of Cover	2.4m from top of watermain to finished grade
During normal operating conditions desired operating pressure is within	350kPa and 480kPa
During normal operating conditions pressure must not drop below	275kPa
During normal operating conditions pressure must not exceed	552kPa
During fire flow operating pressure must not drop below	140kPa

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

Table 2 summarizes the anticipated water supply demand and boundary conditions for the contemplated development based on the ***Water Supply Guidelines***.

Table 2
Water Demand and Boundary Conditions
Proposed Conditions

Design Parameter	Anticipated Demand[1] (L/min)	Boundary Condition[2] (m H_2O / kPa)	
Average Daily Demand	62.9	56.6	555.0
Max Day + Fire Flow (10,000L/min)	10,224.5	52.5	515.0
Max Day + Fire Flow (17,000L/min)	17,224.5	50.1	491.6
Peak Hour	337.1	52.4	513.7

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 75m. See ***Appendix B.***

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 ***FUS*** method, a conservative estimation of fire flow has been established for the contemplated 12-storey building. A fire flow of ***14,000 L/min*** was estimated using the assumptions provided by the Architect, see ***Appendix A*** for correspondence. These assumptions are summarized below:

- Type of construction – Non-Combustible Construction
- Occupancy type –Limited Combustible
- Sprinkler Protection – Sprinklered System

The City of Ottawa was contacted to obtain boundary conditions associated with the estimated water demand as indicated in the boundary request correspondence included in ***Appendix A***.

The City provided both the anticipated minimum and maximum water pressures, as well as the estimated water pressure during fire flow as indicated by the correspondence in ***Appendix A***. Average Day pressures received from the City of Ottawa exceed the maximum operating conditions; a pressure check is recommended at the time of construction to ensure that pressures are below 552kPa. The Peak Hour pressures fall within the required range identified in ***Table 1***. Based on boundary conditions provided by the City, a fire flow of 17,000L/min is available at pressures of over 140KPa, therefore, the contemplated 14,000 L/min can be accommodated above minimum pressures.

3.3 Water Supply Conclusion

It is contemplated to service the development from the existing 250mm watermain within Duford Drive that bisects the site, which would be rerouted around the subject property.

The anticipated water demand was submitted to the City of Ottawa for establishing boundary conditions. In the Average Day scenario, pressures exceed the maximum allowable pressures, a pressure check should be completed at the time of construction to determine if pressure reducing controls are required. Based on the FUS calculation, the subject site has adequate fire protection.

The contemplated 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 Gloucester Collector Sewer catchment area, as shown by the Trunk Sanitary Sewers and Collection Areas map included in ***Appendix C***. The existing 450mm diameter sanitary sewer that bisects the site from Duford Drive to St. Joseph Boulevard is available to service the contemplated development.

The existing 450mm diameter sanitary sewer is currently draining an area of approximately 138 Ha. The City of Ottawa provided a design flow of approximately ***130L/s*** in the existing sanitary sewer at the subject site, see correspondence with the City of Ottawa in ***Appendix C.***

4.2 Wastewater Design

It is anticipated that the contemplated development will be serviced via a connection to the existing 450mm sanitary sewer within Duford Drive that currently bisects the subject property. This sanitary sewer will be rerouted around the subject property from Duford Drive to St. Joseph Boulevard through the Duford Drive right-of-way.

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

Table 3
Wastewater Design Criteria

Design Parameter	Value
Residential Average Apartment	1.8 P/unit
Average Daily Demand	350 L/d/P
Peaking Factor	Harmon's Peaking Factor. Max 4.0, Min 2.0
Commercial Floor Space	5 L/m^2/d
Commercial Office Space	75 L/9.3m^2/d
Restaurant	125 L/seat/d
Infiltration and Inflow Allowance	0.28L/s/ha
Commercial Peaking Factor	1.50 per City of Ottawa Sewer Design Guidelines Appendix 4B
Sanitary sewers are to be sized employing the Manning's Equation	$Q = \frac{1}{n} AR^{2/3} S^{1/2}$
Minimum Sewer Size	250mm diameter
Minimum Manning's 'n'	0.013
Minimum Depth of Cover	2.5m from crown of sewer to grade
Minimum Full Flowing Velocity	0.6m/s
Maximum Full Flowing Velocity	3.0m/s
Extracted from Sections 4 and 6 of the City of Ottawa Sewer Design Guidelines, October 2012.	

Table 4 demonstrates the anticipated peak flow from the contemplated development. See ***Appendix C*** for associated calculations.

Table 4
Summary of Estimated Peak Wastewater Flow

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	1.09
Estimated Peak Dry Weather Flow	4.21
Estimated Peak Wet Weather Flow	4.29

The estimated sanitary flow based on the concept plan provide in ***Drawings/Figures*** anticipates a peak wet weather flow of ***4.29 L/s***.

A sanitary analysis was conducted for the existing 450mm municipal sanitary sewers located downstream of the subject property adjacent to Place D'Orleans. The capacity analysis includes the ***130 L/s*** provided by the City and the ***4.29 L/s*** from the subject site. The residual capacity within the sewer is approximately ***120.7 L/s***. See ***Appendix C*** for capacity calculation and the as-built of the sanitary sewer analyzed.

4.3 Wastewater Servicing Conclusions

The site is tributary to the Gloucestor Collector sewer; based on the sanitary analysis sufficient capacity is available to accommodate the anticipated ***4.29 L/s*** peak wet weather flow from the contemplated development.

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

5.0 STORMWATER MANAGEMENT

5.1 Existing Stormwater Services

Stormwater runoff from the subject property is tributary to the City of Ottawa sewer system located within the Ottawa Central sub-watershed, which discharges to the Ottawa River. As such, approvals for contemplated development within this area are under the approval authority of the City of Ottawa.

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

The estimated pre-development peak flows for the 2, 5, and 100-year are summarized in ***Table 7***:

Table 5
Summary of Existing Peak Storm Flow Rates

City of Ottawa Design Storm	Estimated Peak Flow Rate (L/s)
2-year	11.5
5-year	15.6
100-year	33.5

5.2 Post-development Stormwater Management Target

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

- Attenuate to an allowable release rate based on a Rational Method Coefficient of 0.20, employing the City of Ottawa IDF parameters for a 5-year storm with a calculated time of concentration equal to or greater than 10 minutes;
- Control all storms up to and including the City of Ottawa 100-year design event are to be attenuated on site;
- Based on consultation with the RVCA, stormwater quality controls are not required; correspondence with the RVCA is included in ***Appendix A***.

5.3 Proposed Stormwater Management System

It is contemplated that the stormwater outlet for the development will be to the 300mm diameter storm sewer within St. Joseph Boulevard. Uncontrolled flow will discharge to catch basins connected to the 675mm and 300mm storm sewers within St. Joseph Boulevard.

To meet the stormwater objectives the contemplated development may contain a combination of roof top flow attenuation along with cistern storage. ***Table 6*** estimates post-development flow rates assuming ***23%*** of the area will be uncontrolled. These areas will be compensated for in areas with flow attenuation controls.

Table 6
Stormwater Flow Rate Summary

Control Area	5-Year Release Rate	5-Year Storage	100-Year Release Rate	100-Year Storage
	(L/s)	(m^3)	(L/s)	(m^3)
Unattenuated Areas	4.3	0.0	9.3	0.0
Attenuated Areas	3.4	50.8	6.3	95.6
Total	**7.7**	**50.8**	**15.6**	**95.6**

It is anticipated that approximately ***95.6 m³*** of storage will be required on site to attenuate flow to the established release rate of ***15.6 L/s***; storage calculations are contained within ***Appendix D***.

5.4 Stormwater Servicing Conclusions

Post development stormwater runoff will be required to be restricted to the allowable target release rate for storm events up to and including the 100-year storm in accordance with City of Ottawa ***City Standards***. The post-development allowable release rate was calculated as ***15.6 L/s***. It is estimated that ***95.6 m³*** will be required to meet this release rate.

Based on consultation with the RVCA, stormwater quality controls are not required since runoff from the development would be primarily from the rooftop and landscape areas, and there is no contemplated surface parking.

