5360 Bank Street

Site Servicing and Stormwater Management Report

Stantec

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1 Introduction

Stantec Consulting Ltd. has been commissioned by Greely Sand & Gravel Inc. to prepare the following Servicing and Stormwater Management Report in support of a Zoning Bylaw Amendment (ZBA) and Site Plan Amendment (SPA) application for the proposed redevelopment works located at 5360 Bank Street in the City of Ottawa.

The site is 4.46 ha in area and is situated along the west side of Bank Street. The site is currently zoned Rural Countryside (RU) and consists of garage, maintenance, and storage buildings. The site is bounded by existing rural development to the north and south, a vacant lot with a mine and the John Boyce Municipal Drain to the west, and Bank Street to the east, as shown in **Figure 1.1** below.



Figure 1.1: Key Plan of Site

The proposed works consists of a new water servicing mains along the private driveway and a sanitary septic system servicing the existing garage and maintenance building, and new storm sewer system that conveys drainage from the site to the John Boyce Municipal Drain at the west.

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.

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 site which will be serviced from the existing 400 mm diameter watermain within the Bank Street ROW.
    - Under fire flow (emergency) conditions, the water distribution system is to maintain a minimum pressure greater than 140 kPa (20 psi)
- Wastewater Servicing
    - The site is located outside the City of Ottawa's sanitary servicing area, as such it will require private sanitary septic system for servicing.
- 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 proposed storm sewers that will collect discharge from the site to the John Boyce Municipal Drain to the west.
- Prepare a grading plan in accordance with the proposed drainage and existing grades.

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

2 Background

Documents referenced in preparing of this stormwater and servicing report for 5360 Bank Street include:

- *City of Ottawa Sewer Design Guidelines* (SDG), City of Ottawa, December 2025, including all subsequent technical bulletins
- *City of Ottawa Design Guidelines – Water Distribution*, City of Ottawa, December 2025, including all subsequent technical bulletins
- *Design Guidelines for Drinking Water Systems*, Ministry of the Environment, Conservation, and Parks (MECP), 2008
- *Fire Protection Water Supply Guideline* for Part 3 in the Ontario Building Code, Office of the Fire Marshal (OFM), October 2020
- *Water Supply for Public Fire Protection*, Fire Underwriters Survey (FUS), 2020
- *The Corporation of the Township of Gloucester Engineer's Report – John Boyce Drain (Lots 26 to 30, Concession 4 & 5 (R.F.)),* McCormik, Rankin & Associates Limited, April 1969

3 Water Servicing

3.1 Background

The site is in Pressure Zone 4C of the City of Ottawa's Water Distribution System. The existing watermain along the boundaries of the site consist of the 400 mm diameter watermains within Bank Street. There are existing fire hydrants on the Bank Street watermain.

3.2 Water Demands

3.2.1 Domestic Water Demands

The City of Ottawa Water Distribution Guidelines, ISTB 2021-03 Technical Bulletin, and correspondence between Patterson Group and the client (see **Appendix A**) were used to determine water demands based on the number of employees and visitors at the existing industrial area, and in consideration of industrial peaking factors.

A daily rate of 280 L/persons/day has been used to estimate average daily (AVDY) potable water demand for the onsite population at the light industrial site. Maximum day (MXDY) demands were determined by multiplying the AVDY demands by a factor of 1.5 for industrial areas, while peak hourly (PKHR) demands were determined by multiplying the MXDY by a factor of 1.8 for industrial areas. The estimated demand for the existing industrial site is summarized in **Table 3.1** below and detailed in **Appendix B.1**.

Table 3.1: Estimated Water Demands

Population	AVDY (L/s)	MXDY (L/s)	PKHR (L/s)
6	0.1	0.1	0.2

3.2.2 Fire Flow Demands

The storage and garage building's fire flow requirement was calculated in accordance with the City of Ottawa's Technical Bulletin IWTB-2024-05, which in turn requires use of the Office of the Fire Marshal (OFM) methodology as described within the OBC. Through confirmation from the client's code consultant, (see **Appendix A**), the building and the two add-ons have an occupancy classification of F-3 under the Ontario Building Code with one of the add-ons deemed to be combustible construction while the remainder is deemed non-combustible construction.

Based on the construction type, the overall building's required fire flow was determined to be 45 L/s (2,700 L/min). Detailed fire flow calculations per the OFM methodology are provided in **Appendix B2**.

3.3 Level of Servicing

3.3.1 Boundary Conditions

The estimated water and fire flow demands were used to define the level of servicing required for the maintenance building from the municipal watermain and hydrants within the Bank Street ROW. **Table 3.2** below outlines the boundary conditions for the proposed connections at Bank Street servicing the site provided by the City of Ottawa on February 7th, 2025, based on a maximum available flow of 2 L/s (see **Appendix B.3**).

Table 3.2: Bank Street Boundary Conditions

	Bank Street
Min. HGL (m)	159.2
Max. HGL (m)	165.2

3.3.2 Water Quantity Storage Requirements

The provided boundary conditions indicated that there are limited available flows in the pressure zone, thus additional on-site storage is required to accommodate the fire flow requirements. The building and two add-ons were evaluated separately for fire flow volume requirements, resulting in a total volume of 76,777 L needed for fire flow.

Per Technical Bulletin IWSTB-2024-05, with a required fire flow of 2,700 L/min, the storage tank volume can be reduced by 57,000 L. Given the resulting volume of 19,777 L is less than the minimum permitted storage tank volume of 38,000 L, the final storage tank volume for fire flows demands to service the site is 38,000 L.

3.3.3 Hydraulic Model

A model for the proposed 50mm service line was developed using PCSWMM by Computational Hydraulics Inc. (CHI) to analyze the service under peak hour demands to ensure pressure objectives at the building are met.

The City of Ottawa Water Distribution Guidelines state that the desired range of system pressures under operating demand conditions 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 street. 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).

New watermains (in this case, the 50mm service lateral) were imported to the model to simulate losses within the proposed distribution system. Hazen-Williams coefficients (“C-Factors”) were applied to the new watermain in accordance with the guidelines. A fixed head reservoir was applied in the model at the

connection point to the municipal watermain to correspond with boundary conditions provided under peak hour demands, and the peak hour demand of 0.26L/s applied at the opposite end of the system.

Results of the model run are included in **Appendix B**. Per the model, pressures at ground level at the end of the 50mm water service under peak hour conditions are anticipated to be 69.3 psi (48.77m of head), and thus within the pressure objectives per the guidelines.

3.4 Proposed Water Servicing

The development will be serviced from the existing 400 mm diameter watermain on Bank Street via a 50 mm diameter service connection for domestic water demands, and fire flow demands will be provided by an on-site storage tank.

The proposed water servicing is shown on **Drawing RSGP-1**. Based on the City of Ottawa Water Design Guidelines, the provided boundary conditions, and OBC requirements, the proposed servicing will provide sufficient water supply for domestic and fire flow demands.

4 Wastewater Servicing

Paterson Group have completed the sewage system replacement designs for the site, which is summarized in their Sewage System Layout Plan (PH4841-1 and PH4841-2) attached in the permit issued by the Rideau Valley Conservation Authority (RVCA) for the site's proposed septic sewage system under Permit No. 25-015 (see **Appendix C**). The proposed location of the sewage system is identified on Stantec's servicing and grading plans in **Drawing RSGP-1**.

Paterson determined the sewage system design flow for the proposed development is 450 L/day. Paterson states that adequate septic system size and separation distances have been provided from the proposed onsite well, building, and municipal ROW so that the construction of the on-site sewage system adheres to the Ontario Building Code; and will not impact water quality associated with the drilled well. Detailed layout of their proposed sewage system can be found in Paterson Group's Drawings No. PH4841-1 and PH4841-2.

Paterson Group has designed the septic system to have a 3,600 L (min) septic tank followed by an Eljen specified Geotextile Sand Filter (GSF) style of septic field. The septic system has an infiltration-based outlet, with entirely subsurface discharge. Sufficient grades, slopes, and cover have been provided over the septic tank and weep field such that Paterson has designed a gravity-drainage septic system with no requirements for a sump or pump. Paterson has indicated the ultimate outlet will be the base of the topsoil layer at the property line. Further information on the septic design can be found in the Septic Permit.

5 Stormwater Management and Servicing

5.1 Objectives

The following section describes the stormwater management (SWM) design for the 5360 Bank Street site in accordance with the background documents.

5.2 Stormwater Management (SWM) Criteria

The following summarizes the SWM criteria and constraints that will govern the detailed design of the proposed site as per the latest revision of the City of Ottawa Sewer Design Guidelines.

General

- Use of the dual drainage principle (City of Ottawa SDG)
- Wherever feasible and practical, site-level measures should be used to reduce and control the volume and rate of runoff (City of Ottawa SDG)
- Assess impact of 100-year event outlined in the City of Ottawa Sewer Design Guidelines on the major and minor drainage systems (City of Ottawa SDG)

Storm Sewer & Inlet Controls

- Post-development peak flows must not exceed the pre-development peak flows under the 2-year and 100-year storm events. (City of Ottawa pre-consultation, **Appendix A**)
- The John Boyce Municipal Drain crosses the site at the west and has been identified as the preferred stormwater outlet for the site, modifications to the drain must follow the procedure set by Municipal Drainage staff (City of Ottawa pre-consultation)
- T_c should be not less than 10 minutes since IDF curves become unrealistic at less than 10 min (City of Ottawa SDG).

Surface Storage & Overland Flow

- Building openings to be a minimum of 0.15 m above the 100-year water level (City of Ottawa SDG)
- Maximum depth of flow under either static or dynamic conditions shall be less than 0.35 m (City of Ottawa SDG)
- 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 SDG)

5.3 Existing Conditions

Pre-consultation notes with the City of Ottawa identify that the City of Ottawa does not have on record any building permits for the subject site from 2002 onward. Notes further identify that the site pre-development

conditions can be considered for the site prior to installation of building without record of appropriate permits. As such, existing conditions on-site have been assumed as the works present on-site based on photographic references from 2002 as identified in the figure below.



Figure 5.1: Site Existing (2002) Conditions

The existing site (6.38 ha) is presently composed of a mixture of paved, gravel, and grassed surfaces with scattered small buildings as demonstrated on **Drawing SD-1**. The easterly portion of the site (Areas EX-5 and EX-6) sheet drains largely overland to the southeast towards the existing roadside ditch within Bank Street. Surface runoff is also accepted from a substantial offsite area north of the subject property (existing cemetery lands identified as area EXT-1), as well as smaller portions to the northeast and south (EXT-4 and EXT-3). Runoff from remaining lands is directed overland to the John Boyce Municipal Drain via surface swale either via the northerly property line (Area EX-1), across the western property line (Area EX-2), or via a small surface swale to the south (Areas EX-3, EX-4, and off-site contributing area EXT-2).

The Rational Method was employed to assess the peak rate of runoff anticipated from existing catchment areas during design rainfall events. A summary of the existing catchment areas and runoff coefficients is provided in the table below.

Table 5.1: Summary of Existing Subcatchment Areas

Catchment Areas	A (ha)	C	Flow Type	Outlet
EX-1	0.36	0.54	Uncontrolled	John Boyce Drain
EX-2	1.07	0.39		John Boyce Drain
EX-3	0.51	0.42		John Boyce Drain
EX-4	0.22	0.20		John Boyce Drain
EX-5	0.26	0.59		Bank St. Ditch
EX-6	2.04	0.33		Bank St. Ditch
EXT-1	1.74	0.27	External Contributing Areas	Bank St. Ditch
EXT-2	0.06	0.20		John Boyce Drain
EXT-3	0.08	0.41		Bank St. Ditch
EXT-4	0.04	0.90		Bank St. Ditch
Total	**6.38**	0.36	-	-

An estimated time of concentration was developed for easterly regions tributary to their singular outlet to the Bank Street roadside ditch, with calculations included as part of **Appendix D**. Additional time of concentration calculations were provided for the next largest subcatchment area EX-2, but were found to be governed by the minimum time of concentration of 10 minutes which has been applied for all remaining subcatchment areas.

Estimated peak runoff from the 2-year and 100-year design storm events has been summarized in the tables below. Runoff coefficients have been increased for the 100-year event by 25% per the City of Ottawa's Sewer Design Guidelines.

Table 5.2: 2-Year Peak Pre-Development Runoff

Catchment Areas	A (ha)	C	Tc (min)	I (mm/hr)	Q (L/s)
EXT-1, -3, -4, EX-5, -6	4.16	0.33	37.2	34.57	131.9
EXT-2	0.06	0.20	10	76.81	2.6
EX-1	0.36	0.54	10	76.81	41.5
EX-2	1.07	0.39	10	76.81	89.0
EX-3	0.51	0.42	10	76.81	45.7
EX-4	0.22	0.20	10	76.81	9.4
Total	**6.38**	**0.36**	**-**	**-**	**320.1**

Table 5.3: 100-Year Peak Pre-Development Runoff

Catchment Areas	A (ha)	C	Tc (min)	I (mm/hr)	Q (L/s)
EXT-1, -3, -4, EX-5, -6	4.16	0.41	37.2	79.12	377.4
EXT-2	0.06	0.25	10	178.56	7.4
EX-1	0.36	0.68	10	178.56	120.5
EX-2	1.07	0.49	10	178.56	260.1
EX-3	0.51	0.53	10	178.56	134.1
EX-4	0.22	0.25	10	178.56	27.3

Total	**6.38**	**0.45**	**-**	**-**	**926.8**

5.4 Stormwater Management Design

It is proposed to provide on-site storage to retain runoff in excess of that noted from pre-development conditions for the matching 2 and 100-year design storm events.

The Modified Rational Method was employed to assess the rate and volume of runoff anticipated during post-development rainfall runoff events for areas with stormwater management (SWM) volume controls, and the Rational Method for areas to remain without SWM volume controls. The site was subdivided into sub-catchments (subareas) as defined by the proposed grades and the location, nature, or presence/absence of inlet control devices (ICDs). Each sub-catchment was assigned a runoff coefficient based on the proposed finished surface. A summary of subareas and runoff coefficients is provided in **Table 5.4** below. Further details can be found in **Appendix D**, while **Drawing SD-1** illustrates the proposed sub-catchments.

Table 5.4: Summary of Proposed Subcatchment Areas

Catchment Areas	A (ha)	C	Flow Type	Outlet
S-1	0.36	0.54	Uncontrolled	John Boyce Drain
S-2	0.42	0.52	Controlled	SWM Facility
S-3	0.38	0.70	Controlled	SWM Facility
S-4	0.17	0.20	Uncontrolled	John Boyce Drain
S-5	0.26	0.79	Uncontrolled	Bank St. Ditch
S-6	0.93	0.29	Uncontrolled	Bank St. Ditch
S-7	1.05	0.36	Uncontrolled	Bank St. Ditch
S-8	0.29	0.56	Controlled	SWM Facility
S-9	0.55	0.62	Controlled	SWM Facility
S-10	0.05	0.29	Uncontrolled	Bank St. Ditch
EXT-1	1.74	0.27	External Contributing Areas	Bank St. Ditch
EXT-2	0.06	0.20		John Boyce Drain
EXT-3	0.08	0.41		Bank St. Ditch
EXT-4	0.04	0.90		Bank St. Ditch
Total	**6.38**	0.42	-	-

5.4.1 Quantity Control Storage Requirements

A summary of peak runoff from uncontrolled development areas for the 2 and 100-year design storm events is provided in the tables below and using a re-calculated time of concentration estimate for easterly site areas based on proposed site runoff coefficients.

Table 5.5: 2-Year Peak Post-Development Runoff (Uncontrolled)

Catchment Areas	A (ha)	C	Tc (min)	I (mm/hr)	Q (L/s)
EXT-1, -3, -4, S-5, -6, -7, -10	4.15	0.35	36.3	35.16	141.9
EXT-2	0.06	0.20	10	76.81	2.6
S-1	0.36	0.54	10	76.81	41.5
S-4	0.17	0.20	10	76.81	7.3
Total	**4.74**	**-**	**-**	**-**	**193.3**

Table 5.6: 100-Year Peak Post-Development Runoff (Uncontrolled)

Catchment Areas	A (ha)	C	Tc (min)	I (mm/hr)	Q (L/s)
EXT-1, -3, -4, S-5, -6, -7, -10	4.15	0.44	36.3	80.49	408.3
EXT-2	0.06	0.25	10	178.56	7.4
S-1	0.36	0.68	10	178.56	120.5
S-4	0.17	0.25	10	178.56	21.1
Total	**4.74**	**-**	**-**	**-**	**557.3**

The site requires quantity control measures to meet the restrictive stormwater release criteria. It is proposed that the discharge from the remaining portions of the site constituting most of the redevelopment between 2002-present (areas S-2, -3, -8 and -9) be collected and routed to an end-of-pipe sand filter with an additional storage depth above the filter to control peak runoff. The proposed filter measures 3m in width by approximately 16.5m in length.

Gravity storm sewers are proposed to capture site runoff and direct captured flows to the sand filter. Proposed sewers have been sized to ensure full capture of the 2-year storm using the Rational Method, with design sheet provided in **Appendix D**. No ICDs are proposed for the proposed catch basins discharging to the sewer system. As the sewer is not to maintain connections to building foundation drains, HGL within the sewer during larger (100-year storm events) is not of concern.

The sand filter is equipped with a 300mm thick clear stone drainage layer and 100mm perforated drainage pipe to permit captured & filtered runoff to be directed through a singular catch basin outlet structure located within the filter itself. The filter is composed of a 500mm thick sand layer complete with filter fabric, and overlaid by 150mm of topsoil to permit vegetation growth at the surface. The bottom of the filter drainage layer is to incorporate an impermeable membrane to prevent groundwater contamination. The catch basin is to incorporate an inlet control device (230mm diameter circular orifice plate invert=105.76) to control runoff to the site pre-development release rate less that from uncontrolled areas. The rim of the catch basin (107.75m) has been set to permit additional overflow from larger rainfall events (beyond the 2-year event) to provide additional flow capture for the 100-year storm. Flow capture for the catch basin grate has been estimated based on design chart 4.19 of the MTO's Drainage Management Manual, included within **Appendix D**. Discharge from the filter is directed through the catch basin to the downstream drain via 375mm pipe to the outfall at elevation 105.65m.

A spreadsheet using the Modified Rational Method (MRM) was used to size the filter quantity storage, as shown in **Appendix D.** Filter quantity storage includes both surface storage as well as that within the filter

media and drainage layer with an assumed media porosity of 0.4. Based on the anticipated area of the filter (approximately 49.3m2 in plan), filter and drainage layer combined thickness of 800mm, and anticipated porosity, a subsurface volume of 15.8m3 is available within the proposed filter.

Prior correspondence with South Nation Conservation has identified the 100-year floodplain elevation in proximity to the site's proposed controlled stormwater outlet of 105.66, as such, the bottom of the drainage layer has also been set with an elevation of 105.66 to avoid impacts from the existing floodplain. Should the outlet pipe to the filter become clogged, surface storage will fill up to elevation 108.05 before spilling over a rip rap outlet graded towards the John Boyce Drain. The sand filter has been designed with reinforced granular side slopes to tie into existing grades immediately outside of the anticipated 100-year floodplain elevation of 105.66. See Figure 6 within the geotechnical report PG7831-1 for details of slope reinforcement.

Controlled release rates and associated required storage volumes and water elevations for the proposed filter are summarized in the table below. Controlled release rates have been set in order to ensure that pre-development release rate targets are achieved with consideration to post-development uncontrolled release rates as identified in tables above.

Table 5.7: Summary of Controlled Post-Development Release Rates

Storm Event	Peak Discharge (L/s)	Max Water Elev. (m)	Peak Storage Vol. (m3)
2-Year Storm	120.6	107.03	52.9
100-Year Storm	253.6	107.87	212.0

Catchment areas EXT-1, EXT-3, EXT-4, as well as S-5 and S-6 contribute to a proposed cut-off swale located south of the existing access road for the property. At the point where the majority of subcatchment runoff converges (conservatively assumed as mid-way up the access road), the ditch is proposed as a 3:1 sloped triangular section with an overall depth of 0.4m and longitudinal slope of 0.5%. A Manning's roughness value of 0.025 was used for channel capacity calculations for an unlined earth channel of uniform section with grass/short weeds. Based on channel capacity calculations included in **Appendix D**, the proposed channel is able to convey the 100-year storm runoff without spillage to the Bank Street roadside ditch per existing conditions.

Summation of the controlled and uncontrolled release rates from the site in comparison to existing pre-development allowable flows is identified in the tables below.

Table 5.8: Summary of Total 2-Year and 100-Year Event Release Rates

Drainage areas	2-year Peak Discharge (L/s)	100-Year Peak Discharge (L/s)
Uncontrolled	193.3	557.3
Controlled	120.6	253.6
Target (L/s)	**320.1**	**926.8**
Total (L/s)	**313.9**	**810.9**

5.4.2 Quality Control

Pre-consultation with City of Ottawa staff has identified the requirements for quality control measures to mitigate the impacts of additional runoff resulting from increased imperviousness through measures such as a site-specific stormwater management plan. As the site pre-development criteria can be considered as the site prior to installation of buildings lacking appropriate permits on record (2002), it is the intent of this stormwater management plan to meet Enhanced Level treatment (80% long-term total suspended solids removal) for any increase to impervious areas on site from that time period to the current site plan proposal to ensure no deleterious effects to downstream systems beyond the baseline level.

Surface cover variations onsite between 2002 and the current proposal (areas EX1-6 versus areas S-1 through S-10) including both gravel and paved surfaces amounts to approximately 0.62ha of additional impervious area. The bulk of new impervious area is attributed to areas S-2, S-3, S-8 and S-9. The remaining on-site areas represent a marginal increase to hard & gravel surface areas (approximately 40m2).

The site is proposed to incorporate a sand filter for quality control of runoff from westerly sections of the site, and a proposed oil/grit separator in tandem with a shallow enhanced grassed swale incorporating rock check dams to permit quality control of easterly site areas.

Using the ETV particle size distribution and the Stormceptor Sizing Tool, a Stormceptor model EFO4 has been selected for the proposed manhole at the easterly side areas (areas S-5 and S-10) and will achieve 62% TSS removal. The detailed Stormceptor sizing report is included in **Appendix D**. The OGS unit has been considered as an example only. Other OGS products or treatment systems with equivalent TSS removal capabilities as tested under ETV protocols may also be selected based on the input parameters noted within the Stormceptor sizing report. The grassed swale and rock check flow dams downstream of the proposed OGS unit are anticipated to provide further polishing to further ensure runoff meets enhanced levels of quality control (80% TSS removal).

The proposed sand filter has been sized to ensure full capture of runoff from the 2-year storm event without inflows reaching the elevation of the overflow CB grate elevation of 107.75m (estimated available storage at elevation 107.75 to be 194.1m3 inclusive of filter subsurface storage volumes). Per Table 3.2 of the MECP's Stormwater Management Planning & Design Manual, required quality storage to meet enhanced (80%) TSS removal is estimated as 35m3/ha (for a conservative level of imperviousness of 70%, which is slightly above that currently proposed) of contributing area for an infiltration type SWMP, or approximately 57m3 for the controlled subcatchment areas. As such, sufficient storage exists within the proposed sand filter to meet enhanced levels of quality control for westerly site areas.

Although surficial soils are identified as potentially susceptible to erosion, the JBMD did not appear to be affected by active erosion at time of completion of the geotechnical investigation by Paterson Group. Erosion control measures (slope reinforcement) have been proposed along the existing embankment in proximity to the proposed sand filter to ensure that construction activities do not negatively influence slope stability within the region. See Geotechnical Investigation report by Paterson Group (Report PG7831) for further information.

5.4.3 Groundwater Monitoring

The proposed site has been subject to a groundwater monitoring program as identified in Paterson Group Report PH4841-MEMO.01. Results of the report indicate high groundwater elevations in proximity to the sand filter of between 105.88 and 105.72 (BH3-26 and 4-26), and within the easterly ditch to Bank Street of 107.07 in proximity of BH 5-26. From these values, anticipated seasonal groundwater elevations would be expected to extend into the bottom layer of the sand filter, as well as within the proposed easterly ditch line, although not overtopping proposed check dams or the top of ditch line. As such, it is proposed to underlay the sand filter with an impermeable LLDPE geomembrane to both prevent groundwater ingress to the filter as well as to prevent groundwater contamination per recommendations of the MECP SWMPDM. Similarly, a geomembrane or approved equivalent is proposed to underlay the easterly drainage ditch to Bank Street to ensure high seasonal groundwater does not impact surface storage volumes and resultant quality control provided by the grassed swale and rock check dams. Construction of the sand filter and ditch line is not anticipated to occur during high groundwater conditions, enabling installation of the geomembrane layer.

6 Site Grading

The proposed site measures approximately 4.46 ha in area and comprises of the garage, maintenance, and storage buildings. The topography across the site generally slopes southward towards the maintenance and storage buildings to the John Boyce Municipal Drain, which runs along the west and southwest perimeter of the site.

The removals, servicing, grading and re-instatement plan (see **Drawing RSGP-1**) has been provided to satisfy the stormwater management requirements as detailed in **Section 5**, and provide for minimum cover requirements for storm sewers where possible. Site grading has been established to provide emergency overland flow routes required for stormwater management.

7 Utilities

Accessible overhead (OH) hydro wires run north-south along the western side of the Bank Street right-of-way. The existing utility poles within the public right of way and along the site private access are to be protected during construction.

As the site is currently serviced via existing buildings to remain, no new off-site utility infrastructure is anticipated for the development. Existing overhead wires and utility plant may need to be temporarily moved/reconfigured to allow sufficient clearance for the movement of heavy machinery required for construction. Any relocation of existing utilities will be coordinated with the individual utility providers upon design circulation.

8 Approvals

The proposed development is industrial in nature, therefore the site will require an Environmental Compliance Approval (ECA) from the Ministry of the Environment, Conservation and Parks (MECP) with respect to stormwater management works on-site. In addition, modifications within 15m of the 100 year floodplain of the adjacent municipal drain will require a permit from SNC. As site activities include those described under NAICS code 21 (specifically 212323 for sand and gravel extraction, mining, and quarrying), the site does not appear to be a prescribed activity for the purposes of registering for stormwater management works under the EASR per O.Reg. 137/25.

For ground or surface water volumes being pumped during the construction phase, typically between 50,000 to 400,000 L/day, it is required to register on the Environmental Activity and Sector Registry (EASR). It is possible that groundwater may be encountered during excavation on this site. A minimum of two to four weeks should be allotted for completion of the EASR registration and the preparation of the Water Taking and Discharge Plan by a Qualified Person as stipulated under O.Reg. 63/16. An MECP Permit to Take Water (PTTW), which is required for dewatering volumes exceeding 400,000L/day, is not anticipated for the site.

The South Nation Conservation Authority (SNCA) has issued a permit for the site's proposed septic sewage system – see **Appendix C** for details. A fill permit for regulated areas is required from the SNC for works adjacent to the floodplain prior to construction.

9 Erosion and Sediment 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 track-out 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 preliminary aggregate resource study was prepared by Paterson Group on August 21, 2014, to provide an assessment of the viability of the remaining lands adjacent to the existing mining area. The lands subject to the study were considered for a new commercial subdivision development. Five (5) test pits were put down in May and August 2014. Excerpts from the geotechnical investigation report are attached in **Appendix E**.

The subsurface profile encountered at the test pit locations are characterized primarily by topsoil layer overlying a thin layer of sand and gravel deposits containing silt and clay overlying poorly sorted glacial till deposits, in turn underlain by dolomitic bedrock of the Oxford Formation at shallow depth. Groundwater was encountered at depths ranging from 1.7 m to 4.5 m, though groundwater levels are subject to seasonal fluctuations, with higher levels being encountered during prolonged wet periods.

Based on Paterson's recommendations, while there are no quality aggregate remaining in place, and given the existing commercial land use in the surrounding area, it is their opinion that the geotechnical conditions at the site are suitable for commercial subdivision development.

Refer to the full geotechnical report attached as part of the submission package.

11 Conclusions

11.1 Water Servicing

Based on the supplied boundary conditions and calculated domestic and fire flow demands for the subject site, the adjacent watermain on Bank Street has sufficient capacity to sustain the required domestic demands for the site. The fire flow demands will be provided by an on-site storage tank to supplement the water supply and meet OBC requirements. The building's domestic water supply will be provided by a 50 mm diameter water service connection to the existing 400 mm watermain on Bank Street.

11.2 Wastewater Servicing

A new sewage (septic) system will be established to support the occupancy, and usage demands of the subject site, as designed by Paterson Group.

11.3 Stormwater Servicing and Management

An on-site private storm sewer network with pipe diameters ranging from 300 mm to 450 mm is proposed to convey discharge from the redevelopment area to an end-of-pipe sand filter equipped with a clear stone drainage layer and 100 mm perforated drainage pipe with a catch basin incorporating an inlet control device, as per **Drawing RSGP-1** and **SD-1**. An Oil/Grit separator and in-ditch rock check dams are proposed to provide some quality control for uncontrolled runoff from easterly portions of the site.

11.4 Grading

Site grading has been designed to provide an adequate emergency overland flow route. The site maintains two drainage paths; south to the adjacent John Boyce Municipal Drain and east to the Bank Street roadside ditches as per existing conditions.

11.5 Erosion and Sediment Control During Construction

Erosion and sediment control measures and best management practices outlined in this report and included in the drawing set will be implemented during construction to reduce the impact on adjacent properties, the public ROW, and existing facilities.

11.6 Utilities

The site is situated within an established neighbourhood, and as the existing buildings are serviced by existing utility infrastructure, no new utilities are proposed. Overhead wires along all boundaries of the site will need to be accommodated during construction.

11.7 Approvals

The proposed development is industrial in nature; therefore the site will require an Environmental Compliance Approval (ECA) from the Ministry of the Environment, Conservation and Parks (MECP) with respect to stormwater management works on-site. For the expected dewatering needs of 50,000 to 400,000 L/day, the proponent will need to register on the MECP's Environmental Activity and Sector Registry (EASR). A Permit to Take Water, for dewatering needs in excess of 400,000 L/day, is not anticipated for this site.

