Servicing Report – 3500 Hawthorne Road

Project # 160401284

Prepared for:
252033 Ontario Inc.

Prepared by:
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Sign-off Sheet

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1.0 INTRODUCTION

Stantec Consulting Ltd. has been commissioned by 252033 Ontario Inc. to prepare a servicing study in support of Site Plan Control submission of the proposed development located at 3500 Hawthorne Road. The site is situated northwest of the intersection of Hunt Club Road and Hawthorne Road within the City of Ottawa. The proposed development would replace vacant land with a one storey gas station and convenience store. The site location is shown as **Figure 1** below. The 0.37ha (0.91acre) site is presently zoned GM1[50] (General Mixed Use Subzone 1 Exception 50), which permits the proposed development plan. 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

2.0 BACKGROUND

Documents referenced in preparation of the design for the 3500 Hawthorne Road development include:

- Phase One Environmental Site Assessment - 3500 Hawthorne Road, Stantec Consulting Ltd., April, 2017.
- Geotechnical Report – 3500 Hawthorne Road, Stantec Consulting Ltd., April, 2017.
- City of Ottawa Sewer Design Guidelines, City of Ottawa, October 2012.
- City of Ottawa Design Guidelines – Water Distribution, City of Ottawa, July 2010.

3.0 WATER SUPPLY SERVICING

3.1 BACKGROUND

The proposed development comprises a one storey gas station with a convenience store. The site is located on the west side of Hawthorne Road immediately north of the intersection with Hunt Club Road. The site will be serviced via a 50mm building service connection to the existing 400mm dia. watermain within the Hawthorne Road ROW at the eastern boundary of the site. The property is located within the City's Pressure Zone 2C. Average ground elevations of the site are approximately 84.8m. Under normal operating conditions, hydraulic gradelines vary from approximately 122.1m to 133.5m 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) and the Ottawa Design Guidelines – Water Distribution (2010). Commercial domestic demands have been estimated at 50,000L/ha/day of floor area. See **Appendix A.1** for detailed domestic water demand estimates.

The average day demand (AVDY) for the entire site was determined to be 0.01 L/s. The maximum daily demand (MXDY) is 1.5 times the AVDY for commercial areas, which sums to 0.02 L/s. The peak hour demand (PKHR) is 1.8 times the MXDY for commercial areas, totaling 0.04 L/s.

Ordinary construction was considered in the assessment for fire flow requirements according to the FUS Guidelines, and combustible building contents were considered. Based on calculations per the FUS Guidelines (**Appendix A.2**), the minimum required fire flows for this development are 67 L/s (4,000L/min).

3.3 PROPOSED SERVICING

Per the boundary conditions provided by the City of Ottawa and based on an approximate elevation on-site of 84.8m, adequate flows are available for the subject site with pressures ranging from 37.3m (53.0psi) to 48.7m (69.2psi). This pressure range is within the guidelines of 40-80 psi based on Ottawa's Design Guidelines for Water Distribution.

Using boundary conditions for the proposed development under maximum day demands and a fire flow requirement of 4,000L/min per the FUS methodology, it can be confirmed that the system will maintain a residual pressure of approximately 58.3 psi; which is in excess of the required 140 kPa (20 psi). The above demonstrates that the existing watermain within Hawthorne Road can provide adequate fire and domestic flows in excess of flow requirements for the subject site. A hydrant is proposed on site and is to be located approximately 32m northeast of

the proposed commercial building, and is within 90m of the development 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.

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The site will be serviced via an existing 200mm diameter sanitary sewer situated within an easement that runs to the Foxden Place ROW at the western boundary of the site (see **Drawing SPP-1**). It is proposed to make one 200mm diameter service lateral connection directly to the existing sewer from the proposed manhole 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
- Average Wastewater Generation – 50,000 L/ha/day
- Peak Factor – 1.5 (Harmon's)(Commercial)
- Extraneous Flow Allowance – 0.28 l/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5m

4.3 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 0.4 L/s) to the existing 200mm diameter sanitary sewer. A sanitary sewer design sheet for the proposed service lateral is included in **Appendix B.1**. Full port backwater valves are to be installed on all sanitary services within the site to prevent any surcharge from the downstream sewer main from impacting the proposed property.

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

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 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)
- Enhanced quality control (80% TSS removal via oil/grit separator) to be provided on-site for the development. (City of Ottawa)

Storm Sewer & Inlet Controls

- Size storm sewers to convey 5 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 5-year storm event pre-development rates with a maximum pre-development C coefficient of 0.5.
- Proposed site to discharge the existing 300mm diameter storm sewer within an easement that leads to the Foxden Place ROW at the western boundary of the subject site (City of Ottawa).
- 100-year Storm HGL to be a minimum of 0.30 m below building foundation footing (City of Ottawa).

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 0.30m (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.1**, 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 5-year event discharge under pre-development conditions, to a maximum runoff coefficient C of 0.5. 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)
All Events	54.0

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 surface 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 rooftop by installing restricted flow roof drains. The following calculations assume the roof will be equipped with standard Watts Model R1100 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 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. Proposed drain release rates have been calculated based on the Accutrol weir setting at ¼ open. Storage volume and controlled release rate are summarized in **Table 2**:

Table 2: Roof Control Area (BLDG)

Design Storm	Depth (mm)	Discharge (L/s)	Volume Stored (m^3)
5-Year	104	1.60	3.38
100-Year	139	1.83	8.21

5.3.2.2 Surface Storage

Per the modified rational method calculations included as part of **Appendix C.2**, a portion of the site is to be directed towards two catch basins interconnected to a downstream catch basin manhole equipped with a 115mm orifice plate (ICD) sized to meet the target peak discharge rate during the 100-year event.