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

6.0 UTILITIES

Gas and hydro services currently exist along the north side of St. Joseph Boulevard. There is also an existing gas line within the south side of Duford Drive and a Bell line within the north side of Duford Drive that runs to the corner of St. Joseph Boulevard. Streetlights exist within the Duford Drive right-of-way, adjacent to the subject site. Utility servicing will be coordinated with the individual utility companies prior to site development.

The contemplated development will need to respect clearances for utility lines as required by the utility company having jurisdiction for the services. Any new services crossing the hydro corridor will require an easement and approval from hydro. Any proposed works within the existing hydro easement will require approval from hydro.

7.0 CONCLUSION AND RECOMMENDATIONS

David Schaeffer Engineering Ltd. (DSEL) has been retained to prepare an Assessment of Adequacy of Public Services report in support of the application for a Zoning By-law Amendment (ZBLA) at the south west corner of Duford Drive and St. Joseph Boulevard. The preceding report outlines the following:

- It is contemplated to relocate the existing watermain and sanitary trunk sewer bisecting the subject site, an ECA submitted through the City of Ottawa transfer of review process will be required for the relocation of the existing trunk sewer;
- Based on boundary conditions provided by the City the existing municipal water infrastructure is capable of providing the contemplated development with water within the City's required pressure range;
- The contemplated development is anticipated to have a peak wet weather flow of ***4.29 L/s***; based on the sanitary analysis conducted the existing municipal sewer infrastructure has sufficient capacity to support the development;
- Based on the ***City Standards***, the contemplated development will be required to attenuate post development flows to an equivalent release rate of ***15.6 L/s*** for all storms up to and including the 100-year storm event;
- It is contemplated that stormwater objectives may be met through storm water retention via roof top and cistern storage, it is anticipated that ***95.6 m^3*** of onsite storage will be required to attenuate flow to the established release rate above;
- Based on consultation with the RVCA, stormwater quality controls are not required for the subject property.

Prepared by,
David Schaeffer Engineering Ltd.

Hannah Pepper

Per: Hannah J. Pepper, EIT.

Reviewed by,
David Schaeffer Engineering Ltd.

2017-08-08 Job # 16-897

Per: Adam D. Fobert, P.Eng.

Prepared by,
David Schaeffer Engineering Ltd.

Per: Steven L. Merrick, P.Eng.

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APPENDIX A

Pre-Consultation

DEVELOPMENT SERVICING STUDY CHECKLIST

16-897 28/03/2017

4.1 General Content		
☐	Executive Summary (for larger reports only).	N/A
☒	Date and revision number of the report.	Report Cover Sheet
☒	Location map and plan showing municipal address, boundary, and layout of proposed development.	Drawings/Figures
☒	Plan showing the site and location of all existing services.	Figure 1
☒	Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.	Section 1.0
☒	Summary of Pre-consultation Meetings with City and other approval agencies.	Section 1.3
☒	Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.	Section 2.1
☒	Statement of objectives and servicing criteria.	Section 1.0
☒	Identification of existing and proposed infrastructure available in the immediate area.	Sections 3.1, 4.1, 5.1
☐	Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).	N/A
☐	Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.	N/A
☐	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 1.4
☐	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	N/A

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

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

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

4.3 Development Servicing Report: Wastewater

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

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

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

4.4 Development Servicing Report: Stormwater Checklist

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

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

☒	Descriptions of how the conveyance and storage capacity will be achieved for the development.	Section 5.3
☐	100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.	N/A
☐	Inclusion of hydraulic analysis including hydraulic grade line elevations.	N/A
☒	Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.	Section 6.0
☐	Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.	N/A
☐	Identification of fill constraints related to floodplain and geotechnical investigation.	N/A

4.5 Approval and Permit Requirements: Checklist

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

4.6 Conclusion Checklist

☒	Clearly stated conclusions and recommendations	Section 7.0
☐	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

Hannah Pepper

Subject: FW: Corner of St. Joseph and Duford - Boundary Condition Request

From: Steve Merrick
Sent: March 27, 2017 1:15 PM
To: Burda, Dave <Dave.Burda@ottawa.ca>
Cc: Hannah Pepper <HPepper@dsel.ca>; Belan, Steve <Steve.Belan@ottawa.ca>
Subject: RE: Corner of St. Joseph and Duford - Boundary Condition Request

Hi Dave,

I understand that you spoke with Adam Fobert during the pre-consultation regarding the capacity within the adjacent 450mm sanitary trunk sewer. We can coordinate directly with Eric Touisgnant or, if you rather, forward on the below information for him to complete his analysis.

The contemplated development is located at the south-west corner of the St. Joseph and Duford Dr and consists of a twelve storey commercial and residential building with 144 residential units, 366m^2 of retail and 275m^2 restaurant space. We have calculated the wastewater discharge from the site as per the City of Ottawa sewer design guidelines, see Table 1 below:

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	1.09
Estimated Peak Dry Weather Flow	4.21
Estimated Peak Wet Weather Flow	4.29

I understand that the subject site was contemplated in the construction of the adjacent storm and sanitary sewers. I understand the sanitary contributions are most likely higher than originally contemplated, we hope that City can review the increase in flow to ensure there will be no negative impacts to the sanitary sewer capacity.

Feel free to call to discuss.

Thanks,

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

DSEL
david schaeffer engineering ltd.

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

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

From: Burda, Dave [mailto:Dave.Burda@ottawa.ca]
Sent: Thursday, March 16, 2017 11:22 AM
To: Steve Merrick <SMerrick@dsel.ca>
Cc: Hannah Pepper <HPepper@dsel.ca>; Belan, Steve <Steve.Belan@ottawa.ca>
Subject: RE: Corner of St. Joseph and Duford - Boundary Condition Request

Hi Steve

I have attached the boundary condition request for this site.

I will not provide the "maximum flow available at 140 kPa" as instructed below. I have provided BCs for a fire demand of 10,000 l/min (Technical Bulletin ISTDB-2014-02) and 17,000 l/min, respectively. Fire flows exceeding 17,000 l/min will require justification. The residual pressure is well above 20 psi during the two fire flows scenarios simulated for this development.
Feel free to contact me if you have any further questions or inquiries.

Regards

David Burda, C.E.T.,rcsi
Project Manager, Infrastructure Approvals
Development Review, Suburban Services
Planning, Infrastructure and Economic Development Department
City of Ottawa
110 Laurier Avenue West, Ottawa, ON, K1P 1J1
613.580.2424 ext. 27885

From: Steve Merrick [mailto:SMerrick@dsel.ca]
Sent: Thursday, March 09, 2017 3:13 PM
To: Burda, Dave
Cc: Hannah Pepper
Subject: Corner of St. Joseph and Duford - Boundary Condition Request

Hi Dave,

I understand you met with Adam Fobert on the above noted site. We hope you can provide water boundary conditions based on the information below.

1. The development will yield a demand greater than 50m^3/day and, therefore, will be serviced by a dual connection. It is contemplated to provide a dual connection to the existing 250mm diameter watermain within Duford Drive. A valve will be placed between the two connections to allow for isolation of a single service in the event of watermain disruption. We understand it is the City's preference to provide dual connections to separate watermains for further redundancy, however, the 400mm watermain within St. Joseph does not service the 2E pressure and I do not believe the City typically would accept a connection to a vital watermain such as the 610mm within St. Joseph. Please see the attached sketch for the locations of the connection points to the municipal system.

2. The contemplated development consists of a twelve storey commercial and residential building with 144 residential units and three levels of parking. Approximately 366 m^2 retail space, a 275m^2 restaurant and additional parking spaces are contemplated for the ground floor.

3. A summary of the average total demands for the development is as follows:

	L/min	L/s
Avg. Daily	62.9	1.05
Max Day	224.5	3.74
Peak Hour	337.1	5.62

4. As the concept plan is still in the preliminary stages and specific building information is not available, we hope the City can provide the maximum flow available at 140 kPa. An FUS calculation will be provided at the detailed design phase to ensure that adequate fire protection is available.

Feel free to call if you have any questions, look forward to working with you on this project.

Thanks,

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

DSEL
david schaeffer engineering ltd.