Appendices

Appendix A Background Correspondence

BOWMAN STEEL MANAGEMENT

Main Office:
2027 Kingsgrove.cres,
Gloucester, Ontario, K1J 6E9

Phone:
(613)-227-1350

Technical Office:
2295 Stevenage Dr. Unit #2
Ottawa, Ontario, K1G 3W1

Date: January 9, 2025

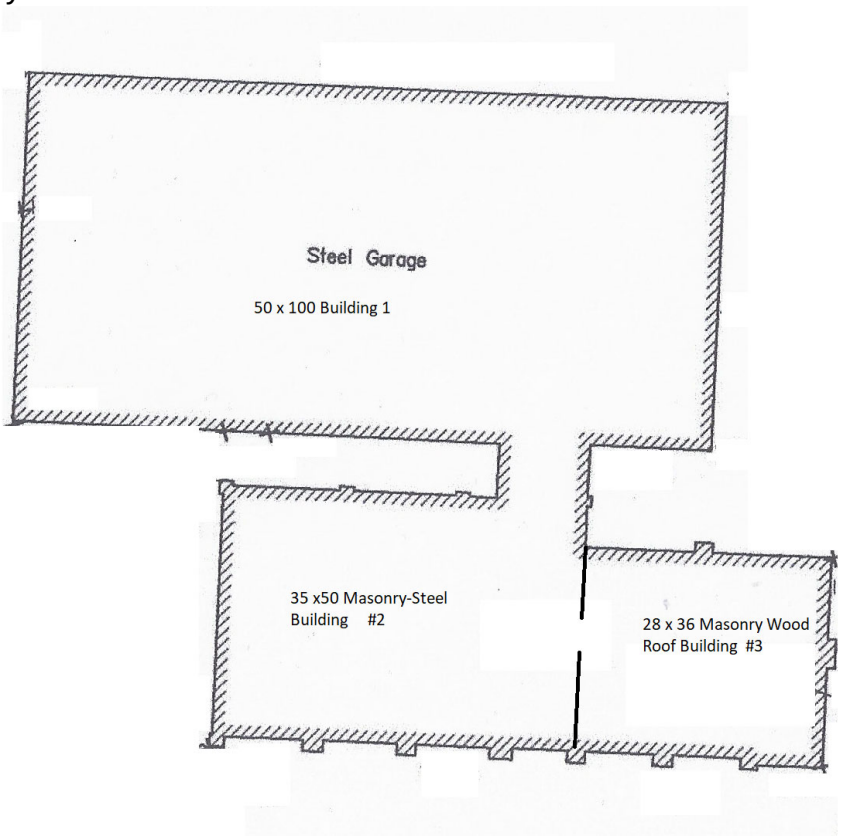
Permit No. 2207206

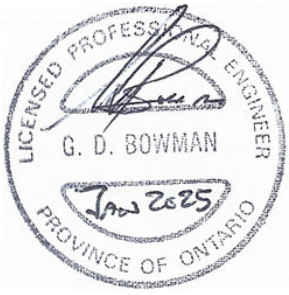
Greely Sand and Gravel Inc
1971 Old Prescott Road
Greely, Ontario
K4P 1N6

Re: Maintenance Building Layout
5360 Bank Street, Greely, Ontario

Dear Sir,
Bowman Steel has reviewed the site above and notes the following Layout

Occupancy Classification is F-3





BOWMAN STEEL MANAGEMENT
Main Office:
2027 Kingsgrove.cres,
Gloucester, Ontario, K1J 6E9
Phone:
(613)-227-1350
Technical Office:
2295 Stevenage Dr. Unit #2
Ottawa, Ontario, K1G 3W1

Date: January 9, 2025

Permit No. 2207206

Greely Sand and Gravel Inc
1971 Old Prescott Road
Greely, Ontario
K4P 1N6

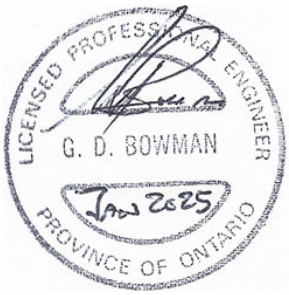
Re: Maintenance Building 1
5360 Bank Street, Greely, Ontario

Dear Sir,
Bowman Steel has reviewed the site above and notes the following .

Structure consists of structural steel columns, beams, bracing, girts, purlins metal siding and metal roof.
Structure is Non Combustible. .

We trust you find the above acceptable.
Sincerely,





Gord Bowman P. Eng
BCIN 28306 / 22151

BOWMAN STEEL MANAGEMENT

Main Office:
2027 Kingsgrove.cres,
Gloucester, Ontario, K1J 6E9

Phone:
(613)-227-1350

Technical Office:
2295 Stevenage Dr. Unit #2
Ottawa, Ontario, K1G 3W1

Date: January 9, 2025

Permit No. 2207206

Greely Sand and Gravel Inc
1971 Old Prescott Road
Greely, Ontario
K4P 1N6

Re: Maintenance Building 2
5360 Bank Street, Greely, Ontario

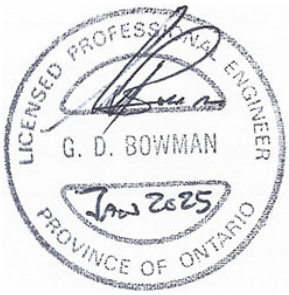
Dear Sir,
Bowman Steel has reviewed the site above and notes the following .

Structure consists of structural Masonry Wall, Steel Roof beams, Steel Joists and metal roof.
Structure is Non Combustible. .

We trust you find the above acceptable.
Sincerely,



Gord Bowman P. Eng
BCIN 28306 / 22151



BOWMAN STEEL MANAGEMENT
Main Office:
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Gloucester, Ontario, K1J 6E9
Phone:
(613)-227-1350
Technical Office:
2295 Stevenage Dr. Unit #2
Ottawa, Ontario, K1G 3W1

Date: January 9, 2025

Permit No. 2207206

Greely Sand and Gravel Inc
1971 Old Prescott Road
Greely, Ontario
K4P 1N6

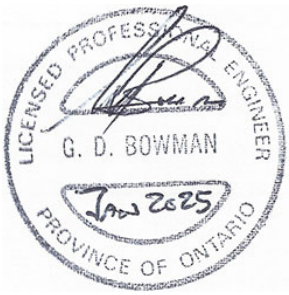
Re: Maintenance Building 3
5360 Bank Street, Greely, Ontario

Dear Sir,
Bowman Steel has reviewed the site above and notes the following .

Structure consists of structural Masonry Wall, Wood Beams, Wood Roof Joists, wood roof Planking
Roof Structure is Combustible. .

We trust you find the above acceptable.
Sincerely,





Gord Bowman P. Eng
BCIN 28306 / 22151

Wu, Michael

From: Moroz, Peter
Sent: January 31, 2025 15:18
To: Wu, Michael
Cc: Thiffault, Dustin
Subject: FW: PH4841 - Greely Sand and Gravel - 5360 Bank Street
Attachments: 24239-24 GreelySand TOPO PofS Con 4 (RF) PtLt 29 Glouc, 5360 Bank St 2024.08.27 _Rev 2.pdf; 24239-24 Greely Sand PtLt29 C4 RF O F4_Client.dwg; 100227.101 _RPT_EIS_2024-10-01_Rev0_reduced.pdf

Michael, please use the below reference staff info to come up with the water demand. This was provided for septic bed design.

thx

Peter

Peter Moroz P.Eng., MBA
Business Center Practice Lead - Community Development (Atlantic & Ontario East)
Stantec
300 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

From: Info Greely Sand and Gravel <info@greelysand.com>
Sent: Wednesday, December 18, 2024 12:23 PM
To: Alex Schopf <aschopf@patersongroup.ca>; Michael Killam <MKillam@patersongroup.ca>; Sharp, Mike <Mike.Sharp@stantec.com>; Moroz, Peter <peter.moroz@stantec.com>; Christine McCuaig <christine@q9planning.com>; Erik Ardley <EArdley@patersongroup.ca>
Cc: Gladish, Alyssa <Alyssa.Gladish@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>; Hendrik Van de Glind <hvandeglind@patersongroup.ca>
Subject: RE: PH4841 - Greely Sand and Gravel - 5360 Bank Street

Hi Alex,

To answer your questions, please see in red below...

Also attached is the topographic information and Gemtec's EIS. I will forward in a separate email the MRIA study.

Thank you,

Tara

Greely Sand & Gravel Inc.
1971 Old Prescott Road
Greely, Ontario
K4P 1N6
Office: 613-821-3003
Fax: 613-821-4069
GreelySand.com

From: Alex Schopf <aschopf@patersongroup.ca>
Sent: Friday, December 13, 2024 9:02 AM
To: Michael Killam <MKillam@patersongroup.ca>; Sharp, Mike <Mike.Sharp@stantec.com>; Moroz, Peter <peter.moroz@stantec.com>; Christine McCuaig <christine@q9planning.com>; Erik Ardley <EArdley@patersongroup.ca>; Info Greely Sand and Gravel <info@greelysand.com>
Cc: Gladish, Alyssa <Alyssa.Gladish@stantec.com>; Thiffault, Dustin <Dustin.Thiffault@stantec.com>; Hendrik Van de Glind <hvandeglind@patersongroup.ca>
Subject: RE: PH4841 - Greely Sand and Gravel - 5360 Bank Street

Hi Brent / Tara,

We would like to ask some clarifying questions so that we can accurately size the septic system and complete the terrain analysis.

- ❑ Do you have any floor plans for the existing buildings and Cace Construction trailers?
  Size of Greely S&G's floor plans: 50x100, 35x50, and 28x36
  Size of CACE Construction: 11x59 and 21x38
- ❑ It is understood there are two sewage systems on site. The report will note that both systems will be decommissioned once a new system is installed and if Cace Construction remains at the site, they will use the washroom within the main building. Understood.

For the **Greely Sand and Gravel Operation** there appears to be a storage building behind the maintenance garage and we would anticipate some form of a small office in the building. The washroom consists of 1 toilet and 1 sink. There are no kitchen facilities or other water related fixtures.

- ❑ How many employees do you have working per day (8 hours) in the maintenance shop? 3 employees
- ❑ Do you have office space? No
  - If so, how many employees do you have working in the office per day if they are separate from the workers in the maintenance shop? N/A
  - What is the area of the office space? (exclude lunchrooms / hallways/ storage areas). N/A
- ❑ How many visitors do you have per day? 2 visitors
  - How long do they typically stay? They do not stay Is the washroom considered as public for their usage? No If no washroom is available to the public, then we can exclude that item.
- ❑ Are the framed shed, steel sided building, and utility building used as storage? Yes
- ❑ Are there any other uses on site that has employees or visitors arriving on site? No

Cace Construction Trailer(s)

- ❑ There appears to be two trailers beside each other. Are both of them used for offices? Yes
- ❑ How many people are there typically in the site trailer(s) per day (8 hours)? 3 employees
  - Is the site trailer used as an office and if so, what is the total area that would be used as offices? Yes
    Size of CACE Construction: 11x59 and 21x38
  - Does Cace have visitors and if so, how many per day would they estimate? Yes, perhaps 2 a day

Septic Systems

- ❑ Is the septic tank for the main system accessible without digging or excavating? Yes
- ❑ Is there a cleanout for the sewage pipe within the building? Yes
  - We would be looking to determine the elevation of the pipe leaving the building to ensure there is appropriate slope leading to the new tank.

We anticipate adding some additional questions as we work through the process to optimize the design and potential costs. We will provide a fee estimate shortly.

Please let us know if you have any questions.

File No.: PC2023-0388

Tracy Zander
ZanderPlan Inc.
Via email: tracy@zanderplan.com

Subject: Phase 2 Pre-Consultation: Meeting Feedback
Proposed Zoning Amendment and Site Plan Control Applications – 5360 Bank St

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on January 17, 2024.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☐	**3** ☐	**4** ☐	**5** ☒

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the materials submitted for the above-noted pre-consultation has been undertaken and staff are satisfied that the information is consistent with previous direction provided and sufficient to move to a Phase 3 pre-consultation.
    a. Please note that we can only discuss and evaluate the Zoning By-law Amendment as part of the Phase 3 pre-consultation. We cannot host the Phase 3 pre-consultation for the Site Plan Control until the property and proposed development is zoning compliant, meaning the new zone must be in full force.

2. Please note that if your development proposal changes significantly in scope, design, or density between the Phase 2 pre-consultation review and Phase 3 pre-consultation submission, you may be required to repeat the Phase 2 pre-consultation process.

3. In your Phase 3 pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been further identified and/or confirmed, during this phase of pre-consultation, as required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline the specific requirements that must be met for each plan or study to be deemed adequate.
    b. A separate **Study and Plan Identification List** has been provided for each application.

Planning

List of Studies and Plans Reviewed:

- **Pyper Severance Sketch for Lot Addition**, 5360 Bank Street, , prepared by ZanderPlan, dated December 6, 2022.
- **Chronological History, 5360 Bank Street, Consent Application/Zoning By-law Amendment, Bredon Developments Inc.**, prepared by Gary McLaren, dated November 22, 2023.
- **Response to Pre-application consultation notes from January 10, 2023**, prepared by ZanderPlan, dated January 3, 2024.
- **Environmental Impact Statement – Land Severance Application – 5360 Bank Street,** prepared by Gemtech, dated February 2, 2022.
- **Preliminary Aggregate Resource Study**, prepared by Paterson Group Inc., revision dated August 21, 2014.
- **Phase One Environmental Site Assessment**, prepared by Gemtec Engineers and Scientists Ltd., dated October 2, 2023.

Deficiencies:

1. The plans and reports provided do not adhere to the terms of reference. They must be updated to include all items listed in the terms of reference for both applications.

Comments:

File History

C1. The subject site was approved for a lot line adjustment on February 10, 2023, to convey the back portion of the property zoned ME to the property abutting the rear lot line to consolidate mineral extraction lands. During review of the Consent Application, staff discovered that several buildings did not have building permits and several land uses were not permitted by the Zoning By-law. As such, a condition of approval was imposed that required the applicant provide evidence that all buildings have permits and the property is zoning compliant. This requires a Zoning By-law Amendment.

C2. Staff hosted a pre-consultation on January 10, 2023, to discuss the proposed Zoning By-law Amendment. Staff confirmed during the meeting that we do not have any permits on record from 2002 onward, meaning that the addition to the maintenance garage and any structures built since then would require building permits. If structures are temporary, they require temporary building permits and must be removed by a specified date. Staff also confirmed the cumulative size of all buildings trigger Site Plan Control.

Proposal

C3. The applicant's intent is to regularize the existing buildings through Site Plan Control and building permits and rezone the property such that all existing uses are permitted. The applicant does not intend to change any buildings and land uses.

C4. It was noted during the meeting that the applicant may wish to further diversify business operations in the future and potentially introduce new land uses as part of the rezoning application. The applicant did not specify which new land uses may be introduced. It is understood that these potential changes would be reflected in the rezoning application but not Site Plan Control as it is unknown exactly when these changes would occur.

i) Please note that if the list or scope of proposed land uses changes from those discussed during the pre-consultation meeting, another Phase 2 pre-consultation meeting might be required for the Zoning By-law amendment.

Official Plan – Designation

C5. The subject site is designated Rural Countryside by Official Plan Schedule B9. The intent of this designation is to accommodate a variety of land uses that are appropriate for a rural location, limiting the amount residential development, and support industries that serve local residents and the travelling public.

C6. As per Official Plan policy 9.2.2(2)(b), small scale light industrial and commercial uses may be permitted through a Zoning By-law amendment where all of the following criteria are met:

i) The uses are necessary to serve the local rural community or the travelling public, such as restaurant, gas station, private medical or medical related-clinics, veterinary services, personal service or motel;

ii) The lands are within 200 metres of an arterial or collector road and can be safely accessed;
iii) The lands are located beyond 1 kilometre of an Urban or Village boundary, or where located less than 1 kilometre from a Village boundary, it can be demonstrated that there is insufficient opportunity for these types of uses to be established within the Village;
iv) The lands are not adjacent to lands designated as Agricultural Resource Area;
v) The development can be supported by services available according to applicable provincial regulations;
vi) The scale of the development is suitable for a rural context and where the size of each commercial occupancy will not exceed 300 square metres of gross leasable floor area; and
vii) The proposed development is designed to minimize hazards between the road on which it fronts and its vehicular points of access, mitigate incompatibilities with adjacent residential uses and to
viii) integrate appropriately with rural character and landscape.

Official Plan – Watercourse Policies

C7. John Boyce Municipal Drain runs through the property. This drain is considered a watercourse by the Official Plan and as such, the following policies from Official Plan section 4.9.3 are applicable.

1) Where a Council-approved watershed, subwatershed or environmental management plan does not exist, or provides incomplete recommendations, the minimum setback from surface water features shall be the greater of the following:
   a) Development limits as established by the conservation authority's hazard limit, which includes the regulatory flood line, geotechnical hazard limit and meander belt;
   b) Development limits as established by the geotechnical hazard limit in keeping with Councilapproved Slope Stability Guidelines for Development Applications;
   c) 30 metres from the top of bank, or the maximum point to which water can rise within the channel before spilling across the adjacent land; and
   d) 15 metres from the existing stable top of slope, where there is a defined valley slope or ravine.

2) Lands within the minimum setback shall remain in a naturally vegetated condition to protect the ecological function of surface water features from adjacent land-use impacts, subject to the exceptions in Policies 6) and 7). Any natural vegetation that is disturbed due to development or site alteration activities shall be restored and enhanced, to the greatest extent possible, with

native species and shall avoid non-native invasive species. Burial or complete encasement of a permanent surface water feature shall not be allowed.

7) Exceptions to the setbacks in Policy 2) shall be considered by the City in consultation with the conservation authority in situations where development is proposed on existing lots where, due to the historical development in the area, it is impossible to achieve the minimum setback because of the size or location of the lot, approved or existing use on the lot or other physical constraint, providing the following conditions are met to the City's satisfaction:
   a) The ecological function of the site is restored and enhanced, to the greatest extent possible, through naturalization with native, non-invasive vegetation and bioengineering techniques to mitigate erosion and stabilize soils; and
   b) Buildings and structures are located, or relocated, to an area within the existing lot that improves the existing setback, to the greatest extent possible, and does not encroach closer to the surface water feature.

Official Plan – Natural Heritage Features

C8. The watercourse and some of the woodlands are considered natural features by the Official Plan as shown on Schedule C11-C. The following policies from Official Plan section 5.6.4.1 are some of the applicable policies:

3) The City shall protect natural heritage features for their natural character and ecosystem services.

4) Development or site alteration proposed in or adjacent to natural heritage features shall be supported by an environmental impact study prepared in accordance with the City's guidelines.

5) Development and site alteration shall have no negative impact on the Natural Heritage System and Natural Heritage Features. Development and site alteration shall be consistent with the conclusions and recommendations of an approved environmental impact study.

Official Plan – Septic System Requirements

C9. The subject site is currently serviced by private septic system and well. It is anticipated that the site will connect to the municipal water main along Bank Street as part of these applications. The site will contain to use a septic system to treat wastewater.

C10. Official Plan policy 4.7.2(9) states:

9) Where new development is proposed that relies upon private sewage systems, including areas of partial servicing, a minimum area of 800 square metres of undeveloped area must be maintained for the sewage system.

Official Plan – 1:100 Year Flood Plain

C11. There is a 1:100 year flood plain on the property surrounding the watercourse.
C12. Official Plan policy 10.1.1(1) states:
1) Development and site alteration shall not be permitted in the 1 in 100 year flood plain or in an erosion hazard area.
C13. Official Plan policy 10.1.1(3) states:
3) Notwithstanding Policy 1) and 2), some minor development and site alterations may be permitted. Minor development and site alterations are defined as the following:
a) Facilities which by their nature must locate in the flood plain, such as bridges, flood and/or erosion control works;
b) Minor additions and/or renovations to existing structures, which do not affect flood flows, meet appropriate floodproofing requirements and are supported by the appropriate conservation authority;
c) The replacement of a dwelling that was in existence at the date of adoption of this Plan, with a new dwelling where:
i) The new dwelling is generally the same gross floor area as the existing dwelling;
ii) The new dwelling is in a location on the lot that has lower flood risk than the existing dwelling;
iii) The new dwelling, in conjunction with any site alteration does not result in a negative effect on flooding; and
iv) The new dwelling and any associated site alteration shall meet the appropriate floodproofing requirements and be supported by the appropriate conservation authority.
d) Passive open spaces which do not affect flood flows;
e) Minor site alterations which do not result in a negative effect on flooding and which are supported by the appropriate conservation authority; and .
f) The severance of a lot containing a surplus farm dwelling as permitted by the provisions of Subsection 9.1.3 provided that safe access to the dwelling or the retained parcel is not eliminated during the regulatory flood event.

Official Plan – 1:350 Year Flood Plain

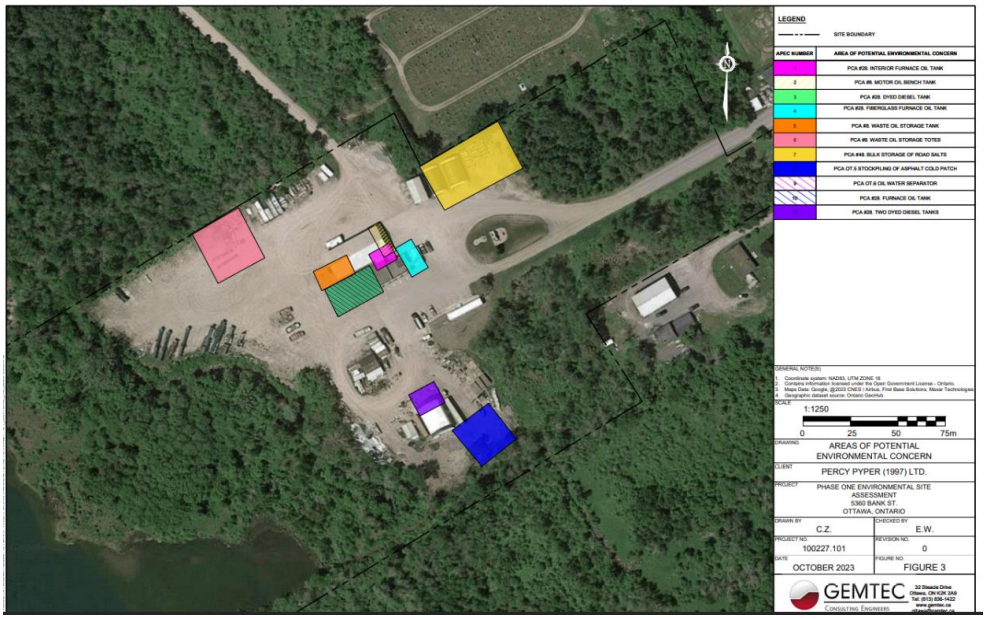
C14. A small portion of the property is within the 1:350 year flood plain and as such, policy 10.1.3(3) applies:
3) Where lands located in a climate change flood vulnerable area are subject to site plan control or plan of subdivision applications, flood risk will be evaluated, and mitigation measures will be applied as part of the planning and design of the site. These measures will be determined through the servicing studies required as part of the development approvals process.
C15. The 1:350 flood plain primarily follows the 1:100 flood plain except for a small area near the south lot line as shown below. This area is identified in the Phase 1

ESA as storage for a potential contaminate. We recommend relocating this storage area to satisfy the 1:350 flood plain policy as well as the watercourse policies above.

GeoOttawa



Phase 1 ESA



Official Plan – Aggregate Overlay

C16. The subject site abuts a Sand and Gravel Overlay to the north as shown on Schedule B9 of the Official Plan. Official Plan policies 5.6.3.2(3 and 4) states:

3) New development shall not be approved within 500 metres of lands within the Bedrock Resource Area Overlay, or within 300 metres of lands within the Sand and Gravel Resource Area Overlay, unless it can be demonstrated through a mineral aggregate impact assessment that such development shall not conflict with future mineral aggregate extraction. Conflicting land uses are new sensitive land uses that interfere with mineral aggregate extraction, including but not limited to:

a. The creation of new lots; except where the intention is to sever a lot for a dwelling existing as of July 9, 1997 and the vacant parcel that remains is rezoned to prohibit the construction of a new dwelling or lodging place;
b. Rezoning to permit dwellings or lodging places (motels, campgrounds, nursing homes, places of assembly etc.); and
c. Small-scale business uses where animals, equipment or employees may be adversely affected by pit or quarry activities.

4) New development may be approved within 500 metres of an existing licensed bedrock quarry or within 300 metres of an existing sand and gravel pit if it can be demonstrated that the existing mineral aggregate operation, and potential future expansion of the operation in depth or extent, will not be affected by the development.

Zoning By-law

C17. The subject site is currently zoned ME2 – Mineral Extraction Zone, Subzone 2 and RU – Rural Countryside Zone. All structures and land uses contemplated in this pre-consultation are entirely within the RU zone which does not permit the current land uses.

C18. The site was previously zoned ME which permitted a quarry, sand or gravel pit, agriculture, and/or forestry. Repair and maintenance of industrial vehicles was a conditionally permitted use provided there was an active mineral extraction license. If the applicant wants to prove any land use enjoys legal non-conforming status, such as the storage yard, the applicant must provide the previous pit license proving the land uses were permitted by the license.

Submission requirements – Zoning By-law Amendment

C19. Staff strongly recommended preparing a written strategy for how building permits will be obtained for each building as some buildings might have to be relocated to satisfy building code requirements. This is particularly important to figure out before the rezoning and site plan control applications to ensure that approved applications will not conflict with building code requirements.
   i) Building Code Services can review the written strategy as part of the Phase 3 pre-con and provide feedback.
   ii) Please note approval of a rezoning and/or site plan control application does not mean approval for a building permit (i.e. just because we approve a site plan does not mean the plan satisfies building code requirements such as fire spacing between buildings).
   iii) Please note that if a Site Plan Control application is approved and it is discovered that building code issues require moving a building, the Site

Plan Control approval might have to be amended through another application.

C20. A **Planning Rationale** is required for the Zoning By-law Amendment. The Planning Rationale should provide clear justification for each land use and any limitations given the constraints such as woodlands, watercourse, and flood plain. For example, the rationale should include an analysis of the storage yard and whether it should remain in its currently location and proximity to the watercourse given the Official Plan policies mentioned above. The rationale should also demonstrate that the proposed zoning amendment satisfies the other policies listed above as well as the Official Plan in general and Provincial Policy Statement.

C21. The **Planning Rationale** should clearly define each proposed principal and accessory/ancillary land uses. For example, it appears that there are several principal land uses such as a storage yard, heavy equipment maintenance garage, and warehouse that should be discussed in the Planning Rationale. There are also other uses that may be principal uses such as an office for a construction company and a parking lot for mineral extraction employes who park on this site before heading into the sand and gravel pit.

i) The Planning Rationale should identify any provisions that are appropriate for the proposed land uses. For example, if a parking lot is proposed as a principal use, the rationale should state whether any limiting provisions are also proposed, such as limiting the parking lot to employee parking for the adjacent pit.

C22. The **Planning Rationale** should discuss appropriate setbacks from lot lines. For example, is the current 2.1m setback from the salt dome to the interior lot line appropriate.

C23. A **Zoning Confirmation Report** is required for the Zoning By-law Amendment and should clearly identify all zoning compliance issues which includes permitted uses and setbacks.

C24. A **Concept Plan** is required for the Zoning By-law Amendment and should clearly identify each proposed principal and accessory/ancillary use. For example, this plan should distinguish the storage yard from parking spots and illustrate the parking required for each use (i.e. office, maintenance garage, warehouse).

C25. A **Survey** is required for all applications.

Submission Requirements – Site Plan Control

C26. Several comments above for the Zoning By-law amendment are also applicable to the Site Plan Control application, particularly the need to demonstrate the appropriateness of each land use and building given the site constraints.

C27. A **Site Plan** is required for the Site Plan Control application. The Site Plan must adhere to the terms of reference.
C28. A **Landscape Plan** is required. We strongly recommend additional tree plantings wherever possible, particularly along parking spots and any outdoor amenity areas.
C29. A **Survey** is required for all applications. The survey normally is required to show the required road protection. Road widening was also requested as a condition of approval for the lot line adjustment application.
C30. **Building Elevations** might be required depending on if buildings will be relocated.
C31. A **Zoning Confirmation Report** is required and should demonstrate compliance with the new zone. This report should be prepared after the new zone is in full effect.

Feel free to contact Sean Harrigan, File Lead, for follow-up questions.

Urban Design

Comments:

C32. A Design Brief is not required due to no new structures proposed.
C33. A Site Plan and Landscape Plan will be required. The Site Plan must show parking stalls, all existing structures and site elements, setbacks from all structures to property lines and meet the City's terms of reference for applicable studies.
C34. Building Elevations will not be required unless future submissions demonstrate buildings must be relocated or new structures are proposed. For buildings that require relocation, building elevations would only be required for uses that are not currently permitted under the existing zoning.

Feel free to contact Molly Smith, Urban Design, for follow-up questions.

Engineering

List of Studies and Plans Reviewed:

- ***Preliminary Aggregate Resource Study***, prepared by Paterson Group Inc., revision dated August 21, 2014.

- ***Phase One Environmental Site Assessment***, prepared by Gemtec Engineers Engineers and Scientists Ltd., dated October 2, 2023.

Deficiencies:

2. The MRIA provided as part of the consent application, *Preliminary Aggregate Resource Study*, prepared by Paterson Group, dated August 2014, does not meet the Terms of Reference for Mineral Aggregate Impact Assessment Studies.

3. The Phase One Environmental Site Assessment prepared by Gemtec identifies that a Phase Two Environmental Site Assessment will be required, but was not submitted at this time.

4. A Site Servicing Study was not submitted for review at this time. This will be required for the Zoning Amendment and Site Plan Control applications.

5. A Septic Impact Assessment was not submitted for review at this time. This will be required for the Zoning Amendment and Site Plan Control applications.

Comments:

C35. The engineering requirements provided below are applicable to the current proposal, which does not consider any proposed development. Site Plan Control requirements would change if any work is deemed required.