The modified rational method was employed to determine the peak volume stored in the catch basin manhole and surface storage areas. The inlet control devices were sized based on the available target release rate from the site during the 100 year storm event. Storage volume and controlled release rates during the 5 and 100 year events are summarized in **Table 3**:

Table 3: 5 and 100 Year Peak Surface Volume and Controlled Discharge Summary

Control Structure	5-Year Event			100-Year Event		
	Discharge (L/s)	Vrequired (m3)	Vavailable (m3)	Discharge (L/s)	Vrequired (m3)	Vavailable (m3)
CBMH 103	42.0	14.3	64.6	42.7	62.4	64.6

5.3.2.3 Uncontrolled Areas

Due to grading restrictions, two sub catchments have been designed without a storage component. The catchment areas discharge off-site uncontrolled to the adjacent Hawthorne Road and Hunt Club Road. 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

Design Storm	Discharge (L/s)
5-Year	4.52
100-Year	9.69

5.3.3 Results

Table 5 demonstrates the proposed stormwater management plan and demonstrates adherence to target peak outflow rates for the site.

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

	5-Year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Uncontrolled – Surface	4.52	9.69
Controlled – Surface	42.00	42.7
Controlled – Roof	1.60	1.83
Total	**48.12**	**54.22**
Target	**54.02**	**54.02**

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.37ha in area. The topography across the site slopes toward a depression at the center of the development, with overland flows generally being directed to the adjacent Hawthorne Road ROW. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, adhere to any geotechnical restrictions (see **Section 10.0**) 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 Hawthorne Road as depicted in **Drawing GP-1.**

7.0 UTILITIES

As the subject site is bound by existing commercial and residential development to the west and north, and by a municipal right-of-way to the east and south, Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available. Hydro Bell and Cable are anticipated to be serviced via overhead pole line at the west side of Hawthorne Road and north side of Hunt Club Road. It is anticipated that existing infrastructure will be sufficient to provide the 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

An Environmental Compliance Approval (ECAs, formerly Certificates of Approval (CofA)) under the Ontario Water Resources Act from the Ontario Ministry of Environment and Climate change (MOECC) is forthcoming. It is expected that a direct submission ECA will be required for approval of proposed storm and sanitary sewers, as well as for stormwater management due to the industrial nature of the subject site. 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) for sewer construction dewatering and building footing excavation will be confirmed by the geotechnical consultant.

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 EC-1** for the proposed location of silt fences and other erosion control structures.

10.0 GEOTECHNICAL INVESTIGATION AND ENVIRONMENTAL ASSESSMENT

An Environmental Assessment for Phase One at 3500 Hawthorne Road was prepared for the subjected site by Stantec Consulting Ltd. for April 2017. Please refer to original report for detail.

A Geotechnical Investigation Report will be provided under separate cover. The report is to summarize the existing soil conditions within the subject area, proposed pavement structures, and construction recommendations.

An assumed pavement structure for proposed hard surfaced areas is outlined in **Table 6** below, and is to be verified within the Geotechnical Investigation Report:

Table 6: Pavement Structure – Access Lanes and Heavy Truck Parking Areas

Thickness (mm)	Material Description
40	Wear Course – HL-3 or Superpave 12.5 Asphaltic Concrete
50	Binder Course – HL-8 or Superpave 19.0 Asphaltic Concrete
150	Base – OPSS Granular A Crushed Stone
450	Subbase - OPSS Granular B Type II
-	Subgrade – Either fill, in situ soil, or OPSS Granular B Type I or II material placed over in situ soil or bedrock.

11.0 CONCLUSIONS

11.1 WATER SERVICING

Based on the supplied boundary conditions for existing watermains 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 sanitary sewer network is sufficiently sized to provide gravity drainage of the site. The proposed site will be serviced by a gravity sewer service lateral which will direct wastewater flows (approx. 0.4 L/s) to the existing 200mm dia. sanitary sewer that runs to Foxden Place ROW at the eastern boundary of the property. The proposed drainage outlet has sufficient capacity to receive sanitary discharge from the site based on pre-consultation through City of Ottawa staff.

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 and controlled roof release has been proposed to limit peak storm sewer inflows to downstream storm sewers to predevelopment levels as determined by City of Ottawa staff. The downstream receiving sewer has sufficient capacity to receive runoff volumes from the site based on pre-consultation through City of Ottawa staff.

11.4 GRADING

Grading for the site has been designed to provide an emergency overland flow route as per City requirements. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities.

11.5 UTILITIES

Utility infrastructure exists within overhead lines within the Hawthorne Road and Hunt Club Road ROW at the eastern and southern boundary of the proposed site. 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 due to the industrial nature of the site. Requirement for a MOE Permit to Take Water (PTTW) for sewer construction dewatering and building footing excavation will be confirmed by the geotechnical consultant.

Appendix A WATER SUPPLY SERVICING

A.1 DOMESTIC WATER DEMAND ESTIMATE

A.2 FIRE FLOW REQUIREMENTS PER FUS

A.3 BOUNDARY CONDITIONS

Appendix B WASTEWATER SERVICING

B.1 SANITARY SEWER DESIGN SHEET

Appendix C STORMWATER MANAGEMENT

C.1 STORM SEWER DESIGN SHEET

C.2 RATIONAL METHOD CALCULATIONS

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