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

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

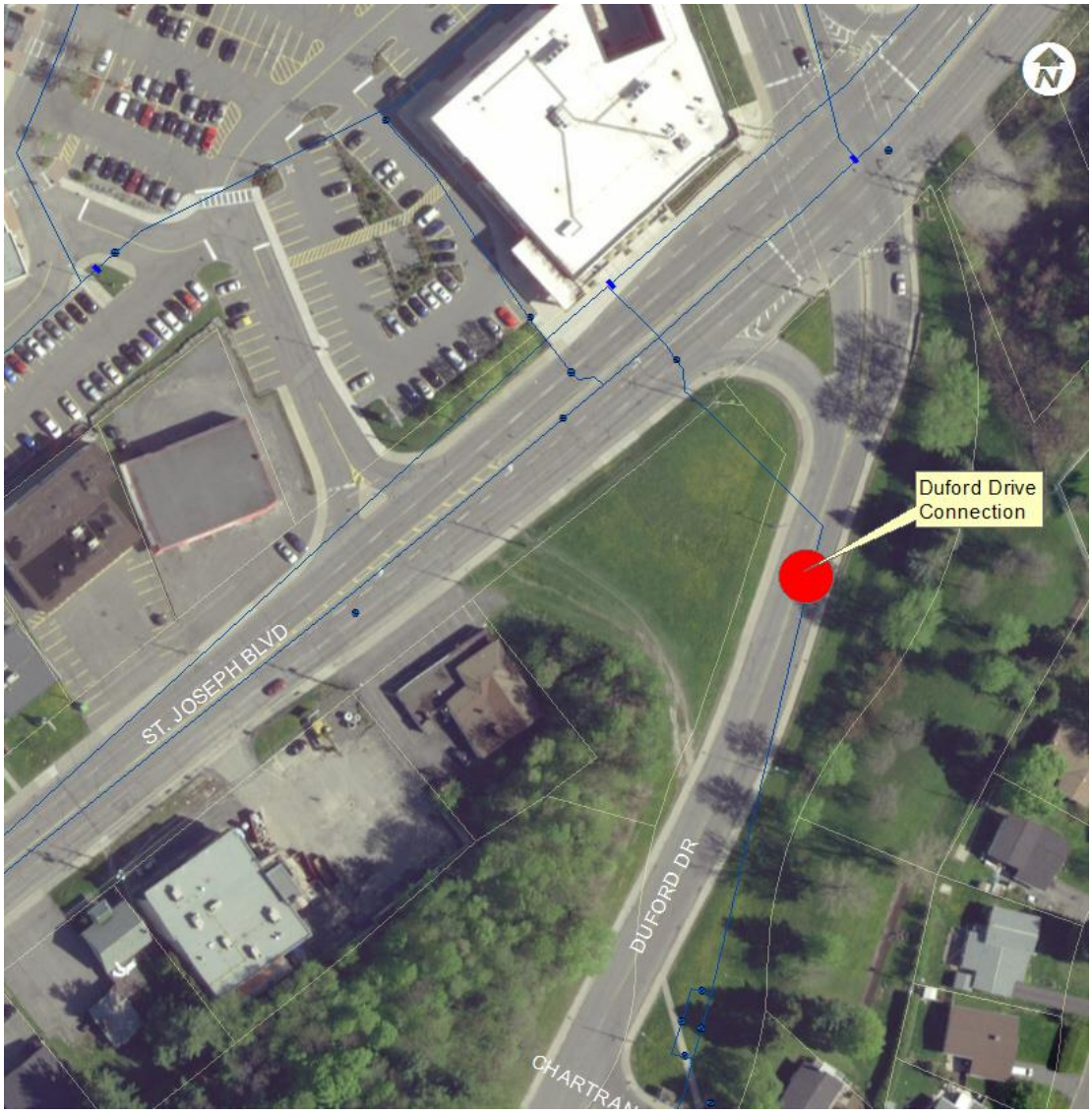
Boundary Condition for Duford at St. Joseph

Information Provided:

Date provided: March 2017

Scenario	Demand	
	L/min	L/s
Average Daily Demand	63	1.1
Maximum Daily Demand	224	3.7
Peak Hour	337	5.6
Fire Flow Demand (10,000 l/min)	10000	166.7
Fire Flow Demand (17,000 l/min)	17000	283.3

Location:



Results:

Connection 1 - Duford Drive

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	131.6	80.5
Peak Hour	127.4	74.5
Max Day plus Fire (10,000 l/min)	127.6	74.7
Max Day plus Fire (17,000 l/min)	125.2	71.3

[1] Ground Elevation = 75 m

Notes:

1) As per the Ontario Building Code in areas that may be occupied, the static pressure at any fixture shall not exceed 552 kPa (80 psi.) Pressure control measures to be considered are as follows, in order of preference:
   a) If possible, systems to be designed to residual pressures of 345 to 552 kPa (50 to 80 psi) in all occupied areas outside of the public right-of-way without special pressure control equipment.
   b) Pressure reducing valves to be installed immediately downstream of the isolation valve in the home/ building, located downstream of the meter so it is owner maintained.

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Hannah Pepper

Subject: FW: Stormwater Quality Controls - Duford and St. Joseph

---

From: Jamie Batchelor [mailto:jamie.batchelor@rvca.ca]
Sent: March 22, 2017 4:20 PM
To: Hannah Pepper <HPepper@dsel.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: RE: Stormwater Quality Controls - Duford and St. Joseph

Hi Hannah,

You are correct. Based on the plans provided, the development will be primarily rooftop area receiving rain water. Given that there is no above ground parking or large drive isles proposed the RVCA would not require water quality control. Just a side note for future reference, the ditch along that stretch of 174 has been identified as part of Brisebois Creek (which has been altered over time). Normally we would request 80% for that stretch if above ground parking and drive isles were proposed.

From: Hannah Pepper [mailto:HPepper@dsel.ca]
Sent: Wednesday, March 22, 2017 11:15 AM
To: Jamie Batchelor <jamie.batchelor@rvca.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: Stormwater Quality Controls - Duford and St. Joseph

Hi Jamie,

Could you please let us know if any stormwater quality controls would be necessary for a contemplated development with the following details?

The property is located at the south west corner of Duford Drive and St. Joseph Boulevard, and would include a 12-storey residential/commercial building. This building would consist of 144 units, a restaurant, commercial space and 3 storeys of underground parking. There would be no surface parking and stormwater storage onsite would be through cistern and rooftop storage.

Stormwater from the subject property would flow to the existing 300mm storm sewer within Duford Drive and then travel 450m within this sewer prior to discharge to the roadside near the on-ramp to Ottawa Regional Road 174, adjacent to Place d'Orleans Drive. Stormwater then travels another 2250m from here before discharging into the Ottawa River. Please see the attached sketch for the flow path.

Runoff from the site would only be from the rooftop and landscape areas and since there is no surface parking, we have anticipated that quality controls will not be necessary. If you could confirm this that would be great.

Thank you,

Hannah Pepper, EIT.
Project Coordinator / Junior Designer

Hannah Pepper

Subject: FW: St. Joseph and Duford Drive - FUS Information
Attachments: Project Areas Sept 2016.pdf

From: Robert Verch [mailto:rverch@rodericklahey.ca]
Sent: March 22, 2017 10:30 AM
To: Hannah Pepper <HPepper@dsel.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: RE: St. Joseph and Duford Drive - FUS Information

Areas are attached. This building would have a construction type of Non-combustible

Rob

From: Hannah Pepper [mailto:HPepper@dsel.ca]
Sent: March-21-17 4:43 PM
To: Robert Verch <rverch@rodericklahey.ca>
Cc: Steve Merrick <SMerrick@dsel.ca>
Subject: St. Joseph and Duford Drive - FUS Information

Hi Rob,

Would you be able to please answer my questions below as best as you can? We are trying to put together some FUS calculations for the site at the corner of St. Joseph Boulevard and Duford Drive, with the Torgan Group.

1) Confirm square footage for the building; a floor by floor breakdown would be great if possible.

2) Confirm construction type (Wood Frame, Ordinary Construction, Non-combustible, Fire Resistive)

Extracted from FUS:

C = coefficient related to the type of construction.
= 1.5 for wood frame construction (structure essentially all combustible).
= 1.0 for ordinary construction (brick or other masonry walls, combustible floor and interior).
= 0.8 for non-combustible construction (unprotected metal structural components, masonry or metal walls).
= 0.6 for fire-resistive construction (fully protected frame, floors, roof).

