Site Servicing and Stormwater Management Brief – 275 King Edward Street, Ottawa, ON

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Sign-off Sheet

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1.0 INTRODUCTION AND OBJECTIVE

Stantec Consulting Ltd. has been retained by Claude Lauzon Group Ltd. to prepare the following site servicing and stormwater management (SWM) brief to satisfy the City of Ottawa Site Plan Control Application process. The site is located on 275 King Edward Avenue, with Clarence Street to the south and Murray Street to the north in the city of Ottawa (see **Figure 1** below).

The 0.13 ha site is currently vacant, but was previously occupied by two vacant two-storey buildings along King Edward and an existing residential dwelling on Murray Street. The proposed development consists of a six-storey condominium apartment building with retail and office space on the ground floor, underground parking and associated access and servicing infrastructure.

Figure 1: Site Location

1.1 OBJECTIVE

This site servicing and SWM brief has been prepared to present a servicing scheme that is free of conflicts and which utilizes the existing infrastructure as obtained from available as-built drawings. Infrastructure requirements for water supply, sanitary and storm sewer services are presented in this report.

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

- Prepare a preliminary grading plan in accordance with the proposed site plan and existing grades.
- Storm Sewer Servicing
  - Define major and minor conveyance systems in conjunction with the preliminary grade control plan
  - Determine the stormwater management storage requirements to meet the allowable release rate for the site
  - Coordinate with mechanical engineer and architect to provide an underground cistern and sump pump system to meet SWM requirements
- Wastewater Servicing
  - Define and size the sanitary service laterals
- Water Servicing
  - Estimate water demands to characterize the proposed feed for the King Edward at Clarence Street development which will be serviced from the existing 152 mm diameter watermain along Clarence Street.
  - 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 40 to 100 psi (275 to 690 kPa)
  - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 20 psi (140 kPa)

The accompanying drawings included in the back of this report illustrate the preliminary internal servicing scheme for the site.

2.0 REFERENCES

The following background studies have been referenced during the preliminary servicing design of the proposed site:

- *Phase 1 Environmental Site Assessment, 260 Murray Street - 263-265 King Edward Avenue – 269-275 King Edward Avenue, Inspec Sol., October 19, 2007*
- *Geotechnical Investigation*, 260 Murray Street / 269-275 King Edward Avenue, Inspec Sol., March 27, 2007
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, July 2010
- *City of Ottawa Sewer Design Guidelines*, City of Ottawa, October 2012
- *Technical Bulletin ISDTB-2014-01,* City of Ottawa, February 2014
- *Hydraulic Analysis - 277 King Edward Street*, Stantec Consulting Ltd., July 6, 2015

3.0 WATER DISTRIBUTION

The proposed building is located in Pressure Zone 1W of the City of Ottawa's Water Distribution System. According to the City's Pressure Zone 1W Operations Manual, the normal hydraulic gradeline (HGL) for Zone 1W is 113 m. However, the HGL depends on water levels in the Carlington Heights Reservoir and high lift pumping conditions at the treatment plants and the Fleet Street Pumping Station. Based on our knowledge of the distribution network, the dynamic HGL in Zone 1W can typically vary from 106.9 m to 119.0 m.

The proposed six-storey building is to be a high rise apartment building with a mixed commercial/ residential use on the ground floor and underground parking. The building is to have a total floor space of approximately 4,260 m^2 (0.43 ha) above grade and is proposed to be connected to the 152 mm diameter watermain along Clarence Street as shown on the Conceptual Site Plan (see **Drawing SSP-1**).

Water demands were calculated using the City of Ottawa Water Distribution Guidelines (July, 2010) to determine the typical operating pressures to be expected at the building. The average daily (AVDY) commercial demand was estimated using a consumption rate of 28,000 L/ha/d**.** Maximum day (MXDY) commercial demand was determined by multiplying the AVDY demand by a factor of 1.5 and peak hourly (PKHR) demand was determined by multiplying the MXDY demand by a factor of 1.5.

