100 Steacie Drive

Site Servicing and Stormwater Management Report

Stantec

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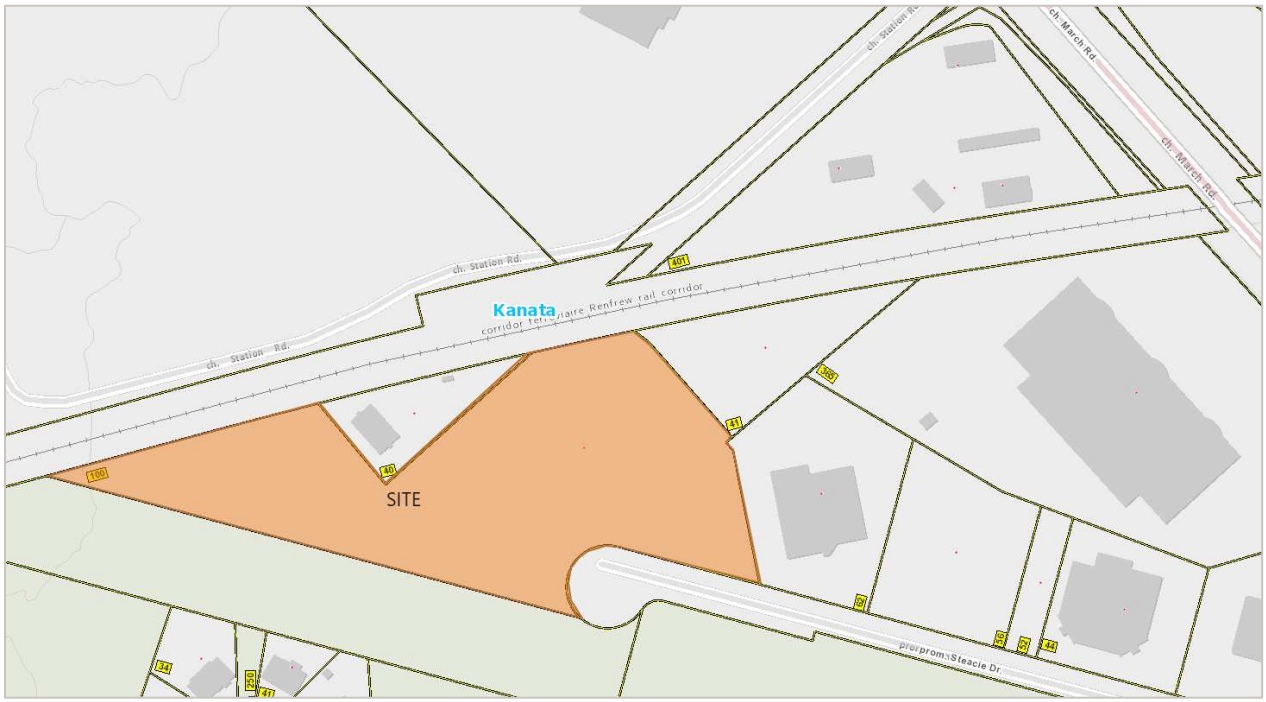
1 Introduction

Stantec Consulting Ltd. has been commissioned by 11034936 Canada Inc. to prepare the following Site Servicing and Stormwater Management Report in support of a Site Plan Control application for the proposed development located at 100 Steacie Drive in the City of Ottawa.

The site is 2.2 ha in area and is situated approximately 250 m southwest from the March Road and Station Road intersection, on the west end of Steacie Drive and the south side of the Canadian National Railway Renfrew Subdivision. The site is currently zoned R4Y [2809] S463-h, O1, and O1R and is presently vacant. The site is bounded by the CN Rail Renfrew Subdivision to the north, Steacie Drive and existing commercial development to the east, greenspace, and existing residential development to the south and west, as shown on **Figure 1.1** below.

Figure 1.1: Location Plan



The proposed 2.2 ha site consists of two 4-storey medium rise residential buildings which would function as retirement facilities. Neuf has prepared a site plan and design brief dated May 29, 2025, while correspondence with Neuf (attached in **Appendix A**) confirmed the two buildings are proposed to have a total of 196 apartment units with the unit type breakdown summarized in **Table 1.1** below.

Table 1.1: Unit Type Breakdown

Unit Type	Number
Studio	2
One-bedroom	170
Two-bedroom	24
Total	**196**

1.1 Objective

This site servicing and stormwater management (SWM) report presents a servicing scheme that is free of conflicts, provides on-site servicing in accordance with City of Ottawa Design Guidelines, and uses the existing municipal infrastructure in accordance with any limitations communicated during consultation with the City of Ottawa staff. Details of the existing infrastructure located within Steacie Drive and Station Road right of ways (ROW) were obtained from available as-built drawings and site topographic survey.