Fire-Resistive Construction - Any structure that is considered fully protected, having at least 3-hour rated structural members and floors. For example, reinforced concrete or protected steel.

Non-combustible Construction - Any structures having all structural members including walls, columns, piers, beams, girders, trusses, floors, and roofs of non-combustible material and not qualifying as fire-resistive construction. For example, unprotected metal buildings.

Ordinary Construction - Any structure having exterior walls of masonry or such non-combustible material, in which the other structural members, including but not limited to columns, floors, roofs, beams, girders, and joists, are wholly or partly of wood or other combustible material.

Wood Frame Construction - Any structure in which the structural members are wholly or partly of wood or other combustible material and the construction does not qualify as ordinary construction.

3) Confirm if the building will be sprinklered.

Thank you,

Hannah Pepper, EIT.
Project Coordinator / Junior Designer

DSEL
david schaeffer engineering ltd.

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

phone: (613) 836-0856 ext. 569
fax: (613) 836-7183
email: hpepper@DSEL.ca

DSEL
david schaeffer engineering ltd.

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fax: (613) 836-7183
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DUFORD DRIVE BUILDING (September 2016)

LEVEL	GROSS AREA	COMMON AREA	SELLABLE AREA	EFFICIENCY	1 BED UNIT	2 BED UNIT	TOTAL
Parking Level P3	12,818 sq. ft.	Parking spaces = 33		Bike spaces = 10	Storage Lockers = 20		
Parking Level P2	22,910 sq. ft.	Parking spaces = 57		Bike spaces = 10	Storage Lockers = 30		
Parking Level P1	22,910 sq. ft.	Parking spaces = 57		Bike spaces = 10	Storage Lockers = 30		
1st FLOOR PARKING	8,984 sq. ft.	Parking spaces = 25		Bike spaces = 10	Storage Lockers = 20		
1st FLOOR (REMANDER)	14,085 sq. ft.	14,085 sq. ft.	14,085 sq. ft.	69.8%	0	0	0
2nd FLOOR	14,998 sq. ft.	8,798 sq. ft.	6,200 sq. ft.	41.0%	4	3	7
3rd FLOOR	14,788 sq. ft.	2,472 sq. ft.	12,316 sq. ft.	83.3%	7	4	11
4th FLOOR	14,587 sq. ft.	3,721 sq. ft.	10,866 sq. ft.	74.5%	7	5	12
5th FLOOR	14,587 sq. ft.	2,472 sq. ft.	12,115 sq. ft.	83.1%	7	6	13
6th FLOOR	14,587 sq. ft.	2,472 sq. ft.	12,115 sq. ft.	83.1%	7	6	13
7th FLOOR	14,587 sq. ft.	2,472 sq. ft.	12,115 sq. ft.	83.1%	7	6	13
8th FLOOR	14,587 sq. ft.	2,472 sq. ft.	12,115 sq. ft.	83.1%	7	6	13
9th FLOOR	14,587 sq. ft.	2,472 sq. ft.	12,115 sq. ft.	83.1%	7	6	13
10th FLOOR	14,587 sq. ft.	2,472 sq. ft.	12,115 sq. ft.	83.1%	7	6	13
11th FLOOR	14,587 sq. ft.	2,472 sq. ft.	12,115 sq. ft.	83.1%	7	6	13
12th FLOOR	12,638 sq. ft.	2,441 sq. ft.	10,197 sq. ft.	80.7%	0	10	10
13th FLOOR	12,638 sq. ft.	2,441 sq. ft.	10,197 sq. ft.	80.7%	0	10	10
TOTAL				79.2%	150	150	150

APPENDIX B

Water Supply

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

Domestic Demand

Type of Housing	Per / Unit	Units	Pop
Single Family	3.4		0
Semi-detached	2.7		0
Townhouse	2.7		0
Apartment			0
Bachelor	1.4		0
1 Bedroom	1.4	69	97
2 Bedroom	2.1	75	158
3 Bedroom	3.1		0
Average	1.8		0

Type of Housing	Per/Bed	Beds	Pop
Boarding*	1		0

	Pop	Avg. Daily		Max Day		Peak Hour	
		m^3/d	L/min	m^3/d	L/min	m^3/d	L/min
Total Domestic Demand	255	89.3	62.0	321.3	223.1	482.0	334.7

Institutional / Commercial / Industrial Demand

Property Type	Unit Rate		Units	Avg. Daily m^3/d	Avg. Daily L/min	Max Day m^3/d	Max Day L/min	Peak Hour m^3/d	Peak Hour L/min
Water Closets**	150.0	L/hr		0.00	0.0	0.0	0.0	0.0	0.0
Restaurant	125.0	L/seat/d	80	1.08	0.7	1.6	1.1	2.9	2.0
Commercial floor space***	5.0	$L/m^2/d$	366	0.20	0.1	0.3	0.2	0.5	0.4
Office	75	$L/9.3m^2/d$		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Light	35,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Industrial - Heavy	55,000	L/gross ha/d		0.00	0.0	0.0	0.0	0.0	0.0
Total I/CI Demand				1.3	0.9	1.9	1.3	3.4	2.4
Total Demand				**90.5**	**62.9**	**323.2**	**224.5**	**485.4**	**337.1**

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines
** Water closets demand of 150 L/hour from Appendix 4-A of the Sewer design guidelines, assuming a 12 hour operation
***Assuming a 12 hour commercial operation

Torgan Group Development
FUS-Fire Flow Demand

Fire Flow Estimation per Fire Underwriters Survey

Water Supply For Public Fire Protection - 1999

Fire Flow Required

1. Base Requirement

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

Type of Construction: Non-Combustible Construction

C	0.8		*Type of Construction Coefficient per FUS Part II, Section 1*
A	18100.0	m^2	*Total floor area based on FUS Part II section 1*

Fire Flow	23678.4	L/min	
	24000.0	**L/min**	*rounded to the nearest 1,000 L/min*

Adjustments

2. Reduction for Occupancy Type

Limited Combustible	-15%	
Fire Flow	**20400.0**	**L/min**

3. Reduction for Sprinkler Protection

Sprinklered	-50%	
Reduction	**-10200**	**L/min**

4. Increase for Separation Distance

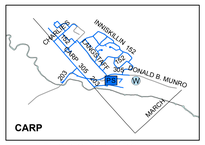
N	30.1m-45m	5%	
S	>45m	0%	
E	>45m	0%	
W	10.1m-20m	15%	
	% Increase	**20%**	*value not to exceed 75% per FUS Part II, Section 4*
	Increase	**4080.0**	**L/min**

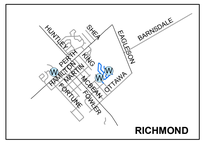
Total Fire Flow

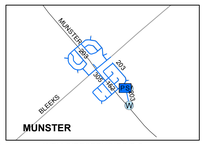
Fire Flow	14280.0	L/min	*fire flow not to exceed 45,000 L/min nor be less than 2,000 L/min per FUS Section*
	14000.0	**L/min**	*rounded to the nearest 1,000 L/min*

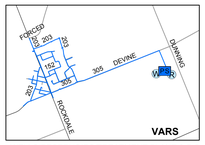
Notes:
-Type of construction, Occupancy Type and Sprinkler Protection information provided by BJH & Associates Architects Inc.
-Calculations based on Fire Underwriters Survey - Part II