The AVDY residential demand was estimated for an apartment unit with an average occupancy of 1.8 persons per unit (PPU) and a consumption rate of 350 L/cap/day. MXDY residential demand was determined by multiplying the AVDY demand by a factor of 2.5 and PKHR residential demand was determined by multiplying the MXDY demand by a factor of 2.2. The estimated demands are summarized in **Table 1**.

Table 1: Estimated Water Demands

	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Commercial	0.01	0.02	0.04
Residential	0.17	0.43	0.94
Total	**0.18**	**0.45**	**0.98**

The fire flow requirement was calculated in accordance with Fire Underwriters Survey (FUS) and determined to be approximately 19,000 L/min (317 L/s). This was based on a non-combustible construction building with a one hour rating for vertical openings and exterior vertical communications, contains combustible contents and is equipped with a sprinkler system. This estimate includes the underground parking levels as part of the total building area (0.11ha per parking level).

The boundary conditions listed below were provided by the City of Ottawa on March 17, 2015 for the estimated water demands for the previous site plan which included 54 apartment units and 781m^2 of commercial space. Since the number of apartment units and total commercial

area are reduced for the current site plan, the previous boundary conditions were considered reasonable and a conservative estimate.

Minimum HGL = 106.3 m

Maximum HGL = 118.6 m

MXDY + Fire Flow (266 L/s) = 99.5 m

The desired normal operating objective pressure range as per the City of Ottawa 2010 Water Distribution Design Guidelines is 345 kPa (50 psi) to 552kPa (80 psi) and no *less than 276kPa (40 psi)* at ground elevation. Furthermore, the maximum pressure at any point in the water distribution should not exceed 100 psi as per the Ontario Building/Plumbing Code; pressure reducing measures are required to service areas where pressures *greater than 552kPa (80 psi)* are anticipated.

The ground elevation along Clarence where the proposed building is to be connected is approximately 57.98 m. With respect to the peak hour flow conditions, the resulting boundary condition HGL of 106.3 m corresponds to a peak hour pressure of 474 kPa (69 psi). Since the proposed building is a 6-storey building, an additional 34 kPa (5 psi) for every additional storey over two storeys is required to account for the change in elevation head and additional headloss. Given that the lowest pressure is expected to be 474 kPa (69 psi) at ground level, the resultant equivalent pressure at the 6th floor will be approximately 338 kPa (49 psi) and within the City's objective pressures. Internal plumbing to be designed to minimum internal headloss otherwise a pump may require to maintain an acceptable level of service on the higher floors.

With respect to the maximum pressure during basic day demands, the resulting boundary condition HGL of 118.6 m corresponds to a pressure of 594 kPa (86 psi). As per the OBC, pressure reducing measures such as PRVs will be required to control pressures that are anticipated to exceed 552 kPa (80 psi).

In regards to available fire flow, boundary conditions provided by the City confirm that a flow rate of 16,000 L/min (266 L/s) would have a residual pressure of 407kPa (59 psi). Therefore, a fire flow rate of 19,000 L/min (317 L/s) should be achievable within the watermain at this proposed location while maintaining a residual pressure of 138kPa (20 psi).

In conclusion, based on the boundary conditions provided, the 152 mm diameter watermain on Clarence Street provides adequate fire flow capacity as per the Fire Underwriters Survey. The service connection will also be capable of providing anticipated demand but exceeds the maximum objective pressure of 552 kPa (80 psi). Therefore, pressure reducing measures, such as a pressure reducing valve, will be required to service the proposed building per the Ontario Plumbing Code. The minimum anticipated pressure of 474 kPa (69psi) is sufficient to provide the highest floors with an acceptable equivalent pressure provided the internal plumbing is sized to minimize headloss, otherwise a booster pump could be required.

4.0 SANITARY SEWER

As illustrated on **Drawing SSP-1**, sanitary servicing for the proposed development will be provided through the existing 300 mm diameter sanitary sewer running west along Clarence Street which ultimately discharges into an existing 1050 mm diameter sanitary sewer on King Edward Avenue.