C36. A **Site Servicing Study** will be required with the Zoning By-law Amendment and the Site Plan Control application. This report should be completed exceeding the minimum requirements laid out in the Site Servicing Study Terms of Reference. The report will serve to address how the design of the site complies with City design guidelines and Official Plan policies, among other evaluation criteria noted in the Terms of Reference. The Official Plan, which receives authority through the Planning Act, identifies in Policy 6, section 2.2.3, that flooding is the costliest type of natural disaster in Canada. The risks of not implementing stormwater management practices could include damage to property, infrastructure, contamination of drinking water sources, and affecting people's safety, finances, physical and mental health. The City looks to lessen these risks by reviewing development to ensure stormwater management practices are being implemented, infrastructure is resilient to future climate conditions, including extreme weather events, and using low impact development where feasible to manage smaller, infrequent events.

a. In terms of the Stormwater Management for the Site Plan Control application, the quantity criteria will be that the post development peak flow rate must match the pre-development peak flow rate for the 2-year and 100-year design events. The pre-development can be considered the site prior to installation of buildings which were installed without appropriate permits. As part of complete site plan control applications, whether development or redevelopment, must identify and mitigate the impacts of additional runoff resulting from increased imperviousness through measures such as site-specific stormwater management postulated in policy 6, section 4.7.1 of the Official Plan.

b. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less as described in the Sewer Design Guidelines, Second Edition, document no. SDG002, October 2012, City of Ottawa, including technical bulletins ISDTB-2014-01, PIEDTB-2016-01, ISTB 2018-01, ISTB-2018-04, ISTB-2019-02, section 8.3.7.3.

c. A calculated time of concentration cannot be less than 10 minutes as described in section 5.1.4 of the Sewer Design Guidelines.

d. The John Boyce Municipal Drain crosses the site and should be contemplated in the Servicing Study. The reporting should discuss and contemplate the appropriate setbacks based on the engineer's report for the drain. Should any modifications to the drain be proposed, they must follow the procedure set out by the Municipal Drainage staff.

e. The water quality control should be an enhanced level treatment, 80% long term suspended sediment removal. Reporting of TSS removal shall be extensive and if peer reviewed and published papers are relied on for conclusions, the conclusions shall be patently clear and the report shall show overwhelming agreement.

f. Runoff will need to be conveyed to a legal and sufficient outlet. In the Zoning Amendment stage, the study should identify the proposed outlet(s) for surface

runoff. If it is proposed to discharge storm water to the existing ditches in the ROW, the ditches will need to be shown to provide continuous flow to an outlet. This comment is sourced from the Official Plan which notes in policy 8, section 4.7.1, that proof of legal and sufficient outlet for proposed stormwater management and drainage systems will be required as a condition of Site Plan Control.

g. Low Impact Development (LID) is to be implemented as per the bulletin from the former MOECC (now MECP) titled Expectations RE: Stormwater Management released in February 2015. In the Zoning By-law, the applicant should identify the treatment train of processes proposed for the development. The Official Plan defines LID as a stormwater management strategy that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible. LID comprises a set of site design strategies that minimize runoff through distributed, small scale structural practices that mimic natural or predevelopment hydrology through the processes of infiltration, evapotranspiration, harvesting, filtration and detention of stormwater. These practices can effectively remove nutrients, pathogens and metals from runoff, and they reduce the volume and intensity of stormwater flows. The City has released a document titled ‘Low Impact Development Technical Guidance Report – Implementation in Areas with Potential Hydrogeological Constraints’ which aids sites which may have constraints such as low permeability or high groundwater.

h. In the Zoning By-law stage, the reporting should discuss the proposed servicing that contributes to whether the site can support the scope of the development. This would include servicing demands in terms of water supply and fire flow, septic impact, low impact development measures, stormwater management facilities and their outlet, amongst other criteria required to support the application.

i. In terms of the water supply portion of the study, the water demands will be determined from the proposed zoning and available or allotted servicing capacity in the watermain. For example, the proposed zoning amendment to Rural General Industrial will need to consider the possible water demands and uses available under this proposed zoning and consider the allotted capacity of the watermain. For example, currently the parcel is zoned RU and is only entitled to water demand based on that existing zoning.

    i. A Boundary Condition Request will need to be prepared and submitted to confirm that the required demands and fire flow can be provided. It is anticipated that there will be limit to the fire flow available.

        1. Boundary Condition Request must include the location of the service(s), and

        2. Location of fire hydrants, and

        3. Type of development and the amount of fire flow required (FUS, 2020), and

        4. Average daily, maximum daily, and maximum hour demands in L/second calculated based on the City of Ottawa – Water Distribution Guidelines, as amended.

    ii. The Site Servicing Study, in the Zoning By-law Amendment stage, should include a section addressing the provision of a water supply for fire suppression.

    iii. In regard to fire flow calculations, the FUS methodology, as opposed to the OBC methodology shall be applied for all rural areas. Enhanced review will be invoked should the construction coefficient chosen be less than 1. It is the responsibility of the

owner to ensure that an adequate water supply for firefighting is provided.

iv. Once the Boundary Condition Request results have been received and a response has been received, the engineering consultant can formalize the Servicing Study for submission.

C37. A Hydrogeological and Terrain Analysis Report will be required with the Zoning Amendment Application. The report will focus on the **Septic Impact Assessment**, which must be prepared as per the City's Terms of Reference, the Hydrogeological and Terrain Analysis Guidelines and MECP Guideline D-5-4. Please refer to the HGTA for the predictive assessment for commercial/industrial developments (not residential developments).

j. Since the application is for a Zoning Amendment, the calculation must be based on a conventional (Class IV) septic system and advanced treatment cannot be considered for the septic impact calculations.

k. Note that compact gravel will be considered impermeable in the septic impact assessment unless accompanied by field testing to confirm infiltration rates.

l. If the existing septic systems will continue to be used, a septic inspection is recommended to confirm the system meets current regulations under the Ontario Building Code. The report should assess whether the existing septic system has sufficient capacity to continue serving the existing uses.

C38. A **Grading and Drainage Plan** will be required with the Zoning By-law Amendment and the Site Plan Control application. The plan serves to identify the existing and proposed drainage patterns and their relationship with the surface runoff control.

m. As part of a complete Zoning By-law Amendment application, the Grading and Drainage Plan should be scoped, at a minimum, to be able to review the minimum setback from the watercourse feature as per Official Plan under section 4.9.3. The applicant can include the extent of the scope that would be required under the Site Plan Control application.

n. As part of a complete Site Plan Control application, the Grading and Drainage Plan would identify and implement site, grading, building, and servicing design measures to protect new or existing development from flooding as per policy 6, section 4.7.1 of the Official Plan.

o. The Plan should have a note that references the horizontal and vertical datums that were used and tied into to complete the project. The drawing should also make reference (on the face of the plan) to a site benchmark that can be used by anyone with a level to carry out checks on the particular project.

C39. A **Phase Two Environmental Site Assessment** (ESA), as deemed applicable by the Phase One ESA, is required for the proposed Zoning Amendment and Site Plan Control application. This mandatory report serves to ensure that development only takes place on sites where the environmental conditions are suitable for the proposed use in accordance with provincial legislation and regulations.

C40. A **Mineral Resource Impact Assessment** will be required with the Zoning Amendment to demonstrate that the existing use or future development based on potential uses available from the proposed zoning amendment, will not conflict with future mineral aggregate extraction and that the existing mineral aggregate operation, and potential future expansion of the operation in depth or extent, will not be affected by the development. (Policy 3 & 4, section 5.6.3.2 of the new Official Plan).

p. The MRIA provided as part of the consent application, *Preliminary Aggregate Resource Study*, prepared by Paterson Group, dated August 2014, does not meet the Terms of Reference for Mineral Aggregate Impact Assessment Studies.

i. Section 4 notes two test pits were conducted in the southern parcel, but the location and ID number were not provided in the Test Pit Location Plan.

1. Assuming TP-4 and 5 are on the southern parcel, there appears to be fine sand that could be extracted. Discussion

should be expanded to discuss what a viable deposit consists of.

ii. The reporting must be expanded to discuss the impact of the current/proposed development on the existing operation and vice versa. Are there any noise or vibration impacts from the existing operation that result in setbacks on the current parcel?

iii. The reporting appears to rely on arguments that are no longer accepted for these types of reports. There appears to be two pieces used in the recommendation that do not meet the Terms of Reference for Mineral Aggregate Impact Assessment Studies.

1. Demand for the type of aggregate (sand). “The quantity of long-term supply of mineral aggregate resources in the city (i.e. the position that the resource is not needed) cannot be accepted as rationale in the assessment.” (Terms of Reference)

2. Proximity to other developments as a justification for the current limits of extraction. It does not set out or discuss what specific ‘applicable setbacks’ apply. “Existing residential or sensitive development will not be accepted as rationale in the assessment for more development.” (Terms of Reference)

C41. An MECP Environmental Compliance Approval (ECA) may be required for any existing or proposed stormwater management facilities or sewage works if the exemption requirements of O.Reg. 525/98 are not met. It is anticipated that the site, based on the industrial use and the existing oil grit separator, would require an ECA. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to arrange a pre-submission consultation:

q. Emily Diamond at (613) 521-3450, ext. 238 or Emily.Diamond@ontario.ca

r. Please note that the process for ECAs is undergoing changes and may be different upon time of submission. Currently, once the development application has been submitted, a request can be made to the City to consider a Transfer of Review (ToR) ECA for SWM works (ponds, ditches, culverts, etc.) for private property, instead of a direct submission ECA. This is subject to approval by the City and MECP. Note that the ECA requirements are currently in transition towards the linear ECA process and more details may become available depending on application submission timeline. It is recommended to check with the City when the development application is submitted to confirm the ECA process at that time.

Feel free to contact Travis Smith, Infrastructure Project Manager, for follow-up questions.

Transportation

Comments:

C42. Right-of-way protection for Bank Street.

a. See Schedule C16 of the Official Plan.

b. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by

Feel free to contact Mike Giampa, Transportation Project Manager, for follow-up questions.

Environment and Trees

List of Studies and Plans Reviewed:

- **Environmental Impact Statement**, prepared by Gemtec, dated February 2, 2022.
- **Phase 1 ESA**, prepared by Gemtec, dated October 2, 2023.

Deficiencies:

6. The provided EIS does not sufficiently address the watercourse feature in order to justify a reduced setback. As such, the required setback from this feature is 30m and all development that is not an existing non-conforming use must be relocated outside of the setback. Additionally, all land within the setback that has been subject to development must be revegetated with native, non-invasive species.

Comments:

C43. If the applicant wishes to apply for a reduced setback under the provisions of section 4.9.3, policy 7 of the Official Plan, then a reviewed EIS must be submitted in support of this. The EIS must undertake a detailed study of the ecological function of the watercourse (through an HDFA) and provide a justification for the setback. Keep in mind that the provisions for this exception are as follows (emphasis mine):

"Exceptions to the setbacks in Policy 2) shall be considered by the City in consultation with the conservation authority in situations where development is proposed on existing lots where, due to the historical development in the area, it **is impossible to achieve the minimum setback** because of the size or location of the lot, approved or existing use on the lot or other physical constraint, providing the following conditions are met to the City's satisfaction:

a) The ecological function of the site is restored and enhanced, to the greatest extent possible, through naturalization with native, non-invasive vegetation and bioengineering techniques to mitigate erosion and stabilize soils; and

b) Buildings and structures are located, **or relocated**, to an area within the existing lot that improves the existing setback, to the greatest extent possible, and does not encroach closer to the surface water feature."

Additional tree plantings to help the city meet its forest canopy goals, as well as reducing the impacts of climate change and the urban heat island effect, are recommended. Again, these plantings should be of a native and non-invasive species.

As noted by other commenters, development within the flood plain, specifically the storage yard in the southereastern section of the site, should be moved outside of the hazard area.

Feel free to contact Mark Elliott, Environmental Planner, or Insert Name, Forester, for follow-up questions.

Parkland
Comments:

C44. Parks & Facilities Planning (PFP) will be requesting **cash-in-lieu of conveyance of parkland** for parkland dedication in accordance with the Parkland Dedication By-law NO. 2022-280 based on the Zoning By-law amendment/building permit/Site Plan Control process.

C45. The amount of parkland dedication required is to be calculated as per the City of Ottawa Parkland Dedication By-law No. 2022-280.

C46. Please provide the City with a surveyor's area certificate/memo which specifies the exact gross land area of the site being developed/redeveloped. For industrial or commercial redevelopment, this includes the portion of the property that is impacted by the proposed redevelopment, but not including any hazard lands or natural heritage features identified in the official plan, an approved Secondary Plan, or through an environmental impact study accepted by the City.

C47. Section 11 (1) of the Parkland Dedication By-law states that "The conveyance of parkland or the payment of cash-in-lieu of parkland is not required for development or redevelopment where it is known, or can be demonstrated, that the required parkland conveyance or cash-in-lieu of parkland, or combination thereof, has been previously satisfied in accordance with the Planning Act, unless:

a. there is a change in the proposed development or redevelopment that would increase the density providing a net dwelling unit gain;
b. the proposed development or redevelopment increases the gross floor area of a non-residential use; or
c. land originally proposed for development or redevelopment for commercial or industrial purposes is now proposed for development or redevelopment for other purposes that have a higher conveyance requirement pursuant to the rates described herein."

If parkland dedication for the parcel has been satisfied previously, please provide Parks & Facilities Planning with the supporting documentation.

C48. Please note that the park comments are preliminary and will be finalized (and subject to change) upon receipt of the development application and any requested supporting documentation. Additionally, if the proposed land use changes, then the parkland dedication requirement will be re-evaluated accordingly.

C49.

Feel free to contact Warren Bedford, Parks Planner, for follow-up questions.

Conservation Authority

Comments:

C50. Watercourse

i) the John Boyce Municipal Drain flows from north to south across the property. A floodplain analysis was completed for the watercourse in 2014.

C51. 1:100 Year Flood Plain

i) The 1:100 year floodplain elevations associated with the property range from 107.8 to 105.11 MASL (CGVD28). A map or GIS file showing the location of the transects can be obtained from SNC.

ii) The floodplain extent must be shown on a grading and drainage plan. Storage of materials and fill placement are not permitted in the floodplain without a permit. To obtain a permit, the applicant may be required to demonstrate that it will not negatively impact flooding.

iii) If the grading plan identified existing materials or fill within the floodplain, South Nation Conservation will recommend that these be removed, and the site restored to the original grade prior to site plan approval.

iv) the floodplain analysis for the John Boyce Municipal Drain indicates that the lands west of the municipal drain are an uncontrolled spill area where the extent and depth of the hazard are currently unknown. Further analysis of the hazard is recommended for any development in this area.

C52. O Reg. 170/06

i) Any development within 15m of the 100 year floodplain elevations will require a permit from SNC and restrictions may apply. In addition, any interference with a watercourse may require a permit and restrictions may apply.

Feel free to contact James Holland, South Nation Conservation Authority, for follow-up questions.

We look forward to further discussing your project with you.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,
Sean Harrigan

c.c. Travis Smith
Damien Whittaker

Obai Mohammed
Cheryl McWilliams
Mark Elliot
Laura Cooper
Molly Smith
Warren Bedford

From:	Smith, Travis
To:	Tracy Zander
Cc:	Moroz, Peter; Info Greely Sand and Gravel; Whittaker, Damien; Brown, Adam; Kukkonen, Stephan; Gladish, Alyssa
Subject:	Re: 5360 Bank Street - Phase 2 Pre-Consultation Meeting Feedback - Request for meeting with City Personnel - File No.: PC2023-0388
Date:	Thursday, May 2, 2024 9:31:55 AM

Morning all,

I wanted to provide a follow-up to the meeting with some more detail of the topics discussed. The information below does not change the requirements from the Feedback Form but is intended to provide additional information/clarifications. At the end of the information is the response to questions on comments C27 & C28, provided by Stephan Kukkonen. Additional information can be requested from other commenters on the application, including the South Nation River Conservation Authority, Municipal Drainage staff, etc. if there are any follow-up questions related to their area of commenting.

Environmental Compliance Approval (ECA), administered in conjunction with the Ministry of the Environment Conservation and Parks (MECP/"the Ministry")

As discussed in the meeting, the site, as it exists, requires an ECA based on the Ministry's requirements.

The application can proceed through direct submission, where the Ministry reviews the application against their requirements. One of the MECP's requirements, for example, would be the application of the Stormwater Management Planning and Design Manual (SMPDM) to the design.

For developments that require direct submission, a request can be made to the City to consider the application through the Transfer of Review process. This typically applies to ECA applications for privately owned sewage works/stormwater facilities (ponds, OGS units, swales, LID facilities, etc.). This process would be completed alongside the planning application and would be reviewed to the same level of criteria as required by MECP. This is subject to approval by the City (those with Signing Authority) and MECP and must be requested, via email, to the Infrastructure Project Manager to be initiated. Direct submission remains an option for other application types that do not meet the CLI ECA process (this cannot be done should the design attempt a TSS removal rate less than 80%) and are not reviewed through Transfer of Review and take 9-11 months to approve. Not having an ECA for works leaves an owner open to risk of fines or legal action from the Ministry.

Stormwater Management (SWM)

Stormwater management is a common requirement for site plan control applications throughout the City. The City's Official Plan, in its policy intent section, reiterates the need for implementing stormwater management practices and incorporating Low Impact Development measures. The City's Sewer Design Guidelines are clear that all industrial site plan applications must include on-site stormwater management measures to avoid the impacts on the downstream storm system.

Concurrent with the City's requirements, the Ministry, in section 3.3 of the SMPDM, referred to above, informs on the impacts and requirements for treating runoff. The Ministry's manual identifies a number of triggers for which an enhanced level of treatment is required which appear to be applicable for this site and were used to determine the required level of treatment for the site.

The first trigger is that an enhanced level of treatment or greater is required for areas with high permeability soils. The Preliminary Aggregate Resources Study, completed by Paterson Group in 2014, during their investigation identified soils in test pits 4 and 5 which seem to fit this description of a high permeability soil. The available geological mapping (OGS) of the site also identifies sands and till, both with high likelihood of being high permeability.

The second is that enhanced protection be provided where there are habitats sensitive to sediment and siltation (such as gravel bottom used for bass spawning). The Environmental Impact Statement, prepared by GEMTEC in February of 2022, identifies that the John Boyce Municipal drain is a class D drain, which identifies that sensitive species are present and spawn in the fall or a combination of the spring/fall based on the DFO classification.

The site is also located within the boundaries of the North Castor River Subwatershed Study (2004). This

study identifies that sites must ensure that stormwater or other sources of water contamination be safely discharged to minimize the impact on the water quality of the North Castor River.

The Ministry's SMPDM, provided above, provides a number of possible solutions that can be investigated for stormwater management facilities and provides some engineering detail as to their design. It is understood, that along with the City, the Ministry would also use this document for the review of the ECA application. A number of possible measures have been pulled from the SMPDM to help you out;

Lot Level and Conveyance Controls include, but are not limited to:

- rooftop storage – restricting the discharge rate from roof drains to provide rooftop detention of stormwater
- parking lot storage – implementing catchbasin restrictors or orifices in the storm sewer to detain stormwater on parking lots
- superpipe storage – oversizing storm sewers and implementing orifices in the sewer to create pipe storage
- rear yard storage – implementing catchbasin restrictors in rear yard catchbasins to create rear yard storage

Infiltration-based controls include:

- reduced grading to allow greater ponding of stormwater and natural infiltration;
- directing roof leaders to rear yard ponding areas, soakaway pits, or to cisterns or rain barrels;
- sump pumping foundation drains to rear yard ponding areas;
- infiltration trenches;
- grassed swales;
- pervious pipe systems;
- vegetated filter strips; and
- stream and valley corridor buffer strips.

End-of-pipe controls include:

- wet ponds;
- wetlands;
- dry ponds; and
- infiltration basins.

It is important to note that not all the above options are suitable for all sites. As an example, the site could look to collecting the roof runoff, which is considered clean, and direct it into an infiltration measure as a way of addressing requirements.

Prior to implementing infiltration style measures there are site characteristics that must be determined. Supporting data collection will involve groundwater monitoring (long term or limited date with a conservative assumption), soil classification, and measured infiltration/percolation testing which will aid the consultant in determining what measures are, or are not, suitable for the site. The City has developed a technical guidance document that can be provided upon request which guides consultants on how to implement SWM/LID on sites with constraints such as high groundwater or low permeability. Not providing treatment of runoff, to minimise erosion nor control sediment transport exposes the owner to risk of fines from Bylaw or from legal risk from adjacent owners or the other partners of the Municipal Drain

Surface Runoff

What I had proposed in the meeting, was that the pre-development level be considered the point prior to the addition to the farm storage building, which requires site plan control to legalize. This would mean that structures built after 2000, along with any cleared areas added, have their impacts mitigated. In layperson's terms, the SWM would need to retain and treat the additional runoff generated from the unauthorized works prior to reaching the municipal drain, or other outlet.

The intent of the lot grading and drainage plan is to demonstrate how surface runoff will be controlled on the site and describe the grading relationships between abutting properties. At all times, inside or outside of a permit, the Site Alteration By-law applies and requires that no person may alter the lot grade such that the flow of runoff is increased, impaired or deviates from the existing drainage pattern or approved grading pattern and causes or is likely to cause an adverse condition on any abutting property. The purpose of the plan for this application is to incorporate the required changes to building locations, determine whether or not the site meets the minimum grading requirements, and remedy any concerns

from changes to lot grading that came as a result of the changes outside of required approvals. The note provided in the meeting that no complaints regarding drainage have been received is not justification for not providing mitigation. As above not providing treatment of runoff exposes the owner to risk of fines from Bylaw or from legal risk from adjacent owners or the other partners of the Municipal Drain.

Legal and Sufficient Outlet

As Damien had mentioned in the meeting, there are two elements to the out letting of runoff to a place that is not a ROW. The first, legal, refers to whether the property has legal rights; whether through the laws of natural drainage or through the Drainage act. It appears based on the presence of the municipal drain on/crossing the property, that the property would have some measure of rights to an outlet.

The second part, the sufficient outlet, is regarding whether the drain is designed to accommodate the runoff entering from the site. A drain that has status under the Drainage Act has special requirements for work in, and around, or any work affecting these drains which involves Municipal Drainage staff. Our understanding is that there is an existing Engineer's Report for this drain that has a requirement to be updated for changes to the flows directed to the drain. Aside from that, the City also requires that surface runoff be controlled and treated on site, which if there are existing measures in place, they should be identified and rationalized in addition to any new measures required to meet requirements noted in the Surface Runoff section above. Not providing treatment of runoff volume and rate, to minimise erosion nor control sediment transport exposes the owner to risk of fines from Bylaw or from legal risk from adjacent owners or the other partners of the Municipal Drain.

Site Plan and Landscape Plan

"C27 – As indicated above, the Site Survey Plan will constitute the Site Plan, since there is no development work proposed. Please confirm this will be sufficient.

A Site Survey Plan alone will not be sufficient for this application. Along with the existing locations of the buildings, the Site Plan should show the entirety of the development, including the location of the outdoor storage areas to be moved outside of the identified floodplain and water course setback. This portion of the development for instance would not be captured by the Site Plan Survey.

As such, we will require a Site Plan to be submitted.

C28 – No development work is proposed on this site, so a Landscape Plan should not be required. There aren't any areas within the developed portion of the site that present planting opportunities that will not interfere with site operations. The site perimeter of the site is treed. Please confirm that no landscape plan is required.

The comments provided by our Environmental Planner in the Phase II Feedback Form require that the portion of land within the watercourse setback be revegetated with native, non-invasive species. The details for revegetation can be included on the Site Plan if illustrated sufficiently. If not, a Landscape Plan detailing the revegetation will be required."

The City, as always, is available to discuss any of these points further. Please let me know at any time if you would like to schedule a meeting to discuss.

Regards,

Travis Smith, P.Eng.
Project Manager
Planning, Development and Building Services Department / Direction générale des services de la planification, de l'aménagement et due batiment
Development Review - Rural
City of Ottawa | Ville d'Ottawa
110 Laurier Avenue West, Ottawa, ON | 110, Avenue. Laurier Ouest, Ottawa (Ontario) K1P 1J1
613.580.2424 ext./poste 16544, travis.smith@ottawa.ca

Appendix B Water Servicing

B.1 Domestic Water Demands

5360 Bank Street, Ottawa, ON - Domestic Water Demand Estimates

Project No. 160401995
Revision: 01
Date: 27-Oct-2026

Designed by: MW
Checked by: DT
Date Checked: 27-Oct-2026
City File No. PC2023-0388

Demand conversion factors per Table 4.2 of the City of Ottawa Water Design Guidelines and Technical Bulletin ISTB-2021-03:		
Population	280	L/persons/day

Population	Avg Day Demand [1]		Max Day Demand [2]		Peak Hour Demand [2]	
	(L/min)	(L/s)	(L/min)	(L/s)	(L/min)	(L/s)
6	3.5	0.06	5.3	0.09	9.5	0.16

Notes:

1 Water demand based on 8-hour work day per correspondence between client and Paterson Group for septic system sizing.

2 Water demand criteria used to estimate peak demand rates for industrial areas are as follows:

maximum daily demand rate = 1.5 x average day demand rate

peak hour demand rate = 1.8 x maximum day demand rate (as per Technical Bulletin ISD-2010-02)

B.2 OBC Fire Flow Demands and Volume

Fire Flow Calculations as per Ontario Building Code 2024 (Appendix A)

Job#	160401995	Designed by:	MW
Date	3-Dec-25	Checked by:	DT
		Description:	Main Building

$Q = KVS_{tot}$

Q = Volume of water required (L)
V = Total building volume (m3)
K = Water supply coefficient from Table 1
S_{tot} = Sotal of spatial coefficeint values from property line exposures on all sides as obtained from the formula

$S_{tot} = 1.0 + [S_{side1} + S_{side2} + S_{side3} + S_{side4}]$

1	Type of construction	Building Classification	% of Building Volume	Water Supply Coefficient
	combustible without Fire-Resistance Ratings	A-4, F-3	6.5%	28
	Non-Combustible without Fire-Resistance Ratings	A-4, F-3	93.5%	19

2	Area of one floor (m^2)	number of floors	height of ceiling (m)	Total Building Volume (m^3)
	477	1	6	4,503
	175	1	3	
	98	1	3	
	273	1	3	

3	Side	Exposure Distance (m)	Spatial Coefficient	Total Spatial Coeffiecient
	North	10	0	1
	East	10	0	
	South	10	0	
	West	10	0	

4	Established Fire Safety Plan?	Reduction in Volume (%)		Total Volume Reduction
	no	0%		0%

5		**Total Volume 'Q' (L)**
	Required volume per OBC 2024	**88,222**
	Storage Evaluation per IWSTB-2024-05	
	Volume Reduction	-57,000
	Revised Volume (L)	31,222
	Final Storage Volume (L)	**38,000**
		Minimum Required Fire Flow (L/min)
		2,700

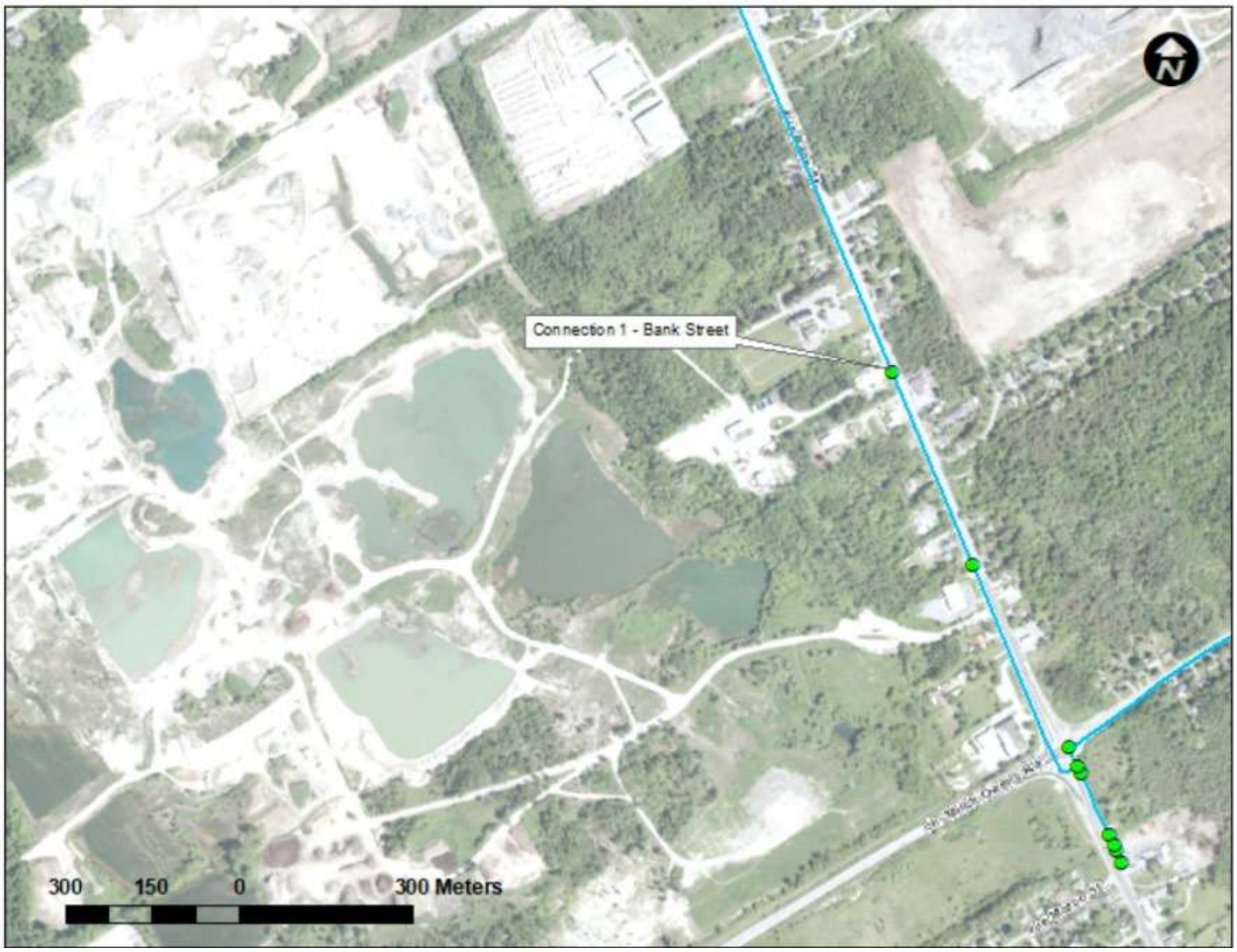
B.3 Boundary Conditions

Boundary Conditions
5360 Bank Street

Provided Information

Scenario	Demand	
	L/min	L/s
Average Daily Demand	120	2.00
Maximum Daily Demand	120	2.00
Peak Hour	120	2.00

Location



Results

Existing Condition

Connection 1 – Bank Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	165.2	84.2
Peak Hour	159.2	75.6

[1] Ground Elevation = 106.0 m

Future SUC

Connection 1 – Bank Street

Demand Scenario	Head (m)	Pressure[1] (psi)
Maximum HGL	165.2	84.2
Peak Hour	159.2	75.6

[1] Ground Elevation = 106.0 m

Disclaimer

The boundary condition information is based on current operation of the city water distribution system. The computer model simulation is based on the best information available at the time. The operation of the water distribution system can change on a regular basis, resulting in a variation in boundary conditions. The physical properties of watermains deteriorate over time, as such must be assumed in the absence of actual field test data. The variation in physical watermain properties can therefore alter the results of the computer model simulation. Fire Flow analysis is a reflection of available flow in the watermain; there may be additional restrictions that occur between the watermain and the hydrant that the model cannot take into account.

