3718 Greenbank Road: Functional Servicing Report

Stantec Project No. 160401657

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1.0 INTRODUCTION

Mattamy Homes Ltd. has retained Stantec Consulting Ltd. to prepare this Functional Servicing Report for 3718 Greenbank Road (Half Moon Bay South Phase 8 - Residential). The subject site is located within the Brazeau Lands development area otherwise known as The Ridge, located at 3809 Borrisokane Road within the Barrhaven South Urban Expansion Area (BSUEA) in the City of Ottawa. It is bound by Dundonald Drive to the north, Obsidian Street to the west and Future Greenbank Road to the east as illustrated in **Figure 1** below.

Figure 1: Key Plan of 3718 Greenbank Road Development Area

The development land is approximately 4.31 ha in area consisting of 1.22 ha commercial area and 3.09 ha residential area comprising 19 blocks of townhouses with a total of 228 units. This functional servicing report covers only the residential portion of the site and will demonstrate that the subject site can be freely serviced by existing municipal water, sanitary, and storm services while complying with established design criteria recommended in background studies and City of Ottawa guidelines. A draft site plan is included in **Appendix B.**

This parcel is currently zoned MR1 and will need to undergo a zoning amendment for future development. The bulk of the current phase of the proposed development has been recently cleared of topsoil which has been stockpiled in several piles across the site. Generally, the ground surface across the subject site is relatively flat within the central portion of the development, and sloping sharply towards the north and

east property lines. It should be noted that parts of the subject site had undergone excavation and in-filling activities as part of a previous sand extraction operation. The property is within the Jock River watershed and is under the jurisdiction of the Rideau Valley Conservation Authority (RVCA).

2.0 REFERENCES

The following documents were referenced in the preparation of this Functional Servicing report:

- *City of Ottawa Sewer Design Guidelines*, 2nd Edition, City of Ottawa, October 2012.
- *City of Ottawa Design Guidelines – Water Distribution*, First Edition, Infrastructure Services Department, City of Ottawa, July 2010.
- *Design Brief for Cavian Greenbank Development Corporation,* The Ridge (Brazeau Lands), David Schaeffer Engineering Ltd., July 2020.
- *Geotechnical Investigation,* Proposed Mixed Use Development Half Moon Bay South – Phase 8 3718 Greenbank Road - Ottawa, PG5690-1, Paterson Group, March, 2020.
- *Hydraulic Capacity and Modeling Analysis Brazeau Lands*, Final Report, GeoAdvice Engineering Inc., July 2020.
- *Master Servicing Study – Barrhaven South Urban Expansion Area,* J.L. Richards & Associates Limited, Revision 2, May 2018.
- *Pond Design Brief for Brazeau Subdivision,* by J.F. Sabourin and Associates, July 2020.
- *Stormwater Management Report for Brazeau Subdivision,* by J.F. Sabourin and Associates (July 2020).
- *Stormwater Planning and Design Manual,* Ministry of the Environment, March 2003.
- *Technical Bulletin ISTB-2014-02 Revision to Ottawa Design Guidelines – Water*, City of Ottawa, May 2014.
- *Technical Bulletin PIEDTB-2016-01 Revisions to Ottawa Design Guidelines – Sewer,* City of Ottawa, September 2016.

3.0 POTABLE WATER SERVICING

3.1 BACKGROUND

The subject site is located within Zone 3SW of the City of Ottawa water distribution system. The proposed residential development will include 19 blocks with 228 townhome units. The subject site is within The Ridge (Brazeau lands) subdivision for which David Schaeffer Engineering Ltd. conducted a site servicing study in July 2020.

The development will be serviced via two existing 200mm diameter private watermain services located within Obsidian street and fed from the existing 300mm diameter watermain terminating at Dundonald Drive and the future New Greenbank Road alignment and a 400mm diameter watermain from the existing Cambrian Road forming part of the Tamarack Meadows, as shown in Design brief by DSEL in **Appendix E.1**.

