W.O. STINSON & SON LTD.

5545 ALBION ROAD

Design Brief

December 24th, 2023

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5545 Albion Road

Design Brief
City of Ottawa
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1 Introduction

5545 Albion Road is located immediately north-east of Albion Road and Mitch Owens Road intersection and is approximately 2.30 hectares. The proposed development consists of a gas bar and cardlock station, which also includes a convenience store and a coffee shop. There will be two proposed entrances to the site, one via Mitch Owens Road and the other via Albion Road, directly oposite of the MacEwens gas station entrance. **Figure 1.1** below shows the subject site location.

Figure 1.1 Site Location

The proposed servicing design conforms to current City of Ottawa and MECP design criteria, and no pre-consultation meetings were requested from the Rideau Valley Conservation Authority (RVCA) or the Ontario Ministry of Environment, Conservation and Parks (MECP).

1.1 Guidelines and Standards

This evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), and the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01, the June 2018 Technical Bulletin ISTB-2018-04, October 2019 Technical Bulletin 2019-01, and the July Technical Bulletin 2019-02.

It also considers the City of Ottawa Water Distribution Design Guidelines (OWDDG), and the 2010 Technical Bulletin 2010-02, the 2014 Technical Bulletin 2014-02, the 2018 Technical Bulletin 2018-02 and the 2020 Technical Bulletin 2020-02.

All specifications are as per current City of Ottawa standards and specifications, and Province of Ontario (OPSS/D) standards, specifications and drawings.

1.2 Pre-Consultation Meeting

The City of Ottawa hosted a virtual pre-consultation meeting on October 21st, 2022. Notes of the meeting are provided in **Appendix A**. There was no major engineering concerns flagged in this meeting. The City of Ottawa Servicing Study Checklist has also been included in **Appendix A**.

1.3 Environmental

There is a drainage feature that runs between 5505 and 5545 Albion Road. After initial proposals, the applicant's current proposal is to retain the existing drainage feature and provide a 15m buffer along its south side. Refer to the Environmental Impact Study prepared by Arcadis dated October 2023.

The subject lands are within a wellhead protection area, refer to the Paterson report – PG5485-1 Revision 2 dated January 30, 2025.

1.4 Geotechnical

Paterson Group was retained to prepare a geotechnical investigation for the proposed development at 5545 Albion Road. The objectives of the investigation were to prepare a report to:

- Determine the subsoil and groundwater conditions at the site by means of test pits and boreholes and;
- To provide geotechnical recommendations pertaining to design of the proposed development including construction considerations.

The geotechnical report PG5485-1 Revision 2 was prepared by Paterson Group in January 2025. The report contains recommendations which include but are not limited to the following:

- Site grading;
- Foundation Design;
- Pavement Structure;
- Sewer and Watermain Construction;
- Groundwater Control;
- Grade raises

In general, the grading plan for 5545 Albion Road adheres to the grade raise constraints noted above. A copy of the grading plan is included in **Appendix E**. The site does not pose any significant grade raise; thus, a grading plan review letter is not required for this development.

2 Water Supply

2.1 Existing Conditions

There are currently no existing municipal watermains in the area of the subject site. There is an existing well on site that is to be decommissioned.

2.2 Proposed Water Plan

A new well is proposed as designed by Paterson. The location is shown on the General Plan of Services C-001 included in **Appendix A**. The well does not provide fire flow for the subject site.

The proposed building falls into E category with a total building area of 335 m^2. According to latest water Technical Bulletin IWSTB-2024-05 for rural area, **Table J.1 - OBC Fire Flows**, the required fire flow for the convenience store can be capped at 1800 L/min since its building area is less than 600 m^2. Therefore, a dedicated water storage tank is not required for the site. Correspondence from Ottawa Fire Service Department is included in **Appendix B**.

3 Wastewater Disposal

3.1 Existing Conditions

There are currently no municipal sanitary sewers in the area of the subject site.

3.2 Proposed Sewers

A private septic sewage system has been proposed to service the convenience store and the coffee shop. The location of the sewage system is shown on the general plan of services.

A series of tanks are proposed outside of the proposed building, including grease interceptor tanks and equalization tank. Effluent from these tanks will then be pumped into BNA treatment train tanks in the septic field. For detail design of the sewage system, please refer to the Paterson drawings included in **Appendix C**.

4 Site Stormwater Management

4.1 Existing Conditions

The subject site consists of a gravel/asphalt parking area and will be redeveloped as per the proposed site plan included in **Appendix A**. The parcel currently has two outlets: a small area drains to Mitch Owens Road and the remaining area drains into the existing roadside ditch at Albion Road through a drainage feature. The areas of the two outlets are shown on the Pre-Development Storm Drainage Area Plan included in **Appendix D**.

The purpose of this evaluation is to prepare the dual drainage design, including the minor and major system, for the W.O. Stinson development at 5545 Albion Road. The design includes the assignment of an inlet control device, on-site storage, maximum depth of surface ponding. The evaluation takes into consideration the City of Ottawa Sewer Design Guidelines (OSDG) (October 2012), the February 2014 Technical Bulletin ISDTB-2014-01, the September 2016 Technical Bulletin PIEDTB-2016-01 and the June 2018 Technical Bulletin ISTB-2018-04.

4.2 Design Criteria

The stormwater system was designed following the principles of dual drainage, making accommodations for both major and minor flow.

Some of the key criteria include the following:

- Design Storm — 1:2 year return (Ottawa)
- Rational Method Sewer Sizing — 1:2 year return (Ottawa)
- Initial Time of Concentration — 10 minutes
- Runoff Coefficients
  - Landscaped Areas — C = 0.20
  - Asphalt/Concrete — C = 0.90
  - Roof — C = 0.90
- Pipe Velocities — 0.80 m/s to 3.0 m/s
- Minimum Pipe Size — 250 mm diameter (200 mm CB Leads)

4.3 System Concept

Where redeveloped areas are provided with a new storm sewer, the sewer has been sized to the 2-year storm design, per OSDG. The outlet of the redeveloped area is to the proposed linear dry pond located parallel to Albion Road property as shown on the General Plan of Services included in **Appendix A**. The dry pond has a highly permeable base to promote infiltration. A secondary, smaller, dry pond has been provided along Mitch Owens Road, which will act as stormwater quantity storage for the clean water from the gas bar and coffee shop roof areas. A highly permeable base has also been provided to promote infiltration.

4.3.1 Dual Drainage Design

The dual drainage system proposed for the subject site will accommodate both major and minor stormwater runoff. Minor flow from the subject site will be conveyed through the storm sewer network and discharge into the

design linear storm pond located in the northwest of the property along Albion Road and ultimately out-letting into the existing ditch through an inlet control device (ICD) at MH3.

The balance of the surface flow not captured by the minor system will be conveyed via the major system. Where possible, storage will be provided in surface sags or low points within the roadway. Once the maximum storage is utilized, the excess flow will cascade to the next downstream sag. Major flow up to 100-year storm events will be restricted and detained on-site. Emergency overflow will be directed toward the northwest portion of the 5545 Albion Road parcel, through the dry pond and ultimately to Albion Road.

4.3.2 Proposed Minor System

Using the criteria identified in Section 4.3, the proposed on-site storm sewers were sized accordingly. A detailed storm sewer design sheet and the associated storm sewer drainage area plan are included in **Appendix D**. The general plan of services, depicting all on-site storm sewers can be found in **Appendix A**.

4.4 Stormwater Management

As noted in the pre-consulting meeting notes, the subject site is within the Mosquito Creek Subwatershed, which at this location is included in the Shields Creek Subwatershed Study, June 2004, prepared by Totten Sims Hubicki. A copy of the stormwater requirements from the Shields Creek Subwatershed Study is included in **Appendix D**.

Refer to Drawing 501 in Appendix D for the pre-development drainage area plan**.**

The stormwater design criteria, as noted in the Shields Creek Subwatershed Study, to be used for the subject site is as follows:

- Control the 2-year post-development flow to 50% of the pre-development peak flow.
- Control the 5-year to 100-year post-development peak flow to match pre-development conditions.

Alternatively, the site must also meet the City of Ottawa's stormwater management criteria, which consist of:

- Application of the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.
- In separated areas, the pre-development runoff shall be the lower of the existing coefficient or a 'C' of 0.5 (SDG § 8.3.7.3).
- The time of concentration is not to be calculated using the Uplands approach
- A calculated time of concentration (cannot be less than 10 minutes).
- Flows to the storm sewer in excess of the 2-year storm release rate, up to and including the 100-year storm event, must be detained on site.
- Storm sewer outlets should not be submerged.
- Under the Sewer Design Guidelines, a ditch is under the definition of a sewer. Further, per section 3.2.1 of the Sewer Design Guidelines, the capacity of the downstream receiving systems must be assessed (also per section 3.2.2.2 and 5.1.2, and others).
- The quantity control criteria is that the 100-year post-development runoff rate shall not exceed the 2-year pre-development runoff rate (subject to subwatershed criteria).
- Quality control criteria 80% TSS removal (technologies' confirmation of passing the ETV protocol will be required for oil/grit separators, if proposed).

The more conservative (most restrictive) of the two criteria is used to control peak flows from the site.

The flow from the future development lands is included in the pond design. While they are currently intended to be vegetated, the stormwater management concept has considered these areas at a higher C value of 0.86 for future development. An interim swale is proposed to collect water from the future lands to the pond. The swale within the future development lands is lower than the ponding elevation, thus theoretically provides some storage based on the current plan. Considering future development is anticipated to infill this swale, its capacity is not considered in the stormwater management calculations.

4.4.1 Restricted Flow Rate

As previously noted, there are two existing outlets servicing the subject lands. Most of the site drains to the existing Albion Road roadside ditch, and the remainder of the site drains towards the existing Mitch Owens Road roadside ditch. Ultimately, both outlets discharge west to the Shield's Creek.

The restricted flow rates to each outlet can be determined as follows:

Albion Outlet

City of Ottawa criteria peak flow:

$\mathbf{Q_{restricted}}$ = **2.78** x **C** x $\mathbf{i_{2yr}}$ x **A** where:

C = Average runoff coefficient = 0.5

$\mathbf{i_{5yr}}$ = Intensity of 2-year storm event (mm/hr)

= $732.951 / (T_c + 6.053)^{0.814}$ = 66.65 mm/hr, where T_c = 13.1 minutes

A = 1.76 Ha

Therefore, the restricted release rate can be determined as:

$\mathbf{Q_{restricted}}$ = **2.78** x **C** x $\mathbf{i_{2yr}}$ x **A**

= 2.78 x 0.5 x 66.65 x 1.76

= 163.05 L/s

Criteria per Shield's Creek SWS:

$\mathbf{Q_{restricted}}$ = **0.79 x 2.78** x **C** x $\mathbf{i_{2yr}}$ x **A** where:

C = Average runoff coefficient = 0.79

$\mathbf{I_{5yr}}$ = Intensity of 2-year storm event (mm/hr)

= $732.951 / (T_c + 6.199)^{0.81}$ = 66.65 mm/hr, where T_c = 13.1 minutes

A = 1.76 Ha

$\mathbf{Q_{restricted}}$ = **50% x 2.78** x **C** x $\mathbf{i_{2yr}}$ x **A**

= 50% x 2.78 x 0.79 x 66.65 x 1.76

= **128.81 L/s**

From the above calculations, the actual calculated restricted peak flow of 128.81 L/s is considered more conservative and has been used as the restricted flow rate for areas of the subject site draining to the existing Albion Road roadside ditch.

Mitch Owens Outlet

City of Ottawa criteria peak flow:

$\mathbf{Q_{restricted}}$ = **2.78** x **C** x $\mathbf{i_{2yr}}$ x **A** where:

C = Average runoff coefficient = 0.5

$\mathbf{i_{5yr}}$ = Intensity of 2-year storm event (mm/hr)

= $732.951 / (T_c + 6.053)^{0.814}$ = 76.81 mm/hr, where T_c = 10 minutes

A = 0.34 Ha

Therefore, the restricted release rate can be determined as:

$\mathbf{Q_{restricted}}$ = **2.78** x **C** x $\mathbf{i_{2yr}}$ x **A**

= 2.78 x 0.5 x 76.81 x 0.34

= 36.30 L/s

Criteria per Shield's Creek SWS:

$\mathbf{Q_{restricted}}$ = **0.79 x 2.78** x **C** x $\mathbf{i_{2yr}}$ x **A** where:

C = Average runoff coefficient = 0.59

$\mathbf{I_{5yr}}$ = Intensity of 2-year storm event (mm/hr)

= $732.951 / (T_c + 6.199)^{0.81}$ = 76.81 mm/hr, where T_c = 10 minutes

A = 0.34 Ha

$\mathbf{Q_{restricted}}$ = **50% x 2.78** x **C** x $\mathbf{i_{2yr}}$ x **A**

= 50% x 2.78 x 0.59 x 76.81 x 0.34

= **21.42 L/s**

From the above calculations, the actual calculated restricted peak flow of 21.42 L/s is considered to be more conservative and has been used as the restricted flow rate for areas of the subject site draining to the existing Mitch Owens roadside ditch.