City of Ottawa - Water Distribution System
Facilities & Feedermains



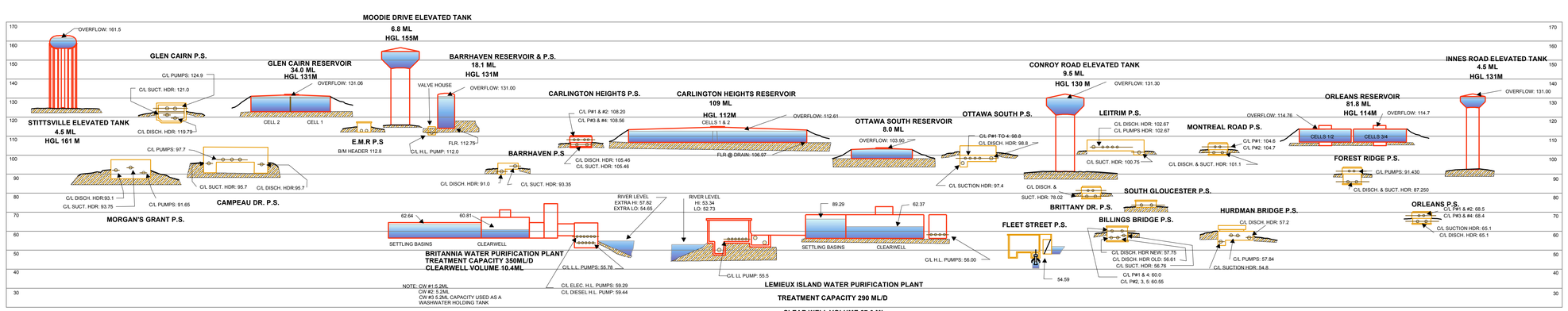






ORLEANS P.S.
FOREST RIDGE P.S
Ogilvie Rd. Backup P.S.
ORLEANS RES.
MONTREAL ROAD P.S.
BRITTANY DRIVE P.S.
FLEET STREET P.S.
LEMIEUX ISLAND PURIFICATION PLANT & P.S. & RES.
INNES RD ELEVATED TANK
Innes Rd/BearBrook Rd Backup P.S.
HURDMAN P.S.
Innes Rd Backup P.S.
BRITANNIA PURIFICATION PLANT & P.S. & RES.
BILLINGS BRIDGE P.S.
MORGAN'S GRANT P.S.
CAMPEAU DR. P.S.
ENERGY MINES & RESOURCES P.S.
CARLINGTON HEIGHTS P.S. & RES.
CONROY RD ELEVATED TANK
SOUTH GLOUCESTER P.S. (INACTIVE)
LEITRIM P.S.
GLEN CAIRN P.S. & RES
BARRHAVEN P.S.
Merivale Rd. Backup P.S.
OTTAWA SOUTH P.S & RES.
STITTSVILLE ELEVATED TANK
BARRHAVEN RES. & P.S.
Abbott/Iber St. Backup P.S.
MOODIE ELEVATED TANK
Shadow Ridge
SHADOW RIDGE P.S. & WELLS
SHADOW RIDGE WELL

1E 1W 2C 2E 2W 3C 3W 4C MONT ME MG EMR BARR SHAD



Legend

Water System Structure

- Pump Station
- Backup Pump Station
- Water Treatment Plant
- Well
- Elevated Tank
- Reservoir

WATERMAINS

Priority, Internal Diameter

- Backbone 1524mm - 1981mm
- Backbone 1067mm - 1372mm
- Backbone 610mm - 914mm
- Backbone 406mm - 508mm
- Backbone 152mm - 305mm
- Distribution 1676mm - 1981mm
- Distribution 1067mm - 1372mm
- Distribution 610mm - 914mm
- Distribution 406mm - 508mm
- Distribution 305mm - 381mm

PRESSURE ZONES

- 1E
- 1W
- 2C
- 2E
- 2W
- 3C
- 3W
- 4C
- BARR
- EMR
- ME
- MG
- MONT
- SHAD

N W E S

Ottawa

Infrastructure Services & Community Sustainability
Infrastructure Services

0 1,000 2,000 4,000 6,000

Meters

FIGURE 1-1

DRAWN BY: D. HESS

DATE: 03 Feb 2015

APPENDIX C

Wastewater Collection

Torgan Group
Proposed Development

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

Site Area 0.27 **ha**

Extraneous Flow Allowances

Infiltration / Inflow **0.08 L/s**

Domestic Contributions

Unit Type	**Unit Rate**	**Units**	**Pop**
Single Family	3.4		0
Semi-detached and duplex	2.7		0
Townhouse	2.7		0
Stacked Townhouse (Duplex)	2.3		0
Apartment			
Bachelor	1.4		0
1 Bedroom	1.4	69	97
2 Bedroom	2.1	75	158
3 Bedroom	3.1		0
Average	1.8		0

Type of Housing	**Per/Bed**	**Beds**	**Pop**
Boarding*	1		0

Total Pop **255**

Average Domestic Flow **1.03 L/s**

Peaking Factor **4.00**

Peak Domestic Flow **4.13 L/s**

Institutional / Commercial / Industrial Contributions

Property Type	**Unit Rate**		**No. of Units**	**Avg Wastewater (L/s)**
Water Closets **	150	L/hr		0.00
Restaurant***	125	L/seat/d	80	0.01
Commercial floor space*	5	$L/m^2/d$	366	0.04
Hospitals	900	L/bed/d		0.00
School	70	L/student/d		0.00
Industrial - Light**	35,000	L/gross ha/d		0.00
Industrial - Heavy**	55,000	L/gross ha/d		0.00

Average I/C/I Flow **0.05**

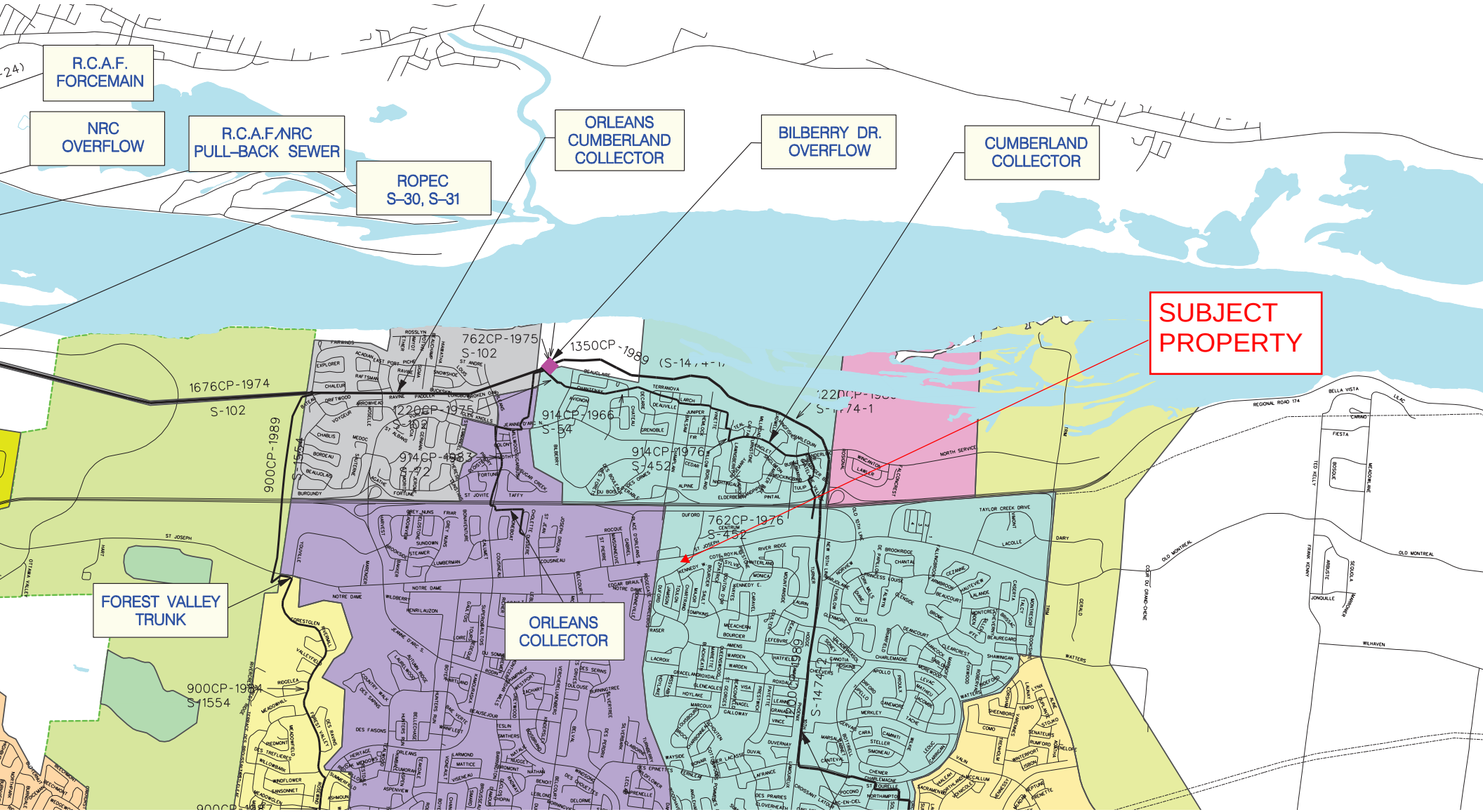
Peak Institutional / Commercial Flow 0.08
Peak Industrial Flow** 0.00
Peak I/C/I Flow **0.08**