Criteria and constraints provided by the City of Ottawa have been used as a basis for the detailed servicing design of the proposed development. Specific and potential development constraints to be addressed are as follows:

- Potable Water Servicing
    - Estimated water demands to characterize the proposed feed(s) for the proposed development which will be serviced from the 200 mm diameter watermains on Steacie Drive and Station Road.
    - Watermain servicing for the development is to be able to provide average day and maximum day (including peak hour) demands (i.e., non-emergency conditions) at pressures within the acceptable range of 345 to 552 kPa (50 to 80 psi)
    - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 140 kPa (20 psi)
- Wastewater (Sanitary) Servicing
    - Define and size the on-site sanitary sewers which will be connected to the existing 250 mm diameter sanitary sewers within the Steacie Drive ROW.
- Storm Sewer Servicing
    - Define major and minor conveyance systems in conjunction with the proposed grading plan.
    - Determine the stormwater management storage requirements to meet the allowable release rate for the site.
    - Define and size the on-site storm sewers that will contribute to the existing ditches along the CN Rail Renfrew Subdivision.
- Prepare a grading plan in accordance with the proposed site plan and existing grades.

Drawing SSP-1 illustrate the proposed internal servicing scheme for the site.

2 Background

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

- *Geotechnical Investigation Proposed Residential Development, Steacie Drive, Kanata, ON,* Morey Houle Chevrier Engineering LTD., May 2005
- 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
- *Site Servicing and Stormwater Management Report – 100 Steacie Drive* (Functional), Revision 3, Stantec Consulting Ltd., March 2022

3 Water Servicing

3.1 Background

The proposed development is in Pressure Zone 2W2C of the City of Ottawa's Water Distribution System. The existing watermains within the vicinity of the site comprises of the 200 mm diameter watermain stub on Station Road and the existing 200 mm diameter watermain on Steacie Drive.

3.1.1 Domestic Water Demands

The City of Ottawa Water Distribution Guidelines (July 2010) and ISTB 2021-03 Technical Bulletin were used to determine water demands based on projected population densities for residential areas and associated peaking factors. The population was estimated using an occupancy of 1.4 persons per unit for studio and one-bedroom units, and 2.1 persons per unit for two-bedroom units. Based on the unit type breakdown in **Table 1.1**, the proposed buildings are estimated to have a total population of 291 persons.

A daily rate of 280 L/cap/day has been used to estimate average daily (AVDY) potable water demand for the residential units. Maximum day (MXDY) demands were determined by multiplying the AVDY demands by a factor of 2.5 for residential areas. Peak hourly (PKHR) demands were determined by multiplying the MXDY by a factor of 2.2 for residential areas. The estimated demands are summarized in **Table 3.1** below and detailed in **Appendix A.1**.

Table 3.1: Estimated Water Demands

Total Apartment Units	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
196	291	0.9	2.4	5.2

3.1.2 Fire Flow Demands

The fire flow requirement for the development was calculated in accordance with Fire Underwriters Survey (FUS) methodology. Per Section 3.2.2.48A of the Ontario Building Code, the building was assumed to be non-combustible construction in the assessment for fire flow requirements according to the Fire Underwriters Survey (FUS) Guidelines.

Required fire flows were estimated based on a building of non-combustible construction type without full protections of all vertical openings (one hour fire rating), and a final sprinkler design to conform to the NFPA 13 standard. The gross floor area of the two largest floors + 50 % of the gross floor area of the additional floors were used in the FUS calculation for the two high-rises, as per Page 22 of the *Fire Underwriters Survey's Water Supply for Public Fire Protection* (2020).

The building's minimum required fire flow was determined to be 150 L/s (9,000 L/min); however, as the water modelling indicated the watermain would not be able to provide the fire flow, revised FUS calculations to account for the firewall splitting the building into two with footprints of 2250 m^2 were provided. Under this revised FUS calculations, the fire flow demand was reduced to 100 L/s (6,000 L/min). Detailed fire flow calculations per the FUS methodology are provided in **Appendix A.2**.

3.1.3 Boundary Conditions

The estimated domestic water demands, and fire flow demands were used to define the level of servicing required for the proposed development from the municipal watermain and hydrants within the Station Road and Steacie Drive ROWs. **Table 3.2** below outlines the boundary conditions for the two proposed connections servicing the site provided by the City of Ottawa as part of the 2nd submission review comments on February 7, 2025, and shown in **Appendix A.3**.

Table 3.2: Boundary Conditions

Connection	Steacie Drive	Station Road
Min. HGL (m)	126.5	
Max. HGL (m)	131.1	
MXDY+FF (183.3 L/s) (m)	111.7	125.0

3.2 Proposed Watermain Servicing and Layout

The proposed watermain alignment and sizing for the development has been designed to tie into the existing watermains on Steacie Drive and Station Road and to provide the required domestic and fire flows.

The building itself will be directly serviced by the 200 mm diameter watermain stub on Steacie Drive via two 150 mm diameter water service laterals, separated by an isolation valve. A new 200 mm diameter watermain is proposed to connect the existing stub on Steacie Drive to the existing watermain on Station Road to provide the necessary fire flows to the development and for looping. **Drawings SSP-1** and **SSP-2** details the proposed watermain design and connections.

3.3 Hydraulic Assessment

3.3.1 Level of Service

The City of Ottawa Water Distribution Design Guidelines state that the desired range of system pressures under normal demand conditions (i.e. basic day, maximum day and peak hour) should be in the range of 350 to 552 kPa (50 to 80 psi) and no less than 275 kPa (40 psi) at the ground elevation in the streets (i.e. at hydrant level). The maximum pressure at any point in the distribution system in occupied areas outside of the public right-of-way is 552 kPa (80 psi).