4.4.2 Uncontrolled Release

Albion Outlet

Based on a 1:100-year event, the flow from the 0.15 ha uncontrolled area (Drainage area UNC1 and UNC4) can be determined as:

$\mathbf{Q_{uncontrolled}}$ = **2.78** x **C** x $\mathbf{i_{100yr}}$ x **A** where:

C = Average runoff coefficient = 0.25 x 1.25 = 0.3125 (100-year C-value)

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

= 1735.688 x $(T_c + 6.014)^{0.820}$ =178.56 mm/hr; where T_c = 10 minutes

A = Uncontrolled Area = 0.15 Ha

Therefore, the uncontrolled release rate can be determined as:

$Q_{uncontrolled}$ = **2.78** x **C** x i_{100yr} x **A**

= 2.78 x 0.3125 x 178.56 x 0.15

= **23.27 L/s**

Mitch Owens Outlet

Based on a 1:100-year event, the flow from the 0.10 ha uncontrolled area can be determined as:

$Q_{uncontrolled}$ = **2.78** x **C** x i_{100yr} x **A** where:

C = Average runoff coefficient = 0.41 x 1.25 = 0.5125 (100-year C-value)

i_{100yr} = Intensity of 100-year storm event (mm/hr)

= 1735.688 x $(T_c + 6.014)^{0.820}$ =178.56 mm/hr; where T_c = 10 minutes

A = Uncontrolled Area = 0.10 Ha

Therefore, the uncontrolled release rate can be determined as:

$Q_{uncontrolled}$ = **2.78** x **C** x i_{100yr} x **A**

= 2.78 x 0.5125 x 178.56 x 0.10

= **25.31 L/s**

4.4.3 Maximum Allowable Release Rate

The Maximum allowable release rate for the outlet to Albion Road can be determined by subtracting the Uncontrolled release rate from the minor system restricted flow rate. Total unrestricted flow from the entire site can be calculated as 23.27 L/s + 25.31 L/s = 48.58 L/s. Total allowable rate from the site can be determined as 128.81 L/s + 21.42 L/s = 150.23 L/s. Therefore,

$Q_{max\ allowable}$ = $Q_{restricted}$ – $Q_{uncontrolled}$

= 150.23 L/s – 48.58 L/s

= **101.65 L/s**

There are two ICD proposed for the site. First ICD of 85 L/s rate will be installed on the outlet structure MH3 of Pond 2. The other ICD of 15 L/s will be installed on the outlet structure CB3 of Pond 1. Hence, the total release rate from the entire site is 85 L/s + 15 L/s = 100 L/s, which is less than the total maximum allowable rate of 101.65 L/s. Surface flows in excess of the site's allowable release rate will be stored on site in strategic surface storage areas, and gradually released into the minor system to respect the site's allowable release rate. The maximum static surface retention depth located within the redeveloped areas is limited to 300mm as shown on the **Ponding Plan** located in **Appendix D**. Overland flow routes will be provided in the grading to permit emergency overland flow. The administration building entrance is provided with a minimum of 300mm freeboard from adjacent ponding areas.

4.4.4 Water Quality Control

The Albion Road outlet to the existing drainage feature requires an enhanced water quality control level. This will be attained by a proposed Oil and Grit Separator providing an 80% TSS removal. Refer to **Appendix D** for OGS details and OGS sizing report.

The Mitch Owens outlet consists of entirely roof areas and vegetated area that drains to the proposed pond and does not require water treatment.

4.4.5 2 Year Ponding

A review of the 2-year ponding has been completed using the modified rational method. A summary of the drainage area has been provided below.

Table 4-1 Summary for 2-Year Ponding

Drainage Area	Total 2-Year Event Volume (m3)	COMMENT
North (Albion)	103.25	This area is controlled at MH3, downstream of Pond 2. The 2-year ponding is entirely contained within the linear dry pond at elevation 102.97m. This is below all CB inlet elevations on site, therefore there will be no surface ponding within roads or parking lots on a 2-year event.
South (Mitch Owens)	2.32	This area is controlled at CB3, downstream of Pond 1. The 2-year ponding is entirely contained within the linear dry pond at elevation 102.83m. This is below all CB inlet elevations on site, therefore there will be no surface ponding within roads or parking lots on a 2-year event.

Based on the above, there will be no surface ponding in the 2-year event.

4.4.6 100 year Ponding

A review of the 100-year ponding has been completed using the modified rational method. A summary of the drainage area has been provided below. The total ICD restricted flow is 100.00 L/s, which is less than the total allowable rate of 101.65 L/s.

Table 4-2 Summary for 100-Year Ponding

Drainage Area	ICD Restricted Flow (L/s)	100-Year Storage Required (m3)	Surface Storage Provided (m3)
North (Albion)	85.00	524.95	695.90
South (Mitch Owens)	15.00	20.38	23.14
Total	**100.00**	**545.33**	**719.04**

4.4.7 100 year + 20% Stress Test

A cursory review of the 100-year event + 20% has been performed using the modified rational method. The Peak flow from each area during a 100-year event has been increased by 20%. The calculations have been included in **Appendix D.**

A summary of the required storage volumes, and overflow balances is provided below.

Table 4-3 Summary for 100-Year+20% Ponding

Drainage Area	ICD Restricted Flow (L/s)	100YR+20% Storage Required (m3)	Surface Storage Provided (m3)	100YR+20% Overflow (m3)
North (Albion)	85.00	670.74	695.90	0
South (Mitch Owens)	15.00	27.34	23.14	4.20
Total	**100.00**	**698.08**	**719.04**	**4.20**

The stress test overflow from the North will be entirely contained within the linear dry pond along Albion Road. Flow exceeding 100-year + 20% will overflow through an emergency spillway to Albion.

The stress test overflow from the South will follow the intended overflow route as identified in the included grading design drawings. The volume of overflow is 4.20m3. Based on the Tc of 16 minutes, this volume can be reverse calculated to 4.37 L/s of overflow.

An open-channel flow calculation has been used to demonstrate the depth of overflow during a stress test event using the aforementioned 4.37 L/s of overflow. The depth is calculated at 0.002 m.

Calculations have been provided in **Appendix D**.

4.4.8 Downstream Ditch Capacity

A review of existing ditch capacity has been performed. Several ditch sections have been surveyed and evaluated to determine the available capacity, including one section upstream of the connection location, and three sections downstream of the site. Please refer to External Drainage Area Plan C-502 for locations of the sections, and areas that contribute to the sections.

Based on a 1:100-year event, the flow from the 27.69 ha natural areas upstream of the subject site to Ditch Section 1 can be determined as:

$\mathbf{Q_{section\ 1}}$ = **2.78** x **C** x $\mathbf{i_{100yr}}$ x **A** where:

C = Average runoff coefficient = 0.20 x 1.25 = 0.25 (100-year C-value)

$\mathbf{i_{100yr}}$ = Intensity of 100-year storm event (mm/hr)

= $1735.688 \times (T_c + 6.014)^{0.820}$ =12.42 mm/hr, where T_c = 407.22 minutes (Tc calculated per Uplands Method with an average slope of 0.5%)

A = Uncontrolled Area = 27.69 Ha

Therefore, 100 year flow to Section 1 can be determined as:

$\mathbf{Q_{section\ 1}}$ = **2.78** x **C** x $\mathbf{i_{100yr}}$ x **A**

= 2.78 x 0.25 x 12.42 x 27.69

= **239.05 L/s**

Flow to Ditch Section 2 will include the flow from Section 1 and the restricted flow from the subject site (85.00 L/s to Albion outlet) and the unrestricted flow from the site to Albion (23.27 L/s). Therefore, the total flow to Section 2 can be calculated as 239.05 + 85.00 + 23.27 = **347.32** L/s.

Using similar method, 100 year flow to Ditch Section 3 and 4 can be determined to be 890.70 L/s and 1330.21 L/s respectively. Detailed calculations are included in **Appendix D**.

Table 4-4 Summary of Ditch Capacity for 100-Year Flow

Ditch Section	100-Year Flow from the Tributary Area (L/s)	Capacity of the Existing Ditch (L/s)
Section 1	239.05	3273.78
Section 2	347.32	3868.71
Section 3	890.70	3982.74
Section 4	1330.21	2317.45

In conclusion, the existing ditch has sufficient capacity for the tributary areas. The flow from the subject site is restricted to 50% of the 2-year pre-development peak flow, thus there will be no negative effect to the downstream drainage system.

5 Source Controls

5.1 General

On site level or source control management of runoff will be provided to provide quality control for the subject lands. Such controls or mitigative measures are proposed for the development not only for final development but also during construction and build out. Some of these measures are:

- flat lot grading;
- vegetation planting; and
- infiltration galleries for groundwater recharge.

5.2 Grading

In accordance with local municipal standards, the parking lots will be graded northeast between 0.5% and 5.0%. Most landscaped area drainage will be directed into a swale drainage system and connects to the storm sewer system. Typically, swales will have slopes larger than 1.5% with subdrains. Copies of the grading plans have been included in **Appendix E.**

5.3 Vegetation

A landscape plan was required and prepared in support of the proposed development requiring site plan control approval. Proposed vegetation provides opportunity to re-create lost natural habitat.

5.4 Low Impact Development

An infiltration opportunity is provided downstream of the OGS unit at the linear dry pond areas as shown in the Servicing Plan. However, as stated in the report completed by Paterson, PH3645-REP.02 dated January 31, 2025, due to the shallow groundwater elevation, the infiltration targets cannot be met.

There will be an opportunity to provide groundwater infiltration during dry conditions. A 64.6m length, 4.0m width by 0.5m depth clear stone trench has been provided below the invert of the linear dry pond area. Using 30% for voids, the cells can provide 38.75m3 of potential infiltration storage. During dry conditions, the infiltration cell will have the capacity to retain a rainfall event of 2mm.

Other methods of achieving LID targets are not practical due to the nature of the development, given that pretreatment of water is required through the use of an OGS unit.

A separate infiltration gallery has been provided for the clean water collected from the building gutters. The gallery measured 83.7m^2 area by 0.33m in height. Using 30% voids, the cells can provide 8.3m3 of potential infiltration storage. During dry conditions, the infiltration cell will have the capacity to retain a rainfall event of 5mm.

6 Conveyance Controls

6.1 Generals

During construction, existing stream and conveyance systems can be exposed to significant sediment loadings. Although construction is only a temporary situation, it is proposed to introduce a number of mitigative construction techniques to reduce unnecessary construction sediment loadings. These will include:

- groundwater in trench will be pumped into a filter mechanism prior to release to the environment;
- bulkhead barriers will be installed at the nearest downstream manhole in each sewer which connects to an existing downstream sewer;
- seepage barriers will be constructed in any temporary drainage ditches; and
- silt sacks will remain on open surface structure such as manholes and catch basins until these structures are commissioned and put into use.
- Silt fencing shall be installed around all long-term stockpile locations to prevent erosion to the surrounding areas.

6.2 Trench Dewatering

During construction of municipal services, any trench dewatering using pumps will be discharged into a filter trap made up of geotextile filters and straw bales similar in design to the OPSD 219.240 Dewatering Trap. These will be constructed in a bowl shape with the fabric forming the bottom and the straw bales forming the sides. Any pumped groundwater will be filtered prior to release to the existing surface runoff. The contractor will inspect and maintain the filters as needed including sediment removal and disposal and material replacement as needed.

6.3 Bulkhead Barriers

At the first manhole constructed immediately upstream of an existing sewer, a ½ diameter bulkhead will be constructed over the lower half of the outletting sewer. This bulkhead will trap any sediment carrying flows, thus preventing any construction–related contamination of existing sewers. The bulkheads will be inspected and maintained including periodic sediment removal as needed.

6.4 Seepage Barriers

These barriers will consist of both the Light Duty Straw Bale Barrier as per OPSD 219.100 or the Light Duty Silt Fence Barrier as per OPSD 219.110 and will be installed in accordance with the sediment and erosion control drawing. The barriers are typically made of layers of straw bales or geotextile fabric staked in place. All seepage barriers will be inspected and maintained as needed.

6.5 Surface Structure Filters

All catch basins, and to a lesser degree manholes, convey surface water to sewers. However, until the surrounding surface has been completed these structures will be covered to prevent sediment from entering the minor storm sewer system. Until rear yards are sodded or until streets are asphalted and curbed, all catch basins and manholes will be equipped with geotextile filter socks. These will stay in place and be maintained during construction and build until it is appropriate to remove them.

7 Roads

Vehicular access to the redevelopment area is provided by two private unsignalized entrances. One is from Albion Road opposite to the existing entrance to McEwen's gas station. The other vehicular access is from Mitch Owens Road.

A sidewalk connection is proposed to the intersection of Albion and Mitch Owens.

There are no bus routes proposed within the redevelopment area.

Pre-consult notes from the City of Ottawa specify that a noise study is unnecessary.

8 Recommendations

8.1 City of Ottawa

The City of Ottawa reviews all development documents, including this report and working drawings. Upon completion, the City will submit the sewer ECA application to the province, and eventually issue a Commence Work Notification.

8.2 Province of Ontario

The Ministry of Environment, Conservation and Parks (MECP) Environmental Compliance Approval is required for the subject development.

8.3 Conservation Authority

Since alteration to the watercourse are no longer required, a permit is not required from the Conservation Authority. The CA should be circulated to provide their input on the site's stormwater management proposals.

8.4 Federal Government

There are no federal permits, authorizations or approvals needed for this development.

9 Conclusion

This report and the accompanying working drawings indicate that the proposed development meets the requirements of the stakeholder regulators, including the City of Ottawa, provincial MECP and RVCA.