Wu, Michael

From: Whittaker, Damien <Damien.Whittaker@ottawa.ca>
Sent: February 7, 2025 13:22
To: Moroz, Peter
Cc: Gladish, Alyssa; Wu, Michael; Thiffault, Dustin
Subject: Re: City File No.: PC2023-0388 - 5360 Bank Street Boundary Conditions Request
Attachments: 5360 Bank BC (4Feb2025).docx

Hello Peter,

Please see the response on the boundary conditions request. Please note the unique response provided- that of demand limited to 2 L/s for 5360 Bank Street with on-site storage being necessary to accommodate peaks and fire protection due to limited flows in the area (pressure zone). There are no immediate plans to increase capacity and to do so is beyond this application (not determined but estimated to be in the seven figure range).

On-site storage will need to be comprehensively demonstrated for the site plan control application regardless of it being "plumbing".

Regards,

Damien Whittaker, P.Eng **(he/him/his il/lui/son)**
Senior Engineer - Infrastructure Applications ▪ Ingénieur principal - applications d'infrastructure
Development Review, Rural Services Unit ▪ Examen des projets d'eménagement, Unité des services ruraux
Planning, Development and Building Services Department (PDBS) ▪ Direction générale des services de la planification, de l'aménagement et du bâtiment (DGSPAB)
City of Ottawa | ville d'Ottawa

From: Moroz, Peter <peter.moroz@stantec.com>
Sent: Friday, 7 February 2025 8:48 AM
To: Whittaker, Damien <Damien.Whittaker@ottawa.ca>
Cc: Gladish, Alyssa <Alyssa.Gladish@stantec.com>; Wu, Michael <Michael.Wu@stantec.com>; Thiffault, Dustin <dustin.thiffault@stantec.com>
Subject: RE: City File No.: PC2023-0388 - 5360 Bank Street Boundary Conditions Request

CAUTION: This email originated from an External Sender. Please do not click links or open attachments unless you recognize the source.
ATTENTION : Ce courriel provient d'un expéditeur externe. Ne cliquez sur aucun lien et n'ouvrez pas de pièce jointe, excepté si vous connaissez l'expéditeur.

Thank you.

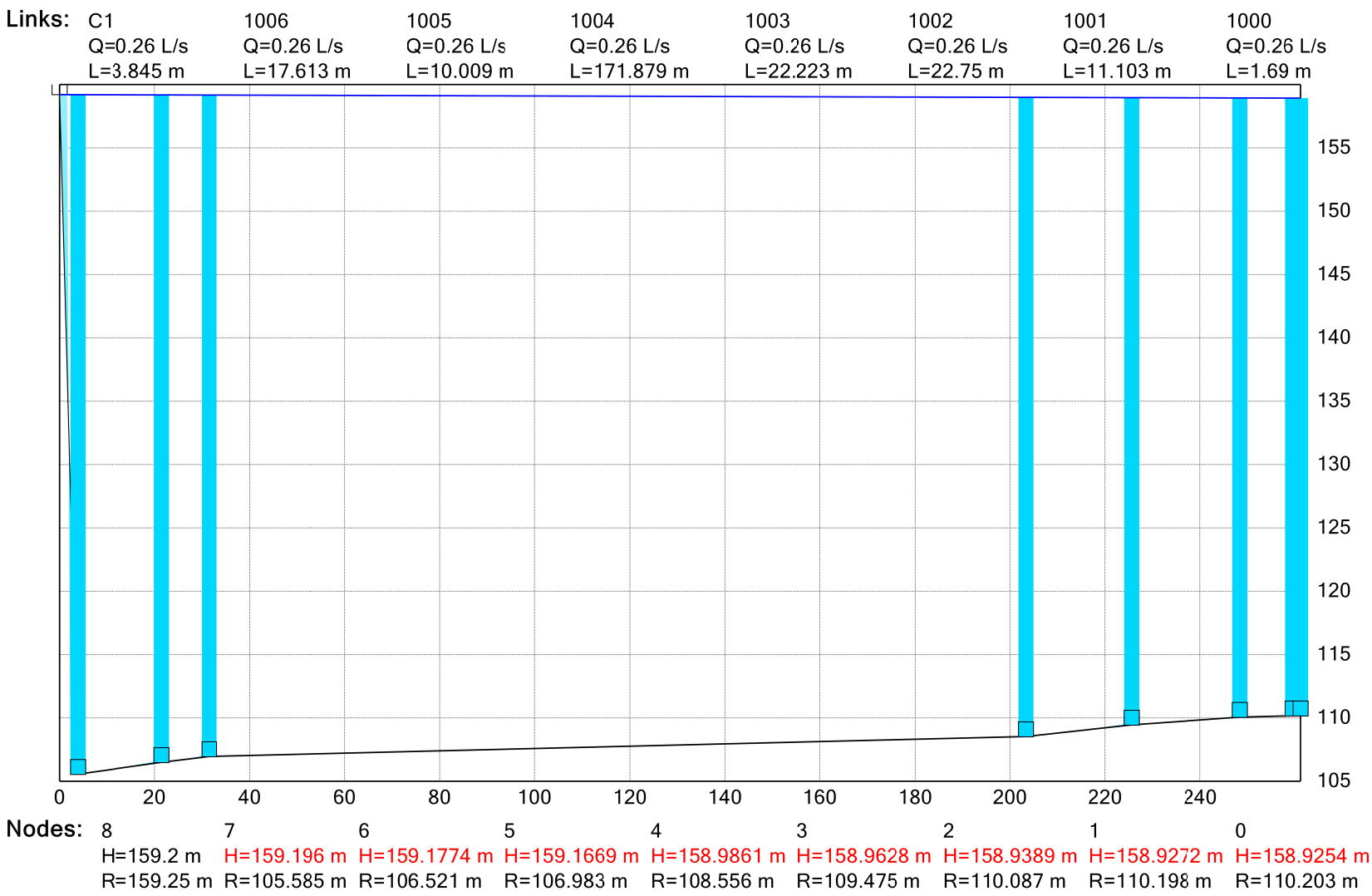
Peter

Peter Moroz P.Eng., MBA
Business Center Practice Lead - Community Development (Atlantic & Ontario East)
Stantec
300 - 1331 Clyde Avenue Ottawa ON K2C 3G4
Cell: (613) 294-2851

peter.moroz@stantec.com

Peak values

HGL



Appendix C Wastewater Septic Permit

Application for a Permit to Construct or Demolish

This form is authorized under subsection 8(1.1) of the *Building Code Act, 1992*

For use by Principal Authority	
Application number:	Permit number (if different):
Date received: R.V.C.A. RECEIVED JAN 16 2025	Roll number: SEPTIC FILE # 25-015

Application submitted to: OTTAWA SEPTIC SYSTEM OFFICE OTTAWA

(Name of municipality, upper-tier municipality, board of health or conservation authority)

A. Project information

Building number, street name	Unit number	Lot/con.
5360 Bank Street		

Municipality	Postal code	Plan number/other description
Ottawa (Greely)	K1X 1H1	

Project value est. $	Area of work (m^2)

B. Purpose of application

New construction	Addition to an existing building	Alteration/repair	Demolition	Conditional Permit
		✓		

Proposed use of building	Current use of building
Commercial	Commercial

Description of proposed work

Installation a Class 4 Sewage System

Class 4 Filter Media Bed

C. Applicant

Applicant is: ☐ Owner or ☑ Authorized agent of owner

Last name	First name	Corporation or partnership	
Van de Glind	Hendrik	Paterson Group Inc.	
Street address		**Unit number**	**Lot/con.**
9 Auriga Drive			
Municipality	**Postal code**	**Province**	**E-mail**
Ottawa (Nepean)	K2E 7T9	Ontario	hvandeglind@patersongroup.ca
Telephone number	**Fax**		**Cell number**
(613) 226-7381	(613) 226-6344		( )

D. Owner (if different from applicant)

Last name	First name	Corporation or partnership	
		Greely Sand and Gravel	
Street address		**Unit number**	**Lot/con.**
1971 Old Prescott Road			
Municipality	**Postal code**	**Province**	**E-mail**
Ottawa (Greely)	K4P 1N6	Ontario	info@greelysand.com
Telephone number	**Fax**		**Cell number**
(613) 821-3003	( )		( )

E. Builder (optional)

Last name	First name	Corporation or partnership (if applicable)	SEPTIC FILE #
Street address		Unit number	Lot/con.
Municipality	Postal code	Province	E-mail
Telephone number ( )	Fax ( )	Cell number ( )	

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F. Tarion Warranty Corporation (Ontario New Home Warranty Program)

i. Is proposed construction for a new home as defined in the *Ontario New Home Warranties Plan Act*? If no, go to section G.	Yes	No ✓
ii. Is registration required under the *Ontario New Home Warranties Plan Act*?	Yes	No ✓

iii. If yes to (ii) provide registration number(s): _____

G. Required Schedules

i) Attach Schedule 1 for each individual who reviews and takes responsibility for design activities.

ii) Attach Schedule 2 where application is to construct on-site, install or repair a sewage system.

H. Completeness and compliance with applicable law

i) This application meets all the requirements of clauses 1.3.1.3 (5) (a) to (d) of Division C of the Building Code (the application is made in the correct form and by the owner or authorized agent, all applicable fields have been completed on the application and required schedules, and all required schedules are submitted).	Yes ✓	No
Payment has been made of all fees that are required, under the applicable by-law, resolution or regulation made under clause 7(1)(c) of the *Building Code Act, 1992*, to be paid when the application is made.	Yes ✓	No
ii) This application is accompanied by the plans and specifications prescribed by the applicable by-law, resolution or regulation made under clause 7(1)(b) of the *Building Code Act, 1992*.	Yes ✓	No
iii) This application is accompanied by the information and documents prescribed by the applicable by-law, resolution or regulation made under clause 7(1)(b) of the *Building Code Act, 1992* which enable the chief building official to determine whether the proposed building, construction or demolition will contravene any applicable law.	Yes ✓	No
iv) The proposed building, construction or demolition will not contravene any applicable law.	Yes ✓	No

I. Declaration of applicant

I Hendrik Van de Glind - Paterson Group declare that:
(print name)

1. The information contained in this application, attached schedules, attached plans and specifications, and other attached documentation is true to the best of my knowledge.
2. If the owner is a corporation or partnership, I have the authority to bind the corporation or partnership.

January 9, 2025
Date

Signature of applicant

Personal information contained in this form and schedules is collected under the authority of subsection 8(1.1) of the *Building Code Act, 1992*, and will be used in the administration and enforcement of the *Building Code Act, 1992*. Questions about the collection of personal information may be addressed to: a) the Chief Building Official of the municipality or upper-tier municipality to which this application is being made, or, b) the inspector having the powers and duties of a chief building official in relation to sewage systems or plumbing for an upper-tier municipality, board of health or conservation authority to whom this application is made, or, c) Director, Building and Development Branch, Ministry of Municipal Affairs and Housing 777 Bay St., 2nd Floor. Toronto, M5G 2E5 (416) 585-6666.

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Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

SEPTIC FILE #

A. Project Information

Building number, street name		Unit no.	Lot/con.
5360 Bank Street			25 - 0 15
Municipality	**Postal code**	**Plan number/ other description**	
Ottawa (Greely)	K1X 1H1		OTTAWA

B. Individual who reviews and takes responsibility for design activities

Name		Firm	
Hendrik Van de Glind		Paterson Group Inc.	
Street address		**Unit no.**	**Lot/con.**
9 Auriga Drive			
Municipality	**Postal code**	**Province**	**E-mail**
Ottawa (Nepean)	K2E 7T9	Ontario	hvandeglind@patersongroup.ca
Telephone number	**Fax number**		**Cell number**
(613) 226-7381	(613) 226-6344		( )

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1. of Division C]

House	HVAC – House	Building Structural
Small Buildings	Building Services	Plumbing – House
Large Buildings	Detection, Lighting and Power	Plumbing – All Buildings
Complex Buildings	Fire Protection	✓ On-site Sewage Systems

Description of designer's work

Sewage System Design

D. Declaration of Designer

I Hendrik Van de Glind - Paterson Group declare that (choose one as appropriate):

(print name)

✓ I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: 111499

Firm BCIN: 29346

I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: _____

Basis for exemption from registration: _____

The design work is exempt from the registration and qualification requirements of the Building Code.

Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

January 9, 2025
Date

Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) (c).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of practice, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

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JAN 16 2025

SEPTIC FILE #
25 - 015
OTTAWA

Schedule 2: Sewage System Installer Information

A. Project Information			
Building number, street name 5360 Bank Street		Unit number	Lot/con.
Municipality Ottawa (Greely)	Postal code K1X 1H1	Plan number/ other description	

B. Sewage system installer

Is the installer of the sewage system engaged in the business of constructing on-site, installing, repairing, servicing, cleaning or emptying sewage systems, in accordance with Building Code Article 3.3.1.1, Division C?

Yes (Continue to Section C) No (Continue to Section E) ✓ Installer unknown at time of application (Continue to Section E)

C. Registered installer information (where answer to B is "Yes")			
Name			BCIN
Street address			Unit number / Lot/con.
Municipality	Postal code	Province	E-mail
Telephone number ( )	Fax ( )		Cell number ( )

D. Qualified supervisor information (where answer to section B is "Yes")	
Name of qualified supervisor(s)	Building Code Identification Number (BCIN)

E. Declaration of Applicant:

I Hendrik Van de Glind - Paterson Group declare that:
(print name)

✓ I am the applicant for the permit to construct the sewage system. If the installer is unknown at time of application, I shall submit a new Schedule 2 prior to construction when the installer is known;

OR

I am the holder of the permit to construct the sewage system, and am submitting a new Schedule 2, now that the installer is known.

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. If the owner is a corporation or partnership, I have the authority to bind the corporation or partnership.

January 9, 2025
Date

Signature of applicant

Ottawa Septic System Office | Bureau des systèmes septiques d'Ottawa

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Do Not Complete
Permit # 25-015
Revision # _____
Date: OTTAWA

Schedule 4
Proposed Services
Complete Sections 1 thru 7

1. **Engineered**
- ✓ Yes
- ___ No

2. **Water supply**
- ___ Proposed
- ✓ Existing

3. **Type of work proposed**
- ___ New Installation
- ✓ Replacement
- ___ Alteration

4. **Type of Well**
- ___ Dug/bored/Sandpoint well
- ✓ Drilled well
- ___ Municipal
- ___ Other

5. **Residential** Sewage Design Flow Info.

Bedrooms _____
House (floor area) _____ **m²**
People _____
Total Fixture Units _____ **(Schedule 8)**
Residential Flow _____ **L/day**

6. Sewage Design Flow **Other Occupancies**

Design Flow 450 L/day
Detailed sewage flow calculations:
Refer to Paterson Group Dwg PH4841-2(rev.1)
3 employees x 75 L/day = 225 L/day x 2 = 450 L/day

7. **Type of System**
- ___ Treatment Unit _____
- ___ Class 2 – Leaching Pit
- ___ Class 3 – Cesspool
- Class 4 – Shallow Buried Trench

Class 4 – Trench **(Schedule 9)**
- ___ Fully raised
- ___ Partially raised
- ___ In-ground

- ✓ Class 4 – Filter Media **(Schedule 10)**
  - ___ Fully raised
  - ___ Partially raised
  - ✓ In-ground

Class 4 – BMEC Area Bed **(Schedule 11)**
- ___ Fully raised
- ___ Partially raised
- ___ In-ground

Class 4 – "Type A" Dispersal **(Schedule 13)**
- ___ Fully raised
- ___ Partially raised
- ___ In-ground

Class 4 – "Type B" Dispersal **(Schedule 14)**
- ___ Fully raised
- ___ Partially raised
- ___ In-ground

Class 5 – Holding Tank (9000L min)
- ___ Tank/TreatmentUnit/PumpChamber ONLY
- ___ Effluent Filter/Risers ONLY

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Permit # SEPTIC FILE # 25-015
Revision # _____
Date: OTTAWA

Schedule 5
Sewage System Details

Type of System: Class 4 - Filter Media (Schedule 4)

Septic/Holding Tank Size: 3,600L(min.) Litres Make: _____

Septic Tank Effluent Filter Make: OBC Approved Model: (PL - 250) or equivalent

Treatment Unit – Make & Model _____

Number of Units: [ ] Other: _____

Refer to Typical Drawing # PH4841-1&2(rev.1) Pump(s) required No

Mantle Information: Pump Rate _____ L/~~15min~~

Native or imported =15m in _____direction(s)

Note: Alarm required for all pumping systems

Slope subgrade _____ % slope

_____ direction(s)

Site to be Scarified (If clay)	**YES / NO**	✓
Clay Seal Required (If bedrock)	**YES / NO**	✓

~~**Trench**~~

Distribution Pipe Length _____ m

Loading Area _____ m^2

Type of Chamber _____

Length of Chamber _____ m

BMEC Area Bed

Type A

Type B

Stone _____ m^2

Sand _____ m^2

Pipe _____ m

Linear Loading _____ L/m^2

Shallow Buried Trench

Pipe Length _____ m

✓ **Filter Media Bed**

Stone 11.4 m^2

Extended Base 11.4 m^2

Pipe 12.0 m

Weight of Filter Media 13,700 Kg

Loading Area _____ m^2

Tank/Treatment Unit/Pump Chamber Replacement ONLY

Effluent Filter & Riser ONLY

Construction Notes:

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Permit #
SEPTIC FILE #
Revision # 25-015
Date:
OTTAWA

LICENSED PROFESSIONAL ENGINEER
09/01/25
M. S. KILLAM
100221103
PROVINCE OF ONTARIO

Schedule 6
Soil and Water Table Information
(Minimum depth of test pit: 2 metres)

Name of Applicant/Agent: Paterson Group Inc Date: December 19, 2025 Time: Applicant/Agent Signature:	Inspector: Date: Time: Inspector Signature:

EG (……..) Soil Description	T	EG (……..) Soil Description	
.5m 1.0 m 1.5m 2.0 m Refer to Paterson Group Drawing PH4841-2(rev.1)		.5m 1.0 m 1.5m 2.0 m Test pits not available for inspection. Engineer assumes all liability for soil and HGWT info/elev's.	
EG (……..) Soil Description	T	EG (……..) Soil Description	T
.5m 1.0 m 1.5m 2.0 m		.5m 1.0 m 1.5m 2.0 m	

LEGEND

BR = Bedrock	HGWT = High ground water table	EG = Existing grade
GWT = Ground water table	M = metres	T = percolation rate

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25-015
Revision #
Date:
OTTAWA

Scale: 1Block = _____

Schedule 7
Layout Section

N

Refer to Paterson Group Drawing PH4841-1(rev.1)

○Dug Well ●Drilled Well ▲Neighbouring Homes ◊Benchmark ---Tile Drainage ——Property Line

Elevations (metric only)
B.M. 109.68 m
B.M.Description Top of Manhole cover on along North side of Grassed area (See Plan)
Exact Location _____

Min. of 5 elevations in proposed system area (in X pattern)
X_1 _____ X_2 _____
X_3 _____ X_4 _____
X_5 _____ X_6 (toe) _____
X_7 _____ X_8 _____

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JAN 16 2025

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Permit #
Revision #
Date:

SEPTIC FILE # 25-015
OTTAWA

Schedule 8
Fixture unit count

Fixtures	# Existing	+	# Proposed	X	unit count	=	Fixture Count
Bathroom							
Bathroom group (toilet, sink and tub **or** shower) installed in the **same** room		+		X	6	=	
Bathtub with/without overhead shower		+		X	1.5	=	
Shower stall		+		X	1.5	=	
Wash basin (SINK) (1½inch trap)	1	+		X	1.5	=	1.5
Watercloset (TOILET) tank operated	1	+		X	4	=	4.0
Bidet		+		X	1	=	
Kitchen							
Dishwasher		+		X	1	=	
Sink with/without garbage grinder(s), domestic and other small type single, double or 2 single with a common trap		+		X	1.5	=	
Other							
Domestic washing machine		+		X	1.5	=	
Combination sink and laundry tray single or double (Installed on 1½ trap)		+		X	1.5	=	

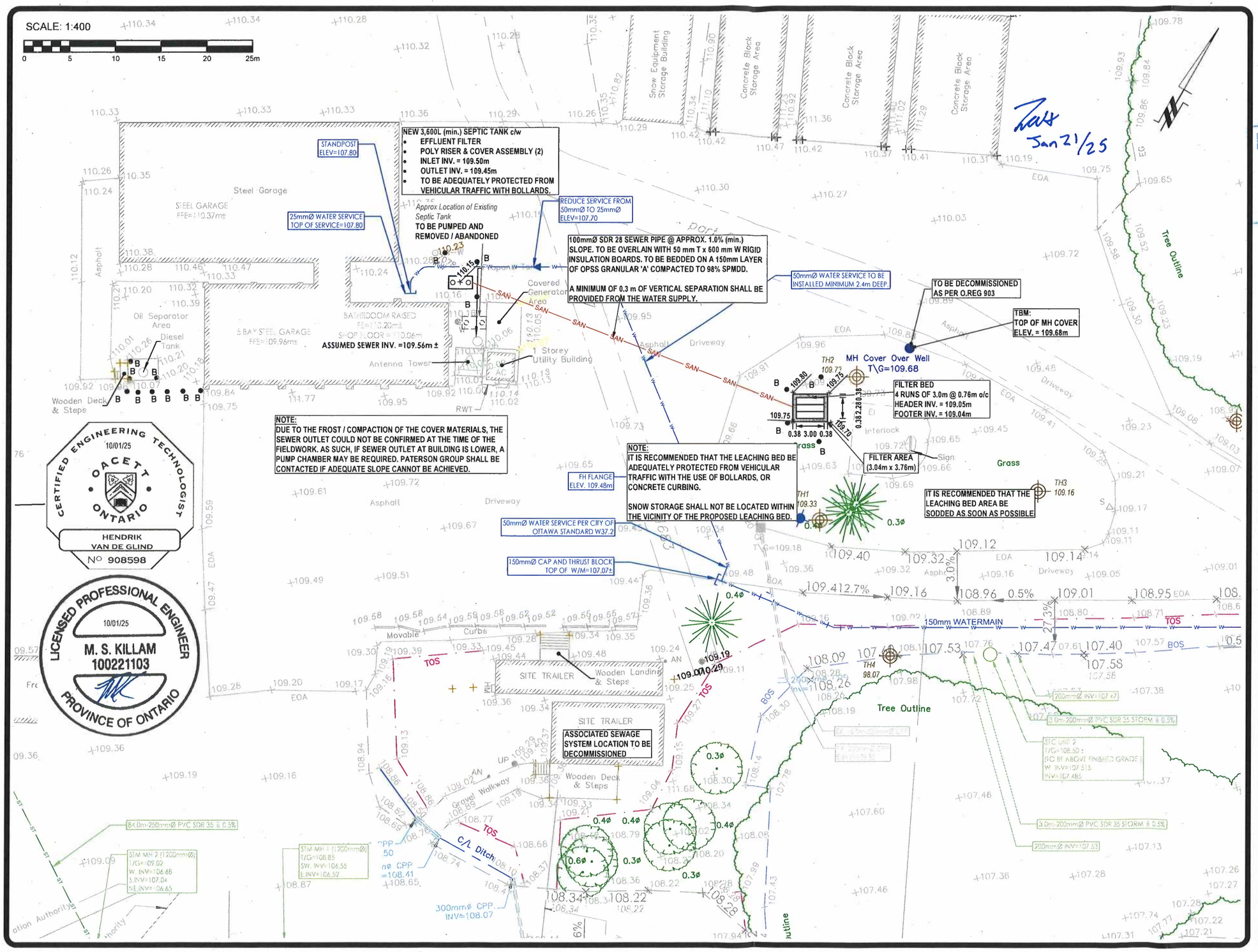
***Total:** 5.5

***Insert the TOTAL in section 5 of Schedule 4** (0.Reg 151/13 Table 7.4.9.3)

1. **Sump pumps and floor drains are not to be connected to the sewage system.** Connection of such fixtures to a sewage system may lead to a hydraulic failure of the said system. The above mentioned fixtures should be discharged separately to an approved Class 2 (leaching pit) sewage system.
2. Where laundry waste is not more than 20% of the total daily design sanitary sewage flow, it may discharge to a sewage system (Part 8, OBC, 8.1.3.1(2)).

[signature] January 9, 2025

Agent/Owner signature **Date**



LEGEND:

⊕	Test Hole Location
x 100.99	Existing Ground Surface Elev. (m)
x 102.30	Proposed Ground Surface Elev. (m)
FFE	Finished Floor Elevation
	Existing Structure

All units are in meters unless otherwise specified.

R.V.C.A. RECEIVED
JAN 16 2025
SEPTIC FILE # 25-015
OTTAWA

BENCHMARK INFORMATION:

TBM: Top of Manhole Cover
Assumed Elevation = 109.68m

REFERENCE:

Base Plan and Topographic Information obtained from Topographic plan of Survey of Part of Lot 29, Concession 4 (Rideau Front) geographic township of Gloucester, City of Ottawa, dated August 27, 2024, by Annis O'Sullivan, Vollebekk LTD.

and

Proposed servicing information obtained from Removals, Servicing Grading and Re-instatement Plan, dated September 5, 2024 by Stantec Consuting Ltd.

DD/MM/YY	DESCRIPTION	REV.
10/01/25	Issued for Septic Permit	1
08/01/25	Issued for Client Review	0

Consultant:

PATERSON GROUP
9 AURIGA DRIVE OTTAWA, ON K2E 7S9 TEL: (613) 226-7381

Client:

GREELY SAND AND GRAVEL

Project:

PROPOSED SEWAGE SYSTEM REPLACEMENT

5360 BANK STREET OTTAWA (GREELY), ONTARIO

Drawing:

SEWAGE SYSTEM LAYOUT PLAN

Scale: 1:400	Drawn by: HV
Date: 01/2025	Checked by: MK

Drawing No.:

PH4841-1(rev.1)

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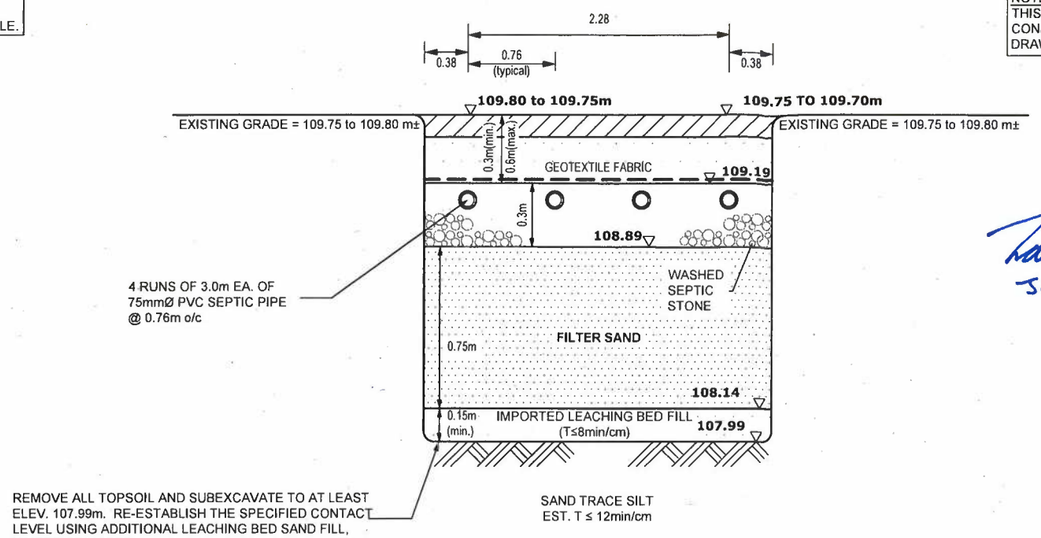
COVER MATERIAL TO CONSIST OF LEACHING BED FILL FOLLOWED BY APPROX. 100mm OF SANDY TOPSOIL. LEACHING BED TO BE VEGETATED AS SOON AS POSSIBLE.

NOTE:
THIS PLAN IS TO BE READ IN CONJUNCTION WITH DRAWING NO. PH48.41-1(rev.1)

FINAL GRADING SHALL BE SUITABLY SHAPED TO DIRECT SURFACE WATER AWAY FROM THE PROPOSED SEWAGE SYSTEM.



PROFILE
N.T.S.

R.V.C.A. RECEIVED
JAN 16 2025

Jan 21/25

SEPTIC FILE #
25-015
OTTAWA

NOTES:

1) ESTIMATE OF DAILY SEWAGE FLOW (Q)

THE TOTAL DAILY DESIGN SANITARY SEWAGE FLOW (T.D.D.S.S.F) RATE IS CALCULATED IN ACCORDANCE WITH O.B.C. TABLE 8.2.1.3.B.

