

**Servicing Report – 316
Somerset Street East**

Project # 160401405



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2572460 Ontario Inc.

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Sign-off Sheet

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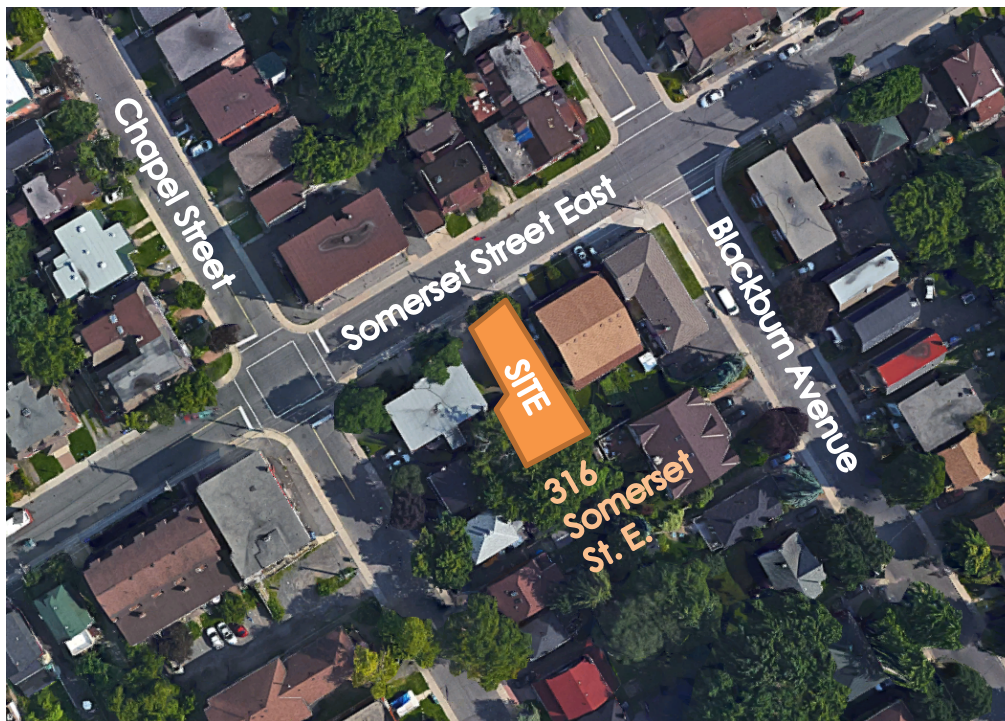
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Introduction
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1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by 2572460 Ontario Inc. to prepare a servicing study in support of Site Plan Control submission of the proposed development located at 316 Somerset Street East. The site is situated southeast of the intersection of Chapel Street and Somerset Street East within the City of Ottawa. The proposed infill development would replace a two-storey dwelling with a three-storey mixed use development comprising 4 residential units with a total of 16 bedrooms and a commercial area on the ground floor. The location of the proposed development is shown as **Figure 1**. The 0.04ha (0.10 acre) site is presently zoned residential fourth density subzone H, and permits the proposed development plan and land use. The intent of this report is to provide a servicing scenario for the site that is free of conflicts, provides on-site servicing in accordance with City of Ottawa design guidelines, and utilizes the existing local infrastructure in accordance with the guidelines outlined per consultation with City of Ottawa staff.