As per the OBC & Guide for Plumbing, if pressures greater than 552 kPa (80 psi) are anticipated, pressure relief measures are required. The maximum pressure at any point in the distribution system in unoccupied

areas shall not exceed 689 kPa (100 psi). Under emergency fire flow conditions, the minimum pressure objective in the distribution system is 138 kPa (20 psi).

3.3.2 Model Development

Hazen-Williams coefficients ("C-Factors") were applied to the new watermain in accordance with the City of Ottawa's Water Distribution Design Guidelines and as shown in **Table 3.3** below.

Table 3.3: Proposed Watermain C-Factors

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

As the proposed connection at Steacie Drive is located around 400 m east from the subject site, the segment of the existing 200 mm diameter watermain along Steacie Drive is modeled. Given there are three existing commercial sites serviced by the Steacie Drive watermain, commercial demands from those sites were estimated through their gross property parcel areas and daily rate of 28,000 L/gross ha/day per the City of Ottawa Water Design Guidelines. Maximum day (MXDY) demands were determined by multiplying the AVDY demands by a factor of 1.5 for commercial areas. Peak hourly (PKHR) demands were determined by multiplying the MXDY by a factor of 1.8 for commercial areas.

The existing external water demands serviced by the existing Steacie Drive watermain is summarized in **Table 3.4** below.

Table 3.4: Estimated Steacie Drive Existing Water Demands

Area (ha)	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
2.1	0.7	1.0	1.9

3.4 Hydraulic Model Results

PCSWMM by Computational Hydraulics Inc. (CHI) was used to conduct the watermain hydraulic analysis. The model was tested for AVDY, PKHR and MXDY+FF demands under the boundary conditions provided by the City of Ottawa.

3.4.1 Average Day Demand (AVDY)

Under average day demand, hydraulic modelling shows the anticipated pressure range to be 389 kPa to 437.3 kPa (56.4 psi to 63.4 psi) across the proposed site as shown in **Figure 3.1** below. This is well within the serviceable limit of 276 kPa to 552 kPa (40 psi to 80 psi) as specified in the City of Ottawa Water Design Guidelines.

Figure 3.1: AVDY Pressure Results (psi)

3.4.2 Peak Hour Demand (PKHR)

Under peak hour demands, hydraulic modelling indicates that the anticipated pressures range from 343 kPa to 373.8 kPa (49.8 psi to 54.2 psi) across the proposed site as shown in **Figure 3.2** below. This is

well within the serviceable limit of 276 kPa to 552 kPa (40 psi to 80 psi) as specified in the City of Ottawa Water Design Guidelines.