- 3 GREELY SAND AND GRAVEL EMPLOYEES @ 8 HOURS PER DAY = 3 x 75 L/DAY = 225 L/DAY
- 3 CACE CONSTRUCTION EMPLOYEES @ 8 HOURS PER DAY = 3 x 75 L/DAY = 225 L/DAY

DESIGN SEWAGE FLOW = 450 L/DAY

2) SOIL CONDITIONS

SOILS INFORMATION GATHERED BY PATERSON GROUP INC. ON DECEMBER 19, 2024

TH 1, ELEV. 109.33m		TH 2, ELEV. 109.73m		TH 3, ELEV. 109.16m	
0-0.41 0.41-1.30	TOPSOIL WITH ORGANICS SAND TRACE SILT, GRAVEL, AND COBBLES	0-0.25 0.25-1.20	TOPSOIL & ORGANICS SAND TRACE SILT, GRAVEL AND COBBLES	0-0.40 0.40-1.21	TOPSOIL SAND TRACE SILT GRAVEL AND COBBLES
-TH DRY UPON COMPLETION		- TH DRY UPON COMPLETION		- TH DRY UPON COMPLETION	

3) SEPTIC TANK

- EXISTING SEPTIC TANK SHALL BE PUMPED AND REMOVED / ABANDONED.
- IF THE EXISTING SEWER OUTLET IS LOWER THAN THE ANTICIPATED ELEVATION OF 109.56m, GRAVITY DRAINAGE TO THE LEACHING BED MAY NOT BE ACHIEVABLE, AS SUCH, A PUMP CHAMBER MAY BE REQUIRED.
- MINIMUM WORKING CAPACITY OF PRETREATMENT TANK = 3Q OR 3,600 L(min.) = 3,600L (min.)
- IIT IS RECOMMENDED THAT A NEW 3,600L (min.) TWO-COMPARTMENT SEPTIC TANK BE INSTALLED.
- AN OBC APPROVED EFFLUENT FILTER (I.E. POLYLOK PL-250 EFFLUENT FILTER, OR EQUIVALENT) SHALL BE INSTALLED ON THE OUTLET PIPE IN THE PRETREATMENT TANK.
- THE ACCESS LIDS TO THE TANK OPENINGS SHALL BE EXTENDED TO THE GROUND SURFACE. INSTALL RISERS AND COVERS TO SUIT.
- THE ACCESS LIDS SHALL INCLUDE SAFETY DEVICES AS PER CSA B66-21.
- THE PVC SDR 28 SEWER PIPE CONNECTED THE SEPTIC TANK TO THE LEACHING BED SHALL BE INSTALLED A 1.0% MINIMUM SLOPE AND SHALL BE OVERLAIN WITH 50mm T x 600mm W RIGID INSULATION BOARDS AND INSTALLED ON A 150 mm LAYER OF OPSS GRANULAR 'A' COMPACTED TO 98% SPMDD.

4) FILTER BED SIZE CRITERIA

- FILTER AREA REQUIRED = Q/75 = 450/75 = 6m²
- USE 4 RUNS OF 3.0m EACH @ 0.76m o/c
- FILTER AREA PROVIDED = 3.04m x 3.76m = 11.4m²
- EXPANDED BASE REQUIRED = Q(t)/850 = 450(12)/850 = 6.4m²
- TOTAL BASE AREA PROVIDED = 3.04m x 3.76m = 11.4m²

5) FILTER BED CONSTRUCTION GUIDELINES

- REMOVE ALL TOPSOIL AND SUBEXCAVATE TO AT LEAST ELEVATION 107.99m, WHICHEVER IS GREATER.
- A MINIMUM THICKNESS OF 0.15m OF LEACHING BED SAND FILL, HAVING A PERCOLATION RATE OF NOT GREATER THAN 8 min/cm, SHALL BE INSTALLED BELOW OVER THE EXPANDED BASE AREA.
- LEACHING BED SAND FILL SHALL CONSIST OF UNIFORM SAND WITH GRADING LIMITS SIMILAR TO 100% PASSING 13.2mm SIEVE, LESS THAN 5% PASSING 0.075mm SIEVE AND HAVING A PERCOLATION RATE OF 6 TO 8 min/cm.
- THE FILTER SAND SHALL CONFORM TO THE REQUIREMENTS OF PART 8 OF THE OBC.
- THE DISTRIBUTION PIPES (4 RUNS OF 3.0m EACH) SHALL CONSIST OF 75mmØ PERFORATED PVC SEPTIC PIPE WHICH SHALL BE EMBEDDED IN A CONTINUOUS 300mm THICK LAYER OF WASHED SEPTIC STONE.
- THE INVERT LEVEL OF THE DISTRIBUTION PIPES SHALL BE SET AT ELEVATION 109.05m AT THE HEADER AND ELEVATION 109.04m AT THE FOOTER.
- THE ENDS OF EACH RUN SHALL BE INTERCONNECTED WITH A SOLID PVC FOOTER PIPE.
- THE CLEAR STONE LAYER SHOULD BE COVERED WITH A NON-WOVEN GEOTEXTILE FABRIC.
- THE SURFACE OF THE BED SHOULD BE COVERED WITH PERMEABLE SAND FOLLOWED BY APPROXIMATELY 0.1m OF SANDY TOPSOIL. THE BED AREA SHOULD BE VEGETATED.
- THE TOTAL THICKNESS OF THE COVER OVER THE CLEAR STONE SHOULD BE WITHIN A RANGE OF 0.3m TO 0.6m.
- THE SIDES OF THE BED SHOULD BE SLOPED IN THE RANGE OF 3H:1V OR SHALLOWER.

6) MINIMUM CLEARANCE DISTANCE FROM LEACHING BED

- 3.0m FROM ANY PROPERTY LINE
- 5.0m FROM ANY STRUCTURE
- 15.0m FROM ANY DRILLED WELL
- 30.0m FROM ANY DUG OR SANDPOINT WELL
- 5.0m FROM ANY POOL (UNLESS OTHERWISE APPROVED)
- 5.0m FROM ANY TREE (UNLESS OTHERWISE APPROVED)

7) MINIMUM CLEARANCE DISTANCE FROM TANK(S)

- 1.5m FROM ANY STRUCTURE
- 15.0m FROM ANY DRILLED WELL
- 3.0m FROM ANY PROPERTY LINE

8) GENERAL

- SNOW STORAGE SHALL NOT BE LOCATED OVER OR UPGRADIENT OF THE PROPOSED SEWAGE SYSTEM.
- THE SEWAGE SYSTEM HAS NOT BEEN DESIGNED TO SUPPORT TRAFFIC LOADING.
- THE BACKFILLING OF THE SEWAGE SYSTEM SHOULD MINIMIZE THE RISK OF OVER COMPACTION WITH THE USE RUBBER TRACKED EQUIPMENT AND BY AVOIDING THE CREATION OF ANY CONSTRUCTION ROUTES OR PATHWAYS OVER THE SYSTEM.
- ANY EXISTING IRRIGATION / SPRINKLER SYSTEM TO BE RELOCATED AWAY FROM PROPOSED LEACHING BED.
- CONTRACTOR SHALL BE QUALIFIED AND REGISTERED UNDER PART 8 OF THE ONTARIO BUILDING CODE.
- ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE LATEST BY-LAWS, CODES, AND REGULATIONS.
- CONTRACTOR SHALL REVIEW DRAWINGS IN DETAIL AND SHALL INFORM THE CONSULTANT OF ANY ERRORS AND/OR OMISSIONS ON DESIGN DRAWINGS IMMEDIATELY.
- CONTRACTOR SHALL BE RESPONSIBLE TO LOCATE AND PROTECT ALL EXISTING UNDERGROUND SERVICES.
- CONTRACTOR SHALL VISIT THE SITE AND REVIEW ALL DOCUMENTATION TO BECOME FAMILIAR WITH THE SITE AND SUBSURFACE SOIL CONDITIONS TO DETERMINE SUITABLE METHODS OF CONSTRUCTION.
- THE FIRM OF PATERSON GROUP INC. HAS PROVIDED DESIGN SERVICES ONLY FOR THE SUBJECT SEWAGE SYSTEM. THE DESIGN HAS BEEN CARRIED OUT IN ACCORDANCE WITH THE MANUFACTURER'S GUIDELINES AND OUR INTERPRETATION OF PART 8 OF THE ONTARIO BUILDING CODE.
- CONSTRUCTION INSPECTIONS DURING THE INSTALLATION OF THE SEWAGE SYSTEM MAY BE REQUIRED BY THE REGULATING AUTHORITY AND ARE RECOMMENDED BY THIS FIRM. IF THIS FIRM IS TO COMPLETE ANY CONSTRUCTION INSPECTION(S), ADDITIONAL FEES MAY BE APPLIED. CONFIRMATION OF PAYMENT WILL BE REQUIRED PRIOR TO THE INSPECTION.
- THE TEST HOLE INFORMATION PROVIDED IS INTENDED TO BE USED FOR DESIGN PURPOSES ONLY, AND SHOULD NOT BE RELIED UPON FOR CONSTRUCTION PURPOSES. IF DISCREPANCIES ARE FOUND DURING THE CONSTRUCTION PROCESS, IT IS THE CLIENT'S RESPONSIBILITY TO CONTACT THIS FIRM TO MAKE ANY NECESSARY COMMENTS OR REVISIONS. ADDITIONAL REVISIONS ARE NOT CONSIDERED PART OF THE DESIGN WORKS AND WILL BE CONSIDERED AS AN ADDITIONAL COST.

CERTIFIED ENGINEERING TECHNOLOGIST
10/01/24
OACETT
ONTARIO
HENDRIK VAN DE GLIND
Nº 908598

LICENSED PROFESSIONAL ENGINEER
10/01/24
M. S. KILLAM
100221103
PROVINCE OF ONTARIO

DD/MM/YY	DESCRIPTION	REV.
09/01/25	Issued for Septic Permit	1
08/01/25	Issued for Client Review	0

Consultant:
PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7Z9
TEL: (613) 226-7381

Client:
GREELY SAND AND GRAVEL

Project:
PROPOSED SEWAGE SYSTEM REPLACEMENT
5360 BANK STREET
OTTAWA (GREELY), ONTARIO

Drawing:
SEWAGE SYSTEM DETAIL & NOTES

Scale:	Drawn by:
N.T.S.	HV
Date: 01/2025	Checked by: MK

Drawing No.:
PH4841-2(rev.1)

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Rideau Valley Conservation Authority

Permit
Part 8 – Sewage System
Ontario Building Code

Do Not Complete
Permit No 25-015
Revision No
Date
Related Application

A copy of this permit must be posted on the property at all time during construction. OBC, Division C — Part 1, Section 1.3.2.1

This permit verifies that the on-site sewage system was reviewed and approved for construction under the *Ontario Building Code* and *O.Reg. 323/12* as amended by *O.Reg. 151/13*.

Inspected & Recommended by: Ryan Hiemstra
Owner: Greely Sand & Gravel
Inspection Date & Time:
Weather:
Civic Address: 5360 Bank Street
Legal:
In the former Township/City of Gloucester

number of bedrooms: non-residential
fixture units:
finished floor area:
Q: 75 L/d/staff x 6 staff = 450 L/day

septic tank 3600 L
effluent filter YES
pump rate L/15 MIN
treatment unit
number of units

weigh bills for Filter Media ■ yes ❒ no
grain size analysis required ■ yes ❒ no
site to be scarified ❒ yes ■ no
clay seal inspection ❒ yes ■ no
mantle required ❒ yes ■ no
sub-grade inspection ❒ yes ■ no

ELEVATION ☒ In Ground ☐ Partially Raised ☐ Fully Raised

TYPE OF SYSTEM

❒ **Trench**
◯ **Pipe and Stone or** ◯ **Chambers**

type of chamber
loading area m^2
total trench length m
trench configuration

❒ **Dispersal Bed**

◉ BMEC ◯ Type A ◯ Type B

stone m^2
sand m^2
pipe
weight of sand kg

❒ **Shallow Buried Trench**

pipe length m
orifice spacing m

■ **Filter Media Bed**

stone 11.43 m^2
extended base 11.43 m^2
pipe 4 runs at 3m; 0.76m o/c
weight of filter media 15,870 kg
loading area native m^2

❒ **Class 5 Holding Tank**

❒ **Septic Tank Only**

Manager, Septic System Approvals: Jason Hull
Permit Date: January 21, 2025
Comments:

❒ maintenance/pumping required ❒ ESA permit # required ❒ engineer to verify ❒subgrade ❒squirt height
❒ Class 5 Holding Tank approval only valid for three years from date of issue

Manager, Septic System Approvals:
Revision Date:
Comments:

NOTE: For further details, refer to corresponding application.

Appendix D Stormwater Management

Stantec

5360 Bank Street

DATE: 2025-12-10
REVISION: 2
DESIGNED BY: ZW
CHECKED BY: DT

FILE NUMBER: 160402060

STORM SEWER DESIGN SHEET
(City of Ottawa)

DESIGN PARAMETERS

$I = a / (t+b)^c$ (As per City of Ottawa Guidelines, 2012)

	1:2 yr	1:5 yr	1:10 yr	1:100 yr
a =	732.951	998.071	1174.184	1735.688
b =	6.199	6.053	6.014	6.014
c =	0.810	0.814	0.816	0.820

MANNING'S n = 0.013
MINIMUM COVER: 2.00 m
TIME OF ENTRY 10 min
BEDDING CLASS = B

LOCATION			DRAINAGE AREA																				PIPE SELECTION											
AREA ID NUMBER	FROM M.H.	TO M.H.	AREA (2-YEAR) (ha)	AREA (5-YEAR) (ha)	AREA (10-YEAR) (ha)	AREA (100-YEAR) (ha)	AREA (ROOF) (ha)	C (2-YEAR) (-)	C (5-YEAR) (-)	C (10-YEAR) (-)	C (100-YEAR) (-)	A x C (2-YEAR) (ha)	ACCUM AxC (2YR) (ha)	A x C (5-YEAR) (ha)	ACCUM. AxC (5YR) (ha)	A x C (10-YEAR) (ha)	ACCUM. AxC (10YR) (ha)	A x C (100-YEAR) (ha)	ACCUM. AxC (100YR) (ha)	T of C (min)	$I_{2\text{-YEAR}}$ (mm/h)	$I_{5\text{-YEAR}}$ (mm/h)	$I_{10\text{-YEAR}}$ (mm/h)	$I_{100\text{-YEAR}}$ (mm/h)	$Q_{CONTROL}$ (L/s)	ACCUM. $Q_{CONTROL}$ (L/s)	Q_{ACT} (CIA/360) (L/s)	LENGTH (m)	PIPE WIDTH OR DIAMETE (mm)	PIPE HEIGHT (mm)	PIPE SHAPE (-)	MATERIAL (-)	CLASS (-)	SLOPE %	Q_{CAP} (FULL) (L/s)	% FULL (-)	VEL. (FULL) (m/s)	VEL. (ACT) (m/s)	TIME OF FLOW (min)
S-2	CB3B	3	0.42	0.00	0.00	0.00	0.00	0.52	0.00	0.00	0.00	0.218	0.218	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	46.6	79.1	300	300	CIRCULAR	PVC	-	0.50	68.0	**68.53%**	0.97	0.91	1.45
																				11.45																			
S-3	CB3A	3	0.38	0.00	0.00	0.00	0.00	0.70	0.00	0.00	0.00	0.266	0.266	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	56.8	4.7	250	250	CIRCULAR	PVC	-	1.50	74.0	**76.72%**	1.49	1.45	0.05
																				10.05																			
	3	2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.484	0.000	0.000	0.000	0.000	0.000	0.000	11.45	71.66	97.12	113.81	166.33	0.0	0.0	96.4	79.4	375	375	CIRCULAR	PVC	-	0.50	116.6	**82.53%**	1.11	1.10	1.20
																				12.65																			
S-8	CB2A	2	0.29	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00	0.162	0.162	0.000	0.000	0.000	0.000	0.000	0.000	10.00	76.81	104.19	122.14	178.56	0.0	0.0	34.6	28.0	250	250	CIRCULAR	PVC	-	0.50	42.7	**81.13%**	0.86	0.85	0.55
																				10.55																			
	2	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.647	0.000	0.000	0.000	0.000	0.000	0.000	12.65	67.94	92.01	107.80	157.49	0.0	0.0	122.1	20.8	450	450	CIRCULAR	CONCRETE	-	0.30	162.9	**74.92%**	0.99	0.96	0.36
	1	OUT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000	0.647	0.000	0.000	0.000	0.000	0.000	0.000	13.01	66.90	90.59	106.12	155.04	0.0	0.0	120.2	29.0	450	450	CIRCULAR	CONCRETE	-	0.30	162.9	**73.78%**	0.99	0.95	0.51
																				13.52																			

PROJECT: 160401995

5360 Bank Street
Existing Conditions
Runoff Coefficient Calculation

Area (ha)	C	Description	A x C
0.26	0.59	EX-5	0.15
2.04	0.33	EX-6	0.67
1.74	0.27	EXT-1	0.47
0.08	0.41	EXT-3	0.03
0.04	0.90	EXT-4	0.04
4.16			1.37

Composite C-Factor: 0.33

C- factor from MTO Design Chart 1.07: Runoff Coefficients

Time of Concentration

Airport (C<0.40)

$tc = [3.26 \times (1.1-C) \times L^{0.5}] / S_w^{0.33}$

L	340	m
S_w	2.0%	
C	0.33	
t_c	37.2	min

Therefore, T_c =	37.2	min
	0.62	hrs

PROJECT: 160401995

5360 Bank Street
Post-Development Conditions
Runoff Coefficient Calculation

Area (ha)	C	Description	A x C
0.26	0.79	S-5	0.21
0.93	0.29	S-6	0.27
1.05	0.36	S-7	0.38
0.05	0.29	S-10	0.01
1.74	0.27	EXT-1	0.47
0.08	0.41	EXT-3	0.03
0.04	0.90	EXT-4	0.04
4.15			1.41

Composite C-Factor: 0.34

C- factor from MTO Design Chart 1.07: Runoff Coefficients

Time of Concentration

Airport (C<0.40)

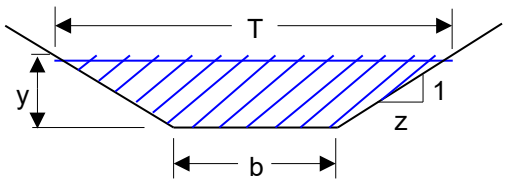
$tc = [3.26 \times (1.1-C) \times L^{0.5}] / S_w^{0.33}$

L	340	m
S_w	2.0%	
C	0.34	
t_c	36.7	min

Therefore, T_c =	36.7	min
	0.61	hrs

5360 Bank Street (Central Section of Swale)

Date: 16-Jul-25



$$A = (b + z \cdot y)y$$

$$P = b + 2 \cdot y \cdot \sqrt{1 + z^2}$$

$$R = \frac{A}{P}$$

$$T = b + 2zy$$

$$V = \frac{Q}{A}$$

$$Q = \frac{A}{n} R^{2/3} \sqrt{S}$$

$$Fr = \sqrt{\frac{Q^2 T}{gA^3}}$$

Design Inputs		
n=	0.025	
z=	3	
b=	0	m
y=	0.350	m
S=	0.005	m/m
Design Outputs		
A=	0.368	m2
P=	2.214	m
R=	0.166	m
T=	2.100	m
Q=	0.314	m3/s
V=	0.85	m/s
Fr No. =	0.652	
Design:	OK, sub-critical	

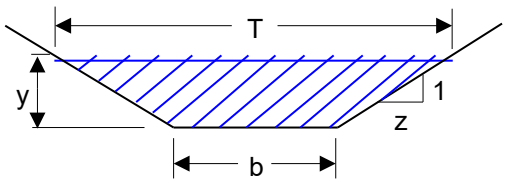
Required Flow (100yr)*	0.312	m3/s
Calculated Channel Capacity =	**0.314**	m3/s

Channel OK

*NOTE: Required Flow as determined by Rational Method (100yr Storm Event)

5360 Bank Street (Eastern Section of Swale)

Date: 16-Jul-25



$$A = (b + z \cdot y)y$$

$$P = b + 2 \cdot y \cdot \sqrt{1 + z^2}$$

$$R = \frac{A}{P}$$

$$T = b + 2zy$$

$$V = \frac{Q}{A}$$

$$Q = \frac{A}{n} R^{2/3} \sqrt{S}$$

$$Fr = \sqrt{\frac{Q^2 T}{gA^3}}$$

Design Inputs		
n=	0.025	
z=	3	
b=	0	m
y=	0.300	m
S=	0.020	m/m
Design Outputs		
A=	0.270	m2
P=	1.897	m
R=	0.142	m
T=	1.800	m
Q=	0.416	m3/s
V=	1.54	m/s
Fr No. =	1.271	
Design:	Not sub-critical!	

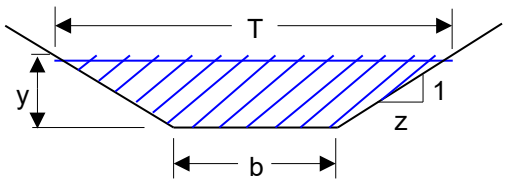
Required Flow (100yr)*	0.328	m3/s
Calculated Channel Capacity =	**0.416**	m3/s

Channel OK

*NOTE: Required Flow as determined by Rational Method (100yr Storm Event)

5360 Bank Street (Swale West of OGS)

Date: 16-Jul-25



$$A = (b + z \cdot y)y$$

$$P = b + 2 \cdot y \cdot \sqrt{1 + z^2}$$

$$R = \frac{A}{P}$$

$$T = b + 2zy$$

$$V = \frac{Q}{A}$$

$$Q = \frac{A}{n} R^{2/3} \sqrt{S}$$

$$Fr = \sqrt{\frac{Q^2 T}{gA^3}}$$

Design Inputs		
n=	0.025	
z=	3	
b=	0	m
y=	0.210	m
S=	0.010	m/m
Design Outputs		
A=	0.132	m2
P=	1.328	m
R=	0.100	m
T=	1.260	m
Q=	0.114	m3/s
V=	0.86	m/s
Fr No. =	0.847	
Design:	OK, sub-critical	

Required Flow (100yr)*	0.109	m3/s
Calculated Channel Capacity =	**0.114**	m3/s

Channel OK

*NOTE: Required Flow as determined by Rational Method (100yr Storm Event)

Stormwater Management Calculations

Project #160401995, 5360 Bank Street
Modified Rational Method Calculations for Storage

2 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	732.951
b =	6.199
c =	0.81

t (min)	I (mm/hr)
10	76.81
20	52.03
30	40.04
40	32.86
50	28.04
60	24.56
70	21.91
80	19.83
90	18.14
100	16.75
110	15.57
120	14.56

2 YEAR Modified Rational Method for Entire Site

Subdrainage Area: S-2, S-3, S-8, S-9 — Controlled - Tributary
Area (ha): 1.63
C: 0.60

tc (min)	I (5 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	76.8	208.8	120.6	88.2	**52.9**
20	52.0	141.5	120.6	20.9	25.0
30	40.0	108.9	108.9	0.0	0.0
40	32.9	89.4	89.4	0.0	0.0
50	28.0	76.2	76.2	0.0	0.0
60	24.6	66.8	66.8	0.0	0.0
70	21.9	59.6	59.6	0.0	0.0
80	19.8	53.9	53.9	0.0	0.0
90	18.1	49.3	49.3	0.0	0.0
100	16.7	45.5	45.5	0.0	0.0
110	15.6	42.3	42.3	0.0	0.0
120	14.6	39.6	39.6	0.0	0.0

Storage: Surface Storage Above Grade + Within Filter Media

Orifice Equation: $Q = CdA(2gh)^{0.5}$ Where C = 0.61
Orifice Diameter: 230.00 mm
Invert Elevation 105.76 m — Media Volume: 39.4 m3
Max Water Elevation: 107.03 m — Porosity: 0.40
Max Ponding Depth 1.27 m — Media Storage: 15.8 m3
Downstream W/L 105.66 m

	Stage	Head (m)	Discharge (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
2-year Water Level	107.03	1.15	120.6	52.9	52.9	OK

SUMMARY TO OUTLET

			Vrequired	Vavailable	
Total Area	1.630	ha			
Total 2yr Flow	120.6	L/s			
Target	126.8	L/s	53	53 m^3	Ok

Project #160401995, 5360 Bank Street
Modified Rational Method Calculations for Storage

100 yr Intensity
City of Ottawa

$I = a/(t + b)^c$

a =	1735.688
b =	6.014
c =	0.820

t (min)	I (mm/hr)
10	178.56
20	119.95
36.3	80.49
40	75.15
50	63.95
60	55.89
70	49.79
80	44.99
90	41.11
100	37.90
110	35.20
120	32.89

100 YEAR Modified Rational Method for Entire Site

Subdrainage Area: S-2, S-3, S-8, S-9 — Controlled - Tributary
Area (ha): 1.63
C: 0.75

tc (min)	I (100 yr) (mm/hr)	Qactual (L/s)	Qrelease (L/s)	Qstored (L/s)	Vstored (m^3)
10	178.6	606.8	253.6	353.3	**212.0**
20	120.0	407.7	253.6	154.1	184.9
30	91.9	312.2	253.6	58.6	105.6
40	75.1	255.4	253.6	1.8	4.3
50	64.0	217.4	217.4	0.0	0.0
60	55.9	190.0	190.0	0.0	0.0
70	49.8	169.2	169.2	0.0	0.0
80	45.0	152.9	152.9	0.0	0.0
90	41.1	139.7	139.7	0.0	0.0
100	37.9	128.8	128.8	0.0	0.0
110	35.2	119.6	119.6	0.0	0.0
120	32.9	111.8	111.8	0.0	0.0

Storage: Surface Storage Above Grade + Within Filter Media

Orifice Equation: $Q = CdA(2gh)^{0.5}$ Where C = 0.61
Orifice Diameter: 230.00 mm
Invert Elevation 105.76 m — CB Rim Elevation 107.75 m
Max Water Elevation: 107.87 m — CB Capture Rate 90.4 L/s
Max Ponding Depth 2.11 m — Max Ponding Depth 0.12 m
Downstream W/L 105.66 m — Downstream W/L 105.66 m

	Stage	Head (m)	Discharge* (L/s)	Vreq (cu. m)	Vavail (cu. m)	Volume Check
100-year Water Level	107.87	2.00	253.6	212.0	212.0	OK

*Includes capture from CB grate per MTO DMM Chart 4.19

SUMMARY TO OUTLET

			Vrequired	Vavailable	
Total Area	1.630	ha			
Total 100yr Flow	253.6	L/s			
Target	369.5	L/s	212	212 m^3	Ok

Imbrium® Systems
ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

12/09/2025

Province:	Ontario
City:	Ottawa
Nearest Rainfall Station:	OTTAWA CDA RCS
Climate Station Id:	6105978
Years of Rainfall Data:	20
Site Name:	
Drainage Area (ha):	0.31
Runoff Coefficient 'c':	0.71
Particle Size Distribution:	CA ETV
Target TSS Removal (%):	60.0

Project Name:	5360 Bank
Project Number:	69555
Designer Name:	Dustin Thiffault
Designer Company:	Stantec Consulting Ltd.
Designer Email:	dustin.thiffault@stantec.com
Designer Phone:	613-724-4420
EOR Name:	
EOR Company:	
EOR Email:	
EOR Phone:	

Required Water Quality Runoff Volume Capture (%):	90.00
Estimated Water Quality Flow Rate (L/s):	7.10
Oil / Fuel Spill Risk Site?	Yes
Upstream Flow Control?	No
Peak Conveyance (maximum) Flow Rate (L/s):	
Influent TSS Concentration (mg/L):	200
Estimated Average Annual Sediment Load (kg/yr):	179
Estimated Average Annual Sediment Volume (L/yr):	145

Net Annual Sediment (TSS) Load Reduction Sizing Summary

Stormceptor Model	TSS Removal Provided (%)
EFO4	62
EFO5	64
EFO6	67
EFO8	69
EFO10	70
EFO12	70

Recommended Stormceptor EFO Model: EFO4

Estimated Net Annual Sediment (TSS) Load Reduction (%): 62

Water Quality Runoff Volume Capture (%): > 90

THIRD-PARTY TESTING AND VERIFICATION

►**Stormceptor® EF and Stormceptor® EFO** are the latest evolutions in the Stormceptor® oil-grit separator (OGS) technology series, and are designed to remove a wide variety of pollutants from stormwater and snowmelt runoff. These technologies have been third-party tested in accordance with the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators** and performance has been third-party verified in accordance with the **ISO 14034 Environmental Technology Verification (ETV)** protocol.

PERFORMANCE

►**Stormceptor® EF and EFO** remove stormwater pollutants through gravity separation and floatation, and feature a patent-pending design that generates positive removal of total suspended solids (TSS) throughout each storm event, including high-intensity storms. Captured pollutants include sediment, free oils, and sediment-bound pollutants such as nutrients, heavy metals, and petroleum hydrocarbons. Stormceptor is sized to remove a high level of TSS from the frequent rainfall events that contribute the vast majority of annual runoff volume and pollutant load. The technology incorporates an internal bypass to convey excessive stormwater flows from high-intensity storms through the device without resuspension and washout (scour) of previously captured pollutants. Proper routine maintenance ensures high pollutant removal performance and protection of downstream waterwavs.