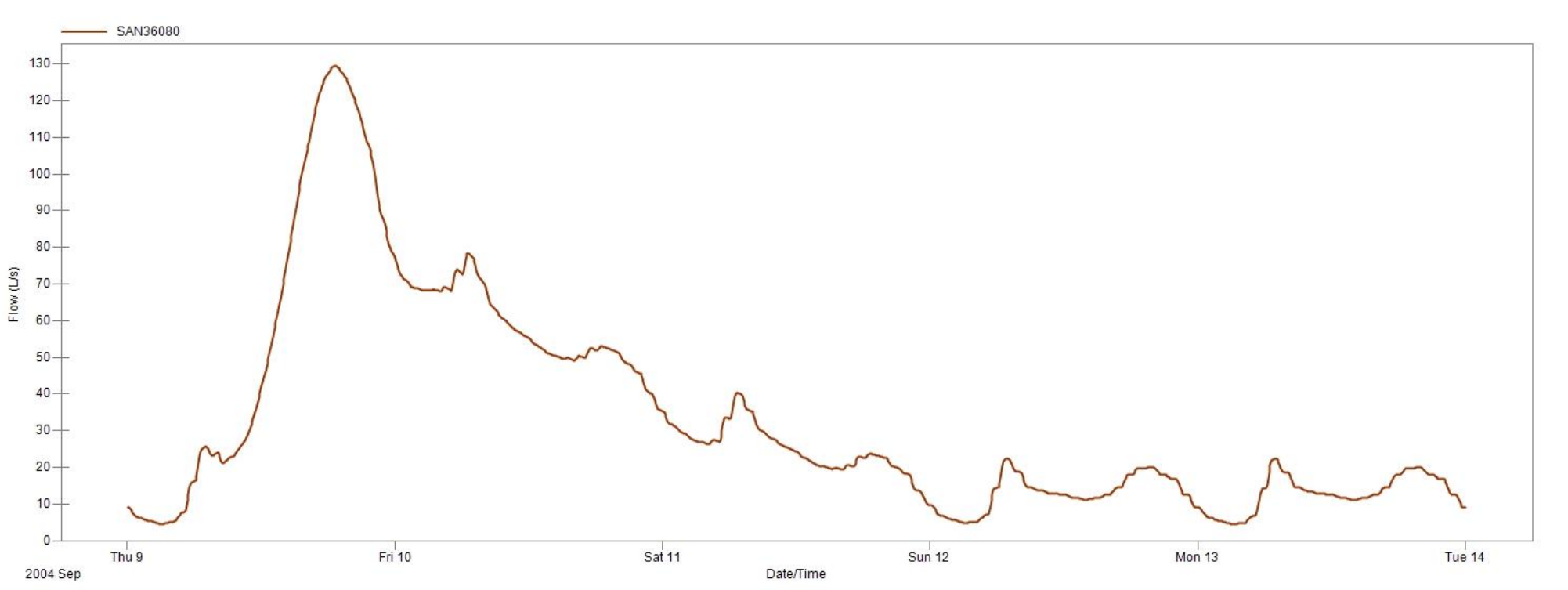
** assuming a 12 hour commercial operation*
*** peak industrial flow per City of Ottawa Sewer Design Guidelines Appendix 4B*

Total Estimated Average Dry Weather Flow Rate	**1.09 L/s**
Total Estimated Peak Dry Weather Flow Rate	**4.21 L/s**
Total Estimated Peak Wet Weather Flow Rate	**4.29 L/s**

* Based on a daily demand of 200L/day per person as identified by Appendix 4-A of the Sewer design guidelines
** Water closets demand of 150 L/hour from Appendix 4-A of the Sewer design guidelines, assuming a 12 hour operation
***Assuming 1 seat is approximately equal to 9.3 m²

TRUNK SANITARY SEWERS AND COLLECTION AREAS MAP




SAN36080
Flow (L/s)
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Thu 9
Fri 10
Sat 11
Sun 12
Mon 13
Tue 14
2004 Sep
Date/Time

Steve Merrick

From: Burda, Dave <Dave.Burda@ottawa.ca>
Sent: Thursday, March 30, 2017 3:22 PM
To: Steve Merrick
Cc: Hannah Pepper; Belan, Steve
Subject: RE: Corner of St. Joseph and Duford - Boundary Condition Request
Attachments: 2011DesignFlow_San36080.jpg

Hi Steve

A design flow of approximately 130 L/s was computed for the areas upstream of the development in 2011 as part of the City's Wastewater Infrastructure Master Plan (see attached). Can you review the theoretical capacity of a few sanitary sewers downstream of the development and add your findings to the servicablity study? I don't foresee any issues.
Regards

David Burda, C.E.T.,rcsi
Project Manager, Infrastructure Approvals
Development Review, Suburban Services
Planning, Infrastructure and Economic Development Department
City of Ottawa
110 Laurier Avenue West, Ottawa, ON, K1P 1J1
613.580.2424 ext. 27885

From: Steve Merrick [mailto:SMerrick@dsel.ca]
Sent: Monday, March 27, 2017 1:15 PM
To: Burda, Dave <Dave.Burda@ottawa.ca>
Cc: Hannah Pepper <HPepper@dsel.ca>; Belan, Steve <Steve.Belan@ottawa.ca>
Subject: RE: Corner of St. Joseph and Duford - Boundary Condition Request

Hi Dave,

I understand that you spoke with Adam Fobert during the pre-consultation regarding the capacity within the adjacent 450mm sanitary trunk sewer. We can coordinate directly with Eric Touisgnant or, if you rather, forward on the below information for him to complete his analysis.

The contemplated development is located at the south-west corner of the St. Joseph and Duford Dr and consists of a twelve storey commercial and residential building with 144 residential units, 366m^2 of retail and 275m^2 restaurant space. We have calculated the wastewater discharge from the site as per the City of Ottawa sewer design guidelines, see Table 1 below:

Design Parameter	Total Flow (L/s)
Estimated Average Dry Weather Flow	1.09
Estimated Peak Dry Weather Flow	4.21
Estimated Peak Wet Weather Flow	4.29

I understand that the subject site was contemplated in the construction of the adjacent storm and sanitary sewers. I understand the sanitary contributions are most likely higher than originally contemplated, we hope that City can review the increase in flow to ensure there will be no negative impacts to the sanitary sewer capacity.

Feel free to call to discuss.

Thanks,

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

DSEL
david schaeffer engineering ltd.

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

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

From: Burda, Dave [mailto:Dave.Burda@ottawa.ca]
Sent: Thursday, March 16, 2017 11:22 AM
To: Steve Merrick <SMerrick@dsel.ca>
Cc: Hannah Pepper <HPepper@dsel.ca>; Belan, Steve <Steve.Belan@ottawa.ca>
Subject: RE: Corner of St. Joseph and Duford - Boundary Condition Request

Hi Steve

I have attached the boundary condition request for this site.

I will not provide the "maximum flow available at 140 kPa" as instructed below. I have provided BCs for a fire demand of 10,000 l/min (Technical Bulletin ISTDB-2014-02) and 17,000 l/min, respectively. Fire flows exceeding 17,000 l/min

will require justification. The residual pressure is well above 20 psi during the two fire flows scenarios simulated for this development.
Feel free to contact me if you have any further questions or inquiries.

Regards

David Burda, C.E.T.,rcsi
Project Manager, Infrastructure Approvals
Development Review, Suburban Services
Planning, Infrastructure and Economic Development Department
City of Ottawa
110 Laurier Avenue West, Ottawa, ON, K1P 1J1
613.580.2424 ext. 27885

From: Steve Merrick [mailto:SMerrick@dsel.ca]
Sent: Thursday, March 09, 2017 3:13 PM
To: Burda, Dave
Cc: Hannah Pepper
Subject: Corner of St. Joseph and Duford - Boundary Condition Request

Hi Dave,

I understand you met with Adam Fobert on the above noted site. We hope you can provide water boundary conditions based on the information below.