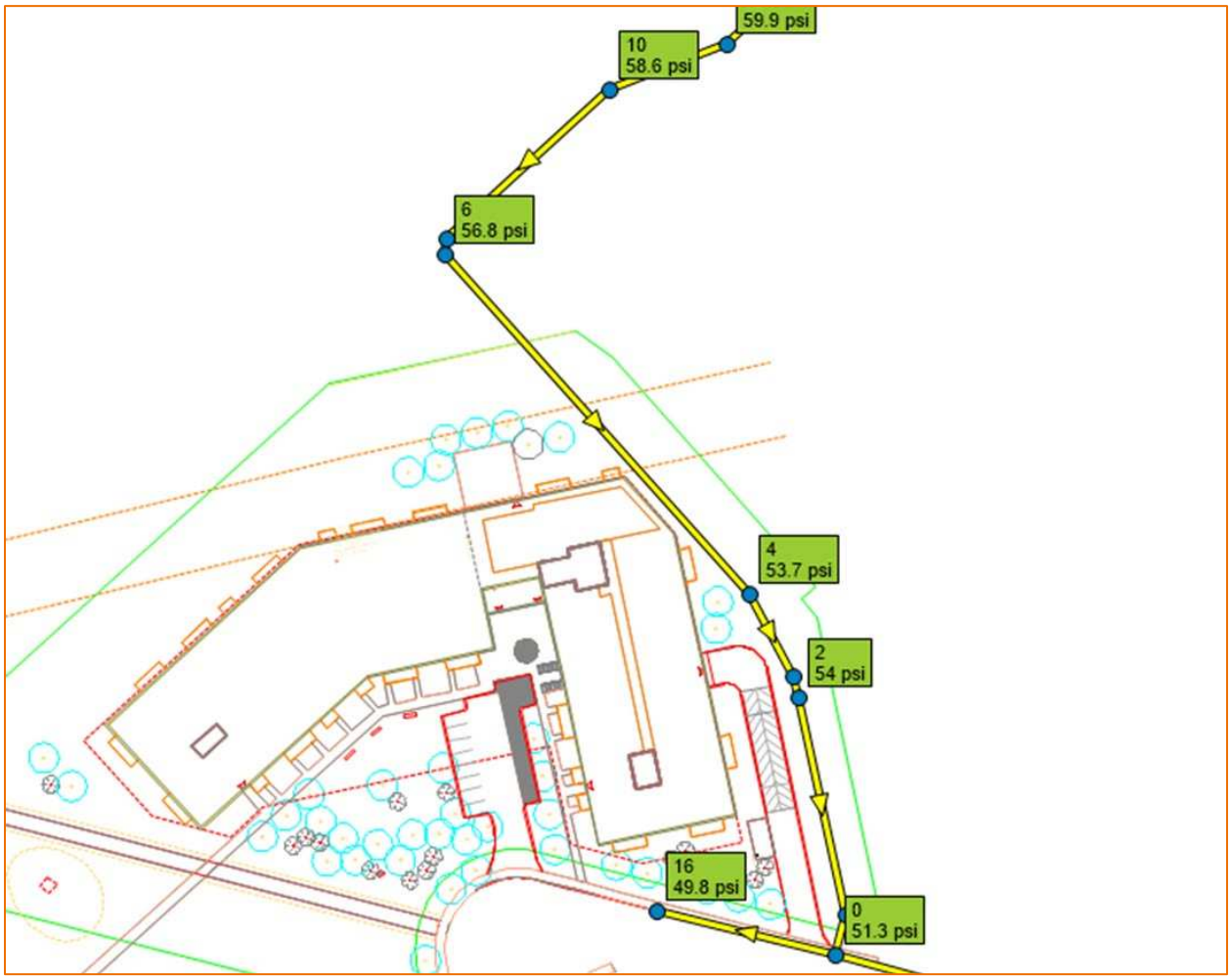


Figure 3.2: PKHR Pressure Results (psi)

3.4.3 Maximum Day Demand + Fire Flow (MXDY+FF)

The hydraulic modeling was also used to assess whether the proposed watermain could provide the maximum day and fire flow demand to the proposed development while maintaining a residual pressure of 138 kPa (20 psi) under the worst-case scenario, per the City of Ottawa Design Guidelines – Water Distribution. The modeling was carried out using a steady-state maximum day demand scenario along with the automated fire flow simulation feature of PCSWMM.

Figure 3.3 illustrates that the proposed watermain can deliver fire flows in excess of 6,000 L/min (100 L/s), while maintaining the required residual pressure of 138 kPa (20 psi).

