# Site Servicing and Stormwater Management Report, Holland Cross Ottawa, ON

File: 160410274

Prepared for:
LaSalle Investment Management

Prepared by:
Stantec Consulting Ltd.
1331 Clyde Avenue, Suite 400
Ottawa, ON  K2C 3G4

April 20, 2023

| Revision | Description | Prepared by | | Checked by |
|---|---|---|---|---|
| 0 | Site Servicing and Stormwater Management Report | Thakshika Rathnasooriya | August 11, 2020 | Kris Kilborn |
| 1 | Report Updates for Detailed Design Site Plan Approval Submission | Sara Kardash | January 28, 2022 | Neal Cody |
| 2 | Site Servicing and Stormwater Management Report | Ashmeet Singh Muker | November 25, 2022 | Neal Cody |
| 3 | Site Servicing and Stormwater Management Report | Warren Johnson | March 8, 2023 | Neal Cody |
| 4 | Site Servicing and Stormwater Management Report | Warren Johnson | April 20, 2023 | Neal Cody |

## Sign-off Sheet

This document entitled Site Servicing and Stormwater Management Report, Holland Cross Ottawa, ON was prepared by Stantec Consulting Ltd. ("Stantec") for the account of LaSalle Investment Management (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by _____
(signature)

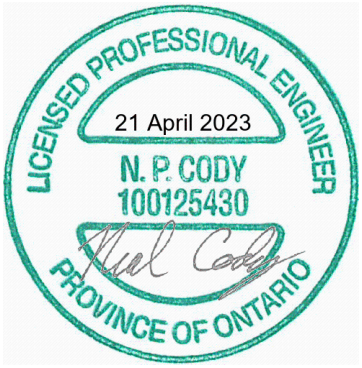
**Warren Johnson, C.E.T.**

Reviewed by: _____
(signature)

**Kris Kilborn, P.Eng.**

Approved by _____
(signature)

**Neal Cody, P.Eng**




Stantec

# Table of Contents



**LIST OF TABLES**

## LIST OF FIGURES



## LIST OF APPENDICES

# 1.0 INTRODUCTION

This Site Servicing and Stormwater Management Report has been prepared to support an application for Zoning Amendment for a property known municipally as 1560 Scott Street. The site is currently zoned Mixed-Use Centre Zone (MC) and is located in the City of Ottawa in the northwest quadrant of the intersection of Hamilton Avenue and Bullman Street and is illustrated on **Figure 1.1**. The proposed mixed-use development comprises a single 25 storey building with retail on the first floor and 281 residential apartment units above. The 0.30ha (0.74 acre) site is currently designated as office space.

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 1.1: Location Plan**

# 2.0 BACKGROUND

The following background studies have been referenced during the servicing and stormwater management design of the proposed site:

- *Geotechnical Engineering Design Input Holland Cross Expansion, 1560 Scott Street, Ottawa, ON,* Golder Associates Inc., May 2020
- *Servicing & Stormwater Management Report, Holland Cross Expansion, Ottawa, ON, Novatech Engineers, Planners & Landscape Architects, August 2014*
- City of Ottawa Design Guidelines – Water Distribution, Infrastructure Services Department, City of Ottawa, First Edition, July 2010
- City of Ottawa Sewer Design Guidelines, 2nd Ed., City of Ottawa, October 2012
- Technical Bulletin ISTB-2018-01 Revision to Ottawa Design Guidelines – Sewer, City of Ottawa, March 2018
- Technical Bulletin ISTB-2018-02 Revision to Ottawa Design Guidelines – Water Distribution, City of Ottawa, March 2018

# 3.0 WATER SUPPLY SERVICING

## 3.1 BACKGROUND

The proposed mixed use development is located on the north-western side of the intersection of Bullman Street and Hamilton Avenue in the Hintonburg community of the City of Ottawa. The property is located within the City's Pressure Zone 1W. Average ground elevations of the site are approximately 61.95m. Under normal operating conditions, hydraulic grade lines vary from approximately 107.9m to 114.6m as confirmed through boundary conditions as provided by the City of Ottawa (see **Appendix A**).