The proposed 0.13 ha development will consist of 31 apartment units, 2600 m^2 of commercial/office area, underground parking, and associated access infrastructure. The anticipated wastewater peak flow generated from the proposed development is summarized in **Table 2** below:

Table 2: Estimated Wastewater Peak Flow

Residential Units				Commercial Area			
# of Units	Population	Peak Factor	Peak Flow (L/s)	Area (ha)	Peak Factor	Peak Flow (L/s)	Infiltration Flow (L/s)
23	42	4.0	0.68	0.15	1.50	0.13	0.05
					Total Estimated Wastewater Peak Flow (L/s):		**0.86**

1. Average residential flow based on 350 L/p/day and average commercial flow obtained from 50,000 L/Gross Area/d
2. Peak factor for residential units calculated using Harmon's formula and taken as 1.5 for commercial areas
3. Average apartment population assumed to be 1.8 persons/unit
4. Infiltration flow based on 0.28 L/s/ha.
5. Commercial area includes underground parking lot area

An analysis of the existing 300mm diameter sanitary sewer in Clarence Street was completed to estimate the available capacity within the sewer. Based on available existing sanitary sewer infrastructure mapping it was determined that the contributing drainage area to the existings sewer is relatively small at approximately 0.89ha (not including the proposed site development). **Figure 2** below illustrates the approximate drainage area. A combination of aerial imagery and street level observation was used to assess the land use and estimate the number of units and population within the drainage area. The results of this analysis are detailed in the sanitary design sheet in **Appendix C** and summarized in **Table 3** below.

Table 3: Summary of External and Site Sanitary Flows

	Area (ha)	Population	Commercial area (ha)	Peak Flow (l/s)	Infiltration (l/s)	Total Flow (l/s)
External	0.89	172	-	3.65	0.25	3.90
Site	0.08	42	0.15	0.81	0.05	0.86
Total	0.97	214	0.15	4.46	0.30	4.76

Figure 2: Existing Sanitary Drainage Area

Detailed sanitary sewage calculations are included in **Appendix C**. A backflow preventer will be required for the proposed building in accordance with the Ottawa sewer design guide, and will be coordinated with building mechanical engineers.

All underground parking drains should be connected to the internal building plumbing. A sump pump will be required to drain the underground parking level 2 based on the proposed elevation of the parking level 2 and the existing sanitary sewer in Clarence Street.

4.1 SANITARY SEWER DESIGN CRITERIA

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

- Minimum Velocity – 0.6 m/s (0.8 m/s for upstream sections)
- Maximum Velocity – 3.0 m/s

Sanitary Sewer
September 20, 2016

- Manning roughness coefficient for all smooth wall pipes – 0.013
- Average Commercial Wastewater Generation – 50,000L/ha/day
- 1.8 persons/residential unit (apartment)
- Commercial Peak Factor – 1.5
- Harmon's Formula for Peak Factor – Max = 4.0
- Extraneous Flow Allowance – 0.28 L/s/ha (conservative value)
- Manhole Spacing – 120 m
- Minimum Cover – 2.5 m

5.0 STORMWATER MANAGEMENT

5.1 OBJECTIVES

The objective of this stormwater management plan is to determine the measures necessary to control the quantity of stormwater released from the proposed development to the required levels, and to provide sufficient detail for approval and construction.

5.2 SWM CRITERIA AND CONSTRAINTS

The stormwater management criteria for the proposed site are based on City of Ottawa Sewer Design Guidelines (2012) and on consultation with City of Ottawa Staff. The following summarizes the criteria used in the preparation of this stormwater management plan:

- All stormwater runoff from the proposed development 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 the five year storm with a runoff coefficient (C) equal to 0.5
- Maximum 100 year water depth of 0.3 m in parking and access areas
- Provide adequate emergency overflow conveyance (overland flow route) off-site
- Size storm sewers to convey 5 year storm event, assuming only roof controls are imposed (i.e. provide capacity for system without inlet control devices installed).
- Size storm sewers using an inlet time of concentration (Tc) of 10 minutes.
- Post-development runoff coefficient (C) value based on proposed impervious areas as per site plan drawing (see **Appendix B**).