It is recommended that the regulators review this submission with the aim of providing the requisite approvals to permit the owners to proceed to the construction stage of the subject site.

Report prepared by:

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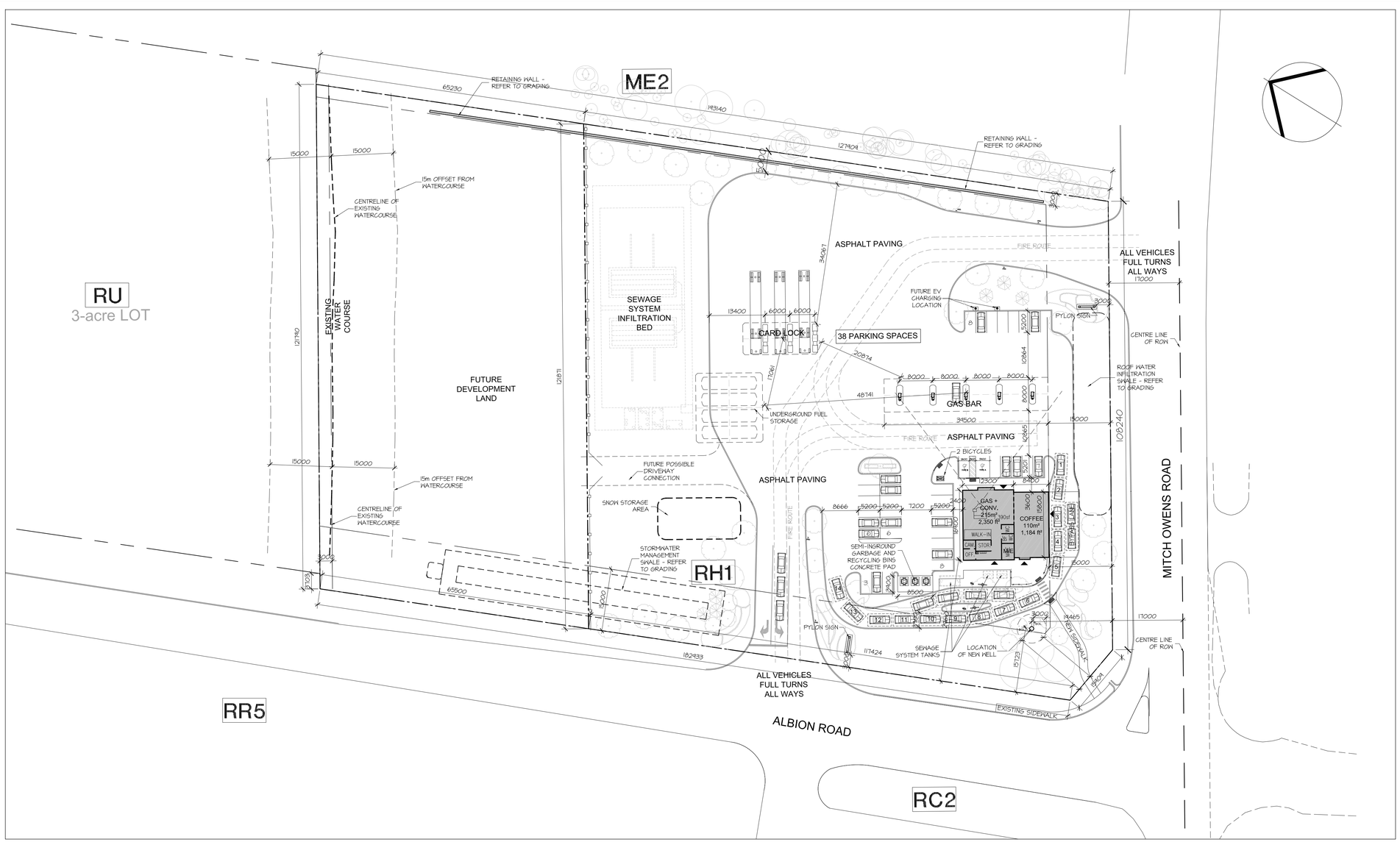
Appendix A

Site Plan

Site Servicing Plan 143219-C-001

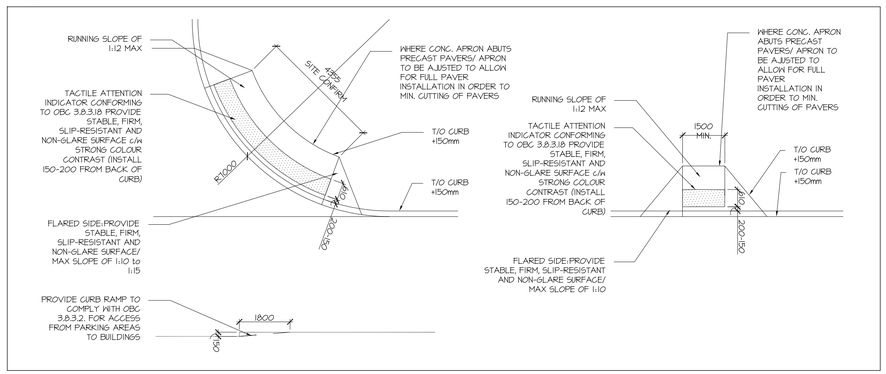
City of Ottawa Pre-Consultation Meeting Notes

City of Ottawa Servicing Checklist



1 SITE PLAN
A1.00

SCALE: 1:500



2 TYPICAL TWSI DETAIL
A1.00

SCALE: 1:100

2024.11.27
1813_Site Plan_Gas Station.dwg

Owner
W. O. STINSON & SON LTD.
4728 Bank Street, Ottawa, ON K1T 3W7
Attn: Keith Oster - 613 241-1781

Architect/Agent
HOBIN ARCHITECTURE INC.
63 Pamilla Street, Ottawa, ON, K1S 3K7
Attn: Doug van den Ham - 613-238-1200 x 115

Survey
STANTEC GEOMATICS LTD.
100-600 Terry Fox Drive, Kanata, Ontario K2L 4B6
Attn: D. S. McMorran - 613-541-2580

ARCADIS
Suite 500, 333 Preston St, Ottawa, ON, K1S 5N4
Attn: Anton Ghetrar P.Eng - 613 225 1311 ext 64012

Structural
NOT YET CONTRACTED

Electrical
MASCS INC.
Attn: David MacNaughtan - 613-713-4734

Landscape
LEVSTEK AND ASSOCAITES
5811 High Cres Ottawa ON K0A 2W0
Attn: Rudy Levstek - 613-826-0518

Traffic
PARSONS ENGINEERS
1223 Michael St., Suite 100, Ottawa, ON K1J 7T2
Attn: Jake Berube - 613-854-1097

LEGAL DESCRIPTION:

PART OF LOT 30, CONCESSION 4 (RIDEAU FRONT)
GEOGRAPHIC TOWNSHIP OF GLOUCESTER
CITY OF OTTAWA

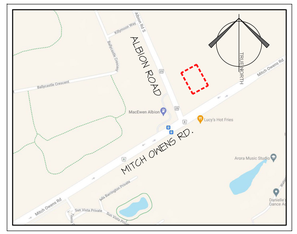
CIVIL ADDRESS:

5545 ALBION ROAD, OTTAWA

ZONING NOTES:

OFFICIAL PLAN DESIGNATION: RURAL COUNTRYSIDE
ZONING - RH1

ZONE: RH1	REQUIRED/ PERMITTED	PROVIDED
PERMITTED USE (AMONG OTHERS)	ALL LAND USES PROPOSED, INCLUDING OTHER HEAVY INDUSTRIAL TYPE USEs	GAS BAR DRIVE-THROUGH FACILITY
CONDITIONAL USES PERMITTED:	ALL LAND USED PROPOSED	CONVENIENCE STORE, RESTAURANT
MIN. LOT AREA	20,000 sq.m.	23,200sq.m.
MIN. LOT WIDTH	60m	120m
MIN. FRONT YARD SETBACK	15 m	15 m PROVIDED
MIN. INTERIOR SIDE YARD SETBACK (i) ABUTTING INDUSTRIAL ZONE (ii) OTHER	 3m 10m	 3m 10m
MIN. CORNER SIDE YARD SETBACK	15m	29m PROVIDED
MAX. PRINCIPAL BUILDING HEIGHT	15m	8m
MAX. LOT COVERAGE (%)	50%	8%
PARKING SPACES Civil	CONVENIENCE STORE 3.4 / 100m2 GFA = 6 GAS BAR = NONE RESTAURANT FAST FOOD PER 101(6)(b)(i) 20% reduction applies when operating with a drive-through 10 / 100m2 GFA = 25 = 20 TOTAL = 26	38
BICYCLE PARKING	Per 111(1): None	2 PROVIDED



LEGEND:

B.F. PARKING STALL c/w BF. SIGNAGE	3400, 5950
DEPRESSED CURB c/w TWSI	
150mm DIA., 6mm THK, GALV. STEEL BOLLARD (MIN. 1.5m HIGH & 1.5m BELOW GRADE)	*BOL
HEAVY DUTY ASPHALT	
PAINTED LINE STOP BAR	
ROLLED CONCRETE CURB	RC
SITE SIGNAGE	
PAINTED LINES	
BIKE RACK	
EXTERIOR LIGHTING/ REFER TO ELEC. DWGS. FOR TYPES	
CHAIN LINK FENCE	
FIRE ROUTE SIGNAGE	FRS
EXISTING TREE* *REFER TO LANDSCAPE L101 FOR DETAILS	
NEW TREE*	
NEW PLANTING*	

no.	date	revision
5	JAN 23, 2024	ISSUED FOR SITEPLAN APPLICATION
4	DEC 3, 2024	ISSUED FOR SITEPLAN APPLICATION
3	NOV 1, 2024	ISSUED FOR PRE CONSULTATION
2	OCT 9, 2024	ISSUED FOR REVIEW
1	OCT 3, 2024	ISSUED FOR REVIEW

It is the responsibility of the appropriate contractor to check and verify all dimensions on site and report all errors and/or omissions to the architect.

All contractors must comply with all pertinent codes and by-laws.

Do not scale drawings.

This drawing may not be used for construction until signed.

ONTARIO ASSOCIATION OF ARCHITECTS
LARRY J. HOBIN
LICENCE
3049

Hobin Architecture Incorporated
63 Pamilla Street
Ottawa, Ontario
Canada K1S 3K7
T: 613-238-7200
F: 613-235-2005
E: mail@hobinarc.com
hobinarc.com
HOBIN ARCHITECTURE

PROJECT/LOCATION:
W.O. Stinson & Son Ltd.
Albion Road Property
5545 Albion Road

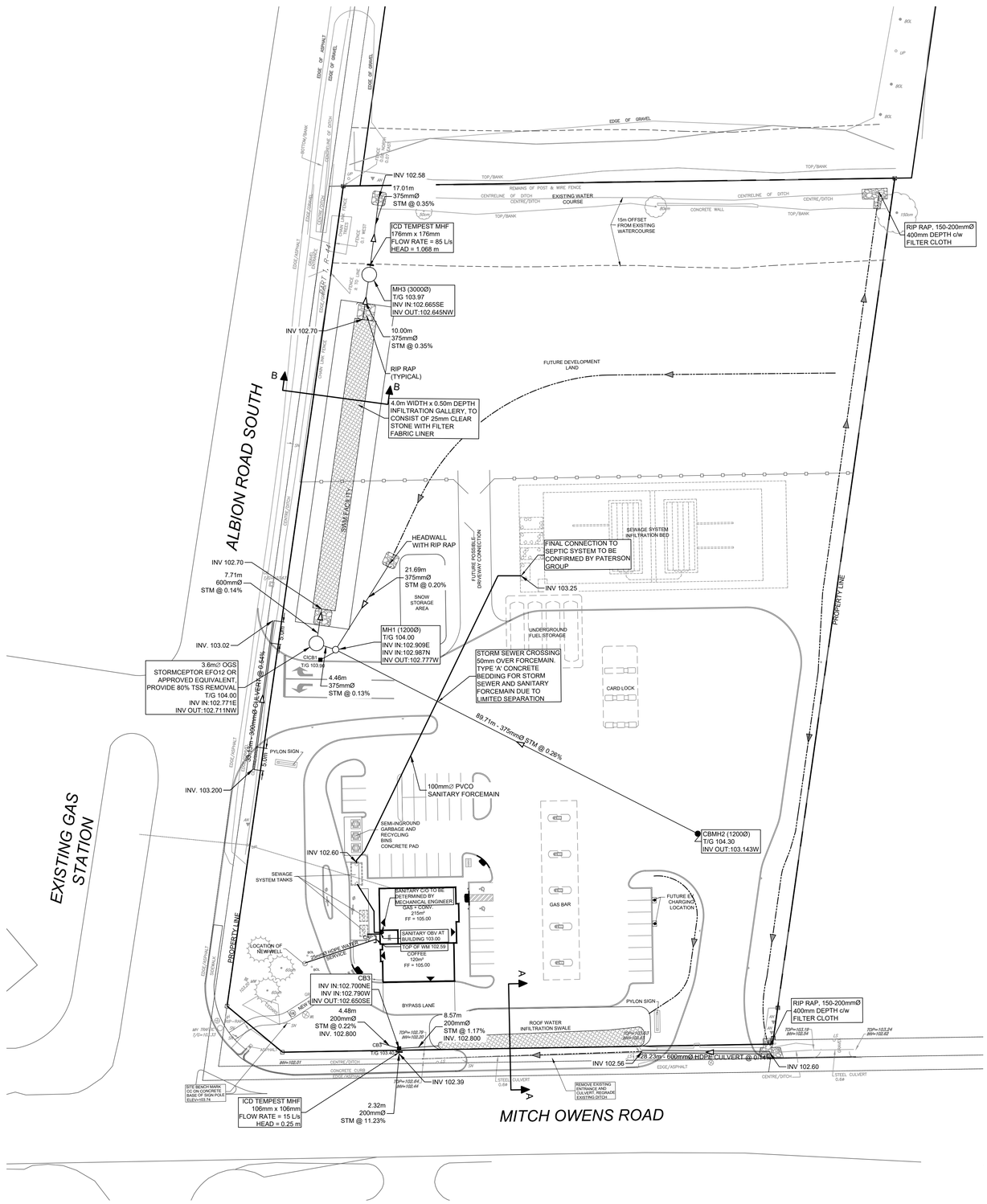
DRAWING TITLE:
GAS BAR AND CARDLOCK CONVENIENCE STORE SITE PLAN

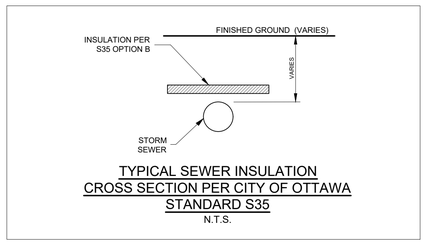
DRAWN BY:	DATE:	SCALE:
DV / MF	SEPT. 2023	AS NOTED