In July 2020, GeoAdvice carried out a watermain analysis to determine the hydraulic capacity of the watermain network within Brazeau Lands which includes the residential portion of 3718 Greenbank Road. The analysis was based on boundary conditions obtained from the City of Ottawa. Refer to GeoAdvice water analysis in enclosed in **Appendix A.3.**

3.1.1 Connections to Existing Infrastructure

The proposed watermain alignment and sizing for the development is demonstrated on **Drawing SSP-1** in **Appendix F**. A 200mm diameter watermain is proposed to loop around the street fronting Block 1, and a second 200mm diameter watermain is proposed to loop around the street fronting Block 18. The connection points are as follows:

1) A 200mm diameter watermain will loop and connect to the existing 300mm watermain along Haiku Street via 45º horizontal bend.

2) A 200mm diameter watermain will loop and connect to the existing 300mm watermain along Obsidian Street via tee connections.

3.1.2 Domestic Water Demands

The 3718 Greenbank Road development will contain a total of 19 blocks with 228 townhome units and outdoor amenity areas having a total estimated population of 616 persons. Refer to **Appendix A.1** for detailed domestic water demand calculations.

Water demands for the development were calculated using the City of Ottawa's Water Distribution Design Guidelines. For residential developments, the average day (AVDY) per capita water demand is 350 L/cap/d. For maximum day (MXDY) demand, AVDY was multiplied by a factor of 2.5 and for peak hour (PKHR) demand, MXDY was multiplied by a factor of 2.2. The calculated residential water consumption is represented in **Table 3–1** below:

Table 3–1 Residential Water Demands

Unit Type	Units/ Amenity areas (m^2)	Persons/Unit	Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
Townhome	228	2.7	616	2.49	6.23	13.72
Outdoor amenity areas	1956			0.63	0.95	1.71
		Total	**616**	**3.13**	**7.18**	**15.43**

3.1.3 Fire Flow

The FUS fire flow calculation spreadsheet for the governing fire flow demand scenario (see **Appendix A.2**) was generated to calculate the expected fire flow demands from the proposed site.

Using the townhome block with the largest number of back-to-back units (12 units) as a worst-case scenario, fire flow calculations were performed with consideration of a firewall separating the governing block into building areas of no more than 600m^2 based on individual unit sizes. For the specified configuration, the required fire flow was estimated to be 167 L/s.

The ground floor area of a single storey of a block was estimated to be 470m^2 based on the average lot sizes shown on the site plan. The calculated fire flow was assessed based on hydraulic capacity and modelling analysis by GeoAdvice in July 2020 which identified connection point 1 as J-41 and connection point 2 as J-86. In the model, the fire flow demand at both connection points were 167L/s, which equals the previously assumed worst-case fire flow demand from the subject site. The model calculated the available flow at the hydrants under max. day and fire flow demands at J-41 and J-86 junction nodes as 615L/s and 436L/s respectively. The residual pressure in the system at 20 psi under Max. Day and fire flow conditions were estimated as 52psi and 45psi respectively.

Therefore, it is expected that the required fire flows for the subject site can be provided by the distribution system while maintaining minimum system residual pressures. Please refer to **Appendix A.3** for water analysis by GeoAdvice. Fire separation via firewalls will keep the maximum ground floor area of residential blocks below 600m^2 as per building code requirements, and location of firewalls within these blocks will be confirmed at the detailed design stage once the detailed hydraulic analysis has been completed.

3.2 LEVEL OF SERVICE

3.2.1 Allowable Pressures

The model by GeoAdvice provided by DSEL demonstrate that the pressures in the proposed development's (residential) watermain stubs fall within the range of target system pressures with a maximum basic day pressure of 76 psi and 72 psi at J-41 (connection point 1) and J-86 (connection point 2) respectively. The minimum peak hour pressure of 47psi and 42psi were observed at connection point 1

and connection point 2 respectively. The pressures are within the allowable pressure range of 350 to 552 kPa (50 to 80 psi) and not less than 275 kPa (40 psi) at the ground elevation in the streets (i.e., at hydrant level).

The residual pressure in the system under Max. Day and fire flow conditions were 52psi and 45psi at connection 1 and connection 2 respectively. Under emergency fire flow conditions, the minimum pressure objective in the distribution system should be more than 138 kPa (20 psi) as per City of Ottawa guidelines.