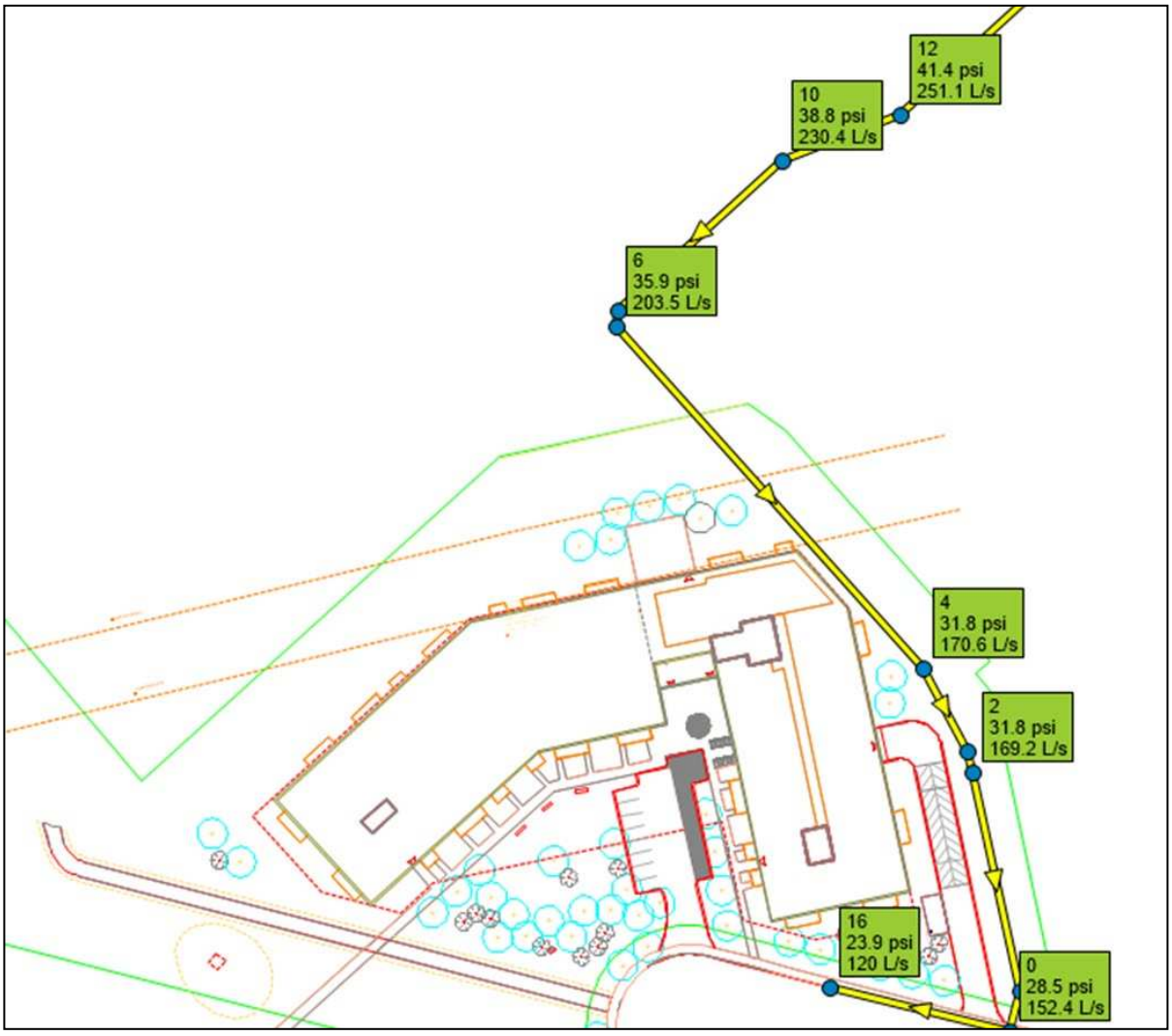


Figure 3.3: MXDY+FF Residual Pressures (psi)

3.5 Conclusion

Based on the findings of the report, sufficient fire flows are available within the proposed watermain network under emergency fire demand conditions (maximum day + fire flow) while meeting the minimum pressure requirements as per City of Ottawa standards.

4 Wastewater Servicing

4.1 Background

The site will be serviced via a short extension of the existing 250 mm diameter sanitary sewer within the Steacie Drive ROW at the southern boundary of the site (see **Drawing SSP-1**). It is proposed to connect to the existing sewer via a 200 mm sanitary service line to service the proposed site.

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 determine the size and location of the sanitary service laterals:

- 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 of sanitary sewer service = 135 mm
- Minimum grade of sanitary sewer service = 1.0 % (2.0 % preferred)
- Average wastewater generation = 280 L/person/day (per City Design Guidelines)
- Peak Factor = based on Harmon Equation; maximum of 4.0 (residential)
- Harmon correction factor = 0.8
- Infiltration allowance = 0.33 L/s/ha (per City Design Guidelines)
- Minimum cover for sewer service connections = 2.0 m
- Average population density for studio and one-bedroom units – 1.4 persons/unit
- Average population density for two-bedroom units – 2.1 persons/unit

4.3 Wastewater Generation and Servicing Design

The estimated peak wastewater flow generated are based on the current site plan. The anticipated wastewater peak flow generated from the proposed development is summarized in **Table 4.1** below.

Table 4.1: Estimated Total Wastewater Peak Flow

Number of Units	Population	Peak Factor	Peak Flow (L/s)	Infiltration Flow (L/s)	Total Peak Flow (L/s)
196	291	3.47	3.3	0.7	4.0

1. Design residential flow based on 280 L/p/day.

2. Peak factor for residential units calculated using Harmon's formula.
3. Average population estimated based on 1.8 persons/unit for apartments units.
4. Infiltration design flow equals 0.33 L/s/ha.

Detailed sanitary sewage calculations are included in **Appendix B.1**. A full port backwater valve will be required for the proposed building in accordance with the Sewer Design Guidelines and will be coordinated with the building mechanical engineers.

4.4 Proposed Servicing

A 200 mm diameter sanitary building service is proposed to service the development. The lateral will connect via a monitoring manhole to the proposed 200 mm diameter on-site private sanitary sewers, which will connect in turn to the existing 250 mm diameter sanitary sewer on Steacie Drive. The proposed sanitary servicing is shown on **Drawings SSP-1** and **SA-1**.

A full port backwater valve Per City Std S14.1 will be installed on the proposed sanitary service within the site to prevent any surcharge from the downstream sewer main from impacting the proposed property. A sump pump will be required for sewage discharge from the mechanical room. Sizing of the service laterals, sump pit, sump pump, and design of the internal plumbing and associated mechanical systems are to be confirmed by the mechanical consultant.

5 Stormwater Management

5.1 Objectives

The goal of this stormwater servicing and stormwater management (SWM) plan is to determine the measures necessary to control the quantity and quality of stormwater released from the proposed development to meet the criteria established during the consultation process with City of Ottawa staff, and to provide sufficient details required for approval.

5.2 SWM Criteria and Constraints

The Stormwater Management (SWM) criteria were established by combining current design practices outlined by the City of Ottawa Sewer Design Guidelines (SDG, October 2012), review of project pre-consultation notes with the City of Ottawa, the functional level *Site Servicing and Stormwater Management Report* previously prepared for the subject lands, 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) to be provided on-site for the development (MVCA/Kizell Drain).