PROJECT: 1813

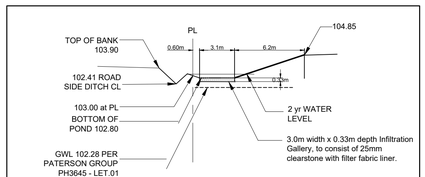
DRAWING NO.: A1.00

REVISION NO.:

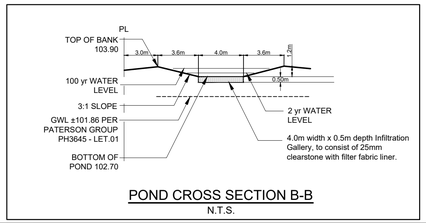




TYPICAL SEWER INSULATION
CROSS SECTION PER CITY OF OTTAWA
STANDARD S35
N.T.S.



POND CROSS SECTION A-A
N.T.S.



POND CROSS SECTION B-B
N.T.S.

CLIENT

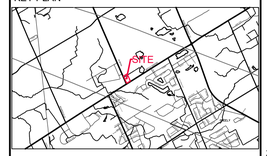
W.O. STINSON & SON LTD.

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2023-11-24
2	SUBMISSION NO.2 FOR CITY REVIEW	2024-03-20
3	ADDED TANK SECTIONS	2024-07-25
4	REVISED PER NEW SITE PLAN	2025-02-03
5		
6		
7		
8		

SEE 010 FOR NOTES, LEGEND, CB TABLE AND DETAILS

KEY PLAN



1:500 0 5 15 25m

SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2025/02/03
PROVINCE OF ONTARIO

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT
W.O. STINSON

ALBION & MITCH OWENS

PROJECT NO: 143219

DRAWN BY:	CHECKED BY:
D.D. / M.M.	R.M./D.G.Y.
PROJECT MGR:	APPROVED BY:
R.M.	D.G.Y.

SHEET TITLE
GENERAL PLAN OF SERVICES

SHEET NUMBER C-001 | ISSUE 4

SCALE CHECK 1 in

XXXXX 10mm

PC2024-0353

File Location: J:\143219_WO_Stinson\7.0_Production\7.03_Design\04_Civil\Sheets\001 GENERAL PLAN OF SERVICES.dwg Last Saved: February 3, 2025, by hennine6066 Plotted: February 3, 2025 7:37:57 AM by Henrie, Eric

Pre-Application Consultation Meeting Notes

Property Address: 5545 Albion Road
PC2021-0333 Meeting #2
Microsoft Teams Meeting October 26th, 2022

Attendees:

Jeffrey Ostafichuk, City of Ottawa, File Lead
Mike Giampa, City of Ottawa, Senior Engineer Infrastructure Applications
Matthew Hayley, City of Ottawa, Planner II - Environmental
Damien Whittaker, City of Ottawa, Senior Engineer Infrastructure Applications
Tessa Di Iorio, City of Ottawa, Risk Management Official
Adam Brown, City of Ottawa, Manager – Development Review Rural
Travis Smith, City of Ottawa, Engineering Intern
Jasdeep Brar, City of Ottawa, Planning Student
Jamie Batchelor, Rideau Valley Conservation Authority

Barrett Wagar
Scott Stinson
Reinhard Vogel
John Pyke
John Armstrong
Jake Berube
Keith Oster
Michael Killam
Terry Brule
Alex Zeller

Regrets:
Doug Van Den Ham

Subject: 5545 Albion Road

Meeting notes:

Opening & attendee introduction

- A request to consider a revised proposal for the Stinson lands at the corner of Albion Road and Mitch Owens Drive
- Revised plan is only looking at the south parcel, zoned RH1. It considers a single building to the south, to service fleet vehicles

- The gas bar, restaurant and car lot are removed.
- The access on Albion Road will be the only access, aligning with the access across the street
- The septic is reduced in size to under 10000 litres per day
- Planning to proceed with the submission of a site plan application before the end of the year

Preliminary comments and questions from staff and agencies, including follow-up actions:

- **Planning Comments** – *provided by Jeffrey Ostafichuk*
  - 5545 Albion Road is zoned Rural Heavy Industrial subzone 1 (RH1). The proposed uses are permitted on this property so no rezoning will be required.
  - Under the current Official Plan, the property is designated a General Rural Area.
  - Under the newly adopted Official Plan, the subject site is designated Rural Countryside. Policy 9.2.2.2. permits "Small scale light industrial and commercial uses" subject to a Zoning By-law amendment.
  - A **Planning Rationale** will be required to demonstrate how the proposed use meets the intent of both the current and newly adopted Official Plans, the Zoning By-law, and the Provincial Policy Statement.
  - A **Site Plan** will be required and must illustrate property boundaries, the watercourse, dimensions of all structures and their setbacks from the property lines, the location of the well and septic, snow storage areas, parking and queuing spaces, drive aisles, the fire route, and stormwater management areas. If you choose to proceed with a phased approach, please be sure to clearly identify which site features will be constructed in each phase.

- **Transportation Comments** – *provided by Mike Giampa*
  - A full TIA is not required. A noise study is not required.
  - A summary/memo of the site generated trips is required. Their impact on the southbound/eastbound left-turn lane queues should be reviewed.
  - Truck turning movements should be reviewed internally and externally to the site.
  - The access location should not conflict with the southbound left-turn lane.
  - Right of way protection on Mitch Owens is 34m.
  - Right of way protection on Albion Road is 30m.

- **Engineering Comments** – *provided by Christine Reist, revised by Travis Smith*
  - Water Servicing
    - There are no existing municipal watermains in the direct area. A **Hydrogeological Report and Terrain Analysis** is required to demonstrate that any existing or proposed well proposed to service the new development is capable of providing satisfactory quality and quantity of groundwater. Refer to Hydrological Assessment and Terrain Analysis Section.
    - The parameters to review are the "subdivision suite (known to local hydrogeological consultants and testing laboratories), trace metals and VOCs
    - Information held by the City notes that the groundwater supply in the vicinity of the subject site may be variable in yield.
    - Bollards, or other means of preventing vehicle access, will need to be provided between areas with vehicle access and the existing or proposed well(s).
    - It is the responsibility of the owner to ensure that adequate water supply for fire-fighting is provided. The FUS methodology, as opposed to the OBC methodology shall be applied. Enhanced review will be invoked should the construction coefficient chosen be less than 1. Please note that the FUS is

the requirement and that the FUS was revised this year (but back-dated to 2020).

- Sanitary Servicing
  - There are no existing municipal sanitary sewers in the direct area. A sewage disposal system (septic system) design will be required, including investigation of the greatest groundwater elevation and percolation test results. It is noted that the surficial geology varies and there is potential for sensitive marine clays which have a low infiltration rate and may impact the septic system design.
  - Bollards, or other means of preventing vehicle access, will need to be provided between areas with vehicle access and the existing and proposed septic system(s).
  - There is a watercourse along the northern edge of 5545 Albion Rd, which isn't shown on the preliminary **Site Plan** provided. The **Grade Control and Drainage Plan** must demonstrate that the applicable clearance distances for septic systems are met as per OBC and Zoning By-law section 69.
  - Based on the discussion in the revised pre-consultation meeting, the project is expected to have a site-wide sanitary daily flow of 10,000 L/d or less.
    - As the expected daily design flow is 10,000 L/d or less, the septic permit from the Ottawa Septic System Office must be issued prior to Site Plan Approval being granted.
    - For Information Only: If the daily design flow is greater than 10,000 L/d, the septic system(s) is regulated by the Ministry of the Environment, Conservation and Parks (MECP) and requires a direct submission Environmental Compliance Approval (ECA) application. It is recommended that that City be present for the applicant's consultations with the MECP. The project would be on hold until the ECA is obtained from the MECP. The turnaround time for an ECA from the MECP can be up to one year. Additionally, a Groundwater Impact Assessment will be required if the site-wide daily design flow is greater than 10,000 L/d. Refer to Septic Impact Assessment section.

- Storm Sewers and Stormwater Management:
  - There are no municipal storm sewers in the ROW. It will need to be demonstrated that there is legal and sufficient stormwater outlet from the site. 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.
  - Stormwater management quality criteria shall be set by Rideau Valley Conservation Authority (RVCA) and is to be 80% TSS removal.
  - The Ottawa Sewer Design Guidelines (SDG) stormwater management quantity criteria for the development is that the 100-year post-development stormwater runoff must be controlled to the 2-year pre-development runoff as per section 8.3.7.3 of the SDG. As per SDG 8.3.7.3, the pre-development condition is to be determined using the smaller of a runoff coefficient of 0.5 (0.4 in combined areas) or the actual existing site runoff coefficient.
  - Snow storage shall be shown on the **Site Plan & Grading and Drainage Plan**
  - The site is within the Mosquito Creek Subwatershed which at this location is included in the Shields Creek Subwatershed Study, June 2004, prepared by Totten Sims Hubicki. The **Stormwater Management Report** must address

the applicable requirements of the Shields Creek Subwatershed Study. Here are a few of the items to be addressed:
    - Stormwater Design Criteria – Section 4.6.1 (p.4-18, sheet 38)
    - Low-capacity Issues – Section 4.7 (p. 4-26, sheet 46)
    - Water Quality – Section 6.3.4.6 (p. 6-15, sheet 116)
    - Infiltration Target Plan – Section 6.3.4.7 (p.6-16, sheet 117) & Figure 5.5.1 (sheet 213)
- Note that due to the Albion Sun Vista Wellhead Protection Area, the design of the proposed infiltration systems will need to minimize the groundwater contamination risk that some infiltration systems may pose in the event of a spill. For example, risks could be minimized by directing only clean runoff (like runoff from the roof of a building) to infiltration systems and locating any subsurface infiltration systems upgradient of any potential sources of contamination.
- As noted in the revised pre-consultation meeting, the infiltration targets and Wellhead Protection Area concerns are separate and infiltration targets must still be met.
- Where the Shields Creek Subwatershed Study and the SDG have different criteria, the more stringent criteria should be applied.
- The revised Site Plan submitted currently is showing limited stormwater management areas. Space will be required for stormwater management systems. The drainage swale shown should be part of a series of measures supported by the stormwater management design,
- A direct submission ECA application to the MECP will be required for any proposed stormwater systems since this is an industrial-use site. Should the stormwater systems serve both properties, the ECA and stormwater systems should be designed for both properties. The turnaround time for an ECA from the MECP can be up to one year.
- An oil/grit separator is required and will need to be included in the MECP ECA application. Oil/grit separators require Environmental Technology Verification (ETV) protocol for ECA approval.
- Low Impact Development (LID) to be implemented as per the bulletin from the former MOECC (now MECP) titled Expectations RE: Stormwater Management released in February 2015. Note that the City has released a document titled ‘Low Impact Development Technical Guidance Report – Implementation in Areas with Potential Hydrogeological Constraints’ which provides guidance for LID design for sites which have constraints.
- LID and SWM design will need to be designed based on the sensitive groundwater features present and will need to demonstrate no concerns with the water quality entering the infiltration facilities. It is recommended that runoff have one or more pre-treatment device(s) prior to entering the infiltration facility. Pre-treatment options to be considered at a minimum:
    - Oil/grit separators,
    - Directing clean roof runoff directly to an infiltration facility,
    - Sand filters,
    - Vegetated filter strips, or
    - Grassed swales

- <u>Geotechnical:</u>
    - Please note that it is anticipated that the surficial geology varies in the vicinity of the subject site and may include organic deposits and sensitive marine

clays. As per section 4.8.3 of the Official Plan, organic soils and sensitive marine clays can be unstable soils. As per Official Plan section 4.8.3, policy 2, development involving storage of hazardous substances isn't permitted in areas with unstable soils. Based on the definition of hazardous substances provided in the Provincial Policy Statement, 2020, fuel and other substances associated with vehicle maintenance and repair facilities would be considered hazardous substances. The **Geotechnical Investigation Report** will need to demonstrate that there are no unstable soils in the areas proposed for uses described in Official Plan section 4.8.3, policy 2. Refer to Official Plan section 4.8.3 for additional requirements for development in areas with unstable soils.