According to City of Ottawa District Plans, existing water infrastructure present on the proposed site is a 150 mm diameter PVC watermain branching off a 200 mm PVC watermain running along Hamilton Avenue. Given the size of the development and domestic demand requirements for the proposed high-rise buildings, two separate connections to the main are required separated by a valve for redundancy. The proposed site will be serviced via a dual 150mm building service TVS connection to the existing 200 mm watermain along Hamilton Avenue as shown on the Site Servicing Plan (see **Drawing SSGP-1**). The existing 150 mm diameter water service lateral running east along the site will be protected and any associated internal plumbing from the existing building will be relocated as required by the mechanical consultant (refer to the **Servicing and Stormwater Management Declaration** provided with the comments response letter).

## 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). A daily rate of 350 L/cap/day has been applied for the population of the proposed site. Population densities have been assumed 2.1 pers./two-bedroom and 1 bedroom plus den apartment units, and 1.4 pers./studio and one-bedroom apartment units. See **Appendix A.1** for detailed domestic water demand estimates. Additionally, commercial and retail domestic demands have been estimated at 28,000L/ha/day of floor area.

The average day demand (AVDY) for the entire site was determined to be 2.07 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, which sums to 5.12 L/s. The peak hour demand (PKHR) is 2.2 times the MXDY for residential areas and 1.8 times the MXDY for commercial areas, totaling 11.25 L/s. The estimated demands are summarized in **Table 3.1** below.

**Table 3.1: Estimated Water Demands**

| Demand Type | Population | Area ($m^2$) | AVDY (L/s) | MXDY (L/s) | PKHR (L/s) |
|---|---|---|---|---|---|
| Residential | 500 | - | 2.02 | 5.06 | 11.14 |
| Commercial, Lobby, and Amenity Space | - | 1282 | 0.04 | 0.06 | 0.11 |
| **Total Site:** | 500 | - | **2.07** | **5.12** | **11.25** |

According to the FUS Guidelines, a building of non-combustible construction with unprotected openings is considered for the assessment. Additionally, the building will be sprinklered, with final sprinkler design to conform to the NFPA 13 standards. An occupancy charge for limited combustible material as well as the extraneous fire flows required for the building exposures were considered in the assessment as per the FUS Guidelines. A firewall will be provided between the existing and proposed buildings and 2-hour fire separations will be provided between each floor of the proposed building. Refer to **Appendix A.6** for confirmation from the architect of the assumed criteria. As per the results, the minimum fire flow required is 66.7 L/s (4,000L/min, see **Appendix A.3**).

Furthermore, non-combustible with fire-resistance ratings was considered in the assessment for fire flow requirements according to the Ontario Building Code (OBC) Guidelines. As a residential apartment the building falls under occupancy Class C. Based on calculations per the OBC Guidelines. The minimum required fire flows for this development are 150 L/s (9,000L/min, see **Appendix A.4**).

Therefore, the required fire flow according to FUS methodology is calculated to be 4,000 L/min which is less than the calculated fire flow as per OBC methodology. Thus, to be conservative in approach the fire flow requirement of 9,000 L/min from OBC methodology would be considered for the proposed development.

## 3.3 PROPOSED SERVICING

Per the boundary conditions provided by the City of Ottawa (**Table 3.2**: Boundary Conditions and based on the elevation on-site of 62.95m, adequate flows are available for the subject site with pressures ranging from 44.95m (63.9psi) to 51.65m (73.4psi).

### Table 3.2: Boundary Conditions

| Demand Scenario | Head (m) | Pressure (psi) |
|---|---|---|
| Minimum HGL | 107.9 | 153.4 |
| Maximum HGL | 114.6 | 162.9 |
| Max Day + Fire Flow | 104.4 | 148.5 |

This pressure range is within the guidelines of 50-80 psi based on Ottawa's Design Guidelines for Water Distribution, therefore pressure reducing valves (PRVs) would not be required to protect from municipal system pressures, but they are required within high pressure zones of the building water distribution system. This is because based on the Hydraulic Analysis calculation sheet attached in **Appendix A.2**, pressures at the 25th level of the building will be below the required 40psi, and as such, booster and fire pumps are to be designed by the mechanical engineering consultant to service the upper levels of the development.

Therefore, any fixtures placed within the high-pressure zones (i.e., fed by the booster pump) and anything connected 5m below ground level fed by the municipal pressure will need PRVs.