Figure 1: Location Plan



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Background
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2.0 BACKGROUND

Documents referenced in preparation of the design for the 316 Somerset Street East development include:

- Geotechnical Report 316 Somerset Street, McIntosh Perry, March 2018.
- City of Ottawa Sewer Design Guidelines, City of Ottawa, October 2012.
- City of Ottawa Design Guidelines – Water Distribution, City of Ottawa, July 2010.
- City of Ottawa Technical Bulletin ISBT-2018-01 Revision to Ottawa Sewer Design Guidelines, March 2018

3.0 WATER SUPPLY SERVICING

3.1 BACKGROUND

The proposed development comprises one three storey mixed use development, complete with associated infrastructure and access areas. The site is located on the south side of Somerset Street East immediately East of the intersection with Chapel Street. The site will be serviced via a 50mm diameter building service connection to the existing 400mm dia. watermain within the Somerset Street East ROW at the northern boundary of the site. The property is located within the City's Pressure Zone 1W. Ground elevations of the site are approximately 58.5 – 58.8m. Under normal operating conditions, hydraulic gradelines vary from approximately 106.5m to 115.8m as confirmed through boundary conditions as provided by the City of Ottawa (see **Appendix A.3**).

3.2 WATER DEMANDS

Water demands for the development were estimated using the Ministry of Environment's Design Guidelines for Drinking Water Systems (2008). A daily rate of 350 L/cap/day has been applied for the population of the proposed site. Population densities have been assumed as 4.0 pers./unit based on 4 bedrooms per unit. See **Appendix A.1** for detailed domestic water demand estimates.

The average day demand (AVDY) for the entire site was determined to be 0.07 L/s. The maximum daily demand (MXDY) is 2.5 times the AVDY for residential areas and 1.5 times the AVDY for commercial areas. MXDY demand has been calculated to be 0.17 L/s for the proposed development. The peak hour demand (PKHR) is 2.2 times the MXDY for residential areas and 1.8 times the MXDY for commercial areas. The PKHR demand has been calculated to be 0.37 L/s for the proposed development.

Wood frame construction was considered in the assessment for fire flow requirements according to the FUS Guidelines. The FUS Guidelines indicate that low hazard occupancies include apartments, dwellings, dormitories, hotels, and schools, and as such, a low hazard occupancy / limited combustible building contents credit was applied. Based on calculations per the FUS Guidelines (**Appendix A.2**), the maximum required fire flows for this development are 150 L/s (9,000L/min).

3.3 PROPOSED SERVICING

Per the boundary conditions provided by the City of Ottawa and based on an approximate elevation on-site of 58.6m, adequate flows are available for the subject site with pressures ranging from 47.9m (68.1 psi) to 57.2m (81.3psi). The values exceed the desired pressure range of 50-80psi based on Ottawa's Design Guidelines for Water Distribution. As a result, it is recommended that pressure reducing valve be installed.

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Water Supply Servicing
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Using boundary conditions for the proposed development under maximum day demands and a fire flow requirement of 9,000L/min per the FUS methodology, it can be confirmed that the system will maintain a residual pressure of approximately 68.7 psi; which is in excess of the required 140 kPa (20 psi). The above demonstrates that the existing watermain within Somerset Street East can provide adequate fire and domestic flows in excess of flow requirements for the subject site. An existing hydrant is located approximately 38m west of the subject site, west of the intersection with Somerset Street East Street and Fifth Avenue, which is within 90m per City of Ottawa standards.

3.4 SUMMARY OF FINDINGS

The proposed development is located in an area of the City's water distribution system that has sufficient capacity to provide both the required domestic and emergency fire flows. Based on boundary conditions as provided by City of Ottawa staff, fire flows are available for this development based on FUS guidelines and as per the City of Ottawa water distribution guidelines. Given that pressures at the site will exceed 80 psi, it is recommended that a pressure reducing valve be installed on the water service.

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The site will be serviced via an existing 1820mm diameter combined sewer situated within the Somerset Street East ROW at the western boundary of the site (see **Drawing SSP-1**). Wastewater flows generated by the proposed development will be from a combination of residential and commercial uses. It is proposed to make one 135mm diameter service lateral connection directly to the existing sewer to service the proposed site.