1. The development will yield a demand greater than 50m^3/day and, therefore, will be serviced by a dual connection. It is contemplated to provide a dual connection to the existing 250mm diameter watermain within Duford Drive. A valve will be placed between the two connections to allow for isolation of a single service in the event of watermain disruption. We understand it is the City's preference to provide dual connections to separate watermains for further redundancy, however, the 400mm watermain within St. Joseph does not service the 2E pressure and I do not believe the City typically would accept a connection to a vital watermain such as the 610mm within St. Joseph. Please see the attached sketch for the locations of the connection points to the municipal system.

2. The contemplated development consists of a twelve storey commercial and residential building with 144 residential units and three levels of parking. Approximately 366 m^2 retail space, a 275m^2 restaurant and additional parking spaces are contemplated for the ground floor.

3. A summary of the average total demands for the development is as follows:

	L/min	L/s
Avg. Daily	62.9	1.05
Max Day	224.5	3.74
Peak Hour	337.1	5.62

4. As the concept plan is still in the preliminary stages and specific building information is not available, we hope the City can provide the maximum flow available at 140 kPa. An FUS calculation will be provided at the detailed design phase to ensure that adequate fire protection is available.

Feel free to call if you have any questions, look forward to working with you on this project.

Thanks,

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

DSEL
david schaeffer engineering ltd.

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

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

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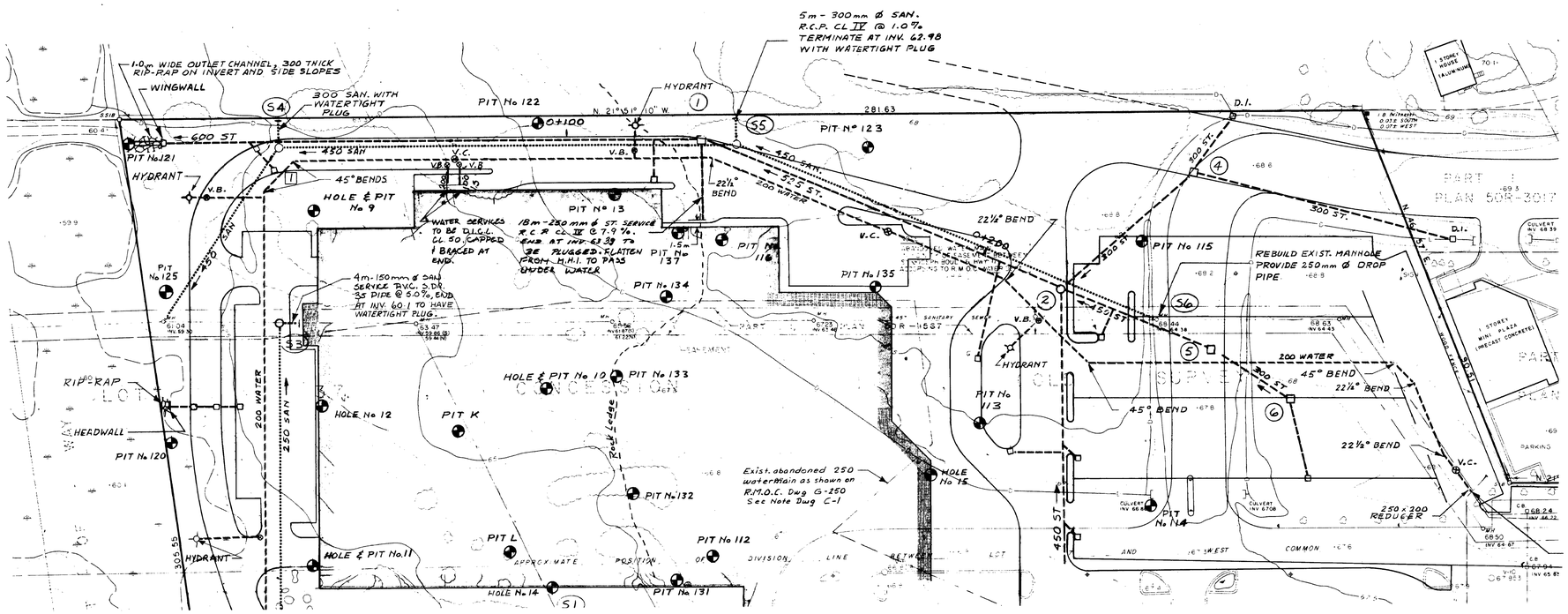

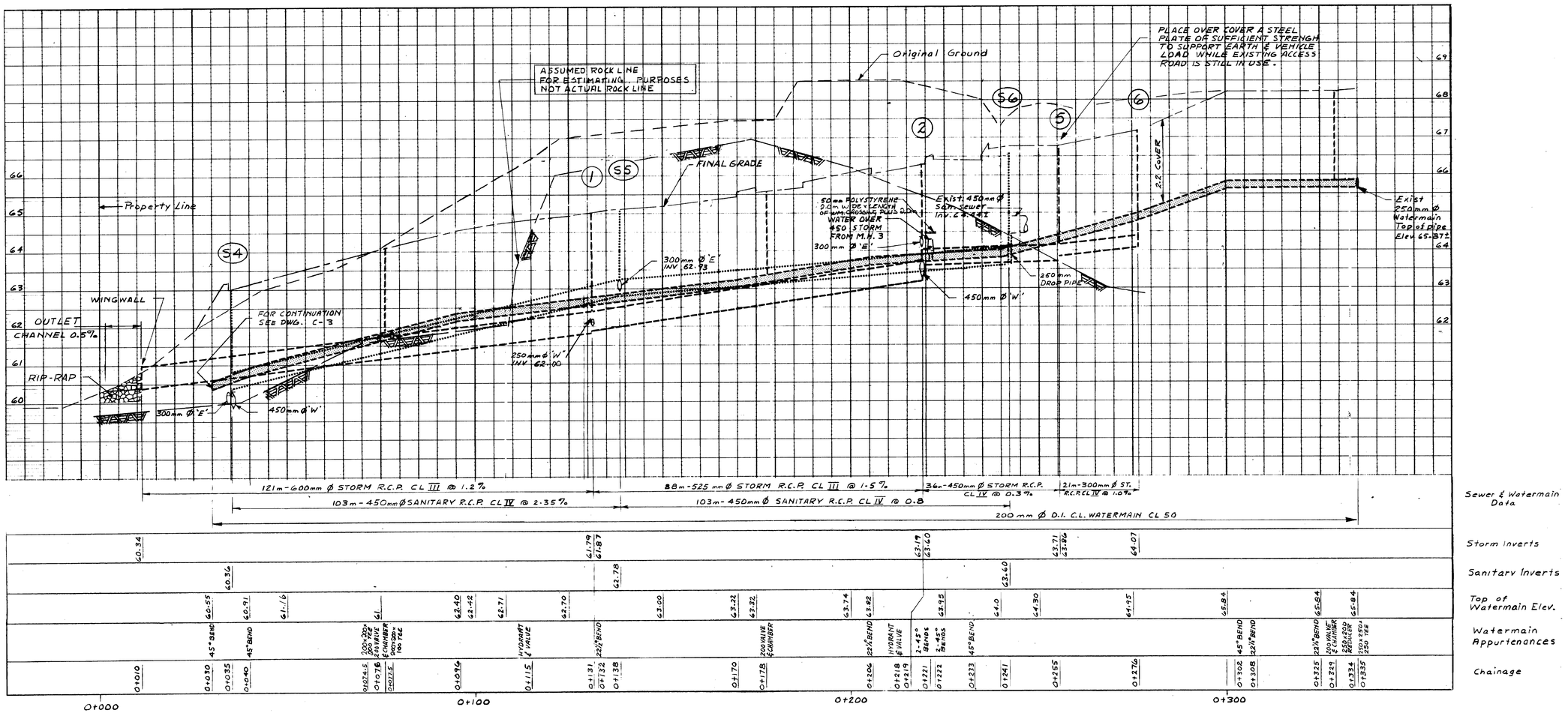

NOTE
- FOR LEGEND AND NOTES SEE DRAWING N° C-1

no	revision	date	by
3	TENDER ISSUE	APRIL 22/82	J.R.A.
2	ISSUED FOR TENDER	APRIL 6/82	J.R.A.
1	GENERAL REVISIONS	MAR. 26/82	J.R.A.