Therefore, using boundary conditions for the proposed development under maximum day demands and a fire flow requirement of 9,000L/min per the OBC methodology, it can be confirmed that the system will maintain a residual pressure of approximately 58.9 psi; which is in excess of the required 140 kPa (20 psi). The above demonstrates that the existing watermain within Hamilton Avenue can provide adequate fire and domestic flows in excess of flow requirements for the subject site. An existing hydrant is located east of the subject site and is within 80m of the proposed building siamese connection per OBC requirements.

Two proposed watermain services (sized at 150 mm in diameter) separated by an isolation valve to the existing 203 mm water main in front of the building on Hamilton Avenue North will provide the basic day demand to the building.

As per Technical Bulletin ISTB 2021-03, hydrant classification was done to calculate the overall fire flow demand. The distances between the site and the fire hydrants are shown in **Table 3.3.**

### Table 3.3: Hydrant and Fire Flow Demands

| Location | Distance to Building (m) | Fire Flow Demand (L/min) | Fire Flow Demand (L/s) |
|---|---|---|---|
| Hamilton Ave N | 104.1 | 3800 | 63.33 |
| Courtyard | Local | 5700 | 95.00 |
| **Total** | | **9500** | **158.33** |

As can be seen from the table above, the fire flow demand from the hydrants is more than sufficient for the required Fire Flow requirement of 9,000 L/min for the proposed development.

## 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 and OBC guidelines and as per the City of Ottawa water distribution guidelines. Pumps to service the upper levels will need to be designed by the mechanical consultant.

# 4.0 WASTEWATER SERVICING

## 4.1 BACKGROUND

The site will be serviced via a proposed 250 mm diameter sanitary service that discharges to the existing 250 mm diameter sanitary sewer within Hamilton Avenue ROW (see **Drawing SSGP-1**). The existing 250 mm diameter sanitary service lateral running east along the site will be protected and any associated internal plumbing from the existing building will be relocated as required by the mechanical consultant (refer to the **Servicing and Stormwater Management Declaration**).

## 4.2 DESIGN CRITERIA

As outlined in the City of Ottawa Sewer Design Guidelines and the MECP'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 areas
- 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 for studio and single-bedroom apartments – 1.4 pers./apartment
- Population density for one-bedroom plus den and two-bedroom apartments – 2.1 pers./bedroom

## 4.3 PROPOSED SERVICING

The proposed site will be serviced by gravity sewers which will direct the wastewater flows (approx. 6.56 L/s with allowance for infiltration) to the proposed 250 mm diameter sanitary sewer. A sanitary sewer design sheet for the proposed sanitary sewers is included in **Appendix B.1.** Capacity in the downstream sanitary sewer system will be assessed during detailed design. 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/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 the small site size and land usage of the development (City of Ottawa).

**Storm Sewer & Inlet Controls**

- All stormwater runoff from the proposed site up to and including the 100-year event to be stored on site and released into the minor system at a maximum rate equivalent to 51.5 L/s calculated based on 2-year pre-development rates.
- Proposed site to discharge to the proposed 200mm diameter storm service, directly connecting to the 450mm storm sewer on Hamilton Avenue ROW at the 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).
- As discussed with the City on June 14, 2022 area EXT-1 can be discounted from the allowable site release rate given that only minor changes to curb works are being proposed in this area.

**Surface Storage & Overland Flow**

- Building openings to be minimum of 0.15m 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 in the 100-year event (City of Ottawa)
- Provide adequate emergency overflow conveyance off-site (City of Ottawa)

The areas which were examined for stormwater management include BLDG (Building), L101A (Underground Storage Area), and UNC-1 (Uncontrolled Area). Although the drawings show a fourth area, EXT-1, this area has not been considered in the Modified Rational Method (MRM) calculations as this area will remain as it is other than an addition of a small amount of grass, reducing its runoff coefficient slightly.

## 5.3 STORMWATER MANAGEMENT

The intent of the stormwater management plan presented herein is to mitigate any negative impact that the proposed development will have on the existing storm sewer infrastructure, while providing adequate capacity to service the proposed buildings, parking and access areas. The proposed stormwater management plan is designed to detain runoff on the roof area to ensure that peak flows after construction will not exceed the allowable site release rate detailed below.

Stormwater runoff from the proposed development will be directed to a proposed 200 mm diameter storm sewer and then south along 450mm diameter storm sewer on Hamilton Avenue. The existing storm service laterals in the vicinity of the site will be protected and any associated internal plumbing from the existing building will be relocated as required by the mechanical consultant. The foundation drain is to be independently connected to the storm service downstream of the internal cistern outlet with a sufficiently sized sump pump with appropriate backup power and backflow prevention (refer to the **Servicing and Stormwater Management Declaration**).