Given the functional grading of the subdivision, pressures within the development are expected to fall within the target range, and pressure reducing valves are not expected to be required. A hydraulic model using H2OMAP Water will be developed as part of the detailed design of the development to confirm system pressures within the private site.

In summary, the proposed 3718 Greenbank Road development can be adequately serviced by the 300mm watermain along Haiku Street and 300mm diameter watermain on Obsidian street, and the private watermains will provide sufficient fire flow to meet FUS requirements. System pressures are expected to fall within the City of Ottawa Water Distribution Guidelines.

4.0 WASTEWATER SERVICING

4.1 BACKGROUND

The subject site is located within the study of the Barrhaven South Urban Expansion Area (BSUEA) for which JLR associates prepared a Master Servicing Study in 2018. The study at, conceptual level, provided design data for wastewater servicing and estimated residual capacities for sanitary trunk sewer in the area, as shown in the MSS extract in **Appendix E.1.** The subject site is referred to as Mattamy West (Residential) in this study. DSEL relied on this study to prepare a design brief for adjacent The Ridge subdivision (Brazeau Lands).

Projected sanitary sewer flows for the subdivision is proposed to drain through the sanitary sewer alignment on Greenbank road. There is an existing 375mm diameter sanitary sewer collecting wastewater from the Ridge (Brazeau lands), which includes 3718 Greenbank Road, and flows into the sanitary sewer on Greenbank road. Refer to **Appendix E.1** for The Ridge site servicing study by DSEL (2020). The estimated peak sanitary flows for the subject site were originally determined as 4.45L/s (for a residential area of 1.90ha and a commercial area of 2.99ha) using City of Ottawa design criteria. This functional sanitary servicing study will be limited to the residential areas of Mattamy West lands which differs slightly from the current site plan.

The proposed development will be serviced by the existing sanitary sewer stub fronting the site, located off the Haiku and Obsidian Street intersection. The existing maintenance hole (SAN MH3A) will be relocated and cored into for the future connection. The wastewater contributions from the site will tie-in to this structure via a 200mm diameter PVC pipe.

DSEL estimated the subject site (referred to as Mattamy West (residential) area) to be 1.9ha with a projected population of 162 persons, peak factor of 3.54 and total flow of 2.49L/s which is 13% of the sanitary sewer full capacity.

4.2 DESIGN CRITERIA

As outlined in the City's Sewer Design Guidelines, the following design parameters were used to calculate estimated wastewater flow rates and to preliminarily size on-site sanitary sewers for the subject site:

a) Minimum Full Flow Velocity – 0.6 m/s
b) Maximum Full Flow Velocity – 3.0 m/s
c) Manning's roughness coefficient for all smooth-walled pipes – 0.013
d) Townhouse persons per unit – 2.7
e) Extraneous Flow Allowance – 0.33 L/s/ha
f) Residential Average Flows – 280 L/cap/day
g) Maintenance Hole Spacing – 120 m
h) Minimum Cover – 2.5m
i) Harmon Correction Factor – 0.8

In addition, a residential peak factor based on Harmon's Equation was used to determine the peak design flows per Ottawa's Sewer Design Guidelines.

Refer to **Appendix C.1** for the sanitary sewer design sheet for 3718 Greenbank Road

4.3 FUNCTIONAL SANITARY SERVICING DESIGN

Fourteen separate runs of 200 mm diameter sanitary sewers are proposed along the private roadways of the subject site. All sanitary sewers within the site ultimately outlet to existing SAN MH 3A located off Haiku/Obsidian Street intersection fronting Block 1. Existing MH SAN 3A is proposed to be relocated slightly closer to the site and cored to allow for connection to the property.

The proposed layout of the sanitary infrastructure is shown on **Drawing SA-1** in **Appendix F.** Sanitary peak flows will be directed to the 200mm diameter sanitary sewer on Obsidian Street which discharges to a 375mm diameter PVC sanitary sewer at Dundonald Drive which is ultimately directed to the sanitary sewer on Future Greenbank road. The connections to the existing sanitary sewer network and the associated peak flows are summarized in **Table 4–1** below.