5.3 STORMWATER MANAGEMENT DESIGN

The proposed 0.13 ha mixed-use development consists of a six-storey building designated for residential, commercial and office use, underground parking, a landscaped area and associated servicing infrastructure. The overall imperviousness of the site is 97% (C = 0.88).

Stormwater runoff from the proposed development will be directed to an existing 375 mm diameter storm sewer running west along Clarence Street and connecting into an existing 1800 mm diameter storm sewer on King Edward Avenue. An underground cistern is proposed to provide an additional 14m^3 of stormwater storage and will be located on underground parking level 1. Proposed elevations of the cistern and storm sewer service will allow for gravity drainage of the cistern. The conceptual site plan and existing storm sewer infrastructure on Clarence Street and King Edward Avenue are shown on **Drawing SSP-1**.

5.3.1 Design Methodology

The intent of the stormwater management plan presented herein is to mitigate any negative impact that the proposed development could have on the existing storm sewer infrastructure, while providing adequate capacity to service the proposed building, parking and access areas. The proposed stormwater management plan is designed to detain runoff on the rooftop and in the subsurface to ensure that peak flows after construction will not exceed the target release rate for the site.

A small portion of the site fronting Clarence Street and King Edward Avenue could not be graded to enter the building's internal plumbing system and as such it will sheet drain uncontrolled. Runoff from this uncontrolled area is included in the overall site discharge calculations.

5.3.2 Water Quantity Control

The Modified Rational Method was employed to assess the quantity and volume of runoff generated during post development conditions. The site was subdivided into subcatchments (subareas) tributary to storm sewer inlets, as defined by the location of catchbasins / inlet grates, and used in the storm sewer design (see **Appendix D**). A summary of subareas and runoff coefficients is provided in **Appendix D**, and **Drawing SD-1** indicates the stormwater management subcatchments.

5.3.3 Allowable Release Rate

Site discharge rates for each storm event up to the 100 year storm event are to be restricted to the 5 year storm event with a runoff coefficient, 'C' value, of 0.50 as outlined below:

Table 4: Target Release Rate

Rational Method 'C'	Area (ha)	Time of Concentration (min)	Q_{Target} (L/s)
0.50	0.13	10	19

5.3.4 Storage Requirements

The site requires quantity control measures to meet the restrictive stormwater release criteria. It is proposed that restricted release rooftop drains be used to reduce the peak outflow from the site. Additionally, a subsurface storage tank is proposed to reduce peak outflows from all site areas connected to the internal plumbing system of the building to meet the site target discharge rate. **Drawing SD-1** indicates the design release rate from the rooftop and the underground storage system. Stormwater management calculations are provided in **Appendix D**.

5.3.4.1 Rooftop Storage

It is proposed to retain stormwater on the rooftops by installing restricted flow roof drains. The following calculations assume the roof will be equipped with three standard Zurn Model Z-105-5 Control-Flow Single Notch Roof Drains, see **Appendix D** for details.

Zurn Industries Ltd. "Control-Flo" roof drain data has been used to calculate a practical roof release rate and detention storage volume for the rooftops. It should be noted that the "Control-Flo" roof drain has been used as an example only and that other products may be specified for use, provided that the roof release rate is restricted to match the maximum rate of release indicated in **Table 5** and **Table 6** and that sufficient roof storage is provided to meet (or exceed) the resulting volume of detained stormwater.

Table 5 and **Table 6** provide details regarding the retention of stormwater on the proposed rooftop during the 5 and 100 year storm events. Refer to **Appendix D** for details.