- If the presence of sensitive marine clays is confirmed, enhanced geotechnical investigation and analysis will be necessary. Investigation of clays should be undertaken with vane shear, Atterberg limits, shrinkage, size, grade raise restriction, consolidation, sensitivity, and liquefaction analysis- amongst others. Note that there are considerations for trees in proximity to foundations in sensitive marine clays. In sensitive marine clays, trees in proximity to foundations can cause foundation damage.
- The **Geotechnical Investigation Report** will need to include rationalization for the pavement design, including vehicle numbers and loading specific to the proposed uses.

- <u>Environmental Site Assessment:</u>
  - An enhanced **Phase 1 Environmental Site Assessment** (ESA) completed in accordance with Ontario Regulation (O.Reg.) 153.04 is required.
  - A Phase 2 ESA may be required, depending on the outcome of the Phase 1 ESA.

- <u>Fuel Storage:</u>
  - The City's Historic Land Use Inventory shows records of above ground and underground fuel storage tanks at 5545 Albion. Any existing tanks must be decommissioned as per TSSA requirements.

- <u>Roads:</u>
  - Please refer to the City of Ottawa Private Approach By-Law 2003-447 for requirements for the entrance design. As per By-Law 2003-447, entrances have a minimum offset from lot lines, and their extensions.
  - Fire routes are to be designated by By-law for Fire Services to establish them as a legal fire route. An 'Application for a Fire Route Designation' form will need to be completed and submitted to the City to add the fire route to the By-law. The form must be filled out by the applicant/agent of the property as well as the property owner. This form will be provided after the application is received or can be provided in advance upon request.
  - The Official Plan of the City of Ottawa requires a Right-of-way Protection width of 17 metres from the centerline of Mitch Owens Road and 18.75 metres from the centerline of Albion Road based on the recommendations of the Official Plan Schedule C16. The Right-of-way protection width is taken where the existing ROW is somewhat less than the street design standard.

- <u>Snow Storage:</u>
  - Any portion of the subject property which is intended to be used for permanent or temporary snow storage shall be as shown on the approved

Site Plan and **Lot Grading and Drainage Plan**. Snow storage shall not interfere with approved grading and drainage patterns or servicing. Snow storage areas shall be setback from the property lines, foundations, fencing or landscaping a minimum of 1.5m. Snow storage areas shall not occupy driveways, aisles, required parking spaces, or any portion of a road allowance nor be adjacent to any well or septic areas.

- Exterior Site Lighting:
  - Any exterior lighting proposed for the site requires certification by a qualified Professional Engineer confirming the design complies with the following criteria:
    - Lighting must be designed using only fixtures that meet the criteria for Full- Cut-Off (Sharp cut-off) Classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES).
    - It must result in minimal light spillage onto adjacent properties. As a guide, 0.5 foot-candle is normally the maximum allowable spillage.
    - The location of the fixtures, fixture types (make, model, and part number), and the mounting heights must be provided.

- Mineral Aggregate Resources:
  - There is a licensed Pit adjacent to the east side of both properties. There is also another Pit within 300m to the north of 5505 Albion.
  - As per policy 10 of Official Plan section 3.7.4, new development won't be approved within 300 metres of a Sand and Gravel Resource Area, unless it can be demonstrated that such development will not conflict with future mineral aggregate extraction. The development described in this pre-consultation application wouldn't be considered to conflict with future mineral aggregate extraction, and therefore there are no associated submission requirements. This comment is included for information purposes to note that if there are changes to the development proposal in the future, it will need to be re-evaluated to determine if a Mineral Resource Impact Assessment would be required. Refer to Official Plan section 3.7.4 for additional information.

- **Environmental Comments**– *provided by Matthew Hayley*
  - An Environmental Impact Statement (EIS) is required due to significant woodlands being within 120 metres and the presence of a mapper watercourse in the Shields Creek Sub watershed Study.
  - The RVCA will provide input on this aspect and the final setback to the watercourse will need to be identified on the site plan. The watercourse needs to be assessed as per the Sub watershed Study and the Rideau Valley Conservation Authority requirements. This watercourse should be kept open and according to the Sub watershed Study can be moved provided the function of the watercourse is kept.

- **Hydrogeology Comments** – *provided by Tessa Di Iorio*

  Wellhead Protection – Albion Sun Vista Communal Well system:

  - The proposed development site is located within the wellhead capture zone for the Albion Sun Vista private communal wells; Albion Sun Vista is an adult lifestyle (retirement) community with 278 residential lots total between 2 development

phases. Note that the City has an MRA for the drinking water system; it is understood that Wellhead Protection report was requested by the City prior to signing the MRA. The report was prepared based on City of Ottawa Terms of Reference and MECP Guidelines (2002).

- The Albion Sun Vista Wellhead Protection Area Plan was prepared for by Trow Associates Inc. (June 2004) and peer reviewed by Jacques Whitford Environmental Ltd. (June 2004).
- The communal supply wells are located downgradient from the subject site, on the south side of Mitch Owens Road. As identified in the Trow/JW Report, the communal wells obtain drinking water from the shallow bedrock aquifer which is hydraulically connected to the sand/gravel/till unit in the recharge area. The development site is located within the recharge area for the communal wells, more specifically within the 10-year (primarily) and 25-year capture zones.
- The Wellhead Protection Area Plan provides clear recommendations to protect the drinking water supply aquifer.
    - Recommendation #1 (page 32): “Protection measures should include limiting the land use in the recharge are to those deemed least risky”. (specifically, within the 10-year capture zone)
        - Note that the proposed use is considered ‘risky’ in terms of chemical storage and handling (DNAPLs), fuel storage and handling (storage tanks and/or truck storage), and other potential contaminants (sewage disposal, truck wash wastewater, stormwater, salt and snow, etc.).
        - The area of the new proposal appears to be located almost entirely within the 10-year capture zone.
        - It is noted that risky uses would be better suited outside the capture zone; the proposed activity of storing and servicing heavy vehicles (which store/transport fuel) is not an appropriate use within the capture zone of a communal well system.

It is understood that the site is zoned heavy industrial, however development should only move forward if the communal water supply can be protected in the long-term and the risk is deemed acceptable. Potential threats to the drinking water supply can be mitigated through clear risk management measures, following the recommendations in the Trow / JW Report and best management practices AND monitoring in perpetuity with well-defined contingency plans. Monitoring requirements must be captured under an Environmental Compliance Approval, ECA (instrument issued by the MECP) or a planning tool that includes the regular review of monitoring results and review of ongoing risk management measures to verify risk management in perpetuity.

- A hydrogeological report must be prepared to define the site specific geological and hydrogeological conditions, which must include a discussion of how the site conditions relate to the conceptual model presented in the Trow/JW Report (i.e. the extent and distribution of the sand, clay and organic deposits); this will help define the vulnerability of the supply aquifer. The report must also identify all potential contamination threats (drinking water threats) onsite and mitigation measures to be implemented.
- The proposed development must adhere to all Wellhead Protection Area Plan recommendations listed in the final report (report dated June 2004 – refer to report for exact wording); this includes (briefly):

    - Protection measures for development within the sand and gravel unit that acts as the recharge area for the contact aquifer: such as best management practices, spills prevention plan, spills response plan, staff training, etc.
    - Installation and sealing of any new well casing be undertaken under the supervision of a licensed P.Geo or P.Eng.; this should also include any installation below grade that can cause a transport pathway to the sand and gravel unit.
    - All underground storage tanks must be equipped with interstitial monitoring systems and the tanks and associated piping should have leak detection systems in place (if applicable).
- The report must include an adaptive environmental monitoring program, with a focus on groundwater monitoring related to potential contaminants of concern as an additional protection and early detection measure.
    - The monitoring program must be captured under an ECA and the issuing body (MECP) must agree to reviewing results in perpetuity; the City will also be copied on all monitoring reports, MECP comments and any proposed changes to the monitoring program. Alternatively, another planning tool can be considered which includes review and oversight of long-term monitoring and risk management measures.
    - Recommend locations for the installation of sentinel wells to support the adaptive monitoring program.
    - Monitoring program should outline the parameters to be monitored, the frequency of monitoring and reporting and clear contingency measures if contamination is detected.
- It is noted that MECP industrial approvals may also include monitoring and a contingency requirements. It is recommended that the City be included in discussions with the MECP related to approvals to ensure consistency.

Hydrogeological Assessment and Terrain Analysis:

- A hydrogeological and terrain analysis report will be required to support the well supply assessment and septic impact assessment, and must meet the requirements and standards outlined in the City's Hydrogeological and Terrain Analysis Guidelines (March 2021). https://documents.ottawa.ca/sites/documents/files/hydrogeo_terrain_analysis_guide_en.pdf

- Onsite Supply Well Assessment:
    - It is understood that the current supply well onsite was installed in 1970 (based on MECP well records). If the existing well will be used to supply the new development, a camera inspection will be required to confirm the integrity of the casing, as well as a well sounding to confirm the integrity of the annular seal and grout. The well must also meet current standards in Ontario Regulation 903 (Wells Regulation). If the well casing or seal/grout is deemed insufficient, then the well should be decommissioned as per the Wells Regulation and a new well installed (adhering to supervision recommendations in the Wellhead Protection Area Plan).
    - The supply well must be established, and a water quantity assessment (pump test) and water quality testing must be conducted. The pump test rate must be justified and meet the demands of the proposed (final)

development. Water quality assessment must show that water quality meets Ontario Drinking Water Standards, Objectives and Guidelines. Water quantity test much include metals, petroleum hydrocarbons, VOCs, BTEX, and any additional parameters associated with past onsite activities.
    - The Hydrogeological report should include an assessment of impact to support how the well will be protected from contamination and damage in the long term; the Phase 2 ESA should be referenced to confirm any existing contamination, mitigation and potential risk to the onsite supply well.

- Septic Impact Assessment:
    - If septic flows are greater than 10,000 L/day (or if ECA is needed for the industrial use??), then an ECA will be required for the septic system. The original proposal included a phased approach for the septic installation, the approach should be discussed with the MECP and City staff should be included in future discussions. It is noted that the septic impact assessment should consider the final septic design and flows.
    - If the septic flow is less than 10,000 L/day (or if no ECA is needed for the septic), then a terrain analysis and septic impact assessment would be required as per MECP Procedure D-5-4 and City Guidelines (see MECP Procedure D-5-4 Section 5.6.3 Predictive Assessment – Industrial/Commercial Development). However, overall septic dilution targets are different if an ECA is required (i.e. 2.5 mg/L or 10 mg/L nitrate in at downgradient property boundary) and the general assessment methodologies are different. The septic impact assessment approach should be discussed and agreed at technical consultation.

- Water budget and infiltration targets and groundwater protection:
    - Note that the site is located within the Shield's Creek Subwatershed Study area, which defines infiltration targets and includes recommendations related to groundwater protection (see section 6.3.4.7). The hydrogeological and terrain analysis report should include a water budget and provide a discussion and support on how the infiltration targets can be met (with clean infiltration only).

- Any existing septic system and fuel tanks onsite from former uses must be removed as per applicable standards and regulations (note the Trow/JW Report identifies that the former use on 5545 Albion Road included 3 USTs; two for diesel fuel and one for gasoline). Confirmation should be provided that all work has been conducted in accordance with standards and requirements in applicable regulations and guidelines (i.e. OBC, TSSA, etc.).

- The developer's consultant can contact me directly if there are any questions about wellhead protection requirements or the hydrogeological study and septic impact assessment requirements. (tessa.diiorio@ottawa.ca)

- **City Surveyor**
    - The determination of property boundaries, minimum setbacks and other regulatory constraints are a critical component of development. An Ontario Land Surveyor (O.L.S.) needs to be consulted at the outset of a project to ensure properties are properly defined and can be used as the geospatial framework for the development.

- Topographic details may also be required for a project and should be either carried out by the O.L.S. that has provided the Legal Survey or done in consultation with the O.L.S. to ensure that the project is integrated to the appropriate control network.

Questions regarding the above requirements can be directed to the City's Surveyor, Bill Harper, at Bill.Harper@ottawa.ca

- **Rideau Valley Conservation Authority Comments** – *provided by Jamie Bachelor*
  - Natural Heritage
    - The proposal relies on the entombment of a portion of a watercourse. A proper Headwater Drainage Features Assessment will need to be submitted to determine whether the proposed entombment can move forward. IBI Group has already reached out to RVCA's Biologist regarding the required information. If the HDFA does not support the entombment of the watercourse, than setbacks in accordance with the Official Plan would apply (30 metres, etc.).
  - Stormwater Management
    - In accordance with our MOA with the City, the RVCA will review the stormwater management plan. The water quality target is 80% TSS removal. The stormwater management plan should be in accordance with the Shields Creek Subwatershed Study and should clearly demonstrate how the hydration of the watercourses are being maintained and how the hydrologic cycle of the site is being maintained through a water budget. There was some discussion regarding LIDs, specifically as it related to infiltration and some of the competing concerns (infiltration vs source water protection). We would like to point out that there are other ways to achieve LIDs other than relying on only infiltration. Other methods which account for evapotranspiration, etc. should also be taken into consideration.