A summary of subareas and runoff coefficients is provided in **Appendix C**, and **Drawing SD-1** indicates the stormwater management sub catchments.

### 5.3.1 Allowable Release Rate

Available topographic information the existing conditions drainage elevations for the site are shown on **Drawing EX-1**; existing drainage areas and runoff coefficients are presented in **Drawing EXSD-1.**

The Modified Rational Method was employed to assess the rate of runoff generated during pre-development conditions. The City of Ottawa Sewer Design Guidelines identify the modified rational method as an acceptable method for determining underground storage requirements for a site of less than 2 ha in area.

The peak 100-year post-development discharge from the subject site is to be limited to the 2-year pre-development rate. The predevelopment release rate for the area has been

determined using the rational method and existing runoff coefficient C values for varying surface treatments per below:

- Asphalt/Hard Surface areas – C=0.90
- Gravel areas – C=0.70
- Grassed/Pervious areas – C=0.20

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 5.1** below:

**Table 5.1: Target Release Rate**

| **Design Storm** | **Target Flow Rate (L/s)** |
|---|---|
| 2-Year and 100-Year<br>(Pre-development Conditions) | 51.5 |

### 5.3.2 Storage Requirements

To meet the restrictive stormwater release criteria for the proposed development, rooftop storage will be used to promote stormwater detention on building roof tops and reduce the peak outflow from the site. Additionally, an underground stormwater storage (cistern) system is proposed in conjunction with a submersible pump to control flows to the target rate. The proposed ponding areas, and underground storage tank details are specified on **Drawing SD-1**.

#### 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 roofs will be equipped with standard Watts Model RD-100_A_ADJ Accuflow Roof Drains which will be 100% closed.

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 5.2**, and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater. Storage volume and controlled release rate are summarized in **Table 5.2**:

**Table 5.2: 100 Year Summary of Roof Controls**

| Area ID | Design Storm | Depth (mm) | Discharge (L/s) | Volume Stored ($m^3$) | Drawdown Time (hr) |
|---|---|---|---|---|---|
| Roof | 2-Year | 83 | 9.46 | 9.31 | 0.3 |
| | 100-Year | 139 | 9.46 | 42.73 | 1.3 |

The total roof area of the proposed building is approx. 1,300 $m^2$ with 80% (1,040 $m^2$) of the roof area assumed to be available for storage, with the runoff coefficient for the roof area as C = 0.90. The roof area drains have been designed to optimize the maximum allowable ponding depth of 0.15m as per the Ontario Building Code. Drain drawdown times for the 2 and 100-year storm event are also shown in **Table 5.2.** Drainage from the roof will directly discharge to the existing 450mm diameter storm sewer on Hamilton Avenue North with the proposed new 200mm storm service downstream of the internal cistern outlet (refer to the **Servicing and Stormwater Management Declaration**).

A *Flow Control Roof Drainage Declaration* letter has been prepared and will be reviewed and signed by mechanical and structural engineers after reviewing this report. The letter will be submitted under separate cover to the City.

### 5.3.2.2 Subsurface Storage

Per the modified rational method calculations included as part of **Appendix C.2**, the remainder of the site is to be directed towards the catch basins in L101A which will discharge to an internal cistern with a submersible pump with a constant release rate to meet the target peak discharge rate during the 100-year event (refer to the **Servicing and Stormwater Management Declaration**).

The required 19$m^3$ of storage will be detained on the proposed site through a cistern within the underground parking. Controlled release rates and storage volumes required are summarized in Table 5.3.

### Table 5.3: Subsurface Storage Area (L101A)

| Tributary Area | Design Storm | Design Head (m) | Discharge (L/s) | Orifice Type | $V_{required}$ ($m^3$) |
|---|---|---|---|---|---|
| L101A | 2-Year | 0.25 | 18.77 | IPEX Tempest HF 133mm Orifice | 0.3 |
| | 100-Year | 0.25 | 18.77 | | 18.5 |

#### 5.3.2.3 Uncontrolled Area

Due to grading restrictions, one sub catchment area has been designed without a storage component. The existing catchment area also discharges off-site uncontrolled to the adjacent Hamilton Avenue. 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 and are shown in **Table 5.4**.