Table 5: Peak Controlled (Rooftop) 5-Year Release Rate

Area ID	Area (ha)	Head (m)	$Q_{release}$ (L/s)	V_{stored} (m^3)
BLDG 1	0.054	0.10	4.61	7.1
BLDG 2	0.015	0.09	1.4	1.2
BLDG 3	0.002	0.05	0.8	0.1
BLDG 4	0.009	0.08	1.3	0.6
BLDG 5	0.004	0.06	1.0	0.1

Table 6: Peak Controlled (Rooftop) 100-Year Release Rate

Area ID	Area (ha)	Head (m)	$Q_{release}$ (L/s)	V_{stored} (m^3)
BLDG 1	0.054	0.13	6.1	16.7
BLDG 2	0.015	0.13	1.9	2.9
BLDG 3	0.002	0.08	1.2	0.2
BLDG 4	0.009	0.11	1.8	1.6
BLDG 5	0.004	0.09	1.4	0.4

5.3.4.2 Subsurface Storage

In addition to rooftop storage, it is proposed to detain stormwater within a 14 m^3 cistern below grade with controlled release rate of 11.0 L/s to the gravity service provided. The modified rational method was used to determine the peak volume requirement for the cistern. Where possible, site drainage areas are captured into the building plumbing directed to the cistern for additional control.

Table 7 and **Table 8** summarize the flow rates to the cistern.

Table 7: Peak Controlled (Tributary) 5-Year Release Rate

Area ID	Area (ha)	Runoff 'C'	$Q_{release}$ (L/s)	V_{stored} (m^3)
1	0.004	0.90	1.4	0.00
2	0.007	0.90	2.5	0.00
3	0.005	0.90	1.8	0.00
4	0.009	0.90	3.2	0.00
Ramp 1	0.001	0.90	0.4	0.00
Total Roof	0.084	0.90	9.11	9.1
Cistern	0.115	0.90	11.0	2.7

Table 8: Peak Controlled (Tributary) 100-Year Release Rate

Area ID	Area (ha)	Runoff 'C'	$Q_{release}$ (L/s)	V_{stored} (m^3)
1	0.004	1.0	2.0	0.00
2	0.007	1.0	3.5	0.00
3	0.005	1.0	2.5	0.00
4	0.009	1.0	4.5	0.00
Ramp 1	0.001	1.0	0.5	0.00
Total Roof	0.084	1.0	12.4	21.8
Cistern	0.115	1.0	11.0	12.3

5.3.5 Uncontrolled Area

A small portion of the site fronting Clarence Street and King Edward Avenue (see area UNC-1 on **Drawing SD-1**) could not be graded to enter the building's internal plumbing system and as such it will sheet drain uncontrolled. **Table 9** and **Table 10** summarize the 5 and 100 year uncontrolled release rates from the proposed development. It is also noted that the boulevard area between the site and King Edward Ave. and Clarence Street will continue to drain to the roadways. Although some hardening of this area is proposed, the post-development runoff coefficient does not exceed the C= 0.5 value designated for the infill development.

Table 9: Peak Uncontrolled (Non-tributary) 5-Year Release Rate

Area ID	Area (ha)	Runoff 'C'	Tc (min)	$Q_{release}$ (L/s)
UNC-1&UNC-2	0.018	0.73	10	5.2

Table 10: Peak Uncontrolled (Non-tributary) 100-Year Release Rate

Area ID	Area (ha)	Runoff 'C'	Tc (min)	$Q_{release}$ (L/s)
UNC-1&UNC-2	0.018	0.91	10	8.2

5.3.6 Results

Table 11 and **Table 12** demonstrate that the proposed stormwater management plan provides adequate attenuation storage to meet the target peak outflow for the site.

Table 11: Estimated Discharge from Site (5-Year)

Area Type	Area (ha)	V_{stored} (m^3)	$Q_{release}$ (L/s)	Target (L/s)
Controlled – Subsurface (Includes Roof area)	0.115	2.7	11	**19**
UNC-1	0.018	0.0	5	
Total	**0.133**	**3.1**	**16**	

Table 12: Estimated Discharge From Site (100-Year)

Area Type	Area (ha)	V_{stored} (m^3)	$Q_{release}$ (L/s)	Target (L/s)
Controlled – Subsurface (Includes Rooftop)	0.115	12.3	11	**19**
UNC-1	0.018	0.0	8	
Total	**0.133**	**12.3**	**19**	

6.0 GRADING AND DRAINAGE

The proposed development site measures approximately 0.13 ha in area. Approximately half of the site currently drains north towards Murray Street and the other half drains south towards Clarence Street, with an average grade change of approximately 0.56 m. A detailed grading plan (see **Drawing GP-1**) has been provided to satisfy the stormwater management requirements, to meet minimum cover requirements for storm and sanitary sewers, and to provide sufficient cover over top of the underground parking garage. Site grading has been established to provide emergency overland flow routes for stormwater management in accordance with City of Ottawa requirements.