Table 4–1 Summary of Proposed Sanitary Peak Flows

Area ID Number	Total area (ha)	No. Units	Population	Total Peak Flow (L/s)
Total Site	3.09	228	615	7.7

A population density of 2.7ppu was applied to the residential townhouse units on site. A residential peak factor, based on Harmon Equation, was used to determine the peak design flows. An allowance of 0.33 L/s/effective gross ha (for all areas) was used to generate peak extraneous flows.

The total design peak flow for the subject site to be conveyed to the connections at the Obsidian street sewer is 7.7 L/s. This value is slightly higher than the previous estimate of 2.49L/s by DSEL based on a service area of 1.9 ha and population of 162 people. The difference (4.68L/s) can be accommodated by the 200mm receiving sewer in Obsidian Street.

JLR Associates identified in its MSS for the BSUEA that there is residual capacity within the sanitary sewers draining Mattamy lands west to new Greenbank road based on a Stantec (2015) hydrodynamic model of trunk sanitary sewers (450 mm in diameter and greater), which in turn demonstrated that the existing downstream trunk system could accommodate the flows generated with no risk of surcharging or basement flooding. Consequently, Stantec concluded that system upgrades were not required. The residual capacity in the sanitary sewer downstream of Greenbank road was estimated as 74.0L/s (Refer to **Appendix E.1** for details).

5.0 STORMWATER MANAGEMENT AND SERVICING

5.1 BACKGROUND

The proposed residential development encompasses approximately 3.09 ha of land and consists of back-to-back townhomes and outdoor amenity areas. J.F. Sabourin and Associates Inc. (JFSA) were retained by David Schaeffer Engineering Ltd. (DSEL) to prepare a Stormwater Management (SWM) Plan for the adjacent Ridge (Brazeau) Subdivision. It should be noted that 1.93 ha was considered as the area of the proposed development, this value was adopted in all SWM analysis by JFSA. The design criteria, constraints and recommendations established by JFSA remain the governing criteria for the site and would be complied with in the SWM design of the subject site.

5.2 DESIGN CRITERIA AND CONSTRAINTS

The design criteria and guidelines used for the stormwater management of the subject subdivision are those that were developed in the background documents by JFSA, DSEL and JLR in the BSUEA MSS as well as those provided in the October 2012 *City of Ottawa Sewer Design Guidelines* and subsequent technical memorandums, and generally accepted stormwater management design guidelines.

The SWM design will ensure that all storm runoff within the site be controlled, and site release restricted to the rational method peak flow of 261L/s calculated by JFSA for the site based on a catchment area of 1.93 Ha. Hence, no adjustments to downstream infrastructure will be required to service the site.

All storm runoff within the site will be controlled and directed to an existing storm control point identified as MH 3 in JFSA SWM model. MH 3 has with an upstream Hydraulic Grade Line of 99.716m based on JFSA's simulation under 100-year 3-hour Chicago storm, 100-year 24-hour SCS Type II storm and the three historical events.

As reported by JFSA, the minor and major system stormwater management design criteria and constraints will consist of:

5.2.1 Minor System

a) Storm sewers are to be designed to provide a minimum 2-year level of service, plus 5-year inflows on collector roads and 10-year inflows on arterial roads.

b) The 100-year hydraulic grade line (HGL) within the development minor systems must be maintained at least 0.3 m below the underside of footing elevation where gravity house connections are installed.

c) For less frequent storms (i.e. larger than 1:2 year or 1:5 year on collector / 1:10 year on arterial roads), the minor system shall, if required, will be limited with the use of inlet control devices to

prevent excessive hydraulic surcharges and to maximize the use of surface storage on the road where desired.

d) Catchbasins on the road are to be equipped with City standard type S19 (fish) grates or City standard type S22 side inlets, and grates for catchbasins in rear yards, park and open spaces with pedestrian traffic are to be City standard type S19, S30 and S31.

e) Single catchbasins are to be equipped with 200 mm minimum lead pipes, and double catchbasins are to be equipped with 250 mm minimum lead pipes.

f) Rear yard catchbasins are to be equipped with 250 mm minimum lead pipes. Catchbasins installed on the street, where rear yard catchbasins connect to the main storm sewer through the catchbasin, are to be equipped with 250 mm minimum lead pipes for both single and double catchbasins.

g) Under full flow conditions, the allowable velocity in storm sewers is to be no less than 0.80 m/s and no greater than 3.0 m/s. Where velocities over 3.0 m/s are proposed, provisions shall be made to protect against displacement of sewers by sudden jarring or movement. Velocities greater than 6 m/s are not permitted.