MURRAY & MURRAY GRIFFITHS & RANKIN
architects & planning consultants
541 Sussex Drive Ottawa K1N 6Z6 Ontario Canada 237-5215

consultant
DeLCan DE LEUW CATHER CANADA LTD
CONSULTING ENGINEERS AND PLANNERS

north point

professional stamp

project title
PHASE - 2
PLACE D'ORLEANS SHOPPING CENTRE
FOR
MARATHON REALTY CO. LTD.

RECEIVED JUN 01 1982

drawing title
PLAN AND PROFILE I
SITE SERVICES

drawn	approved	scales	date
R.N.H.	J.R.A.	H=1:500 V=1:50	MAR. 1982
job no.	drawing no.		revision
8143	C-2		2943

Figured dimensions only should be taken from this drawing. All contractors must visit the site and be responsible for taking and checking all dimensions that relate to this work.

SANITARY SEWER CALCULATION SHEET - EXISTING CONDITIONS

PROJECT: **Torgan Group Development**
LOCATION: **Duford Drive and St. Joseph Boulevard**
FILE REF: **16-897**
DATE: **08-Aug-17**

DESIGN PARAMETERS

Avg. Daily Flow Res.	300	L/p/d	Peak Fact Res. Per Harmons: Min = 2.0, Max =4.0		Infiltration / Inflow	0.28	L/s/ha
Avg. Daily Flow Comm.	17,000	L/ha/d	Peak Fact. Comm.	1	Min. Pipe Velocity	0.60	m/s full flowing
Avg. Daily Flow Instit.	10,000	L/ha/d	Peak Fact. Instit.	1	Max. Pipe Velocity	3.00	m/s full flowing
Avg. Daily Flow Indust.	10,000	L/ha/d	Peak Fact. Indust. per MOE graph		Mannings N	0.013	

Location			Residential Area and Population									Commercial		Institutional		Industrial		Infiltration				Pipe Data									
Area ID	Up	Down	Area	Number of Units 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	Qresidual
									Area	Pop.																						
			(ha)	Singles	Semi's	Town's	Apt's		(ha)		(-)	(L/s)	(ha)	(ha)	(ha)	(ha)	(ha)	(ha)	(L/s)	(ha)	(ha)	(L/s)	(L/s)	(mm)	(%)	(m)	(m^2)	(m)	(m/s)	(L/s)	(-)	(L/s)
	S6	S5						0.0	0.000	0.0	4.00	0.00		0.00		0.00		0.00	0.0	0.000	0.000	0.000	134.29	450	0.80	103.0	0.159	0.113	1.60	255.0	0.53	120.7
	S5	S4						0.0	0.000	0.0	4.00	0.00		0.00		0.00		0.00	0.0	0.000	0.000	0.000	134.29	450	2.35	103.0	0.159	0.113	2.75	437.1	0.31	302.8

APPENDIX D

Stormwater Management

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

Existing Drainage Charateristics From Internal Site

Area	0.27	ha
C	0.20	Rational Method runoff coefficient
L	58	m
Up Elev	79	m
Dn Elev	71.25	m
Slope	13.4	%
Tc	10.0	min

1) Time of Concentration per Federal Aviation Administration

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

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

Estimated Peak Flow

	2-year	5-year	100-year	
i	76.8	104.2	178.6	mm/hr
Q	11.5	15.6	33.5	L/s

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

Target Flow Rate

Area	0.27	ha
C	0.20	Rational Method runoff coefficient
t_c	10.0	min

	5-year	
i	104.2	mm/hr
Q	15.6	L/s

Estimated Post Development Peak Flow from Unattenuated Areas

Total Area	0.06	ha
C	0.25	Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual}* (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10.0	104.2	4.3	4.3	0.0	0.0	178.6	9.3	9.3	0.0	0.0

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

Estimated Post Development Peak Flow from Attenuated Areas

Total Area	0.21	ha
C	0.90	Rational Method runoff coefficient

	5-year					100-year				
t_c (min)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)	i (mm/hr)	Q_{actual} (L/s)	$Q_{release}$ (L/s)	Q_{stored} (L/s)	V_{stored} (m^3)
10	104.2	54.7	3.3	51.4	30.8	178.6	104.2	6.3	97.8	58.7
15	83.6	43.9	3.3	40.5	36.5	142.9	83.4	6.3	77.0	69.3
20	70.3	36.9	3.3	33.5	40.3	120.0	70.0	6.3	63.6	76.4
25	60.9	32.0	3.3	28.6	42.9	103.8	60.6	6.3	54.2	81.4
30	53.9	28.3	3.3	25.0	44.9	91.9	53.6	6.3	47.3	85.1
35	48.5	25.5	3.3	22.1	46.5	82.6	48.2	6.3	41.8	87.9
40	44.2	23.2	3.3	19.8	47.6	75.1	43.8	6.3	37.5	90.0
45	40.6	21.3	3.4	18.0	48.5	69.1	40.3	6.3	34.0	91.7
50	37.7	19.8	3.4	16.4	49.2	64.0	37.3	6.3	31.0	92.9
55	35.1	18.4	3.4	15.1	49.8	59.6	34.8	6.3	28.5	93.9
60	32.9	17.3	3.4	13.9	50.2	55.9	32.6	6.3	26.3	94.6
65	31.0	16.3	3.4	12.9	50.5	52.6	30.7	6.3	24.4	95.1
70	29.4	15.4	3.4	12.1	50.7	49.8	29.0	6.3	22.7	95.4
75	27.9	14.6	3.4	11.3	50.8	47.3	27.6	6.3	21.2	95.6
80	26.6	13.9	3.4	10.6	50.8	45.0	26.2	6.3	19.9	95.6
85	25.4	13.3	3.4	10.0	50.8	43.0	25.1	6.3	18.7	95.5
90	24.3	12.8	3.4	9.4	50.7	41.1	24.0	6.3	17.7	95.3
95	23.3	12.2	3.4	8.9	50.6	39.4	23.0	6.3	16.7	95.0
100	22.4	11.8	3.4	8.4	50.4	37.9	22.1	6.3	15.8	94.7
105	21.6	11.3	3.4	8.0	50.2	36.5	21.3	6.3	15.0	94.3
110	20.8	10.9	3.4	7.6	49.9	35.2	20.5	6.3	14.2	93.8

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)

5-year $Q_{attenuated}$	**3.36 L/s**	**100-year $Q_{attenuated}$**	**6.33 L/s**
5-year Max. Storage Required	**50.8 m^3**	**100-year Max. Storage Required**	**95.6 m^3**

Summary of Release Rates and Storage Volumes

Control Area	5-Year Release Rate (L/s)	5-Year Storage (m^3)	100-Year Release Rate (L/s)	100-Year Storage (m^3)
Unattenuated Areas	4.3	0.0	9.3	0.0
Attenutated Areas	3.4	50.8	6.3	95.6
Total	**7.7**	**50.8**	**15.6**	**95.6**

DRAWINGS / FIGURES

St. JOSEPH BLVD.

69.00

69.50

69.90

70.00

71.00

72.00

73.00

74.00

75.00

76.00

77.00

78.00

79.00

80.00

2 STOREY COMMERCIAL BUILDING

COMMERCIAL RETAIL (3,940 sq. ft.)

ST. JOSEPH ENTRY

COMMERCIAL RESTAURANT (2,960 sq. ft.)

SECOND FLOOR EXTERIOR TERRACE

74.40

AM3

12 STOREY COMMERCIAL / RESIDENTIAL BUILDING

11th & 12th LEVEL OUTLINE

DUFORD DRIVE ENTRY

DUFORD DRIVE

5.08

2.23

10.19

71.04

SITE PLAN

0m 10 20 30

RODERICKLAHEY ARCHITECT INC

SITE PLAN
12 STOREY

PLOT DATE: Monday, November 28, 2016

ST. JOSEPH & DUFORD DRIVE
OTTAWA ONTARIO

THE TORGAN GROUP