Storm Sewer & Inlet Controls

- Discharge for each storm event to be restricted to pre-development levels with a maximum runoff coefficient of C=0.50. (City of Ottawa pre-consultation)
- Peak flows generated from events greater than the 5-year and including the 100-year storm must be detained on site (City of Ottawa pre-consultation)
- The foundation drainage system is to be independently connected to sewer main unless being pumped with appropriate back up power, sufficient sized pump, and backflow prevention. (City of Ottawa pre-consultation)
- Tc should be not less than 10 minutes (City of Ottawa SDG).
- Size storm sewers to convey at minimum the 5-year storm event under free-flow conditions using City of Ottawa I-D-F parameters (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 minimum of 0.30 m above the 100-year water level (City of Ottawa)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.35 m in the 100-year event (City of Ottawa)
- Provide adequate emergency overflow conveyance off-site with a minimum vertical clearance of 15 cm between the spill elevation and the ground elevation at the building envelope in the proximity of the flow route or ponding area (City of Ottawa)

5.3 Existing Conditions

The existing site (2.25 ha) is vacant with thick trees and greenspace. An area measuring approximately 2.33 ha corresponding to lands within the site for development and upstream offsite tributary areas have been used for determining the pre-development target release rate. Available topographic information for the site, of which the existing drainage conditions and grading for the site are derived from, are shown in **Drawing EX-1**.

Four sub-catchments were delineated in **Drawing EX-1** based on the existing topographic grading and outlets. As the existing site is undeveloped, the overall pre-development runoff coefficient was established to be C=0.20, below the maximum pre-development runoff coefficient of C=0.50 identified in consultation with City of Ottawa staff and summarized in **Table 5.1** below.

Table 5.1: Summary of Existing Subcatchment Areas

Catchment Areas	C	A (ha)	Outlet
EX-1	0.20	1.18	Ditch along rail line (West)
EX-2	0.20	0.11	Steacie ROW
EX-3	0.20	0.46	Ditch along rail line (North) via adjacent property
EX-4	0.20	0.58	Ditch along rail line (North)
Total	**0.20**	**2.33**	**-**

Note that area EX-1 includes upstream off-site tributary areas within the adjacent park land. Areas not proposed for development (Areas UNC-2 through UNC-4 as shown on **Drawing SD-1**) will continue to discharge overland on their existing drainage path. Area UNC-1 will continue to discharge uncontrolled to the Steacie Drive ROW and represents a marginal increase in runoff to the existing Steacie Drive roadside ditch.

The pre-development release rates for the site have been determined using the rational method and drainage characteristics identified 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 5.2** below:

Table 5.2: Target Release Rate

Design Storm	Target Flow Rate (L/s)
5-Year	135.1
100-Year	289.3

5.4 Stormwater Management Design

The proposed building will be serviced by a 250 mm diameter storm service lateral connected to a storm sewer network within the private driveways, which will collect stormwater discharge to a proposed stormwater dry pond, which ultimately discharges to the existing ditches along the north side of the existing rail corridor. The site has been subdivided into catchment areas to effectively collect, store, and convey runoff flowrates not exceeding the target release rate established in sections above.

Discharge from the building's rooftop, foundation drains, trench drain, and area drains are to be routed to the 250 mm diameter storm service lateral via the building's internal plumbing, which is to be designed by the mechanical consultant. On site catch basin(s) will collect additional drainage on site to the storm sewers for conveyance to the dry pond.

The proposed site plan, drainage areas and proposed storm sewer infrastructure are shown on **Drawing SD-1 and SSP-1**.

5.4.1 Quantity Control: Storage Requirements

The Modified Rational Method (MRM) was used to assess the flow rate and volume of runoff generated under post-development conditions. The site was subdivided into sub-catchments tributary to separate drainage outlets with most directed towards the dry pond. **Drawing SD-1** shows the delineated sub-catchment areas, while the MRM spreadsheet is included in **Appendix C.2**.

The following assumptions were made in the creation of the storm drainage plot and accompanying MRM spreadsheet:

- Excess run-off that cannot be captured as surface storage due to grading constraints is to sheet flow uncontrolled per existing conditions (areas UNC-1 to UNC-4).

- Area OFF-1 encompasses off-site runoff from the adjacent park which flows through the subject site. Area OFF-1 is tributary to the proposed dry pond and has been included in the overall pond discharge rate.
- An inlet control device (ICD) at the dry pond outlet manhole will be used to manage stormwater flows from the site.
- Restricted roof drains will be used to manage stormwater flows from the rooftop.

5.4.1.1 Rooftop Storage

It is proposed to retain stormwater on the building rooftop to a maximum depth of 0.15 m by installing restricted flow roof drains and overflow scuppers. The MRM calculations assume the roof will be equipped with 8 standard Watts model roof drains complete with Adjustable Accutrol Weirs. Discharge from the 8 controlled roof drains will be routed by the mechanical consultant through the building's internal plumbing to the storm service lateral.

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 5.3**, 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 5.3**:

Table 5.3: 100 Year Summary of Roof Controls

Area ID	Depth (mm)	Discharge (L/s)	Volume Stored (m^3)	Storage Provided (m^3)
R1A	134	20.7	66.6	90.5

*Drainage from the roof is anticipated to enter the dry pond at the western boundary of the site.

5.4.1.2 Surface Storage

As part of the stormwater management design of the site development, a stormwater management dry pond is proposed to attenuate peak flows from the site. Per the modified rational method calculations included as part of **Appendix C.2**, discharge from site are to be directed towards the proposed storm sewers on site, which ultimately conveys discharge to the dry pond. The volume of storage proposed is sufficient to retain the stormwater generated by each storm event while not exceeding the allowable release rate. A large portion of the stormwater on the site (excluding some uncontrolled flows) will be directed towards the dry pond and ultimately discharge to Kizell Creek.