5.2.2 Major System

a) The major system shall be designed with enough road surface storage to allow the excess runoff of a 100-year storm to be retained within road ponding areas where desired.

b) Inlet control devices would be sized such that they do not create surface ponding on the road during the 2-year design storm on local roads (5-year design storm on collector and 10-year design storm on arterial roads); it should be noted that surface ponding over grates is present during rainfall under any design, as an appropriate depth of water is required for runoff to enter the grate.

c) Roof leaders shall be installed to direct the runoff to splash pads and on to grassed areas.

d) For the 100-year storm, the maximum total depth of water (static + dynamic) on all roads shall not exceed 35 cm at the gutter.

e) During the 100-year + 20% stress test, the maximum extent of surface water on streets, rear yards, public space and parking areas shall not touch the building envelope.

f) When catchbasins are installed in rear yards, safe overland flow routes are to be provided to allow the release of excess flows from such areas.

g) The product of the maximum flow depths on streets and maximum flow velocity must be less than 0.60 m^2/s on all roads.

h) The excess major system flows up to the 100-year return period are to be retained on-site in development blocks such as the proposed development.

i) There must be at least 15 cm of vertical clearance between the spill elevation on the street and the ground elevation at the nearest building envelope that is in the proximity of the flow route or ponding area.

j) There must be at least 30 cm of vertical clearance between the rear yard spill elevation and the ground elevation at the adjacent building envelope.

5.3 WATER BALANCE – INFILTRATION REQUIREMENTS

As a Best Management Practices (BMP) approach the BSUEA MSS requires the capture and infiltration of stormwater via exfiltration system installed on local roads, such as the private roads within the subject site, where the surface runoff is not impacted by the City's winter road salting program to meet pre-development water balance criteria. As a part of the BSUEA MSS it was determined that pre-development infiltration within the study area accounted for 40% of the overall site's water budget. The City and RVCA determined that predevelopment infiltration levels should be maintained under post development conditions and that the infiltration should be provided across the development and not simply concentrated to one or two locations. JFSA determined the infiltration target for the site to be of the average simulated annual rainfall volume (552.0 mm), which is calculated to be 220.8mm annually as reported by JFSA in **Appendix E.2.**

At this functional stage an Etobicoke Exfiltration System has been proposed to be located within the storm sewer on private roads of the subject site on sewer sections not identified as Catch basin leads, the proposed locations of which are highlighted in **Drawing SD-1** in **Appendix F**.

Target infiltration levels and capacity of the EES system needed will be confirmed at detailed design. The EES units will be installed underneath storm sewers within the ROW in specific areas determined as being suitable based on-site constraints. Each system is expected to consist of one or two 250 mm diameter perforated pipes surrounded by a 0.85 m deep by 1.20 m wide clear stone trench. Goss traps will be installed in upstream catchbasins in order to prevent/mitigate debris and potential oils from entering the perforated pipe system.

A water balance and subsurface hydrogeological investigation with respect to native soil infiltration potential will be used at detailed design stage to determine the EES capacity selected for the proposed development.

5.4 PROPOSED CONDITIONS

The proposed site conditions are based on the preliminary storm design of the subject site and Storm drainage plan shown in **Drawing SD-1** in **Appendix F**. The storm drainage areas have been assessed at a high level, and the runoff coefficients (C values) were calculated for each sub-catchment area using a C of 0.20 for soft surfaces (i.e. landscaped areas) and a C of 0.90 for hard surfaces (i.e. roads, roofs, and

sidewalks). Runoff coefficients are demonstrated on the Storm Drainage Plan shown on **Drawing SD-1** in **Appendix F**, while the functional storm sewer design sheet has been provided in **Appendix D.1**.