PARTICLE SIZE DISTRIBUTION (PSD)

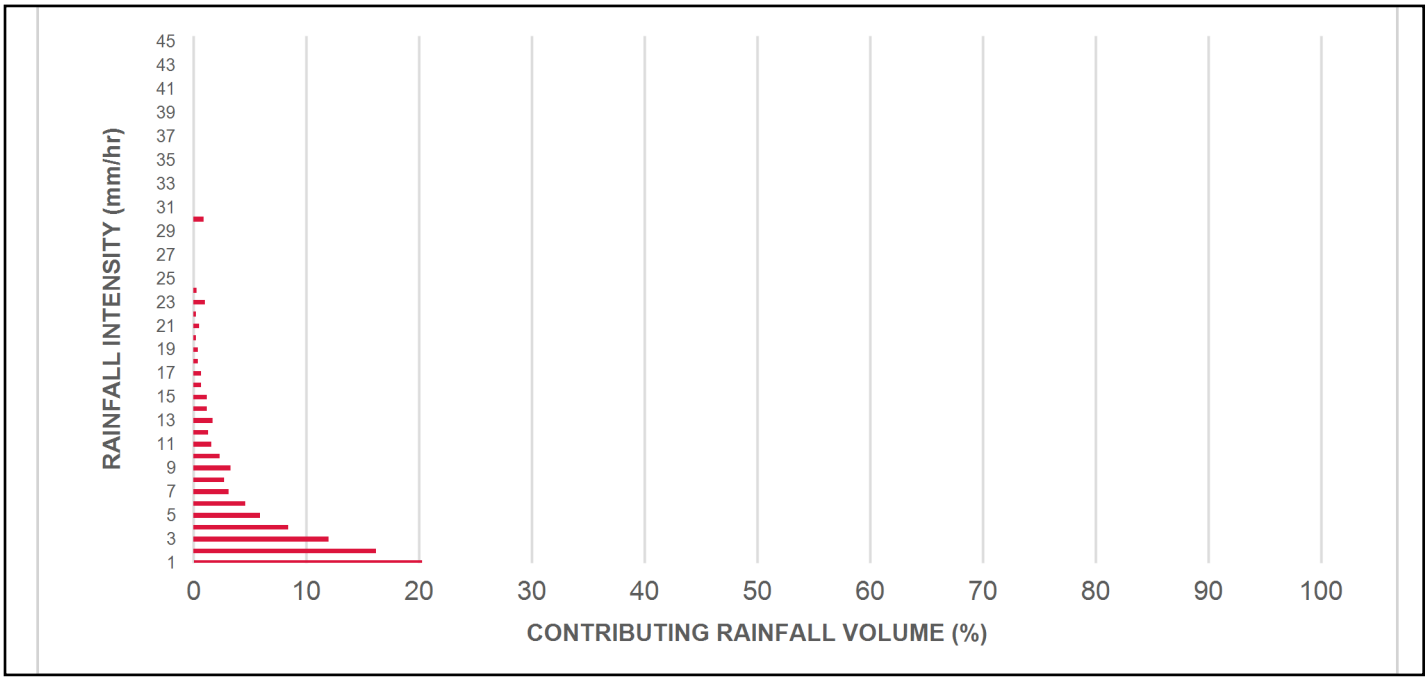
►The **Canadian ETV PSD** shown in the table below was used, or in part, for this sizing. This is the identical PSD that is referenced in the Canadian ETV ***Procedure for Laboratory Testing of Oil-Grit Separators*** for both sediment removal testing and scour testing. The Canadian ETV PSD contains a wide range of particle sizes in the sand and silt fractions, and is considered reasonably representative of the particle size fractions found in typical urban stormwater runoff.

Particle Size (µm)	Percent Less Than	Particle Size Fraction (µm)	Percent
1000	100	500-1000	5
500	95	250-500	5
250	90	150-250	15
150	75	100-150	15
100	60	75-100	10
75	50	50-75	5
50	45	20-50	10
20	35	8-20	15
8	20	5-8	10
5	10	2-5	5
2	5	<2	5

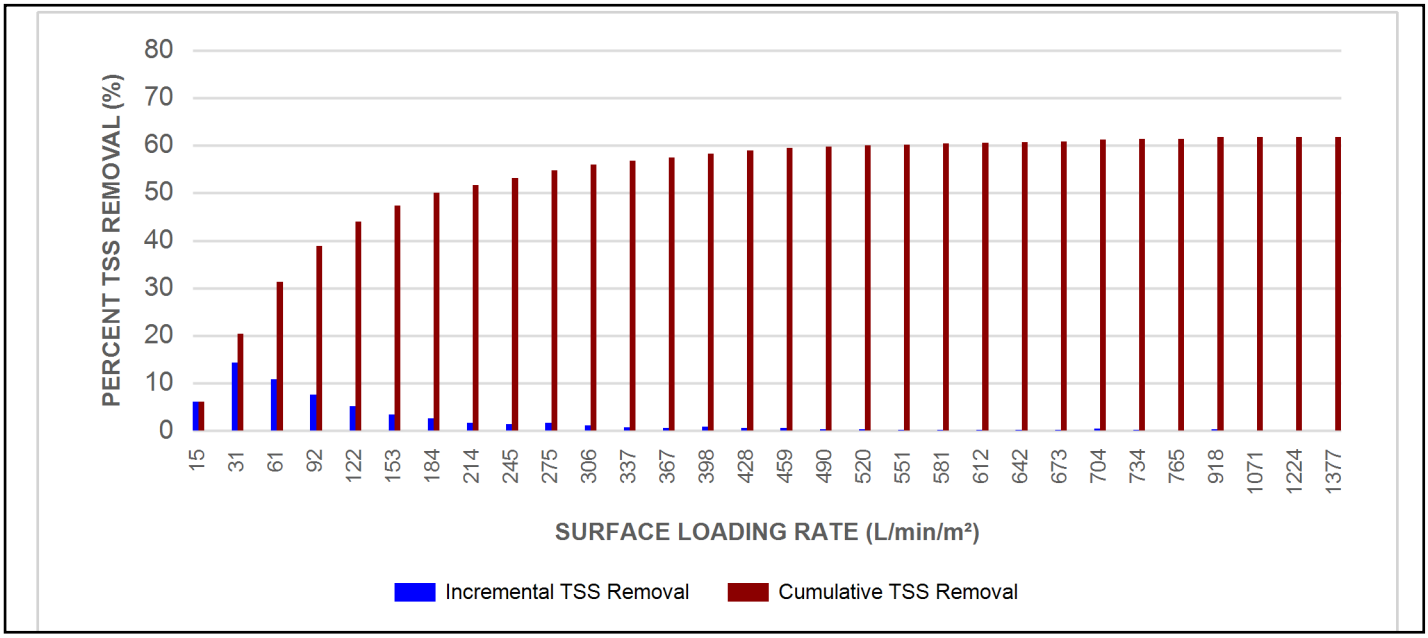
Rainfall Intensity (mm / hr)	Percent Rainfall Volume (%)	Cumulative Rainfall Volume (%)	Flow Rate (L/s)	Flow Rate (L/min)	Surface Loading Rate (L/min/m²)	Removal Efficiency (%)	Incremental Removal (%)	Cumulative Removal (%)
0.50	8.6	8.6	0.31	18.0	15.0	70	6.1	6.1
1.00	20.3	29.0	0.61	37.0	31.0	70	14.3	20.4
2.00	16.2	45.2	1.22	73.0	61.0	67	10.9	31.3
3.00	12.0	57.2	1.84	110.0	92.0	63	7.6	38.9
4.00	8.4	65.6	2.45	147.0	122.0	61	5.1	44.0
5.00	5.9	71.6	3.06	184.0	153.0	58	3.5	47.4
6.00	4.6	76.2	3.67	220.0	184.0	56	2.6	50.0
7.00	3.1	79.3	4.28	257.0	214.0	54	1.6	51.7
8.00	2.7	82.0	4.90	294.0	245.0	53	1.4	53.1
9.00	3.3	85.3	5.51	330.0	275.0	52	1.7	54.8
10.00	2.3	87.6	6.12	367.0	306.0	51	1.2	56.0
11.00	1.6	89.2	6.73	404.0	337.0	50	0.8	56.8
12.00	1.3	90.5	7.34	441.0	367.0	49	0.6	57.5
13.00	1.7	92.2	7.95	477.0	398.0	48	0.8	58.3
14.00	1.2	93.5	8.57	514.0	428.0	47	0.6	58.9
15.00	1.2	94.6	9.18	551.0	459.0	47	0.5	59.4
16.00	0.7	95.3	9.79	587.0	490.0	45	0.3	59.7
17.00	0.7	96.1	10.40	624.0	520.0	44	0.3	60.0
18.00	0.4	96.5	11.01	661.0	551.0	44	0.2	60.2
19.00	0.4	96.9	11.63	698.0	581.0	43	0.2	60.4
20.00	0.2	97.1	12.24	734.0	612.0	42	0.1	60.5
21.00	0.5	97.5	12.85	771.0	642.0	42	0.2	60.7
22.00	0.2	97.8	13.46	808.0	673.0	42	0.1	60.8
23.00	1.0	98.8	14.07	844.0	704.0	42	0.4	61.2
24.00	0.3	99.1	14.69	881.0	734.0	41	0.1	61.3
25.00	0.0	99.1	15.30	918.0	765.0	41	0.0	61.3
30.00	0.9	100.0	18.36	1101.0	918.0	40	0.4	61.7
35.00	0.0	100.0	21.42	1285.0	1071.0	39	0.0	61.7
40.00	0.0	100.0	24.48	1469.0	1224.0	37	0.0	61.7
45.00	0.0	100.0	27.53	1652.0	1377.0	34	0.0	61.7
Estimated Net Annual Sediment (TSS) Load Reduction =								**62 %**

Climate Station ID: 6105978 *Years of Rainfall Data*: 20

RAINFALL DATA FROM OTTAWA CDA RCS RAINFALL STATION



INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



Maximum Pipe Diameter / Peak Conveyance

Stormceptor EF / EFO	Model Diameter		Min Angle Inlet / Outlet Pipes	Max Inlet Pipe Diameter		Max Outlet Pipe Diameter		Peak Conveyance Flow Rate	
	(m)	(ft)		(mm)	(in)	(mm)	(in)	(L/s)	(cfs)
EF4 / EFO4	1.2	4	90	609	24	609	24	425	15
EF5 / EFO5	1.5	5	90	762	30	762	30	710	25
EF6 / EFO6	1.8	6	90	914	36	914	36	990	35
EF8 / EFO8	2.4	8	90	1219	48	1219	48	1700	60
EF10 / EFO10	3.0	10	90	1828	72	1828	72	2830	100
EF12 / EFO12	3.6	12	90	1828	72	1828	72	2830	100

SCOUR PREVENTION AND ONLINE CONFIGURATION

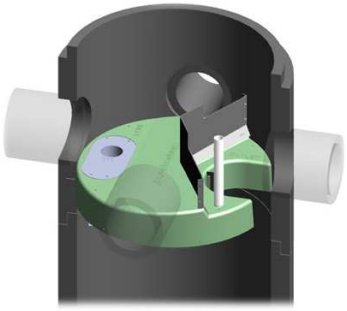
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test performance has been third-party verified in accordance with the ISO 14034 ETV protocol. As a result, Stormceptor EF and EFO are approved for online installation, eliminating the need for costly additional bypass structures, piping, and installation expense.

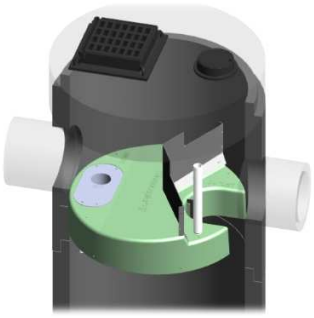
DESIGN FLEXIBILITY

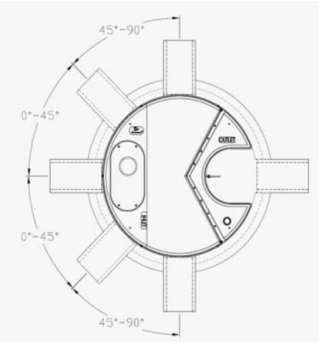
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend angle, and can be modified to ensure performance in submerged conditions.

OIL CAPTURE AND RETENTION

►While Stormceptor® EF will capture and retain oil from dry weather spills and low intensity runoff, **Stormceptor® EFO** has demonstrated superior oil capture and greater than 99% oil retention in third-party testing according to the light liquid re-entrainment testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**. Stormceptor EFO is recommended for sites where oil capture and retention is a requirement.







INLET-TO-OUTLET DROP

Elevation differential between inlet and outlet pipe inverts is dictated by the angle at which the inlet pipe(s) enters the unit.
0° - 45° : The inlet pipe is 1-inch (25mm) higher than the outlet pipe.
45° - 90° : The inlet pipe is 2-inches (50mm) higher than the outlet pipe.

HEAD LOSS

The head loss through Stormceptor EF is similar to that of a 60-degree bend structure. The applicable K value for calculating minor losses through the unit is 1.1. For submerged conditions the applicable K value is 3.0.

Pollutant Capacity

Stormceptor EF / EFO	Model Diameter		Depth (Outlet Pipe Invert to Sump Floor)		Oil Volume		Recommended Sediment Maintenance Depth *		Maximum Sediment Volume *		Maximum Sediment Mass **	
	(m)	(ft)	(m)	(ft)	(L)	(Gal)	(mm)	(in)	(L)	(ft^3)	(kg)	(lb)
EF4 / EFO4	1.2	4	1.52	5.0	265	70	203	8	1190	42	1904	5250
EF5 / EFO5	1.5	5	1.62	5.3	420	111	305	10	2124	75	2612	5758
EF6 / EFO6	1.8	6	1.93	6.3	610	160	305	12	3470	123	5552	15375
EF8 / EFO8	2.4	8	2.59	8.5	1070	280	610	24	8780	310	14048	38750
EF10 / EFO10	3.0	10	3.25	10.7	1670	440	610	24	17790	628	28464	78500
EF12 / EFO12	3.6	12	3.89	12.8	2475	655	610	24	31220	1103	49952	137875

*Increased sump depth may be added to increase sediment storage capacity
** Average density of wet packed sediment in sump = 1.6 kg/L (100 lb/ft^3)

Feature	Benefit	Feature Appeals To
Patent-pending enhanced flow treatment and scour prevention technology	Superior, verified third-party performance	Regulator, Specifying & Design Engineer
Third-party verified light liquid capture and retention for EFO version	Proven performance for fuel/oil hotspot locations	Regulator, Specifying & Design Engineer, Site Owner
Functions as bend, junction or inlet structure	Design flexibility	Specifying & Design Engineer
Minimal drop between inlet and outlet	Site installation ease	Contractor
Large diameter outlet riser for inspection and maintenance	Easy maintenance access from grade	Maintenance Contractor & Site Owner

STANDARD STORMCEPTOR EF/EFO DRAWINGS

For standard details, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

STANDARD STORMCEPTOR EF/EFO SPECIFICATION

For specifications, please visit http://www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-ef

Table of TSS Removal vs Surface Loading Rate Based on Third-Party Test Results
Stormceptor® EFO

SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL	SLR (L/min/m²)	TSS % REMOVAL
1	70	660	42	1320	35	1980	24
30	70	690	42	1350	35	2010	24
60	67	720	41	1380	34	2040	23
90	63	750	41	1410	34	2070	23
120	61	780	41	1440	33	2100	23
150	58	810	41	1470	32	2130	22
180	56	840	41	1500	32	2160	22
210	54	870	41	1530	31	2190	22
240	53	900	41	1560	31	2220	21
270	52	930	40	1590	30	2250	21
300	51	960	40	1620	29	2280	21
330	50	990	40	1650	29	2310	21
360	49	1020	40	1680	28	2340	20
390	48	1050	39	1710	28	2370	20
420	47	1080	39	1740	27	2400	20
450	47	1110	38	1770	27	2430	20
480	46	1140	38	1800	26	2460	19
510	45	1170	37	1830	26	2490	19
540	44	1200	37	1860	26	2520	19
570	43	1230	37	1890	25	2550	19
600	42	1260	36	1920	25	2580	18
630	42	1290	36	1950	24	2600	26

STANDARD PERFORMANCE SPECIFICATION FOR "OIL GRIT SEPARATOR" (OGS) STORMWATER QUALITY TREAMENT DEVICE

PART 1 – GENERAL

1.1 WORK INCLUDED

This section specifies requirements for selecting, sizing, and designing an underground Oil Grit Separator (OGS) device for stormwater quality treatment, with third-party testing results and a Statement of Verification in accordance with ISO 14034 Environmental Management – Environmental Technology Verification (ETV).

1.2 REFERENCE STANDARDS & PROCEDURES

ISO 14034:2016 Environmental management – Environmental technology verification (ETV)

Canadian Environmental Technology Verification (ETV) Program's **Procedure for Laboratory Testing of Oil-Grit** S**eparators**

1.3 SUBMITTALS

1.3.1 All submittals, including sizing reports & shop drawings, shall be submitted upon request with each order to the contractor then forwarded to the Engineer of Record for review and acceptance. Shop drawings shall detail all OGS components, elevations, and sequence of construction.

1.3.2 Alternative devices shall have features identical to or greater than the specified device, including: treatment chamber diameter, treatment chamber wet volume, sediment storage volume, and oil storage volume.

1.3.3 Unless directed otherwise by the Engineer of Record, OGS stormwater quality treatment product substitutions or alternatives submitted within ten days prior to project bid shall not be accepted. All alternatives or substitutions submitted shall be signed and sealed by a local registered Professional Engineer, based on the exact same criteria detailed in Section 3, in entirety, subject to review and approval by the Engineer of Record.

PART 2 – PRODUCTS

2.1 OGS POLLUTANT STORAGE

The OGS device shall include a sump for sediment storage, and a protected volume for the capture and storage of petroleum hydrocarbons and buoyant gross pollutants. The minimum sediment & petroleum hydrocarbon storage capacity shall be as follows:

2.1.1	4 ft (1219 mm) Diameter OGS Units:	1.19 m^3 sediment / 265 L oil
	5 ft (1524 mm) Diameter OGS Units:	1.95 m^3 sediment / 420 L oil
	6 ft (1829 mm) Diameter OGS Units:	3.48 m^3 sediment / 609 L oil
	8 ft (2438 mm) Diameter OGS Units:	8.78 m^3 sediment / 1,071 L oil
	10 ft (3048 mm) Diameter OGS Units:	17.78 m^3 sediment / 1,673 L oil
	12 ft (3657 mm) Diameter OGS Units:	31.23 m^3 sediment / 2,476 L oil

PART 3 – PERFORMANCE & DESIGN

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall remove oil, sediment and gross pollutants from stormwater runoff during frequent wet weather events, and retain these pollutants during less frequent high flow wet weather events below the insert within the OGS for later removal during maintenance. The Manufacturer shall have at least ten (10) years of local experience, history and success in engineering design, manufacturing and production and supply of OGS stormwater quality treatment device systems, acceptable to the Engineer of Record.

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing of the OGS shall be determined by use of a minimum ten (10) years of local historical rainfall data provided by Environment Canada. Sizing shall also be determined by use of the sediment removal performance data derived from the ISO 14034 ETV third-party verified laboratory testing data from testing conducted in accordance with the Canadian ETV protocol Procedure for Laboratory Testing of Oil-Grit Separators, as follows:

3.2.1 Sediment removal efficiency for a given surface loading rate and its associated flow rate shall be based on sediment removal efficiency demonstrated at the seven (7) tested surface loading rates specified in the protocol, ranging 40 L/min/m^2 to 1400 L/min/m^2, and as stated in the ISO 14034 ETV Verification Statement for the OGS device.

3.2.2 Sediment removal efficiency for surface loading rates between 40 L/min/m^2 and 1400 L/min/m^2 shall be based on linear interpolation of data between consecutive tested surface loading rates.

3.2.3 Sediment removal efficiency for surface loading rates less than the lowest tested surface loading rate of 40 L/min/m^2 shall be assumed to be identical to the sediment removal efficiency at 40 L/min/m^2. No extrapolation shall be allowed that results in a sediment removal efficiency that is greater than that demonstrated at 40 L/min/m^2.

3.2.4 Sediment removal efficiency for surface loading rates greater than the highest tested surface loading rate of 1400 L/min/m^2 shall assume zero sediment removal for the portion of flow that exceeds 1400 L/min/m^2, and shall be calculated using a simple proportioning formula, with 1400 L/min/m^2 in the numerator and the higher surface loading rate in the denominator, and multiplying the resulting fraction times the sediment removal efficiency at 1400 L/min/m^2.

The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of third-party scour testing conducted in accordance with the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**

3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/m^2.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-

entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m^2 to 2600 L/min/m^2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.** However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

Stormceptor® EF and EFO Oil-Grit Separators

Developed by Imbrium Systems, Inc.,
Whitby, Ontario, Canada

Registration: GPS-ETV_VR2020-11-15_Imbrium-SC

In accordance with

ISO 14034:2016

Environmental management —
Environmental technology verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

November 15, 2020
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
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Technology description and application

The Stormceptor® EF and EFO are treatment devices designed to remove oil, sediment, trash, debris, and pollutants attached to particulates from Stormwater and snowmelt runoff. The device takes the place of a conventional manhole within a storm drain system and offers design flexibility that works with various site constraints. The EFO is designed with a shorter bypass weir height, which accepts lower surface loading rate into the sump, thereby reducing re-entrainment of captured free floating light liquids.

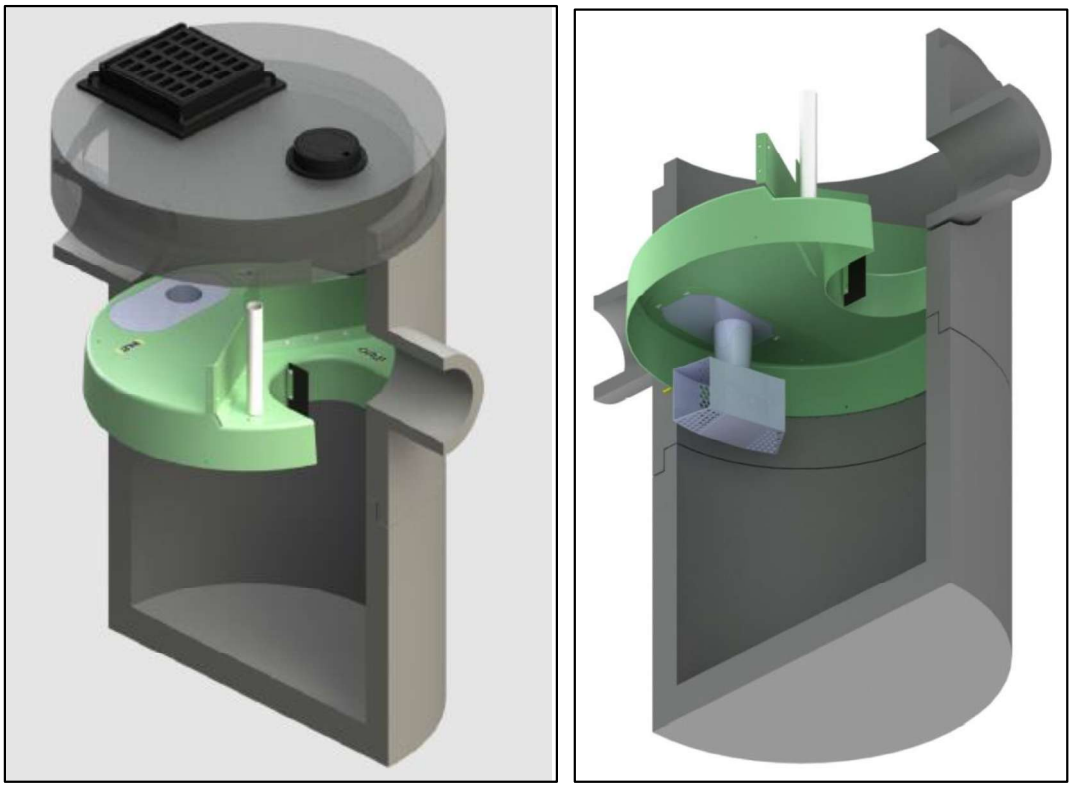

Figure 1. Graphic of typical inline Stormceptor® unit and core components.

Stormwater and snowmelt runoff enters the Stormceptor® EF/EFO's upper chamber through the inlet pipe(s) or a surface inlet grate. An insert divides the unit into lower and upper chambers and incorporates a weir to reduce influent velocity and separate influent (untreated) from effluent (treated) flows. Influent water ponds upstream of the insert's weir providing driving head for the water flowing downwards into the drop pipe where a vortex pulls the water into the lower chamber. The water diffuses at lower velocities in multiple directions through the drop pipe outlet openings. Oil and other floatables rise up and are trapped beneath the insert, while sediments undergo gravitational settling to the sump's bottom. Water from the sump can exit by flowing upward to the outlet riser onto the top side of the insert and downstream of the weir, where it discharges through the outlet pipe.

Maximum flow rate into the lower chamber is a function of weir height and drop pipe orifice diameter. The Stormceptor® EF and EFO are designed to allow a surface loading rate of 1135 L/min/m^2 (27.9 gal/min/ft^2) and 535 L/min/m^2 (13.1 gal/min/ft^2) into the lower chamber, respectively. When prescribed surface loading rates are exceeded, ponding water can overtop the weir height and bypass the lower treatment chamber, exiting directly through the outlet pipe. Hydraulic testing and scour testing demonstrate that the internal bypass effectively prevents scour at all bypass flow rates. Increasing the bypass flow rate does not increase the orifice-controlled flow rate into the lower treatment chamber where sediment is stored. This internal bypass feature allows for in-line installation, avoiding the cost of

additional bypass structures. During bypass, treatment continues in the lower chamber at the maximum flow rate. The Stormceptor® EFO's lower design surface loading rate is favorable for minimizing re-entrainment and washout of captured light liquids. Inspection of Stormceptor® EF and EFO devices is performed from grade by inserting a sediment probe through the outlet riser and an oil dipstick through the oil inspection pipe. The unit can be maintained by using a vacuum hose through the outlet riser.

Performance conditions

The data and results published in this Technology Fact Sheet were obtained from the testing program conducted on the Imbrium Systems Inc.'s Stormceptor® EF4 and EFO4 Oil-Grit Separators, in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014). The Procedure was prepared by the Toronto and Region Conservation Authority (TRCA) for Environment Canada's Environmental Technology Verification (ETV) Program. A copy of the Procedure may be accessed on the Canadian ETV website at www.etvcanada.ca.

Performance claim(s)

Capture test [a]:

During the capture test, the Stormceptor® EF4 OGS device, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 46, 44, and 49 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Stormceptor® EFO4, with a false floor set to 50% of the manufacturer's recommended maximum sediment storage depth and a constant influent test sediment concentration of 200 mg/L, removes 70, 64, 54, 48, 42, 40, and 34 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 1000, and 1400 L/min/m^2, respectively.

Scour test [a]:

During the scour test, the Stormceptor® EF4 and Stormceptor® EFO4 OGS devices, with 10.2 cm (4 inches) of test sediment pre-loaded onto a false floor reaching 50% of the manufacturer's recommended maximum sediment storage depth, generate corrected effluent concentrations of 4.6, 0.7, 0, 0.2, and 0.4 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2, respectively.

Light liquid re-entrainment test[a]:

During the light liquid re-entrainment test, the Stormceptor® EFO4 OGS device with surrogate low-density polyethylene beads preloaded within the lower chamber oil collection zone, representing a floating light liquid volume equal to a depth of 50.8 mm over the sedimentation area, retained 100, 99.5, 99.8, 99.8, and 99.9 percent of loaded beads by mass during the 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2.

[a] The claim can be applied to other units smaller or larger than the tested unit as long as the untested units meet the scaling rule specified in the Procedure for Laboratory of Testing of Oil Grit Separators (Version 3.0, June 2014)

Performance results

The test sediment consisted of ground silica (1 – 1000 micron) with a specific gravity of 2.65, uniformly mixed to meet the particle size distribution specified in the testing procedure. The *Procedure for Laboratory Testing of Oil Grit Separators* requires that the three sample average of the test sediment particle size distribution (PSD) meet the specified PSD percent less than values within a boundary threshold of 6%. The comparison of the average test sediment PSD to the CETV specified PSD in Figure 2 indicates that the test sediment used for the capture and scour tests met this condition.

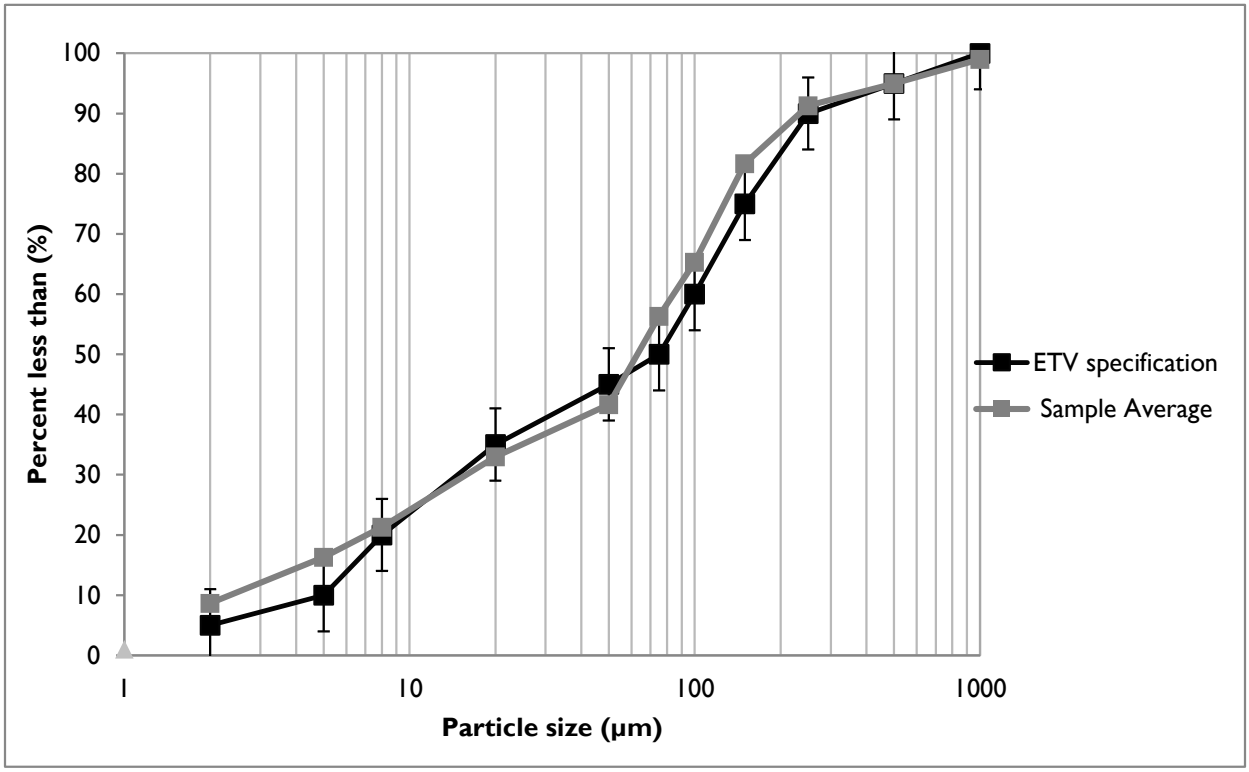

Figure 2. The three sample average particle size distribution (PSD) of the test sediment used for the capture and scour test compared to the specified PSD.