The MRM sheet provided in **Appendix C.2** demonstrates that a volume of 94.6 m^3 of storage is required. Based on the proposed site plan, dry pond storage is available to provide the necessary storage within the site.

Controlled release rates and storage volumes required are summarized in **Table 5.4.**

Table 5.4: Surface Storage Areas - 100 Year Event

Tributary Area	Design Storm	Design Head (m)	Discharge (L/s)	Orifice Type	$V_{required}$ (m^3)	$V_{provided}$ (m^3)
POND-1, POND-2, POND-3, R2B, TRENCH, OFF-1	100-Year	1.09 (elevation 86.59)	88.6	200 mm	127.7	425.0

The proposed stormwater management pond is equipped with a 1.0 m wide spillway at elevation 87.40 to ensure that if the quantity control orifice is blocked, the pond may still safely discharge without impacting upstream USF elevations. As the proposed pond is oversized to meet storage requirements of the 100-year storm event, spillway use is not anticipated for design storm events up to and including the 100-year storm event.

5.4.1.3 Uncontrolled Areas

Uncontrolled areas represent drainage areas that cannot be graded to enter the storm sewer system due to grading restrictions. As such, they will sheet drain off the site to adjacent outlets per existing conditions.

Table 5.5: Peak Post-Development Uncontrolled Surface Release Rates

Design Storm	Release Rate (L/s)				
	UNC-1	UNC-2	UNC-3	UNC-4	Total
5-Year	6.6	12.3	24.1	31.7	**74.7**
100-Year	14.2	26.4	51.6	67.9	**160.1**

Table 5.6 compares the pre- and post-development peak stormwater release rates from site areas to the existing outlets per existing conditions. The table below demonstrates that by developing the site, the overall stormwater release rate from the site will be reduced by as compared to existing conditions.

Table 5.6: Comparison of Discharge Pre- to Post-Development

Outlet		A (ha)	C	5-Year (L/s)	5-Year Difference (L/s)	100-Year (L/s)	100-Year Difference (L/s)
Ditch along rail line (West)	Pre-	1.18	0.20	68.4	-	146.4	-
	Post-	0.55	0.20	31.7	-36.7	67.9	-78.5
Steacie Drive ROW	Pre-	0.11	0.20	6.4	-	13.7	-
	Post-	0.06	0.40	6.6	0.2	14.2	0.5
Ditch along rail line (North) via Adjacent property	Pre-	0.46	0.20	26.6	-	57.1	-
	Post-	0.19	0.23	12.3	-14.3	26.4	-30.7
Ditch along rail line (North)	Pre-	0.58	0.20	33.6	-	72.0	-
	Post-	0.33	0.20	24.1	-9.5	51.6	-20.4
Difference		**0.00**	**-**	**-**	**-60.3**	**-**	**-129.1**

The reverse sloped ramp to the parking garage is to be equipped with a trench drain at the bottom of the ramp to provide an outlet for the driveway area (TRENCH subcatchment) with connection to the building storm service.

5.4.2 Results

Table 5.7 identifies the release rates associated with the proposed stormwater management plan and demonstrates adherence to target peak outflow rates of the site. While the post-development discharge under the 5-year storm event exceeds its target, the impact of the 7 L/s exceedance is minimal.

Table 5.7: Summary 5-Year and 100-Year Event Release Rates

	Peak Discharge (L/s)	
	5-Year (L/s)	**100-Year (L/s)**
Total to Railway Ditch	135	235
Total to Steacie Drive ROW	7	14
Total	**142**	**249**
Target	**135**	**289**

5.4.3 Quality Control

On-site quality control measures are expected for the proposed development per pre-consultation with MVCA and City of Ottawa staff. It is assumed that enhanced protection (80 % removal of total suspended

solids) will be required for the site before discharging to the Kizell Creek. As a result, an oil grit separator (OGS) has been proposed to treat runoff from impervious areas directed to the proposed dry pond.

The OGS unit will be privately maintained and located upstream of the dry pond as shown on **Drawing SD-1**. Using a fine particle size distribution and the Stormceptor Sizing Tool, a Stormceptor model EF05 has been selected for the proposed inlet manhole at the dry pond and will achieve 85 % TSS removal, exceeding the minimum required level of 80 %. The surface areas and runoff coefficient in which the sizing is based on is tabulated in **Table 5.8** below, while the detailed Stormceptor sizing report is included in **Appendix C.3**.

Table 5.8: Surface Area and Runoff for Stormceptor Sizing

Catchment Areas	A (ha)	C
R1A	0.23	0.90
R2B	0.22	0.90
TRENCH	0.05	0.67
POND-1	0.39	0.27
POND-2	0.14	0.29
POND-3	0.09	0.77
Total	**1.12**	**0.58**

The proposed OGS (Stormceptor) unit has been considered as an example only. Other OGS products or treatment systems with equivalent TSS removal capabilities may also be selected based on the input parameters noted within the Stormceptor sizing report.

6 Grading and Drainage

The proposed development site measures approximately 2.2 ha in area. The topography across the site is sloped with higher elevations near the southern boundary draining towards Kizell Creek located at the southwestern boundary of the site.