Submission requirements and fees

- A complete list of required studies and plans accompanies this document.
- Additional information regarding fees related to planning applications can be found here.
- Plans are to be standard A1 size (594 mm x 841 mm) or Arch D size (609.6 mm x 914.4 mm) sheets, dimensioned in metric and utilizing an appropriate Metric scale (1:200, 1:250, 1:300, 1:400 or 1:500).
- All PDF submitted documents are to be unlocked and flattened.

Next steps

- We encourage the applicant to discuss the proposal with Councillor, community groups and neighbours
- It is anticipated that, as a result of the *More Homes for Everyone Act, 2022*, for applications for site plan approval and zoning by-law amendments, new processes in respect of pre-application consultation will be in place as of January 1, 2023. The new processes are anticipated to require a multiple phase pre-application consultation approach before an application will be deemed complete. Applicants who have not filed a complete application by the effective date may be required to undertake further pre-application consultation(s) consistent with the provincial changes. The by-laws to be amended include By-law 2009-320, the Pre-Consultation By-law, By-law 2022-239, the planning fees by-law and By-law 2022-254, the Information and Materials for Planning Application By-law. The revisions are

anticipated to be before Council in the period after the new Council takes office and the end of the year.

Servicing study guidelines for development applications

4. Development Servicing Study Checklist

The following section describes the checklist of the required content of servicing studies. It is expected that the proponent will address each one of the following items for the study to be deemed complete and ready for review by City of Ottawa Infrastructure Approvals staff.

The level of required detail in the Servicing Study will increase depending on the type of application. For example, for Official Plan amendments and re-zoning applications, the main issues will be to determine the capacity requirements for the proposed change in land use and confirm this against the existing capacity constraint, and to define the solutions, phasing of works and the financing of works to address the capacity constraint. For subdivisions and site plans, the above will be required with additional detailed information supporting the servicing within the development boundary.

4.1 General Content

- ☐ Executive Summary (for larger reports only).
- ☒ Date and revision number of the report.
- ☒ Location map and plan showing municipal address, boundary, and layout of proposed development.
- ☒ Plan showing the site and location of all existing services.
- ☒ Development statistics, land use, density, adherence to zoning and official plan, and reference to applicable subwatershed and watershed plans that provide context to which individual developments must adhere.
- ☒ Summary of Pre-consultation Meetings with City and other approval agencies.
- ☐ Reference and confirm conformance to higher level studies and reports (Master Servicing Studies, Environmental Assessments, Community Design Plans), or in the case where it is not in conformance, the proponent must provide justification and develop a defendable design criteria.
- ☒ Statement of objectives and servicing criteria.
- ☒ Identification of existing and proposed infrastructure available in the immediate area.
- ☒ Identification of Environmentally Significant Areas, watercourses and Municipal Drains potentially impacted by the proposed development (Reference can be made to the Natural Heritage Studies, if available).
- ☒ Concept level master grading plan to confirm existing and proposed grades in the development. This is required to confirm the feasibility of proposed stormwater management and drainage, soil removal and fill constraints, and potential impacts to neighbouring properties. This is also required to confirm that the proposed grading will not impede existing major system flow paths.
- ☒ Identification of potential impacts of proposed piped services on private services (such as wells and septic fields on adjacent lands) and mitigation required to address potential impacts.
- ☐ Proposed phasing of the development, if applicable.

☒ Reference to geotechnical studies and recommendations concerning servicing.

☒ All preliminary and formal site plan submissions should have the following information:
- Metric scale
- North arrow (including construction North)
- Key plan
- Name and contact information of applicant and property owner
- Property limits including bearings and dimensions
- Existing and proposed structures and parking areas
- Easements, road widening and rights-of-way
- Adjacent street names

4.2 Development Servicing Report: Water

☐ Confirm consistency with Master Servicing Study, if available
☐ Availability of public infrastructure to service proposed development
☐ Identification of system constraints
☐ Identify boundary conditions
☐ Confirmation of adequate domestic supply and pressure
☐ Confirmation of adequate fire flow protection and confirmation that fire flow is calculated as per the Fire Underwriter's Survey. Output should show available fire flow at locations throughout the development.
☐ Provide a check of high pressures. If pressure is found to be high, an assessment is required to confirm the application of pressure reducing valves.
☐ Definition of phasing constraints. Hydraulic modeling is required to confirm servicing for all defined phases of the project including the ultimate design
☐ Address reliability requirements such as appropriate location of shut-off valves
☐ Check on the necessity of a pressure zone boundary modification.
☐ Reference to water supply analysis to show that major infrastructure is capable of delivering sufficient water for the proposed land use. This includes data that shows that the expected demands under average day, peak hour and fire flow conditions provide water within the required pressure range

- ☐ Description of the proposed water distribution network, including locations of proposed connections to the existing system, provisions for necessary looping, and appurtenances (valves, pressure reducing valves, valve chambers, and fire hydrants) including special metering provisions.
- ☐ Description of off-site required feedermains, booster pumping stations, and other water infrastructure that will be ultimately required to service proposed development, including financing, interim facilities, and timing of implementation.
- ☒ Confirmation that water demands are calculated based on the City of Ottawa Design Guidelines.
- ☐ Provision of a model schematic showing the boundary conditions locations, streets, parcels, and building locations for reference.

4.3 Development Servicing Report: Wastewater

- ☐ Summary of proposed design criteria (Note: Wet-weather flow criteria should not deviate from the City of Ottawa Sewer Design Guidelines. Monitored flow data from relatively new infrastructure cannot be used to justify capacity requirements for proposed infrastructure).
- ☐ Confirm consistency with Master Servicing Study and/or justifications for deviations.
- ☐ Consideration of local conditions that may contribute to extraneous flows that are higher than the recommended flows in the guidelines. This includes groundwater and soil conditions, and age and condition of sewers.
- ☐ Description of existing sanitary sewer available for discharge of wastewater from proposed development.
- ☐ Verify available capacity in downstream sanitary sewer and/or identification of upgrades necessary to service the proposed development. (Reference can be made to previously completed Master Servicing Study if applicable)
- ☐ Calculations related to dry-weather and wet-weather flow rates from the development in standard MOE sanitary sewer design table (Appendix ‘C’) format.
- ☐ Description of proposed sewer network including sewers, pumping stations, and forcemains.
- ☐ Discussion of previously identified environmental constraints and impact on servicing (environmental constraints are related to limitations imposed on the development in order to preserve the physical condition of watercourses, vegetation, soil cover, as well as protecting against water quantity and quality).
- ☐ Pumping stations: impacts of proposed development on existing pumping stations or requirements for new pumping station to service development.
- ☐ Forcemain capacity in terms of operational redundancy, surge pressure and maximum flow velocity.
- ☐ Identification and implementation of the emergency overflow from sanitary pumping stations in relation to the hydraulic grade line to protect against basement flooding.
- ☐ Special considerations such as contamination, corrosive environment etc.

4.4 Development Servicing Report: Stormwater Checklist

- ☒ Description of drainage outlets and downstream constraints including legality of outlets (i.e. municipal drain, right-of-way, watercourse, or private property)
- ☐ Analysis of available capacity in existing public infrastructure.
- ☒ A drawing showing the subject lands, its surroundings, the receiving watercourse, existing drainage patterns, and proposed drainage pattern.
- ☒ Water quantity control objective (e.g. controlling post-development peak flows to pre-development level for storm events ranging from the 2 or 5 year event (dependent on the receiving sewer design) to 100 year return period); if other objectives are being applied, a rationale must be included with reference to hydrologic analyses of the potentially affected subwatersheds, taking into account long-term cumulative effects.
- ☒ Water Quality control objective (basic, normal or enhanced level of protection based on the sensitivities of the receiving watercourse) and storage requirements.
- ☒ Description of the stormwater management concept with facility locations and descriptions with references and supporting information.
- ☒ Set-back from private sewage disposal systems.
- ☒ Watercourse and hazard lands setbacks.
- ☐ Record of pre-consultation with the Ontario Ministry of Environment and the Conservation Authority that has jurisdiction on the affected watershed.
- ☒ Confirm consistency with sub-watershed and Master Servicing Study, if applicable study exists.
- ☒ Storage requirements (complete with calculations) and conveyance capacity for minor events (1:5 year return period) and major events (1:100 year return period).
- ☒ Identification of watercourses within the proposed development and how watercourses will be protected, or, if necessary, altered by the proposed development with applicable approvals.
- ☒ Calculate pre and post development peak flow rates including a description of existing site conditions and proposed impervious areas and drainage catchments in comparison to existing conditions.
- ☒ Any proposed diversion of drainage catchment areas from one outlet to another.
- ☒ Proposed minor and major systems including locations and sizes of stormwater trunk sewers, and stormwater management facilities.
- ☐ If quantity control is not proposed, demonstration that downstream system has adequate capacity for the post-development flows up to and including the 100 year return period storm event.
- ☒ Identification of potential impacts to receiving watercourses
- ☐ Identification of municipal drains and related approval requirements.
- ☒ Descriptions of how the conveyance and storage capacity will be achieved for the development.
- ☒ 100 year flood levels and major flow routing to protect proposed development from flooding for establishing minimum building elevations (MBE) and overall grading.

- ☐ Inclusion of hydraulic analysis including hydraulic grade line elevations.
- ☐ Description of approach to erosion and sediment control during construction for the protection of receiving watercourse or drainage corridors.
- ☐ Identification of floodplains – proponent to obtain relevant floodplain information from the appropriate Conservation Authority. The proponent may be required to delineate floodplain elevations to the satisfaction of the Conservation Authority if such information is not available or if information does not match current conditions.
- ☐ Identification of fill constraints related to floodplain and geotechnical investigation.

4.5 Approval and Permit Requirements: Checklist

The Servicing Study shall provide a list of applicable permits and regulatory approvals necessary for the proposed development as well as the relevant issues affecting each approval. The approval and permitting shall include but not be limited to the following:

- ☐ Conservation Authority as the designated approval agency for modification of floodplain, potential impact on fish habitat, proposed works in or adjacent to a watercourse, cut/fill permits and Approval under Lakes and Rivers Improvement Act. The Conservation Authority is not the approval authority for the Lakes and Rivers Improvement Act. Where there are Conservation Authority regulations in place, approval under the Lakes and Rivers Improvement Act is not required, except in cases of dams as defined in the Act.
- ☐ Application for Certificate of Approval (CofA) under the Ontario Water Resources Act.
- ☐ Changes to Municipal Drains.
- ☐ Other permits (National Capital Commission, Parks Canada, Public Works and Government Services Canada, Ministry of Transportation etc.)

4.6 Conclusion Checklist

- ☒ Clearly stated conclusions and recommendations
- ☒ Comments received from review agencies including the City of Ottawa and information on how the comments were addressed. Final sign-off from the responsible reviewing agency.
- ☒ All draft and final reports shall be signed and stamped by a professional Engineer registered in Ontario

Appendix B

Email Response Regarding Fire Flow Requirements

Outlook

RE: W.O. Stinson Site Plan - Fire Flow Requirements

From Evans, Allan <Allan.Evans@ottawa.ca>
Date Tue 12/10/2024 2:31 PM
To Zhuang, Amy <amy.zhuang@arcadis.com>
Cc Magladry, Ryan <ryan.magladry@arcadis.com>; Whittaker, Damien <Damien.Whittaker@ottawa.ca>

Hi Amy – based upon the proposed size of the building and occupancy type, OFS agrees that on site water storage is not required.

Final approval lies with Building Code Services.

Allan Evans

Fire Protection Engineer / Ingénieur de Protection d'Incendies
Prevention Division / Prévention des Incendies
Ottawa Fire Services / Service des Incendies d'Ottawa
1445 Carling Avenue / 1445 Avenue Carling
Ottawa, ON K1Z 7L9
Allan.Evans@Ottawa.ca
☎ (613) 913-2747 | ☎ (613) 580-2424 x24119 | 🖷 (613) 580-2866 | ✉ Mail Code: 25-102 | @OFSFPE

From: Zhuang, Amy <amy.zhuang@arcadis.com>
Sent: December 10, 2024 1:37 PM
To: Evans, Allan <Allan.Evans@ottawa.ca>
Cc: Magladry, Ryan <ryan.magladry@arcadis.com>; Whittaker, Damien <Damien.Whittaker@ottawa.ca>
Subject: W.O. Stinson Site Plan - Fire Flow Requirements

Hi Allan,

Since our last submission, Stinson has modified its site plan application for 5545 Albion Road. The old concept of a service wash bay and truck parking has been abandoned, and the new concept includes a gas station, with typical gas bar, convenience store and coffee shop. A separate card lock fuelling station is also included in the new concept. The building falls into E category with a total building area of 335 m2. According to latest water Technical Bulletin IWSTB-2024-05 for rural area, **Table J.1 - OBC Fire Flows**, the required fire flow for the convenience store can be capped at 1800 L/min since its building area is less than 600m2. Based on our understanding, dedicated water storage tanks are not required.

We are reaching out to confirm if there is any additional requirement regarding the fire fighting for the site. Latest site plan is attached for your information. Thanks!

J4.0 MINIMUM WATER SUPPLY FLOW RATE

The minimum water supply flow rate is based on the required fire flow and is provided in **Table J.1**.