The capacity of the device to retain sediment was determined at seven surface loading rates using the modified mass balance method. This method involved measuring the mass and particle size distribution of the injected and retained sediment for each test run. Performance was evaluated with a false floor simulating the technology filled to 50% of the manufacturer's recommended maximum sediment storage depth. The test was carried out with clean water that maintained a sediment concentration below 20 mg/L. Based on these conditions, removal efficiencies for individual particle size classes and for the test sediment as a whole were determined for each of the tested surface loading rates (Table 1). Since the EF and EFO models are identical except for the weir height, which bypasses flows from the EFO model at a surface loading rate of 535 L/min/m^2 (13.1 gpm/ft^2), sediment capture tests at surface loading rates from 40 to 400 L/min/m^2 were only performed on the EF unit. Surface loading rates of 600, 1000, and 1400 L/min/m^2 were tested on both units separately. Results for the EFO model at these higher flow rates are presented in Table 2.

In some instances, the removal efficiencies were above 100% for certain particle size fractions. These discrepancies are not unique to any one test laboratory and may be attributed to errors relating to the blending of sediment, collection of representative samples for laboratory submission, and laboratory

analysis of PSD. Due to these errors, caution should be exercised in applying the removal efficiencies by particle size fraction for the purposes of sizing the tested device (see Bulletin # CETV 2016-11-0001). The results for "all particle sizes by mass balance" (see Table 1 and 2) are based on measurements of the total injected and retained sediment mass, and are therefore not subject to blending, sampling or PSD analysis errors.

Table 1. Removal efficiencies (%) of the EF4 at specified surface loading rates

Particle size fraction (µm)	**Surface loading rate (L/min/m²)**						
	40	80	200	400	600	1000	1400
>500	90	58	58	100*	86	72	100*
250 - 500	100*	100*	100	100*	100*	100*	100*
150 - 250	90	82	26	100*	100*	67	90
105 - 150	100*	100*	100*	100*	100*	100*	100
75 - 105	100*	92	74	82	77	68	76
53 - 75	Undefined [a]	56	100*	72	69	50	80
20 - 53	54	100*	54	33	36	40	31
8 - 20	67	52	25	21	17	20	20
5 – 8	33	29	11	12	9	7	19
<5	13	0	0	0	0	0	4
All particle sizes by mass balance	**70.4**	**63.8**	**53.9**	**47.5**	**46.0**	**43.7**	**49.0**

[a] An outlier in the feed sample sieve data resulted in a negative removal efficiency for this size fraction.
* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 101 and 171% (average 128%). See text and Bulletin # CETV 2016-11-0001 for more information.

Table 2. Removal efficiencies (%) of the EFO4 at surface loading rates above the bypass rate of 535 L/min/m²

Particle size fraction (µm)	**Surface loading rate (L/min/m²)**		
	600	1000	1400
>500	89	83	100*
250 - 500	90	100*	92
150 - 250	90	67	100*
105 - 150	85	92	77
75 - 105	80	71	65
53 - 75	60	31	36
20 - 53	33	43	23
8 - 20	17	23	15
5 – 8	10	3	3
<5	0	0	0
All particle sizes by mass balance	**41.7**	**39.7**	**34.2**

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 103 and 111% (average 107%). See text and Bulletin # CETV 2016-11-0001 for more information.

Figure 3 compares the particle size distribution (PSD) of the three sample average of the test sediment to the PSD of the sediment retained by the EF4 at each of the tested surface loading rates. Figure 4 shows the same graph for the EFO4 unit at surface loading rates above the bypass rate of 535 L/min/m².

As expected, the capture efficiency for fine particles in both units was generally found to decrease as surface loading rates increased.

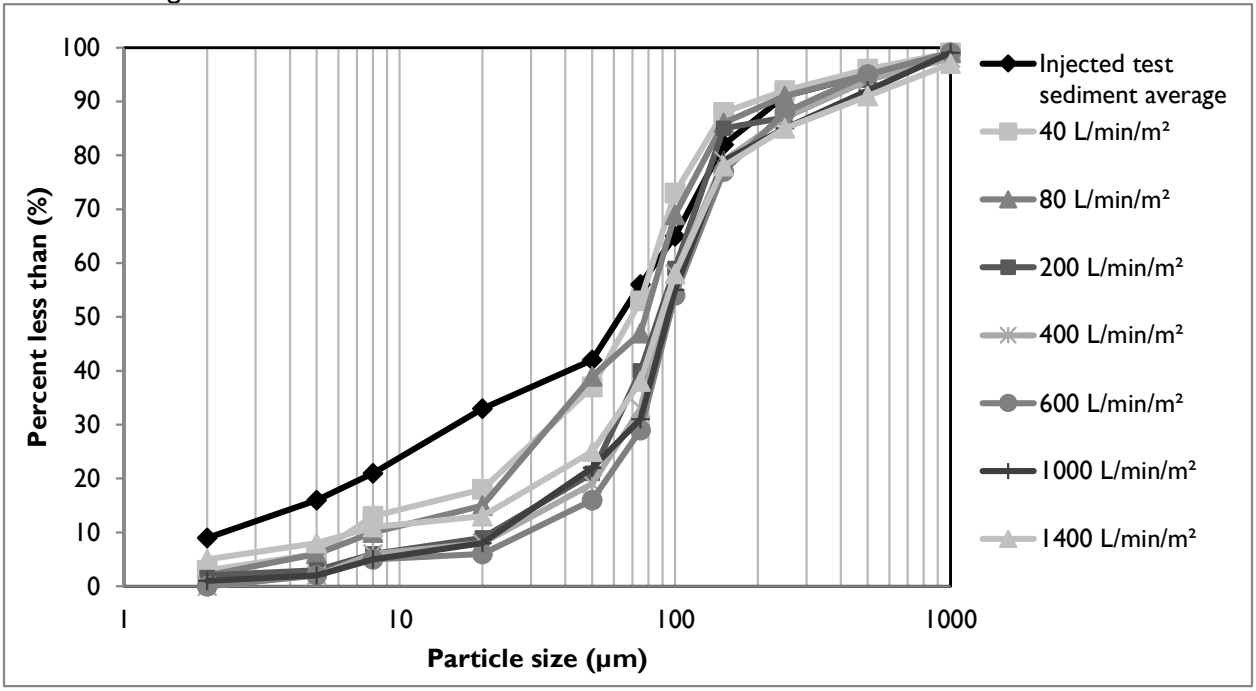

Figure 3. Particle size distribution of sediment retained in the EF4 in relation to the injected test sediment average.

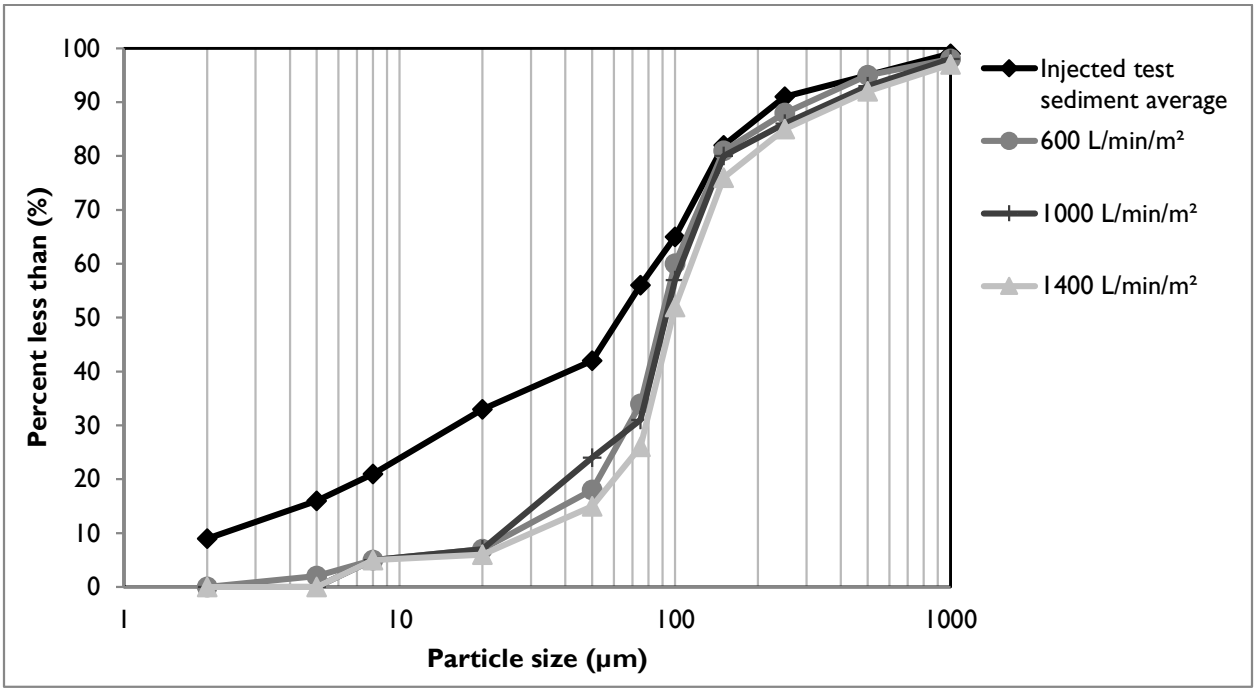

Figure 4. Particle size distribution of sediment retained in the EFO4 in relation to the injected test sediment average at surface loading rates above the bypass rate of 535 L/min/m²

Table 4 shows the results of the sediment scour and re-suspension test for the EF4 unit. The EFO4 was not tested as it was reasonably assumed that scour rates would be lower given that flow bypass occurs at a lower surface loading rate. The scour test involved preloading 10.2 cm of fresh test sediment into

the sedimentation sump of the device. The sediment was placed on a false floor to mimic a device filled to 50% of the maximum recommended sediment storage depth. Clean water was run through the device at five surface loading rates over a 30 minute period. Each flow rate was maintained for 5 minutes with a one minute transition time between flow rates. Effluent samples were collected at one minute sampling intervals and analyzed for Suspended Sediment Concentration (SSC) and PSD by recognized methods. The effluent samples were subsequently adjusted based on the background concentration of the influent water. Typically, the smallest 5% of particles captured during the 40 L/min/m^2 sediment capture test is also used to adjust the concentration, as per the method described in Bulletin # CETV 2016-09-0001. However, since the composites of effluent concentrations were below the Reporting Detection Limit of the Laser Diffraction PSD methodology, this adjustment was not made. Results showed average adjusted effluent sediment concentrations below 5 mg/L at all tested surface loading rates.

It should be noted that the EF4 starts to internally bypass water at 1135 L/min/m^2, potentially resulting in the dilution of effluent concentrations, which would not normally occur under typical field conditions because the field influent concentration would contain a much higher sediment concentration than during the lab test. Recalculation of effluent concentrations to account for dilution at surface loading rates above the bypass rate showed sediment effluent concentrations to be below 1.6 mg/L.

Table 4. Scour test adjusted effluent sediment concentration.

Run	Surface loading rate (L/min/m^2)	Run time (min)	Background sample concentration (mg/L)	Adjusted effluent suspended sediment concentration (mg/L) [a]	Average (mg/L)
1	200	1:00	<RDL	11.9	4.6
		2:00		7.0	
		3:00		4.4	
		4:00		2.2	
		5:00		1.0	
		6:00		1.2	
2	800	7:00	<RDL	1.1	0.7
		8:00		0.9	
		9:00		0.6	
		10:00		1.4	
		11:00		0.1	
		12:00		0	
3	1400	13:00	<RDL	0	0
		14:00		0.1	
		15:00		0	
		16:00		0	
		17:00		0	
		18:00		0	
4	2000	19:00	1.2	0.2	0.2
		20:00		0	
		21:00		0	
		22:00		0.7	
		23:00		0	
		24:00		0.4	

5	2600	25:00	1.6	0.3	0.4
		26:00		0.4	
		27:00		0.7	
		28:00		0.4	
		29:00		0.2	
		30:00		0.4	

[a] The adjusted effluent suspended sediment concentration represents the actual measured effluent concentration minus the background concentration. For more information see Bulletin # CETV 2016-09-0001.

The results of the light liquid re-entrainment test used to evaluate the unit's capacity to prevent re-entrainment of light liquids are reported in Table 5. The test involved preloading 58.3 L (corresponding to a 5 cm depth over the collection sump area of 1.17m^2) of surrogate low-density polyethylene beads within the oil collection skirt and running clean water through the device continuously at five surface loading rates (200, 800, 1400, 2000, and 2600 L/min/m^2). Each flow rate was maintained for 5 minutes with approximately 1 minute transition time between flow rates. The effluent flow was screened to capture all re-entrained pellets throughout the test.

Table 5. Light liquid re-entrainment test results for the EFO4.

Surface Loading Rate (L/min/m2)	Time Stamp	Amount of Beads Re-entrained			
		Mass (g)	Volume (L)[a]	% of Pre-loaded Mass Re-entrained	% of Pre-loaded Mass Retained
200	62	0	0	0.00	100
800	247	168.45	0.3	0.52	99.48
1400	432	51.88	0.09	0.16	99.83
2000	617	55.54	0.1	0.17	99.84
2600	802	19.73	0.035	0.06	99.94
Total Re-entrained		295.60	0.525	0.91	--
Total Retained		32403	57.78	--	99.09
Total Loaded		32699	58.3	--	--

[a] Determined from bead bulk density of 0.56074 g/cm^3

Variances from testing Procedure

The following minor deviations from the *Procedure for Laboratory Testing of Oil-Grit Separators* (Version 3.0, June 2014) have been noted:

1. During the capture test, the 40 L/min/m^2 and 80 L/min/m^2 surface loading rates were evaluated over 3 and 2 days respectively due to the long duration needed to feed the required minimum of 11.3 kg of test sediment into the unit at these lower flow rates. Pumps were shut down at the end of each intermediate day, and turned on again the following morning. The target flow rate was re-established within 30 seconds of switching on the pump. This procedure may have allowed sediments to be captured that otherwise may have exited the unit if the test was continuous. On the basis of practical considerations, this variance was approved by the verifier prior to testing.

2. During the scour test, the coefficient of variation (COV) for the lowest flow rate tested (200 L/min/m^2) was 0.07, which exceeded the specified limit of 0.04 target specified in the OGS Procedure. A pump capable of attaining the highest flow rate of 3036 L/min had difficulty maintaining the lowest flow of 234 L/min but still remained within +/- 10% of the target flow and is viewed as having very little impact on the observed results. Similarly, for the light liquid re-entrainment test the COV for the flow rate of the 200 L/min/m^2 run was 0.049, exceeding the limit of 0.04, but is believed to introduce negligible bias.

3. Due to pressure build up in the filters, the runs at 1000 L/min/m^2 for the Stormceptor® EF4 and 1000 and 1400 L/min/m^2 for the Stormceptor® EFO4 were slightly shorter than the target. The run times were 54, 59 and 43 minutes respectively, versus targets of 60 and 50 minutes. The final feed samples were timed to coincide with the end of the run. Since >25 lbs of sediment was fed, the shortened time did not invalidate the runs.

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management -- Environmental technology verification (ETV)***. Data and information provided by Imbrium Systems Inc. to support the performance claim included the following: Performance test report prepared by Good Harbour Laboratories, and dated September 8, 2017; the report is based on testing completed in accordance with the Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014).

What is ISO14034:2016 Environmental management – Environmental technology verification (ETV)?

ISO 14034:2016 specifies principles, procedures and requirements for environmental technology verification (ETV), and was developed and published by the *International Organization for Standardization (ISO)*. The objective of ETV is to provide credible, reliable and independent verification of the performance of environmental technologies. An environmental technology is a technology that either results in an environmental added value or measures parameters that indicate an environmental impact. Such technologies have an increasingly important role in addressing environmental challenges and achieving sustainable development.

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Appendix E External Report Excerpts

1.0 INTRODUCTION

At the request of Mr. Brent Pyper of Greely Sand and Gravel, this firm was retained to conduct a preliminary assessment of the viability of the remaining lands adjacent to the current extraction area, and currently zoned as a Mineral Resource designation (ME2 Zone) in the City of Ottawa Official Plan. In particular, the lands under consideration consist of two parcels of land fronting near to Bank Street and having a municipal identification of 5310 Bank Street (north parcel) and 5362 Bank Street (south parcel), Ottawa, Ontario. The future development of these lands are currently being considered for a commercial subdivision.

This report has been prepared specifically and solely for the above noted project which is described herein. It contains all of our findings and results of the preliminary investigation at this site.

2.0 SITE INFORMATION

The subject lands consists of two properties located on the west side of Bank Street in the City of Ottawa. The properties abut each other and are located immediately east of the existing Greely Sand and Gravel Aggregate Extraction area, as shown on Figure 1. The northern parcel, which is known as the Moffatt Lands, is located on Part of Lot 28, Concession IV in the former Township of Gloucester and has a municipal address of 5310 Bank Street. The southern parcel, known as the Pyper Lands, consists of Part of Lot 27, Concession IV in the former Township of Gloucester and has a municipal address of 5362 Bank Street. The total study area is approximately 20.4 hectares in size with the north and south parcels being approximately 15.58 and 4.83 hectares in size, respectively.

The northern parcel currently has a ME2 zoning and the southern parcel has a RU zoning designation. The properties are sandwiched by an existing church and graveyard located at 5338 Bank Street (RI5 Zoning). A large commercial property (Grandor Lumber) is located immediately north of the study area at 5224 Bank Street (RG1 Zoning). There is currently a licenced bedrock quarry, owned and operated by R.W. Tomlinson Limited on the east of Bank Street approximately 250 m east of the eastern limits of the study area. There is also a cellular telephone tower located near the centre of the study area.

Presently, the northern parcel is mostly heavily tree covered with the exception of a gravel access road and a cell tower located near the centre of this parcel. A number of buildings and a large gravel parking/storage area are located in the northwest quadrant of the south parcel. The south parcel is mostly tree covered to the east half of the property. Reference should be made to the appended Site Location Plan for an aerial view of the surrounding lands.

It should be noted that the south parcel, identified as 5362 Bank Street did have a prior Mineral Resource Designation that was subsequently changed to the RU Zoning.

3.0 SCOPE OF WORK

The scope of work for this Preliminary Aggregate Resource Study was as follows:

- ❑ Determine the suitability of the overburden aggregates (based on gradation) of the various materials recovered from the test pits.
- ❑ Provide an assessment of the viability of the suggested aggregate reserve within the ME2 Zone, for future extraction in the overburden materials.

4.0 METHODOLOGY

On May 27, 2014, a site meeting was held with Chris Bierman of the Ministry of Natural Resources and the current landowners. A walkabout of the site was conducted, and three (3) test pits were put down, on the north parcel, to provide verification of the aggregate quality. On August 5, 2014, two (2) additional test pits were put down on the south parcel. The approximate locations of the test holes are shown on Drawing No. PH2552-FIG.2, Test Pit Location Plan, included in Appendix 3.

The test pits were completed using a track mounted mechanical shovel supplied by the client. The test pit procedure consisted of excavating to the required depths at the selected locations and logging and sampling the overburden. The test pits were loosely backfilled upon completion.

Sampling and Identification

All soil samples were classified on site, placed in sealed plastic bags and transported to our laboratory. The depths at which the test pit samples were recovered from the test holes are shown as G samples on the Soil Profile and Test Data sheets in Appendix 1.

The subsurface conditions observed in the test holes were recorded in detail in the field. The soil profiles are presented on the Soil Profile and Test Data sheets in Appendix 1 of this report.

Groundwater

At the time of the fieldwork program, groundwater was encountered at depths ranging from 1.7 m in TP 1 to 4.5 m in TP 4 and TP 5. Seasonal variations in the groundwater table are to be expected, with higher levels being encountered during prolonged wet periods (i.e. spring thaw).

Laboratory Testing

Soil samples were recovered from the subject site and visually examined in our laboratory to review the results of the field logging. Samples of the various stratigraphic units were selected for grain size distribution analyses. The results are presented in Appendix 2.

5.0 OBSERVATIONS

5.1 Regional Geology

The dominant stratigraphic unit in the extraction area west of the subject property comprises fluvioglacial deposits that have resulted in the formation of an esker, that is quite extensive in the Greely area. This formation has been successfully mined in recent years, and has been known to produce good quality sand and gravel material. On the edges of the esker deposit, as is the case for the subject lands, poorly sorted glacial till materials exist. Regional mapping, which is duplicated on Drawing No. PH2552-FIG.3 in Appendix 3 provides confirmation of the in situ observations at the test pit locations.

5.2 Subsurface Profile

The soil profile underlying the north parcel (TP 1 to TP 3 inclusive) consists primarily of a topsoil layer overlying a thin layer of sand and gravel deposits containing silt and clay overlying poorly sorted glacial till deposits. The glacial till is underlain by dolomitic bedrock of the Oxford Formation at shallow depth. In the eastern face of the existing pit to the west, the glacial till unit was visible in the pit face, and basically defines the limit of usable quality aggregate in the current extraction area.

The soil profile underlying the south parcel, as encountered in TP 4 and TP 5, generally consists of fill materials (1.5 m to 2.3 m thick), underlain by a fine sand deposit (approximately 1.8 m thick), which in turn, is underlain by fine sand to sandy silt. Groundwater was encountered at approximately 4.5 m depth.

Reference should be made to the Soil Profile and Test Data sheets in Appendix 1 for the details of the soil profiles encountered at each test hole location.

Any information pertaining to soils and all test hole logs are furnished as a matter of general information only, and test pit descriptions or logs are not to be interpreted as descriptive of conditions at locations other than those described by the test pits themselves.

5.3 Laboratory Testing

Five samples representing the stratigraphic units in the test pits were submitted for grain size distribution analysis. The results are summarized in Table 1. The detailed results are presented on the Grain Size Distribution sheets in Appendix 2 of this report.

Table 1 - Result Summary of Grain Size Distribution Tests on Sand and Silty Sand / Sandy Silt Samples

Sample	Depth (m)	Gravel (%)	Sand (%)	Silt and Clay Fines (%)
TP1-G1	0.5	15	60	25
TP1-G2	1.6	36	52	12
TP2-G3	2	8	68	24
TP2-G4	3.5	12	77	11
TP3-G5	0.6	48	35	17
TP4-G6	3.6	1	95	4
TP4-G7	4.3	0	90	10
TP5-G8	3.8	0	23	77

Based on the results of the eight (8) grain size distributions, none of the samples meet the Ontario Provincial Standard Specifications (OPSS) for a Granular B Type I material.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Viability of Future Extraction

Based on the results of this study, in conjunction with regional investigations and mapping, the primary extraction areas are in the esker deposit to the west of the subject lands, which is currently owned and operated by Greely Sand and Gravel.

Based on regional mapping, in conjunction with site specific observations, the eastern extremity of the current pit operations have reached the point where no quality aggregate remains in place, thus limiting the value of the remaining lands as an aggregate resource. The further complicating factor is that the remaining lands are landlocked on three sides, with existing commercial or institutional development on the north and south sides, and Bank Street to the east. The application of applicable setbacks would result in minimal lands being available for further mining operations, and from a strictly planning perspective, would not be considered to be viable, even if there were quality aggregates on the site.

In addition, the depth of overburden is quite limited, and none of the sand samples meet specifications OPSS Granular B Type 1 material, or for other select materials such as concrete sand, mortar sand, filter sand, playground sand and/or bedding sand.

6.2 Proposed Commercial Development

Based on the results of this investigation, it is our opinion that the geotechnical conditions underlying the site are suitable for commercial subdivision development. Although this study is not intended to be used in support of a subdivision development application, it is evident that this property would be well suited for commercial type development, given the current land uses on the surrounding lands.

7.0 SUMMARY

A geological assessment was conducted on the subject properties to determine the suitability of these lands for future aggregate extraction operations. Based on the results of this assessment, it is evident that the current operations to the west have reached their eastern limit of quality aggregate. Based on the results of the test pitting and laboratory testing, the material contained within the ME2 Zone does not meet specifications for select granular material, and as such, has no economic value in this regard. The existing lands to the north and south along Bank Street have been previously de-designated and developed, which would result in significant reductions in aggregate extraction, due the applicable setbacks that would be required for a mineral resource extraction operation. As such, it is our opinion that the de-designation of these lands complies with the intent of the Provincial Policy statements based on economic viability and potential environmental impacts.

Yours truly,

Paterson Group Inc.

Stephen J. Walker, P. Eng.



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5.0 Discussion

5.1 Geotechnical Assessment

From a geotechnical perspective, the subject site is suitable for the proposed development. For any new structures, it is recommended that they be founded on conventional spread footings bearing on an undisturbed, compact to dense silty sand or glacial till bearing surface.

Where fill or loose silty sand is encountered at the underside of the footing (USF), it should be sub-excavated to the surface of the undisturbed, compact to dense ilty sand or glacial till and replaced with engineered fill or lean concrete up to the proposed founding elevation. The lateral limits of the engineered fill or lean concrete placement should be in accordance with our lateral support recommendations provided herein.

A slope stability assessment has been conducted in order to determine the Limit of Hazard Lands setbacks from the existing pond.

The above and other considerations are further discussed in the following sections.

5.2 Site Grading and Preparation

Stripping Depth and Subgrade Preparation

Topsoil, asphalt or fill, such as those containing organic materials, should be stripped from under the building footprints and other settlement sensitive structures, prior to placing the fill.

However, it is anticipated that the existing fill can remain in place below the proposed building, outside of the lateral support zones of the footings, provided that the existing fill subgrade is proof rolled several times under dry conditions and above freezing temperatures. The proof rolling should consist of several passes of a vibratory drum roller, which is done under the supervision of Paterson. Any poor performing areas noted during the proof rolling operation should be removed and replaced with an approved fill.

Where silty sand is encountered at the slab-on-grade subgrade and/or underside of the footing (USF) elevation, and is observed to be in a loose state of compactness, it should also be proof-compacted with several passes of a vibratory plate compactor or drum roller.

Existing foundation walls and other construction debris, if encountered, should be entirely removed from within the proposed structure perimeter. Under paved areas, existing construction remnants, such as foundation walls, should be excavated to a minimum depth of 1 m below the final grade.

Fill Placement

Fill placed for grading beneath the building areas should consist, unless otherwise specified, of clean imported granular fill, such as Ontario Provincial Standard Specifications (OPSS) Granular A or Granular B Type II. The imported fill material should be tested and approved prior to delivery. The fill should be placed in maximum 300 mm thick loose lifts and compacted by suitable compaction equipment. Fill placed beneath proposed building and paved areas should be compacted to a minimum 98% of the Standard Proctor Maximum Dry Density (SPMDD).

Non-specified existing fill, along with site-excavated soil, can be used as general landscaping fill where settlement of the ground surface is of minor concern. These materials should be spread in thin lifts and at least compacted by the tracks of the spreading equipment to minimize voids. If this material is to be used to build up the subgrade level for areas to be paved, it should be compacted in thin lifts to at least 95% of the material's SPMDD.

Fill used for grading beneath the base and subbase layers of paved areas should consist, unless otherwise specified, of clean imported granular fill, such as OPSS Granular A, Granular B Type II or select subgrade material. This material should be tested and approved prior to delivery to the site. The fill should be placed in lifts no greater than 300 mm thick and compacted using suitable compaction equipment for the lift thickness. Fill placed beneath the paved areas should be compacted to at least 95% of its SPMDD.

5.3 Foundation Design

Conventional Spread Footings

Conventional spread footings placed on an undisturbed, compact to dense glacial till or silty sand bearing surfaces can be designed using a bearing resistance value at serviceability limit states (SLS) of **150 kPa** and a factored bearing resistance value at ultimate limit states (ULS) of **225 kPa**. A geotechnical resistance factor of 0.5 was applied to the above-noted bearing resistance value at ULS.

An undisturbed soil bearing surface consists of a surface from which topsoil and deleterious materials, such as loose, frozen or disturbed soil, whether in situ or not, have been removed, in the dry, prior to the placement of concrete for footings.

Footings bearing on the undisturbed, compact to dense glacial till or silty sand and designed using the above-noted bearing resistance value at SLS will be subjected to potential post-construction total and differential settlement of 25 and 20 mm, respectively.

Lateral Support

The bearing medium under footing-supported structures is required to be provided with adequate lateral support with respect to excavations and different foundation levels. Adequate lateral support is provided to a soil bearing medium when a plane extending down and out from the bottom edge of the footing or raft at a minimum of 1.5H:1V, passes only through in situ soil or engineered fill of the same or higher capacity as the soil.

5.4 Design for Earthquakes

The site class for seismic site response can be taken as **Class X_D**. If a higher seismic site class is required for the proposed development, then a site-specific shear wave velocity test may be completed to accurately determine the applicable seismic site classification for foundation design, as defined in the Ontario Building Code (OBC) 2024.

Soils underlying the subject site are not susceptible to liquefaction. Reference should be made to the latest version of the OBC 2024 for a full discussion of the earthquake design requirements.

5.5 Slab-on-Grade Construction

With the removal of all topsoil and fill, containing significant amounts of deleterious or organic materials, the existing fill, silty sand, or glacial till subgrade approved by the geotechnical consultant at the time of excavation will be considered an acceptable subgrade surface on which to commence backfilling for slab-on-grade construction. A vibratory drum roller should complete several passes over the subgrade surface as a proof-rolling program. Any poor performing areas should be removed and reinstated with an engineered fill, such as OPSS Granular B Type II.

It is recommended that the upper 200 mm of sub-slab fill consist of OPSS Granular A crushed stone. All backfill material within the footprints of the proposed structures should be placed in maximum 300 mm thick loose layers and compacted to a minimum of 98% of the SPMDD.

5.6 Pavement Design

The pavement structures presented in the following tables are recommended for the design of car-only parking, heavy truck parking and loading areas and access lanes.