4.2 DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines and the MOE's Design Guidelines for Sewage Works, the following criteria were used to calculate estimated wastewater flow rates and to size the sanitary sewers:

- Minimum Velocity – 0.6 m/s (0.8 m/s for upstream sections)
- Maximum Velocity – 3.0 m/s
- Manning roughness coefficient for all smooth wall pipes – 0.013
- Minimum size – 200mm dia. for residential mains
- Average Wastewater Generation – 280L/cap/day
- Peak Factor – 4.0 (Harmon's)
- Extraneous Flow Allowance – 0.33 l/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m
- Population Density per 4-Bedroom Apartment – 4.0persons/unit

4.3 PROPOSED SERVICING

The proposed site is designed with a 135mm sanitary service to direct wastewater flows (approx. 0.22 L/s with allowance for infiltration) to the existing 1820mm diameter combined sewer fronting the property. The proposed site servicing is detailed on **Drawing SSP-1**. A sanitary sewer design sheet for the proposed sanitary service lateral is included in **Appendix B.1**. Full port backwater valves are to be installed on the building sanitary and storm services to prevent any surcharge from the downstream combined sewer from impacting the development.

5.0 STORMWATER MANAGEMENT

5.1 BACKGROUND AND OBJECTIVES

The proposed development will be serviced via an existing 1820mm diameter combined sewer within the Somerset Street East ROW. The target release rate to the combined sewer will be a combination of both storm and sanitary outflows.

The objective of this stormwater management plan is to determine the measures necessary to control the quantity/quality of stormwater released from the proposed development to criteria established during the pre-consultation/zoning process, and to provide sufficient detail for approval and construction.

5.2 SWM CRITERIA AND CONSTRAINTS

Criteria were established by combining current design practices outlined by the City of Ottawa Design Guidelines (2012), and through consultation with City of Ottawa staff. The following summarizes the criteria, with the source of each criterion indicated in brackets:

General

- Use of the dual drainage principle (City of Ottawa).
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff. (City of Ottawa)
- Assess impact of 100 year event outlined in the City of Ottawa Sewer Design Guidelines on major & minor drainage system (City of Ottawa)
- The proposed site is not subject to quality control criteria due to adjacent downstream land uses, distance from the sewer outfall, and presence of downstream combined sewers (City of Ottawa).

Storm Sewer & Inlet Controls

- Size on-site storm sewers to convey at minimum the 2 year storm event under free-flow conditions using City of Ottawa I-D-F parameters (City of Ottawa).
- Site discharge rates for each storm event to be restricted to 2-year storm event pre-development rates with a maximum pre-development C coefficient of 0.4(City of Ottawa).
- Peak discharge rates during wet weather events to be further reduced by peak calculated sanitary discharge from the site (City of Ottawa).
- Proposed site to discharge the existing 1820mm diameter combined sewer within the Somerset Street East ROW (City of Ottawa).
- 100-year Storm HGL to be a minimum of 0.30 m below building foundation footing (City of Ottawa).

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Surface Storage & Overland Flow

- Building openings to be a minimum of 0.30m above the 100-year water level (City of Ottawa)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.35m (City of Ottawa)
- Provide adequate emergency overflow conveyance off-site (City of Ottawa)

5.3 STORMWATER MANAGEMENT

The Modified Rational Method was employed to assess the rate and volume of runoff generated during post-development conditions. The site was subdivided into subcatchments (subareas) tributary to stormwater controls as defined by the location of inlet control devices. A summary of subareas and runoff coefficients is provided in **Appendix C**, and **Drawing SD-1** indicates the stormwater management subcatchments.