### Table 5.4: Uncontrolled Non-Tributary Area (UNC-1)

| Design Storm | Discharge (L/s) |
|---|---|
| 2-Year | 8.0 |
| 100-Year | 23.3 |

### 5.3.3 Results

**Table 5.5** demonstrates that the proposed stormwater management plan provides adequate attenuation storage to control post-development flows to the target peak outflow rate of the site.

### Table 5.5: Summary 100 Year Event Release Rates

| Catchment Area | 100-Year Peak Discharge (L/s) |
|---|---|
| Uncontrolled | 23.3 |
| Controlled – Subsurface & Roof | 28.2 |
| **Total** | **51.5** |
| **Target** | **51.5** |

# 6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.3ha in area. The topography across the site is relatively flat on the northern boundary with a marginally increased slope on the southern boundary of the proposed building, and currently drains from west to east, with overland flow generally being directed to the adjacent Hamilton Avenue ROW. A grading plan (see **Drawing SSGP-1**) has been provided to satisfy the stormwater management requirements, adhere to any geotechnical restrictions 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 Hamilton Avenue as depicted in **Drawing SSGP-1.**

April 20, 2023

# 7.0 UTILITIES

Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available within subsurface utility infrastructure within the Hamilton Avenue ROW. Exact size, location and routing of utilities, along with determination of any off-site works required for redevelopment, will be finalized after design circulation.

Enbridge has a plant within the vicinity of the site which will likely have sufficient capacity, however, only after receiving the detail loading criteria will they be able to provide their final design.

Detailed design of the required utility services will be completed by the respective utility companies.

# 8.0 APPROVALS

An Ontario Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECAs, formerly Certificates of Approval C of A) under the Ontario Water Resources Act maybe a requirement if existing sewers are shared to outlet onto Hamilton Avenue as the proposed site is expected to be severed into a separate parcel of land.

Requirement for a MECP Permit to Take Water (PTTW) for pumping during construction of the underground parking levels will be confirmed by the geotechnical consultant.

# 9.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was conducted by Golder Associates Ltd. in May 2020. Subsurface soil conditions within the boundaries of the proposed site were determined by 4 test pits distributed across the site. Some investigations were previously completed in 1986 by McRostie. The subsurface profile across the site described by the previous investigation consists of 2.3m of fill material made up by topsoil, sand gravel, clay, bricks, wood, metal and concrete below the original ground surface and underlain by glacial till.

An organic layer was found to be 0.3m to 0.8m thick near the building in test pits M120/E120 and N150/E120 at depths of 1.7m and 1.35m below ground surface. It is anticipated that during construction of the existing building the noted materials above were removed.

Bedrock elevations were previously encountered at elevations of 59.8 to 61.0m. Groundwater levels have altered since previous investigation and current water levels are influenced by existing building drainage systems.

# 10.0 CONCLUSIONS

## 10.1 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. Pumps to service the upper levels and PRVs to protect fixtures from the high pressures will need to be designed by the mechanical consultant.

## 10.2 SANITARY SERVICING

The existing sanitary sewer network is sufficiently sized to provide gravity drainage of the proposed site. The subjected site will be serviced by a new proposed 250mm dia. gravity sewer service lateral which will direct wastewater flows (approx. 8.3 L/s) to the 250mm dia. sewer along Hamilton Avenue at the eastern boundary of the property. The existing drainage outlet has sufficient capacity to receive sanitary discharge from the site.

## 10.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with local and provincial standards. Rooftop storage and minimal surface storage has been controlled to meet the allowable release rate to the existing 450mm diameter storm sewer within Hamilton Avenue ROW. The downstream receiving sewer has sufficient capacity to receive runoff volumes from the site.

## 10.4 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 Golder Associates Ltd. Erosion and sediment control measures will be implemented during construction to reduce the impact on existing facilities.

## 10.5 UTILITIES

Utility infrastructure exists within the Hamilton Avenue ROW at the eastern 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.

## 10.6 APPROVALS/PERMITS

An Ontario Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECAs, formerly Certificates of Approval C of A) under the Ontario Water Resources Act maybe a requirement if existing sewers are shared to outlet onto Hamilton Avenue as the proposed site is expected to be severed into a separate parcel of land. Requirement for a MECP Permit to Take Water (PTTW) for sewer and building construction will be confirmed by the geotechnical consultant.