Detailed grading plans (see **Drawing GP-1, GP-2**) 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 Kizell Creek as depicted in **Drawing GP-1.**

7 Utilities

Bell, Hydro and Rogers services exist in the vicinity of the proposed site. The site will be serviced through connection to these existing services.

As per our conversation with Enbridge, they have a plant within the vicinity of the site and 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.

Hydro, Bell, Gas and Cable servicing for the proposed development should be readily available within subsurface utility infrastructure within the Steacie Drive 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.

8 Approvals

The proposed stormwater works comprises of a dry pond that ultimately discharges to Kizell Creek. As the site is of a single parcel under singular ownership, The site will not require an Environmental Compliance Approval (ECA) from the Ministry of the Environment, Conservation and Parks (MECP) under O.Reg. 525/98 for stormwater management works. An ECA will be required for municipally operated sanitary sewer works within the Steacie Drive ROW, to be processed under CLI-ECA for pre-approved works.

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 Erosion Control During Construction

To protect downstream water quality and prevent sediment build-up in catch basins and storm sewers, erosion and sediment control measures must be implemented during construction. The following recommendations will be included in the contract documents and communicated to the Contractor.

1. Implement best management practices to provide appropriate protection of the existing and proposed drainage system and the receiving water course(s).
2. Limit the extent of the 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 geotextiles, geogrid, or synthetic mulches.
6. Install silt barriers/fencing around the perimeter of the site as indicated in **Drawing ECDS-1** to prevent the migration of sediment offsite.
7. Install trackout control mats (mud mats) at the entrance/egress to prevent migration of sediment into the public ROW.
8. Provide sediment traps and basins during dewatering works.
9. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
10. Schedule the construction works at times which avoid flooding due to seasonal rains.

The Contractor will also be required to complete inspections and guarantee the proper performance of their erosion and sediment control measures at least after every rainfall. The inspections are to include:

- Verification that water is not flowing under silt barriers.
- Cleaning and changing the sediment traps placed on catch basins.

Refer to **Drawing ECDS-1** for the proposed location of silt fences, sediment traps, and other erosion control measures.

10 Geotechnical Investigation

A geotechnical investigation was conducted by Morey Houle Chevrier Engineering Ltd. in May 2005. Subsurface soil conditions within the boundaries of the proposed site were determined by 16 boreholes distributed across the site. The subsurface profile across the site described by the previous investigation consists of surficial fill material made up by topsoil composed of silty sand, underlaid by silty clay with glacial till encountered at some locations.

Bedrock elevations vary from 0.9 m to 5.4 m below existing ground surface. Groundwater elevations at the time were encountered from 0.2 m to 0.6 m. An updated geotechnical investigation is recommended to obtain accurate results based on current conditions.

11 Conclusions

11.1 Water Servicing

Based on the boundary conditions provided by the City of Ottawa, the adjacent watermains on Steacie Drive and Station Road can provide adequate flow and pressure to service the development. Pressure across the distribution system meets the pressure range as per the City of Ottawa Water Design guidelines under typical demand conditions (Average Day and Peak Hour).

The results also indicate that sufficient fire flows are available within the proposed watermain network under emergency fire demand conditions (maximum day + fire flow) while meeting the minimum requirements as per the City of Ottawa Water Design guidelines.

11.2 Sanitary Servicing

The proposed sanitary sewer service will consist of a sanitary service lateral, a 200 mm diameter sanitary sewer, a sanitary sump pit, monitoring ports, and sump pump(s) directing wastewater to the existing 250 mm diameter sanitary sewer on Steacie Drive. Full port backwater valves will be installed on the proposed sanitary service within the site to prevent any surcharge from the downstream sewer main from impacting the proposed property. A sump pump will be required for sewage discharge from the mechanical room. Sizing of the service lateral, sump pit, and sump pump are to be confirmed by the mechanical consultant.

11.3 Stormwater Servicing

Rooftop storage and a stormwater dry pond has been proposed to limit the stormwater discharge rates to the pre-development levels. The uncontrolled site areas continue to drain uncontrolled to the existing outlets, adjacent properties, and the Steacie Drive ROW as per existing conditions.

A 250 mm diameter storm service lateral is proposed for the building's foundation, roof drain, and internal storm drainage plumbing system, which will receive drainage from the area drains on site and will be equipped with a full port backwater valve. The on-site storm sewer conveys discharge from the building and the immediate areas to a proposed dry pond, which will be equipped with an inlet control device at the outlet for quantity control and outlet to the existing northern ditch within the existing rail corridor. Sizing of the service lateral, foundation, and area drains are to be confirmed by the mechanical consultant. Flood plain mapping provided by the MVCA for Kizell Creek has been incorporated in the site design.

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 Houle Chevrier

Engineering Ltd. 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 Steacie Drive ROW at the 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

The site will be subjected to Ministry of the Environment, Conservation and Parks (MECP) Environmental Compliance Approval (ECA) process under O.Reg. 525/98 for sanitary sewer works within Steacie Drive. Requirement for a MECP Permit to Take Water (PTTW) for sewer and building construction will be confirmed by the geotechnical consultant.