Minor system flow will be conveyed by the proposed storm sewer within the private roadways of the development. Catchbasin and catchbasin leads are proposed as stormwater inlet structures across the site. Overland flow routes are also proposed to safely convey emergency overland peak flows through the streets fronting Block 1 and 18, which direct flows to Obsidian and in two different directions through Haiku and Chillerton Drive as shown in in **Drawing SD-1** in **Appendix F.**

Inlet control devices (ICDs) are to be specified during the detailed design stage for all street and rear yard catch basins to limit the inflow to the minor system to conform with controlled discharge requirements provided by the JFSA SWM report in **Appendix E.2**. A detailed hydrologic and hydraulic model will be completed at the detailed design stage to assess the total surface flow depth on streets during major storm events and to size ICDs to meet the target release rate. **Drawing SD-1** outlines the functional proposed storm sewer alignment and drainage divides.

5.4.1 Quality Control

As reported by JFSA, the subject site is within the Jock River Subwatershed and will be serviced by a dry SWM pond that will be constructed in the northwest corner of The Ridge development and will discharge to the Jock River via an existing ditch on the west side of Borrisokane Road. As reported by DSEL, the Ridge subdivision will be serviced by two oil-and-grit separators that discharge to the SWM pond and that have been sized to ensure 80% Total Suspended Solids (TSS) removal. These facilities have been sized to provide quality control to 3718 Greenbank Road. As documented in the Barrhaven South Urban Expansion Area Master Servicing Study by J. L Richards, 2018, the development will also have Etobicoke Exfiltration Systems (EES) implemented within this subdivision for further quality control of first flush rainfall.

6.0 GEOTECHNICAL CONSIDERATIONS AND GRADING

6.1 GEOTECHNICAL INVESTIGATION

A geotechnical investigation report for the development was completed by Paterson Group on March 30, 2021. The geotechnical investigation report is included in **Appendix E.3**.

The objective of the investigation was to determine the subsoil and groundwater conditions at this site by means of a borehole program and to provide geotechnical recommendations for the design of the proposed development based on the results on the results of the boreholes and other soil information available.

The field program was carried out between February 17 and 23, 2021 and consisted of advancing a total of 12 boreholes to a maximum depth of 9.8 m below existing grade. Previous investigations were completed within the general area and surroundings of the subject site and consisted of a series of boreholes and test pits advanced to a maximum depth of 9.1 m below ground surface. The borehole locations were distributed in a manner to provide general coverage of the subject site and taking into consideration current site conditions.

Based on the Paterson's report, the subject site is a former agricultural land. The bulk of the current phase of the proposed development has been recently cleared of topsoil which has been stockpiled in several piles across the site. Generally, the ground surface across the subject site is relatively flat within the central portion and slopes up towards the edges. It should be noted that parts of the subject site had undergone excavation and in-filling activities as part of a previous sand extraction operation. Historical aerial photographs of the site indicating fill movement activities since 1976 were included in Appendix 2 of Paterson's report. The area to the south is significantly elevated. The area to the north and west also present a steep slope where fill was encountered.

Generally, the subsurface profile across the subject site consists of varying amounts of fill consisting of silty sand mixed with occasional silty clay, gravel and cobbles. It should be noted that the fill thickness within BH 9-21, BH 10-21 and BH 11-21 ranged from 4.5 m and up to 8.23 m below ground surface. A deep deposit of compact to dense brown silty sand to underlie the fill layer. Gravel and cobbles were occasionally encountered within the silty sand layer. The silty sand was observed to be underlain by a glacial till deposit composed of dense brown sandy silt to silty sand with gravel, cobbles and boulders within BH 3-21. Practical refusal to augering was encountered at a range between 4.6 m and 8.3 m below existing ground surface. Practical refusal to DCPT was encountered at 9.8 m below existing ground surface at BH 7-21. Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for specific details of the soil profiles encountered at each test hole location.

6.1.1 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be low to moderate and controllable using open sumps. The contractor should be prepared to direct water away from all bearing surfaces and subgrades, regardless of the source, to prevent disturbance to the founding medium.

A temporary Ministry of the Environment, Conservation and Parks (MECP) permit to take water (PTTW) may be required for this project if more than 400,000 L/day of ground and/or surface water is to be pumped during the construction phase. A minimum of 4 to 5 months should be allowed for completion of the PTTW application package and issuance of the permit by the MECP.