5.3.1 Allowable Release Rate

Based on consultation with City of Ottawa staff, the peak post-development discharge from the subject site is to be limited to that of the 2-year event discharge under pre-development conditions, to a maximum discharge coefficient C of 0.4, and reduced further by the estimated peak sanitary discharge from the site. The predevelopment release rate for the area has been determined using the rational method based on the criteria above. A time of concentration for the predevelopment area (10 minutes) was assigned based on the relatively small site and its proximity to the existing drainage outlet for the site. C coefficient values have been increased by 25% for the post-development 100-year storm event based on MTO Drainage Manual recommendations. Peak flow rates have been calculated using the rational method as follows:

$$Q = 2.78 CiA$$

Where: Q = peak flow rate, L/s

A = drainage area, ha

I = rainfall intensity, mm/hr (per Ottawa IDF curves)

C = site runoff coefficient

The target release rate for the site is summarized in **Table 1** below:

Table 1: Target Release Rates

Design Storm	Target Flow Rate (L/s)	Less peak Sanitary Discharge
All Events	3.12	2.90

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Stormwater Management
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5.3.2 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. It is proposed that rooftop storage via restricted roof release in combination with in pipe storage and sewers equipped with inlet control devices(ICDs) be used to reduce site peak outflow to target rates.

5.3.2.1 Rooftop Storage

It is proposed to retain stormwater on the building rooftops by installing restricted flow roof drains. The following calculations assume the roof will be equipped with standard Watts Model RD-100_A_ADJ Accuflow Roof Drains.

Watts Drainage “Accutrol” roof drain weir data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the “Accutrol” weir has been used as an example only, and that other products may be specified for use, provided that the total roof drain release rate for subcatchment BLDG 1 is restricted to match the maximum rate of release indicated in Table 2, and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater. The controlled roof drain will be directed to the downstream storage pipe. Storage volume and controlled release rate are summarized in **Table 2**:

Table 2: Roof Control Area

Design Storm	Depth (mm)	Discharge (L/s)	Volume Stored (m ³)
2-Year	78.5	1.44	0.9
100-Year	129.6	1.76	4.1

5.3.2.2 Subsurface Storage

Per the modified rational method calculations included as part of **Appendix C**, the remainder of the site is to be directed towards a catch basin ‘T’, catch basin lead, 750mm diameter storage pipe and storm catchbasin manhole complete with an IPEX Tempest LMF model 55 ICD sized to meet the target peak discharge rate for the during the 100-year event. In order to control peak discharge from the subject site to within target levels, storage has been provided within the catch basin and 750mm diameter storage pipe in the amount of approximately 3.37m³. Storage volume and controlled release rates are summarized in **Table 3**:

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Table 3: Controlled Discharge Summary

Design Storm	Design Head (m)	Discharge (L/s)	Static Ponding Depth (m)	V _{required} (m ³)	V _{available} (m ³)
2-Year	0.28	1.44	0.00	1.13	3.37
100-Year	0.73	2.31	0.00	2.89	3.37

The inlet control device (ICD) was sized based on head/discharge curves as provided by the manufacturer (IPEX).

Downstream water levels were considered to be at the receiving sewer obvert immediately downstream of the proposed storage unit. Refer to calculations included as part of **Appendix C** for details.

5.3.2.3 Uncontrolled Area

Due to grading restrictions, one subcatchment has been designed without a storage component. This catchment area discharges off-site uncontrolled to the adjacent Somerset Street. Peak discharges from uncontrolled areas have been considered in the overall SWM plan and have been balanced through overcontrolling proposed site discharge rates to meet target levels.

Table 4: Uncontrolled Non-Tributary Area (UNC-1)

Design Storm	Discharge (L/s)
2-Year	0.24
100-Year	0.52

5.3.3 Results

Table 5 demonstrates that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflow rates for the site.

Table 5: Summary of Total 2 and 100 Year Event Release Rates

	2-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Controlled –Subsurface*	1.44	2.31
Uncontrolled	0.24	0.52
Total	1.68	2.83
Target	2.90	2.90

*Roof discharge directed to subsurface storage pipe.

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Grading and Drainage
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6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.04 ha in area. The topography across the site is relatively flat, and currently drains from southeast to northwest, with overland flow generally being directed to the adjacent Somerset Street East ROW. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements for the site, and provide for minimum cover requirements for storm and sanitary sewers where possible. Site grading has been established to provide emergency overland flow routes required for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes for flows deriving from storm events in excess of the maximum design event to the existing Somerset Street East as depicted in **Drawing GP-1**.