Table 1 – Recommended Pavement Structure – Car Only Parking Areas	
Thickness (mm)	**Material Description**
50	**Wear Course** – HL-3 or Superpave 12.5 Asphalt Concrete
150	**BASE** - OPSS Granular A Crushed Stone
300	**SUBBASE** - OPSS Granular B Type II
SUBGRADE – Either existing fill, in-situ soil, or OPSS Granular B Type I or II material placed over in-situ soil or fill.	

Table 2 – Recommended Pavement Structure – Access Lanes, Loading Areas and Heavy Truck Parking	
Thickness (mm)	**Material Description**
40	**Wear Course** - Superpave 12.5 Asphaltic Concrete
50	**Binder Course** - Superpave 19.0 Asphaltic Concrete
150	**BASE** - OPSS Granular A Crushed Stone
450	**SUBBASE** - OPSS Granular B Type II
SUBGRADE – Either existing fill, in-situ soil, or OPSS Granular B Type I or II material placed over in-situ soil or fill.	

Minimum Performance Graded (PG) 58-34 asphalt cement should be used for this project. If soft spots develop in the subgrade during compaction or due to construction traffic, the affected areas should be excavated and replaced with OPSS Granular B Type II material. The pavement granular base and subbase should be placed in maximum 300 mm thick lifts and compacted to a minimum of 99% of the material's SPMDD using suitable vibratory equipment.

Where the proposed asphalt surface meets existing asphalt, the following joint transition detail should be employed:

- ❑ A 300 mm wide section of the existing asphalt should be saw cut from the existing pavement edge to provide a sound surface to abut the proposed pavement structure.
- ❑ It is recommended to mill a 300 mm wide and 40 mm deep section of the existing asphalt at the saw cut edge.

6.0 Design and Construction Precautions

6.1 Foundation Drainage and Backfill

A perimeter foundation drainage system is recommended for any new buildings constructed at this site with below-grade space. Where utilized, the system should consist of a 150 mm diameter perforated and corrugated plastic pipe which is surrounded on all sides by 150 mm of 19 mm clear crushed stone, and placed at the footing level around the exterior perimeter of the structure. The pipe should have a positive outlet, such as a gravity connection to the storm sewer.

Backfill against the exterior sides of the foundation walls should consist of free-draining, non-frost-susceptible granular materials, such as clean sand or OPSS Granular B Type I granular material, should otherwise be used for this purpose.

Backfill material below sidewalks and walkway subgrade areas throughout the subject site, including along the building, should be provided with a minimum 300 mm thick layer of OPSS Granular A or OPSS Granular B Type II crushed stone. This material should be placed in maximum 300 mm thick loose lifts and compacted to a minimum of 98% of the materials SPMDD.

6.2 Protection of Footings Against Frost Action

Perimeter footings of heated structures are required to be insulated against the deleterious effects of frost action. Generally, a minimum of 1.5 m thick soil cover, or an equivalent combination of soil cover and foundation insulation, should be provided in this regard.

Other exterior unheated footings, such as those for isolated exterior piers, are more prone to deleterious movement associated with frost action than the exterior walls of the proper structure and require additional protection, such as soil cover of 2.1 m, or an equivalent combination of soil cover and foundation insulation.

6.3 Excavation Side Slopes

The side slopes of excavations in the overburden material should either be cut back at acceptable slopes or should be retained by shoring systems from the start of the excavation until the structure is backfilled. It is expected that sufficient room will be available for the greater part of the excavation to be undertaken by open-cut methods (i.e. unsupported excavations).

The excavation side slopes above the groundwater level extending to a maximum depth of 3 m should be excavated at 1H:1V or shallower. The shallower slope is required for excavation below groundwater level. The subsurface soils are considered to be a Type 2 and 3 soil according to the Occupational Health and Safety Act and Regulations for Construction Projects.

Excavated soil should not be stockpiled directly at the top of excavations and heavy equipment should be kept away from the excavation sides.

Slopes in excess of 3 m in height should be periodically inspected by the geotechnical consultant in order to detect if the slopes are exhibiting signs of distress.

A trench box is recommended to protect personnel working in trenches with steep or vertical sides. Services are expected to be installed by "cut and cover" methods and excavations should not remain open for extended periods of time.

6.4 Pipe Bedding and Backfill

Bedding and backfill materials should be in accordance with the most recent Material Specifications and Standard Detail Drawings from the Department of Public Works and Services, Infrastructure Services Branch of the City of Ottawa.

A minimum 150 mm of OPSS Granular A should be placed for bedding for sewer or water pipes when placed on a soil subgrade. The bedding should extend to the spring line of the pipe. Cover material, from the spring line to a minimum of 300 mm above the obvert of the pipe, should consist of OPSS Granular A or Granular B Type II with a maximum size of 25 mm. The bedding layer should be increased to a minimum thickness of 300 mm where the subgrade consists of grey silty clay. The bedding and cover materials should be placed in maximum 300 mm thick lifts compacted to 95% of the material's standard Proctor maximum dry density.

It should generally be possible to re-use the site generated fill, silty sand, and glacial till materials (moist, not wet) above the cover material if excavation and filling operations are carried out in dry and non-freezing weather conditions. The wet silty sand should be given a sufficient drying period to decrease its moisture content to an acceptable level to make compaction possible prior to being reused.

Where hard surface areas are considered above the trench backfill, the trench backfill material within the frost zone (about 1.8 m below finished grade) and above the cover material should match the soils exposed at the trench walls to minimize differential frost heaving. The trench backfill should be placed in maximum 225 mm thick loose lifts and compacted to a minimum of 95% of the material standard Proctor maximum dry density.

6.5 Groundwater Control

It is anticipated that groundwater infiltration into the excavations should be 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.

Under the current regulations enacted by the Ministry of Environment, Conservation and Parks (MECP), any dewatering in excess of 50,000 L/day requires a registration on the Environmental Activity and Sector Registry (EASR), provided that dewatering is related to construction. If the dewatering is not related to construction, a Permit to Take Water obtained from the MECP will be required.

In the event that an EASR is required to facilitate dewatering of the proposed development, a minimum of 3 to 4 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. Should a Permit to Take Water be required, a minimum of five to six months should be allotted for completion of the permit, due to the minimum review period imposed by the MECP.

6.6 Winter Construction

Precautions must be taken if winter construction is considered for this project. The subsoil conditions at this site mostly consist of frost susceptible materials. In the presence of water and freezing conditions, ice could form within the soil mass. Heaving and settlement upon thawing could occur.

In the event of construction during below zero temperatures, the founding stratum should be protected from freezing temperatures by the use of straw, propane heaters, tarpaulins or other suitable means.

In this regard, the base of the excavations should be insulated from sub-zero temperatures immediately upon exposure and until such time as heat is adequately supplied to the building and the footings are protected with sufficient soil cover to prevent freezing at founding level.

Trench excavations and pavement construction are also difficult activities to complete during freezing conditions without introducing frost in the subgrade or in the excavation walls and bottoms.

Precautions should be taken if activities are to be carried out during freezing conditions. Additional information could be provided, if required.

6.7 Corrosion Potential and Sulphate

The results of analytical testing show that the sulphate content is less than 0.1%. This result is indicative that Type 10 Portland cement (GU – General Use cement) would be appropriate for this site. The chloride content and pH of the sample indicate that they are not a significant factor in creating a corrosive environment for exposed ferrous metals at this site, whereas the resistivity is indicative of a non-aggressive to moderately aggressive corrosive environment.

6.8 Slope Stability Assessment

As noted above, the subject site slopes downward from the central portion toward the west and south, in the direction of the adjacent ponds and watercourse, with an approximate elevation change of 4 to 5 m across the site. Accordingly, slope stability analyses were carried out under the proposed site conditions.

The slope stability analysis of the proposed site conditions was carried out using SLIDE2, a computer program, which permits a two-dimensional slope stability analysis using several widely-accepted limit equilibrium methods, such as the Bishop's Method. The program calculates a factor of safety, which represents the ratio of the forces resisting failure to those favoring failure. Theoretically, a factor of safety of 1.0 represents a condition where the slope is stable. However, due to intrinsic limitations of the calculation methods and the variability of the subsoil and groundwater conditions, a factor of safety greater than 1.0 is usually required to ascertain that the risks of failure are acceptable. Minimum factors of safety of 1.5 and 1.1 are generally recommended under static and seismic conditions, respectively, where the failure of the slope would endanger permanent structures.

Subsoil conditions at the cross-section were inferred based on the completed boreholes at the subject site and our knowledge of the area. The soil parameters used for the analysis are shown in Figures 2A to 5B in Appendix 2.

Static and Seismic Loading Analysis

The results for the analysis of the proposed slopes (Section A-A', B-B', and C-C') are shown in Figures 3A to 5B attached to this memorandum. For Section B-B', the slope stability analyses indicate that the estimated factors of safety under the proposed conditions are below the minimum recommended values of 1.5 and 1.1 for static and seismic conditions, respectively, indicating unstable slope conditions. For Sections A-A and C-C, the slope stability analyses indicate that the estimated factors of safety under the proposed conditions are greater than 1.5 and 1.1 for static and seismic conditions, respectively, indicating stable slope conditions.

It is important to note that due to the nature of the cohesionless soils (silty sand), groundwater infiltration through the slope may cause several washouts over the long run. In addition, precipitation events along with snow melting events in early spring seasons will also contribute to eroding the slope face by surface water runoff. Therefore, additional analyses were conducted with suggested remedial work to ensure that a factor of safety of 1.5 and 1.1 for static and seismic conditions, respectively, are achieved. The following represents the analyses conducted for the proposed condition of the slope (Figures 3A and 3B) and the suggested remedial work for Section A-A' (Figures 4A and 4B) under static and seismic conditions:

Figures 3A and 3B illustrate the slope under proposed conditions without the installation of erosion control measures. The analyzed slopes were estimated to have factors of safety of 1.14 under static conditions, which are below the minimum required factor of safety of 1.5 for stable slope conditions. Under seismic conditions, the estimated factors of safety are 0.785, which are below the minimum recommended factor of safety of 1.1 for seismic conditions.

Figures 4A and 4B illustrate a proposed slope reinforcement system consisting of compacted granular material extending from approximately 1.0 m at the toe of the slope to approximately 0.5 m near the top of the slope. Reference should be made to Figure 6 - Recommended Remedial Work in Appendix 2. Followed by the placement of a woven geotextile liner such as such as Terrafix 200W or an approved equivalent. The geotextile liner should be pinned to the ground with steel pins embedded a minimum 450 mm below the slope surface. Alternatively, the geotextile liner can also be anchored with any recommended anchorage system by the geotextile supplier, pending Paterson's review and approval. The geotextile liners along the slope face should be overlapped by a minimum 300 mm and anchored with pins spaced at max 1.5 m along the overlapped areas. Following the placement of the geotextile liner, a granular material, such as OPSS Granular B Type II, compacted to a minimum of 95% of the material Standard Proctor Maximum Dry Density (SPMDD) should be installed. With the proposed reinforcement system, the slopes were estimated to achieve improved factors of safety of 1.655 under static conditions, and 1.174 under seismic conditions.

As a second layer of protection, hydroseeding can be installed over the slope face to establish vegetations. It is important to note that the remedial program will provide erosion control measures where implemented. However, areas not included in the remedial work may be susceptible to natural surficial erosion caused by rain events or surface water runoff.

Toe Erosion and Access Allowances

Based on the soil profiles encountered at the borehole locations, a dense to very dense silty sand is anticipated to be subject to erosion activity. The John Boyce Municipal Drain did not appear to be affected by active erosion at the time of our site visit. Based on the anticipated soils, a toe erosion allowance of 2 m should be applied. Please note that if the remedial work is implemented on any portion of the slope, the toe erosion setback may be fully removed from the Limit of hazard lands setback provided on the attached plan.

Further, an access allowance of 6 m is required from the top of slope or geotechnical setback (where applicable).

Limit of Hazard Lands

Based on the above, a setback taken from the top of the current slope has been provided as based on the above-noted observations and analysis. Reference should be made to Drawing PG7831-1 – Test Hole Location Plan for the proposed Limit of Hazard Lands setback for development considerations at the subject site. The existing vegetation on the slope faces should not be removed as it contributes to the stability of the slope and reduces erosion.

6.9 Stormwater Management Pond

It is understood that the proposed stormwater management pond (SWMP) will be located within the subject site. Based on the test holes completed within the footprint of the SWMP, it is anticipated that the proposed structure will be founded on a silty sand and/or glacial till bearing surface.

Given the anticipated silty sand and/or glacial till at the bottom and lower sides of the SWMP, a liner is recommended. The pond liner may consist of one of the following:

- A 500 mm thick layer of workable, brown silty clay which is compacted with several passes of a sheepsfoot roller, and placed directly over the bedrock.

- 150 mm thick layer of 19 mm clear crushed stone placed over the bedrock subgrade, followed by a scrim-reinforced geosynthetic clay liner (such as the Bentofix Thermal Lock SRNWL Series Geosynthetic Clay Liner, or approved equivalent) which is capped with a 300 mm thick layer of OPSS Granular A material.

7.0 Recommendations

It is recommended that the following be carried out by Paterson once details of the proposed development are available:

- ❑ Review detailed Grading and Servicing Plans, from a geotechnical perspective.
- ❑ Review of detailed plans pertaining to excavation.

It is a requirement for the foundation design data provided herein to be applicable that a material testing and observation program be performed by the geotechnical consultant. The following aspects of the program should be performed by Paterson:

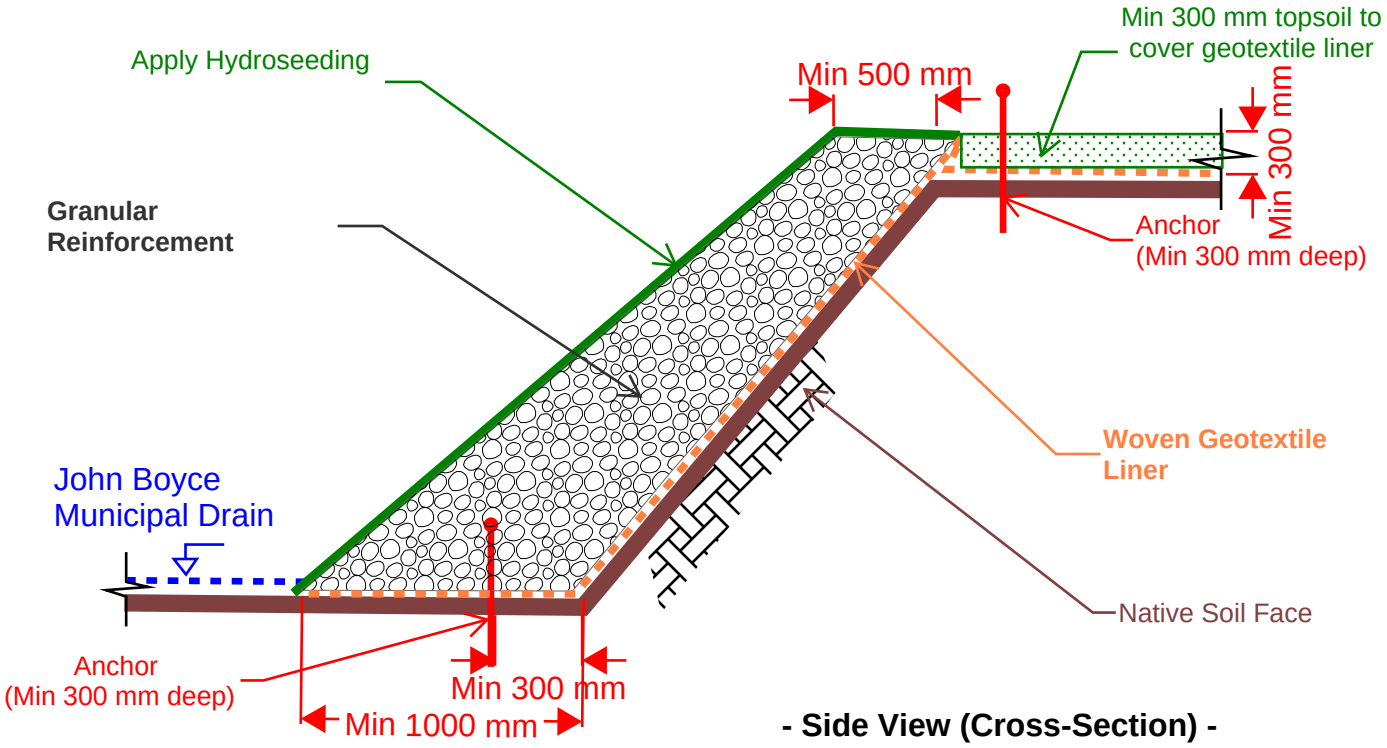
- ❑ Observation of all bearing surfaces prior to the placement of concrete.
- ❑ Sampling and testing of the concrete and fill materials used.
- ❑ Periodic observation of the condition of unsupported excavation side slopes in excess of 3 m in height, if applicable.
- ❑ Observation of all subgrades prior to backfilling.
- ❑ Field density tests to determine the level of compaction achieved.
- ❑ Sampling and testing of the bituminous concrete including mix design reviews.

A report confirming that these works have been conducted in general accordance with our recommendations could be issued upon the completion of a satisfactory inspection program by the geotechnical consultant.

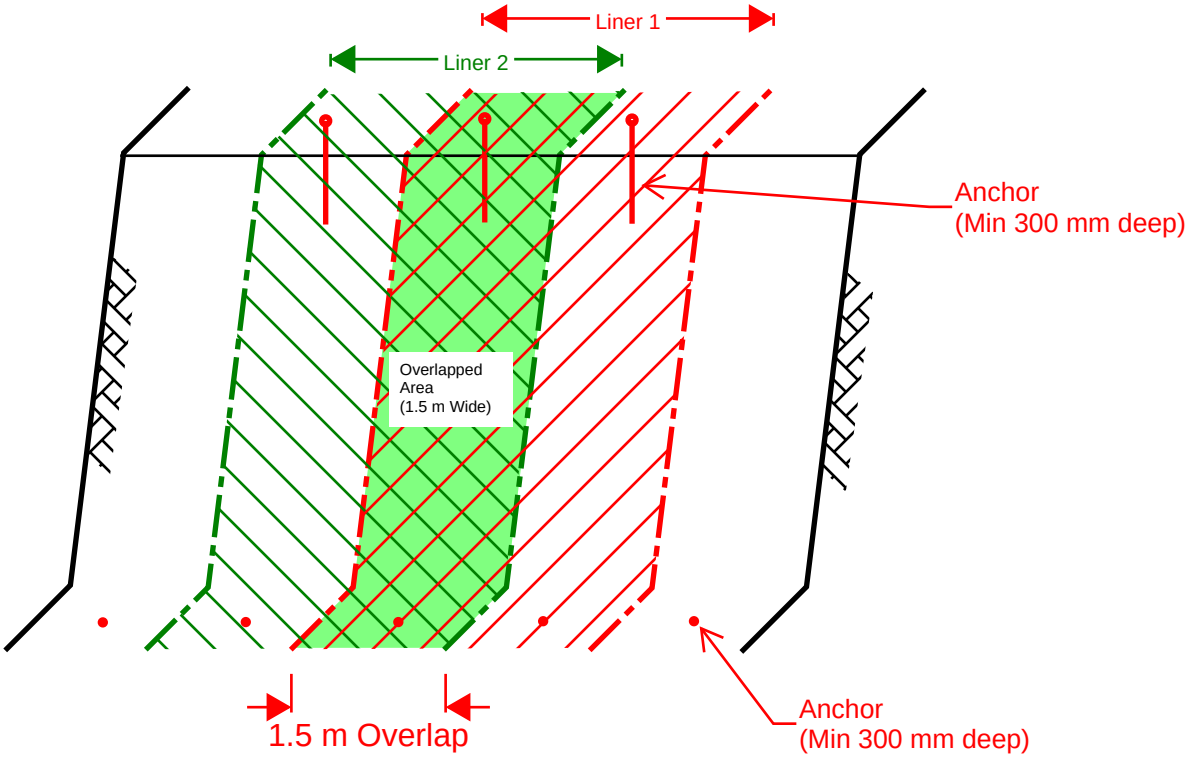
All excess soils must be handled in accordance with *Ontario Regulation 406/19: On-Site and Excess Soil Management.*

PATERSON GROUP	Geotechnical Investigation	Job No.: PG7831
	Proposed Development	Date: July 9, 2026
	5360 Bank Street – Ottawa, Ontario	Dwn: ZAM
	Drawing is not to scale	Page: 1 of 1

Figure 6 – Recommended Remedial Work



- Side View (Cross-Section) -



- Profile View of Slope Face -

PATERSON GROUP

memorandum

re: **Groundwater Monitoring Program Summary**
Re-zoning and Site Plan Control Application
5360 Bank Street – Ottawa

to: **Percy Pyper (1997) Ltd** – Brent Pyper – info@greelysand.com

date: June 4, 2026

file: PH4841-MEMO.01

Further to your request and authorization, Paterson Group (Paterson) has conducted a Groundwater Monitoring Program (GMP) in support of the proposed Re-zoning and Site Plan Control Application to be located at the aforementioned site.

1.0 Background Information

A field investigation was carried out by Paterson on March 17, 2026 at the subject site. During that time, a total of five (5) boreholes were extended to a maximum depth of 6.4 m below ground surface (bgs). At that time, all of the boreholes were equipped with monitoring well installations (BH 1-26, BH 2-26, BH 3-26, BH 4-26 and BH 5-26). Those 5 monitoring wells were utilized for the current groundwater monitoring program. The monitoring wells were distributed in a manner to provide general coverage of the proposed development, taking into consideration underground utilities and site features.

Hydrogeological Pre-consultation

A Hydrogeological Pre-consultation occurred with City of Ottawa (City) staff on February 26, 2026. During the Hydrogeological Pre-consultation and the following email discussions, it was determined that the City would accept a scoped GMP. Both the length of the monitoring program and the proposed monitoring well locations were approved by the City.

Field Survey

The monitoring well locations, and ground surface elevations at each monitoring well location were surveyed by Paterson using a handheld GPS unit and referenced to a geodetic datum. The location and ground surface elevation at each monitoring well location is presented on Drawing PG7831-1 – Test Hole Location Plan attached to the current memorandum.

Subsurface Profile

The subsurface profile at the monitoring well locations included in the current groundwater monitoring program generally consisted of fill or topsoil followed by till consisting of a brown silty sand with gravel and cobbles. In BH 1-26, BH 2-26 and BH 5-26 a brown silty sand layer with trace gravel or trace clay was noted to lie between the fill or topsoil layer and the till layer. Details of the subsurface profile at the monitoring wells included in current groundwater monitoring program can be found in the Soil Profile and Test Data Sheets attached to the current report.

Monitoring Well Installation

Each of the monitoring wells was constructed with 1.5 m of slotted 51 mm diameter PVC screen at the base of the aforementioned monitoring well with 51 mm diameter PVC riser pipe extending from the top of the screen to ground surface. The 51 mm diameter PVC riser extended to ground surface and was either capped with a flush mount cover or extended above the ground surface and covered with a protective steel monitoring well casing.

2.0 Groundwater Monitoring Program

On March 19, 2026 BH 1-26, BH 2-26, BH 3-26, BH 4-26 and BH 5-26 were equipped with a Van Essen Instrument Mini-Diver Water Level Logger to accurately monitor fluctuations in the groundwater levels. In addition, a Van Essen Instruments Baro-Diver was installed in BH 5-26 to monitor changes in atmospheric pressure. The Mini-Divers were programmed to continuously measure and record groundwater levels throughout the subject site at a rate of 1 reading every 24 hours.

The results of the groundwater fluctuations and correlated precipitation events for each monitoring well location between March 19, 2026 and May 28, 2026 have been summarized in Figure 1 through Figure 5 attached to the current report.

3.0 Groundwater Monitoring Results

The data presented in Figure 1 through Figure 5 illustrate the collected groundwater elevations between March 19, 2026 and May 28, 2026. The groundwater readings measured within the monitoring wells across the subject site varied from a minimum elevation of 104.95 m asl to a maximum average elevation of 107.07 m asl. The low and high groundwater elevation measurements at each monitoring well location are summarized in Table 1 below.

Based on our analysis of the datalogger readings, seasonal groundwater fluctuations can be observed at each monitoring well location with a difference in elevation between the low and high readings ranging from 0.24 to 0.95 m. The low groundwater level across the site was noted to be at an average elevation of 105.44 m asl throughout the monitoring period. The high groundwater table across the site during this monitoring period was found to be at an average elevation of 106.09 m asl.

Table 1: Groundwater Monitoring Summary

Well ID	Ground Surface Elevation (m asl)	Low Groundwater Elevation (m asl)	High Groundwater Elevation (m asl)	Difference in Groundwater Elevation (m asl)
BH 1-26	109.08	105.95	106.37	0.42
BH 2-26	109.72	105.19	105.43	0.24
BH 3-26	108.16	105.01	105.88	0.87
BH 4-26	107.99	104.95	105.72	0.77
BH 5-26	107.37	106.12	107.07	0.95
Average		105.44	106.09	0.65

We trust that this information satisfies your requirements.

Best Regards,

Paterson Group Inc.

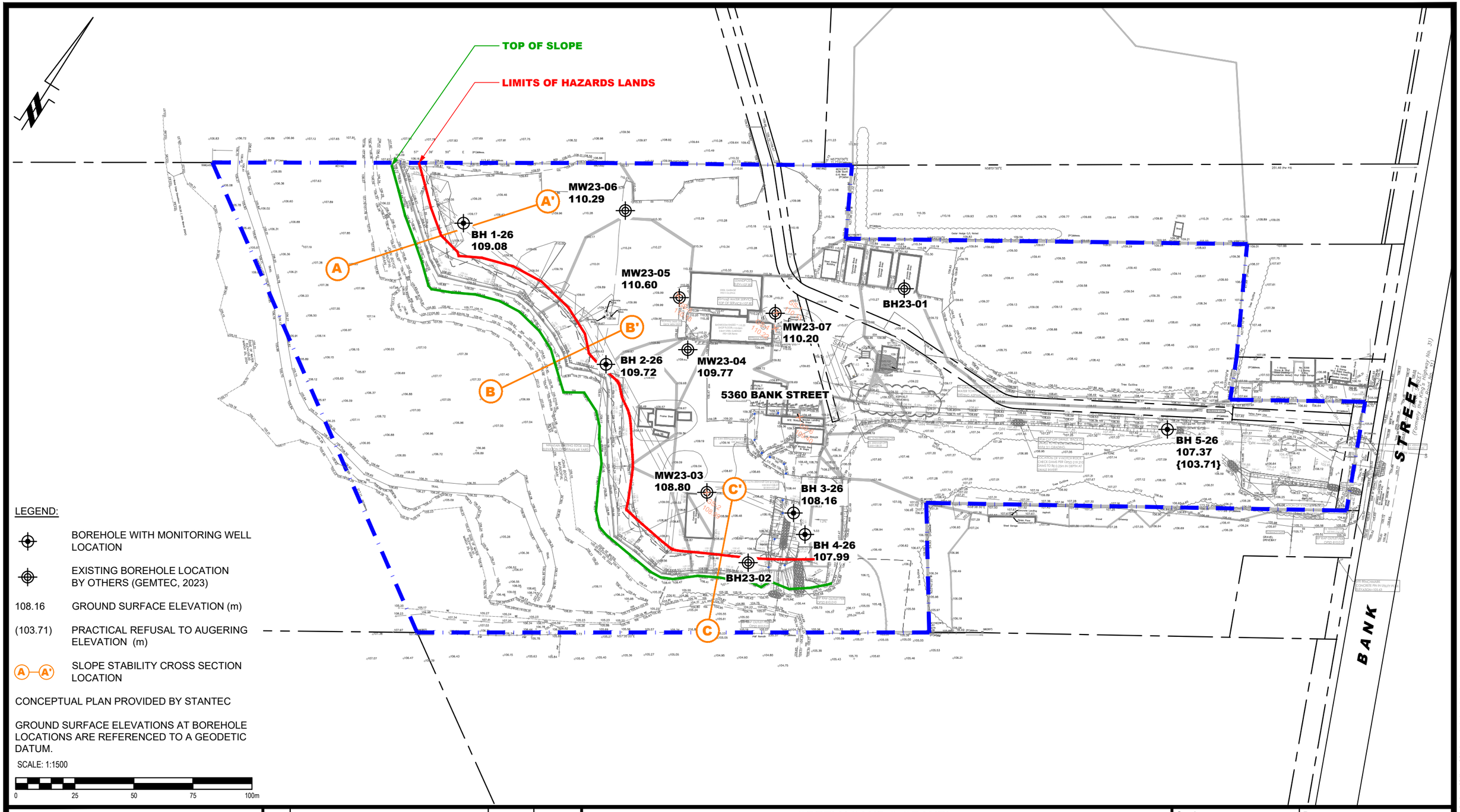


Erik Ardley, P.Geo



Attachments

- ❑ Figure 1 through Figure 5 – Groundwater Monitoring Levels
- ❑ Soil Profile and Test Data Sheets
- ❑ Drawing PG7831-1 – Test Hole Location Plan



LEGEND:

- BOREHOLE WITH MONITORING WELL LOCATION
- EXISTING BOREHOLE LOCATION BY OTHERS (GEMTEC, 2023)
- 108.16 GROUND SURFACE ELEVATION (m)
- (103.71) PRACTICAL REFUSAL TO AUGERING ELEVATION (m)
- A—A' SLOPE STABILITY CROSS SECTION LOCATION

CONCEPTUAL PLAN PROVIDED BY STANTEC

GROUND SURFACE ELEVATIONS AT BOREHOLE LOCATIONS ARE REFERENCED TO A GEODETIC DATUM.

SCALE: 1:1500

0 25 50 75 100m

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9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL

GREELY SAND & GRAVEL
GEOTECHNICAL INVESTIGATION
PROPOSED DEVELOPMENT
5360 BANK STREET
OTTAWA, ONTARIO

Title: TEST HOLE LOPCATION PLAN

Scale: 1:1500	Date: 03/2026
Drawn by: GK	Report No.: PG7831-1
Checked by: ZA	Dwg. No.: PG7831-1
Approved by: SD	Revision No.:

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With every community, we redefine what's possible.

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

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