The subject site maintains emergency overland flow routes to the existing Murray Street ROW and the existing Clarence Street ROW as depicted on **Drawings GP-1** and **SD-1**.

7.0 UTILITIES

All utilities (Hydro Ottawa, Bell Canada, Rogers Ottawa, and Enbridge Gas) have existing plants in the area. The site will be serviced through connection to these existing services. Detailed design of the required utility services will be further investigated as part of the composite utility planning process following design circulation.

8.0 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.
9. Installation of a mud matt to prevent mud and debris from being transported off site.
10. Installation of a silt fence to prevent sediment runoff.

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

1. Verification that water is not flowing under silt barriers.
2. 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.

9.0 GEOTECHNICAL INVESTIGATION

A geotechnical investigation was conducted by Inspec-Sol in March 2007. As stated in the geotechnical investigation, the subsurface profile across the site consists of surficial fill overlying a thick silt deposit and glacial sand till.

Groundwater levels were measured in hydraulic piezometers acting as standpipes installed in Borehole #1. Groundwater levels were recorded on February 26 and March 7, 2013 and were found to be 3.50 and 3.44 m below the existing ground surface respectively. Groundwater levels are subject to seasonal fluctuations.

The geotechnical investigation recommended that a trench drain system be installed as a precautionary measure, around the exterior perimeter walls and beneath the deepest basement floor slab. The drain system should be provided with sufficient clean-outs to permit maintenance when required and should also be connected to a suitable sump pit(s) for mechanical evacuation.

10.0 CONCLUSIONS

10.1 WATER SERVICING

The 152 mm diameter watermain on King Edward provides adequate fire flow capacity as per the Fire Underwriters Survey. The service connection will also be capable of providing anticipated demand but exceeds the maximum objective pressure of 552 kPa (80 psi). Therefore, pressure reducing measures, such as a pressure reducing valve, will be required to service the proposed building per the Ontario Plumbing Code. The minimum anticipated pressure of 474 kPa (69 psi) is sufficient to provide the highest floors with an acceptable equivalent pressure provided the internal plumbing is sized to minimize headloss, otherwise a booster pump could be required.

10.2 SANITARY SERVICING

The proposed sanitary sewer lateral is sufficiently sized to provide gravity drainage for the site. The proposed site will be serviced by a 150 mm diameter service lateral directing wastewater flows to the existing 300 mm dia. Clarence Street sanitary sewer. A backflow preventer will be required for the proposed building in accordance with the Ottawa sewer design guide, and will be coordinated with building mechanical engineers. The proposed sanitary drainage pattern is in accordance with direction from pre-consultation with City of Ottawa staff.

10.3 STORMWATER SERVICING

The proposed stormwater management plan is in compliance with the goals specified through consultation with the City of Ottawa, as well as local standards. Subsurface and rooftop storage is proposed to limit inflow from the site area into the minor system to the required target release rate. An underground cistern and pump will be required to direct controlled release rates from the site to the proposed gravity service connected to the existing 375 mm dia. Clarence Street storm sewer. The downstream receiving sewer has sufficient capacity to receive runoff volumes from the site based on consultation with City of Ottawa staff.

10.4 GRADING

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

10.5 UTILITIES

All utilities (Hydro Ottawa, Bell Canada, Rogers Ottawa, and Enbridge Gas) have existing plants in the subject area. Exact size, location and routing of utilities will be finalized after design circulation.

10.6 APPROVAL / PERMITS

Ministry of the Environment and Climate Change (MOECC) Environmental Compliance Approvals (ECA) are not expected to be required for the subject site as the site is private and will remain under singular ownership. A Permit to Take Water may be required for pumping requirements for construction of underground parking level. No other approval requirements from other regulatory agencies are anticipated.