For typical ground or surface water volumes being pumped during the construction phase, between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). A minimum of two to four weeks should be allotted for completion of the EASR registration and the Water Taking and Discharge Plan to be prepared by a Qualified Person as stipulated under O.Reg. 63/16. If a project qualifies for a PTTW based upon anticipated conditions, an EASR will not be allowed as a temporary dewatering measure while awaiting the MECP review of the PTTW application. From a geotechnical perspective, the subject site is suitable for the proposed mixed-use development. It is anticipated that the proposed buildings will be founded over conventional footings placed over an undisturbed compact to dense silty sand or dense glacial till bearing surface or an engineered fill pad over an approved fill subgrade bearing medium.

6.2 FUNCTIONAL GRADING PLAN

Preliminary grading for the proposed site has been provided as shown on **Drawing GP-1** in **Appendix F**. Grading design has been based on the existing topography and the requirement to route overland flows from the proposed development to Obsidian street. A detailed grading plan in accordance with all geotechnical recommendations is to be prepared at the detailed design stage. No grading restrictions have been identified at the time of preparing this report. Any grading restrictions identified will be presented in subsequent submissions.

Overland flow arrows are shown in **Drawing GP-1** in **Appendix F** to indicate the anticipated grading throughout the site.

7.0 APPROVALS

An Environmental Compliance Approval (ECA) will be required from the Ontario Ministry of the Environment, Conservation and Parks (MECP) for the proposed works.

An MECP Permit to Take Water (PTTW) or registration on the Environmental Activity and Sector Registry may be required as noted in **Section 6.0** above.

No other approval requirements from other regulatory agencies have been identified at the time of this report.

8.0 EROSION CONTROL

In order 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. Provide sediment traps and basins during dewatering works.
7. Install sediment traps (such as SiltSack® by Terrafix) between catch basins and frames.
8. 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.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 POTABLE WATER SERVICING

The model by GeoAdvice provided by DSEL demonstrates that the pressures in the proposed development's watermain stubs fall within the range of target system pressures with a maximum basic day pressure of 76 psi and 72 psi at J-41 (connection point 1) and J-86 (connection point 2) respectively.

The subject lands can be adequately serviced by the 300mm watermain along Haiku Street and 300mm diameter watermain on Obsidian street. Private watermains will provide sufficient fire flow to meet FUS requirements. System pressures will fall within the City of Ottawa Water Distribution Guidelines.

9.2 WASTEWATER SERVICING

The total design peak flow for the subject site to be conveyed to the connections at the Obsidian street sewer is 7.7 L/s. This value is slightly higher than the previous estimate of 2.49L/s by DSEL based on a service area of 1.9 ha and population of 162 people. The difference (4.68L/s) can be accommodated by the 200mm receiving sewer in Obsidian Street.

JLR Associates identified in its MSS for BSUEA stated that there is residual capacity within the sanitary sewers draining Mattamy lands west to new Greenbank road based on a Stantec (2015) hydrodynamic model of trunk sanitary sewers (450 mm in diameter and greater), which in turn demonstrated that the existing downstream trunk system could accommodate the flows generated with no risk of surcharging or basement flooding.

9.3 STORMWATER MANAGEMENT AND SERVICING

All storm runoff within the site will be controlled and directed to an existing storm control point identified as MH 3 in JFSA SWM model.

An Etobicoke Exfiltration System has been proposed to be located below the storm sewer on private roads of the subject site to meet water balance requirements of the BSUEA. The stormwater drainage plan has been designed to achieve stormwater servicing that is free of conflict with other services, respects the stormwater management requirement listed in background studies and in conformity with the City of Ottawa guidelines.

9.4 GRADING

Grading design has been based on the existing topography and the requirement to route overland flows from the proposed development to Obsidian street. A detailed grading plan in accordance with all geotechnical recommendations is to be prepared at the detailed design stage. No grading restrictions have been identified at the time of preparing this report. Any grading restrictions identified will be presented in subsequent submissions.

9.5 APPROVALS/PERMITS

An Environmental Compliance Approval (ECA) will be required from the Ontario Ministry of the Environment, Conservation and Parks (MECP) for the proposed works. An MECP Permit to Take Water (PTTW) or registration on the Environmental Activity and Sector Registry may be required as noted in Section 6.0 above. No other approval requirements from other regulatory agencies have been identified at the time of this report.