7.0 UTILITIES

As the subject site lies within a mature developed residential community, Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available. It is anticipated that existing infrastructure will be sufficient to provide a means of distribution for the proposed site. Exact size, location and routing of utilities, along with determination of any off-site works required for redevelopment, will be finalized after design circulation.

8.0 APPROVALS

Pre-consultation with Ontario Ministry of Environment (MOECC) staff concerning Environmental Compliance Approvals (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act is forthcoming. It is expected that a direct submission ECA will be required for approval of the proposed building service connections and stormwater management system, as they connect directly to an existing combined sewer. The Rideau Valley Conservation Authority will need to be consulted in order to obtain municipal approval for site development.

Requirement for a MOE Permit to Take Water (PTTW) is unlikely for the site as the majority of proposed works are above the groundwater elevations shown in the geotechnical report. The geotechnical consultant shall confirm at the time of application that a PTTW is not required.

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Erosion Control During Construction
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9.0 EROSION CONTROL DURING CONSTRUCTION

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

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit extent of exposed soils at any given time.
3. Re-vegetate exposed areas as soon as possible.
4. Minimize the area to be cleared and grubbed.
5. Protect exposed slopes with plastic or synthetic mulches.
6. Provide sediment traps and basins during dewatering.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. Plan construction at proper time to avoid flooding.

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

9. Verification that water is not flowing under silt barriers.
10. Clean and change silt traps at catch basins.

Refer to **Drawing ECDS-1** for the proposed location of silt fences, straw bales and other erosion control structures.

10.0 GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL ASSESSMENT

A geotechnical Investigation Report was prepared by McIntosh Perry in March 2018. The report summarizes the existing soil conditions within the subject area and construction recommendations. The report concluded that the site consists of fill material with traces of sand, gravel, clay and silt underlain by shale. Please refer to the geotechnical report which has been submitted to support the site plan application for further detail.

11.0 CONCLUSIONS

11.1 WATER SERVICING

Based on the supplied boundary conditions for existing watermain and estimated domestic and fire flow demands for the subject site, it is anticipated that the proposed servicing in this development will provide sufficient capacity to sustain both the required domestic demands and emergency fire flow demands of the proposed site. Fire flows greater than those required per the FUS Guidelines are available for this development.

11.2 SANITARY SERVICING

The proposed site will be serviced by a gravity sewer service lateral which will direct wastewater flows (approx. 0.22 L/s) to the existing 1820mm dia. combined sewer within the Somerset Street East ROW at the northern boundary of the property. The proposed drainage outlet has sufficient capacity to receive sanitary discharge from the site.

11.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa. Rooftop storage, controlled roof release, and subsurface storage via large diameter storage pipe has been proposed to limit peak storm sewer inflows to downstream combined sewers to levels as determined by City of Ottawa staff. The combined storm and sanitary flow from the site will be controlled to less than the 2 year storm event.

11.4 GRADING

Grading for the site has been designed to provide an emergency overland flow route as per City requirements and reflects the recommendations in the Geotechnical Investigation Report prepared by McIntosh Perry. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities.

11.5 UTILITIES

Utility infrastructure exists within the Somerset Street East ROW. It is anticipated that existing infrastructure will be sufficient to provide a means of distribution for the proposed site. Exact size, location and routing of utilities will be finalized after design circulation.

11.6 APPROVALS/PERMITS

An MOECC Environmental Compliance Approval is expected to be required for the subject site as the on-site sewers and stormwater management system will connect and directly discharge to

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an existing combined sewer. Requirements for a Permit to Take Water (PTTW) are not anticipated. Need for a PTTW for sewer construction dewatering and building footing excavation will be confirmed by the geotechnical consultant. The Rideau Valley Conservation Authority will need to be consulted in order to obtain municipal approval for site development. No other approval requirements from other regulatory agencies are anticipated.