Table J.1 – OBC Fire Flows

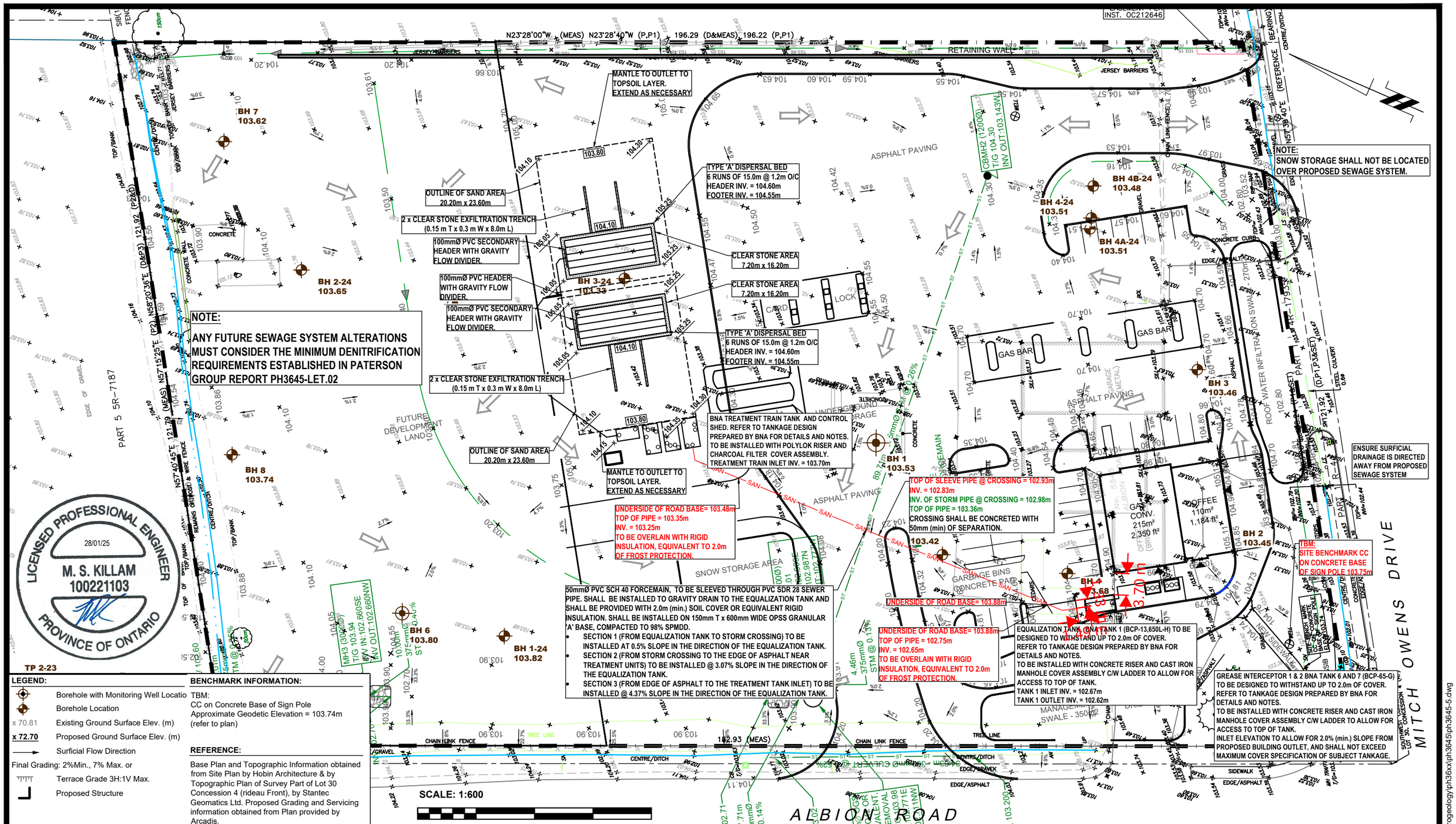
Part 3 Building under the Building Code	Required Minimum Water Supply Flow Rate, L/min
One-storey building with building area not exceeding 600 m^2	1800
All other buildings	2700 (if Q ≤ 108000 L) 3600 (if Q > 108000 L and ≤ 135000 L) 4500 (if Q > 135000 L and ≤ 162000 L) 5400 (if Q > 162000 L and ≤ 190000 L) 6300 (if Q > 190000 L and ≤ 270000 L) 9000 (if Q > 270000 L)

Regards,
Amy Zhuang (she/her/hers) P.ENG.
Civil Engineer
Suite 500, 333 Preston Street | Ottawa | ON | K1S 5N4 | Canada
T: +1 613 225 1311 ext 64080
www.arcadis.com

From: Evans, Allan <Allan.Evans@ottawa.ca>
Sent: Wednesday, July 26, 2023 12:33 PM
To: Anton Chetrar <anton.chetrar@ibigroup.com>
Cc: Ryan Magladry <rmagladry@ibigroup.com>; Whittaker, Damien <Damien.Whittaker@ottawa.ca>
Subject: RE: W.O. Stinson Site Plan

Appendix C

Septic Design (Paterson)



LICENSED PROFESSIONAL ENGINEER
M. S. KILLAM
100221103
28/01/25
PROVINCE OF ONTARIO

LEGEND:

- Borehole with Monitoring Well Locatio
- Borehole Location
- x 70.81 Existing Ground Surface Elev. (m)
- **x 72.70** Proposed Ground Surface Elev. (m)
- Surficial Flow Direction
- Final Grading: 2%Min., 7% Max. or
- Terrace Grade 3H:1V Max.
- Proposed Structure

BENCHMARK INFORMATION:

TBM:
CC on Concrete Base of Sign Pole
Approximate Geodetic Elevation = 103.74m
(refer to plan)

REFERENCE:

Base Plan and Topographic Information obtained from Site Plan by Hobin Architecture & by Topographic Plan of Survey Part of Lot 30 Concession 4 (rideau Front), by Stantec Geomatics Ltd. Proposed Grading and Servicing information obtained from Plan provided by Arcadis.

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

DD/MM/YY	Description	Rev.
28/01/25	Issued with Revised Site Plan	0

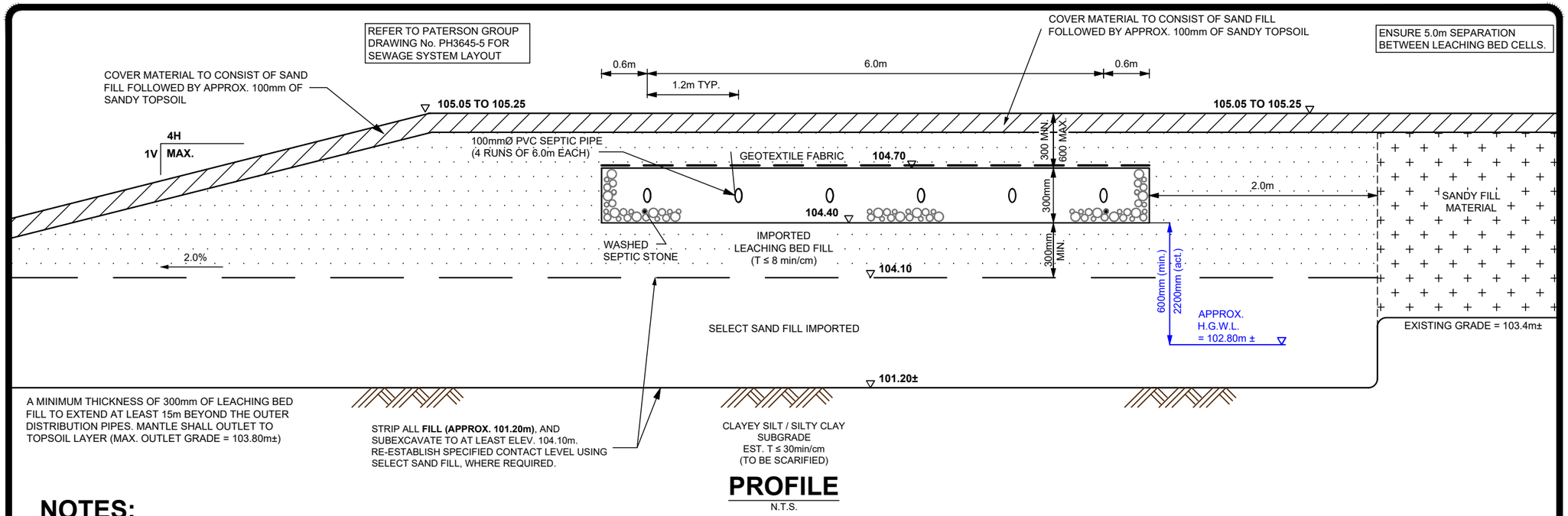
Client
W.O. STINSON & SON LTD.

Project
PROPOSED COMMERCIAL BUILDING
5545 ALBION ROAD
OTTAWA (GREELY), ONTARIO

Drawing
SEWAGE SYSTEM LAYOUT PLAN

Scale: 1:600	Drawn by: HV
Date: 01/2025	Checked by: MK
Drawing no.: PH3645-5	

p:\autocad drawings\hydrogeology\ph36xx\ph3645\ph3645-5.dwg



PROFILE

N.T.S.

NOTES:

1) ESTIMATE OF DAILY SEWAGE FLOW (Q)

TOTAL DESIGN DAILY SANITARY SEWAGE FLOW (T.D.D.S.S.F.) HAS BEEN CALCULATED IN ACCORDANCE WITH OBC TABLE 8.2.1.3.B. AND WITH TIM HORTON'S SEWAGE SYSTEM DESIGN GUIDELINES.

- GAS BAR @ 560 L/DAY PER NOZZLES: 10 NOZZLES = 5,600 L/DAY
- CARD-LOCK FUEL SERVICE: 8L/USE x 50 USES PER DAY = 400 L/DAY
- CONVENIENCE STORE @ 1230 L/DAY / WATER CLOSET: 1 WATER CLOSET = 1,230 L/DAY
- TIM HORTONS DRIVE THROUGH: 190 L / 9.25 m²: (110 m²/9.25) x 190 L/DAY = 2,259 L/DAY & 75 L/DAY PER EMPLOYEE PER 8 HOUR SHIFT: 6 x 8 HOUR SHIFTS = 450 L/DAY
- ESTIMATED SEWAGE FLOW = 9,939 L/DAY

DESIGN DAILY SEWAGE FLOW = 10,000 L/DAY

2) SOIL CONDITIONS

SOILS INFORMATION GATHERED BY PATERSON GROUP INC. ON APRIL 11, 2024, REFER TO PATERSON GROUP REPORT No. PH3645-1Rev.01.

BH 1-24, ELEV. 103.82m		BH 2-24, ELEV. 103.65m		BH 3-24, ELEV. 103.33m	
0-0.56	FILL: SISA, w STONE & GR.	0-0.15	TOPSOIL GRAVEL & COBBLES	0-2.13	FILL: SISA, w STONE & GR.
0.56-0.94	TOPSOIL, tr. ORGANICS	0.15-0.61	FILL:SISA, w STONE & GR.	2.13-4.11	SILTLY CLAY TO CLAYEY SILT
0.94-2.97	Br. SISA, Grey @ 2.3m	0.61-2.21	COMPACT Br. SILTY SAND	BH TERMINATED @ 7.52m	
BH TERMINATED @ 9.75m		BH TERMINATED @ 8.23m			
- G.W.L. @ 1.39m DEPTH (102.43m)		- G.W.L. @ 0.86m DEPTH (102.79m)		GREYING @ 2.13m DEPTH (101.20m)	

3) PRE-TREATMENT TANKAGE

- TANKAGE DESIGN HAS BEEN COMPLETED BY OTHERS (BNA)
- ANY PRETREATMENT TANKAGE THAT EXCEEDS STANDARD MAXIMUM MANUFACTURER SPECIFIED COVER SHALL BE REVIEWED BY A STRUCTURAL ENGINEER.

4) TREATMENT TANKAGE

- TANKAGE DESIGN HAS BEEN COMPLETED BY OTHERS (BNA).
- ANY TREATMENT TANKAGE THAT EXCEEDS STANDARD MAXIMUM MANUFACTURER SPECIFIED COVER SHALL BE REVIEWED BY A STRUCTURAL ENGINEER.

5) FORCEMAIN/PUMP CHAMBER

- A 50mmØ (NOMINAL) PVC SCH40 FORCEMAIN SHALL BE USED TO CARRY THE EFFLUENT FROM THE TREATMENT UNIT TO THE PRESSURIZED FLOW DIVIDER.
- FORCEMAINS TO BE PROVIDED WITH 2.0m (min.) OF SOIL COVER (OR EQUIVALENT INSULATION) AND SHALL GRAVITY DRAIN.
- FORCEMAINS SHALL BE SLEEVED THROUGH A 100mm (min.) SDR 28 PVC GASKETED PIPE UNDER ROADWAY.
- FORCEMAINS SHALL BE INSTALLED ON A 150mm THICK LAYER OF OPSS GRANULAR 'A' COMPACTED TO 98% SPMDD.

6) LEACHING BED

- THE DISPOSAL FIELD SHALL CONSIST OF 2 x TYPE 'A' DISPERSAL BED COMPRISED OF 6 RUNS OF 15.0m EACH RUN @ 1.2m O/C SPACING OF 100mmØ PVC PERFORATED SEPTIC PIPE.
- CLEAR STONE AREA REQUIRED = Q/50 = 10,000/50 = 200.0m²
- CLEAR STONE AREA PROVIDED = 2 x (7.2m x 16.20m) = 2 x 116.64 = 233.3m²
- SAND AREA REQUIRED = QT/400 = 10,000(30)/400 = 750m²
- SAND AREA PROVIDED = 2 x (20.2m x 23.63.5m) = 2 x 529.2m² = 1,058.4m²
- REMOVE ALL EXISTING **TOPSOIL**, AND FILL **(APPROX. 101.2m±)** WITHIN THE LIMITS OF THE SAND AREA AND SUBEXCAVATE TO AT LEAST ELEVATION 104.10m, WHICHEVER IS GREATER.
- THE MINIMUM SPECIFIED CONTACT ELEVATION OF 104.10m SHALL BE ESTABLISHED WITH SELECT SAND FILL.
- THE SUBGRADE SHALL BE SCARIFIED UNDER DRY CONDITIONS.
- THE SPECIFIED TOP OF THE SAND LAYER (ELEV. 104.40m), BELOW THE CLEAR STONE DISTRIBUTION AREA, SHOULD BE ESTABLISHED WITH IMPORTED SAND FILL, HAVING A PERCOLATION RATE OF NOT GREATER THAN 8 min/cm (300mm THICKNESS MINIMUM).
- LEACHING BED SAND FILL SHALL BE 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. LEACHING BED FILL SHALL BE PRE- APPROVED BY THE CONSULTANT.
- THE SAND AREA OUTSIDE OF THE LIMITS OF THE DISTRIBUTION AREA SHALL CONSIST OF A MINIMUM THICKNESS OF 300mm OF UNIFORM SAND HAVING A PERCOLATION RATE OF NOT GREATER THAN 8 min/cm. MATCH EXISTING GRADE WITH ADDITIONAL LEACHING BED SAND FILL.
- THE DISTRIBUTION PIPES SHOULD CONSIST OF 100mmØ PERFORATED SEPTIC PIPE WHICH SHALL BE EMBEDDED IN A 300mm THICK LAYER OF WASHED SEPTIC STONE.
- THE INVERT LEVEL OF THE DISTRIBUTION PIPES SHALL BE SET AT ELEVATION 104.60m AT THE HEADER AND SET AT ELEVATION 104.55m AT THE FOOTER.
- THE ENDS OF EACH RUN SHALL BE INTERCONNECTED WITH A FOOTER PIPE.
- THE MAIN CLEAR STONE LAYER SHALL BE COVERED WITH AN APPROVED GEOTEXTILE FABRIC.
- THE SURFACE OF THE BED SHOULD BE COVERED WITH SAND FILL FOLLOWED BY APPROXIMATELY 100mm OF SANDY TOPSOIL. THE BED AREA SHOULD BE VEGETATED.
- THE TOTAL THICKNESS OF THE COVER OVER THE CLEAR STONE DISTRIBUTION LAYER SHALL RANGE BETWEEN 0.3m AND 0.6m.
- THE SIDES OF THE BED SHOULD BE SLOPED AT 4H:1V OR SHALLOWER.

7) MINIMUM CLEARANCE DISTANCE FROM CLEAR STONE

- 6.9m FROM ANY PROPERTY LINE
- 8.9m FROM ANY STRUCTURE
- 18.9m FROM ANY DRILLED WELL
- 5.0m FROM ANY TREES UNLESS OTHERWISE APPROVED
- 5.0m FROM DRIVEWAY

8) MINIMUM CLEARANCE DISTANCE FROM TANK(S)

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

9) GENERAL

- **ANY FUTURE SEWAGE SYSTEM ALTERATIONS MUST CONSIDER THE MINIMUM DENITRIFICATION REQUIREMENTS ESTABLISHED IN PATERSON GROUP REPORT PH3645-LET.02.**
- **SNOW STORAGE SHALL NOT BE LOCATED OVER 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 IRRIGATION / SPRINKLER SYSTEM TO BE LOCATED 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 STRONGLY RECOMMENDED BY THIS FIRM DUE TO THE POTENTIAL VARIABILITY IN BEDROCK ELEVATION AT THE SUBJECT SITE. 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.**

LICENSED PROFESSIONAL ENGINEER
28/01/25
M. S. KILLAM
100221103
PROVINCE OF ONTARIO

DD/MM/YY	DESCRIPTION	REV.
28/01/25	Issued with Revised Site Plan	0

Consultant:

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

Client:

W.O. STINSON & SON LTD.

Project:

PROPOSED COMMERCIAL BUILDING

5545 ALBION ROAD
OTTAWA (GREELY), ONTARIO

Drawing:

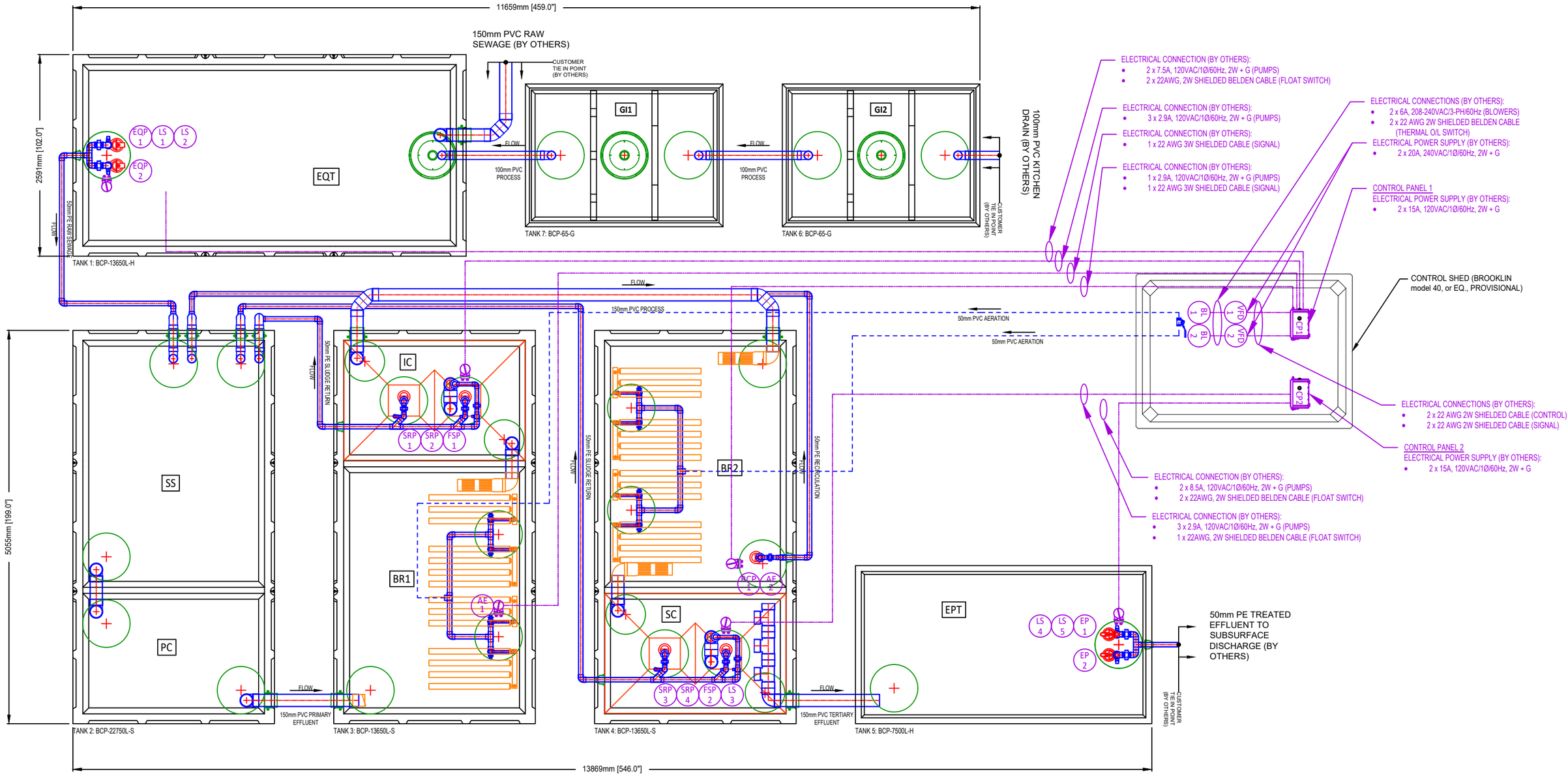
SEWAGE SYSTEM DETAIL & NOTES

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

Drawing No.:

PH3645-6

p:\autocad drawings\hydrogeology\ph36xx\ph3645\ph3645-6.dwg



PROCESS FLOW
SLUDGE RETURN/RECIRC
AERATION
CHEMICAL DOSING
ELECTRICAL

BL	BLOWER
VFD	VARIABLE FREQUENCY DRIVE
CDP	CHEMICAL DOSING PUMP
SRP	SLUDGE RETURN PUMP
FSP	FLOATING SLUDGE (SKIMMER) PUMP
EQP	FLOW EQUALIZATION PUMP
RCP	RECIRCULATION PUMP
EP	EFFLUENT PUMP
LS	LEVEL SWITCH (FLOAT)

NOTES:

A. ALL WORK, INSTALLATION AND CONNECTIONS IN RELATION TO THE TREATMENT SYSTEM SHALL BE DONE IN ACCORDANCE WITH THE WRITTEN INSTRUCTIONS PROVIDED BY BERGMANN NORTH AMERICA INC. AND IN ACCORDANCE WITH ALL APPLICABLE LOCAL CODES AND REGULATIONS.

B. ALL ACCESS OPENINGS MUST BE INSTALLED TO GRADE AND SECURED TO PREVENT ACCIDENTAL OR UNAUTHORIZED ACCESS.

C. A MAXIMUM OF 1 METRE BURIAL DEPTH IS ALLOWABLE ON TOP OF ANY TANKS IN A NON-TRAFFIC AREA. EXTRA REINFORCEMENT IS REQUIRED FOR USE IN AREAS WITH VEHICULAR TRAFFIC AND BURIAL DEPTHS OVER 1 METRE.

TANK LIST

PROCESS NAME		TANK #	~ WORKING VOLUME (m³)
EQT	EQUALIZATION TANK	1	13.6
SS	SLUDGE STORAGE	2	14.5
PC	PRIMARY CLARIFIER	2	6.9
BR1	BIOREACTOR 1	3	9.0
C	INTERMEDIATE CLARIFIER	3	2.7
BR2	BIOREACTOR 2	4	9.0
SC	SECONDARY CLARIFIER	4	2.7
EPT	EFFLUENT PUMP TANK	5	7.5
GI1	GREASE INTERCEPTOR 1	6	3.0
GI2	GREASE INTERCEPTOR 2	7	3.0

BNA BERGMANN NORTH AMERICA INC.

iQ. MBBR

TIM HORTONS - WWTS

DRAWING: PLAN LAYOUT
PRELIMINARY
Rev.0

DRAWN BY:	APPROVED BY:	SHEET
IR	MM	1 of 1

DATE: 2024/08/13 | SCALE: 1:50

Appendix D

Storm Sewer Design Sheet

Storm Water Management Sheet

Storm Drainage Area Plan 143219-C-500

Pre-Development Storm Drainage Area Plan 143219-C-501

External Storm Drainage Area Plan 143219-C-502

Ponding Plan 143219-C-600

Runoff Coefficient Calculations

Orifice Sizing Calculations

Overflow Depth Calculation (Pond outlet)

Capacity of Existing Ditch Calculations

Excerpts from Shields Creek Study

OGS Sizing Report

OGS EFO12-Detail

OGS TSS confirmation Correspondence

Downspout Leaf Guard & Overflow

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)-333 Preston Street
awa, Ontario K1S 5N4 Canada
adis.com

STORM SEWER DESIGN SHEET

5545 Albion Road
W.O. Stinson & Son Ltd.
City of Ottawa

LOCATION				AREA (Ha)										RATIONAL DESIGN FLOW														SEWER DATA									
STREET	AREA ID	FROM	TO	C= 0.20	C= 0.25	C= 0.40	C= 0.50	C= 0.57	C= 0.64	C= 0.69	C= 0.86	C= 0.90	C= 0.95	IND 2.78AC	CUM 2.78AC	INLET (min)	TIME IN PIPE	TOTAL (min)	i (2) (mm/hr)	i (5) (mm/hr)	i (10) (mm/hr)	i (100) (mm/hr)	2yr PEAK FLOW (L/s)	5yr PEAK FLOW (L/s)	10yr PEAK FLOW (L/s)	100yr PEAK FLOW (L/s)	FIXED FLOW IND	FIXED FLOW CUM	DESIGN FLOW (L/s)	CAPACITY (L/s)	LENGTH (m)	PIPE SIZE (mm) DIA	PIPE SIZE (mm) W	PIPE SIZE (mm) H	SLOPE (%)	VELOCITY (m/s)	AVAIL CAP (2yr) (L/s)	AVAIL CAP (2yr) (%)
	CBMH2	CBMH2	MH1								0.32			0.77	0.77	10.00	1.83	11.83	76.81				58.76						58.76	93.27	89.71	375			0.26	0.818	34.51	37.00%
	FUTURE	HW	MH1						0.76					1.35	1.35	10.00	0.45	10.45	76.81				103.86						103.86	133.02	21.69	450			0.20	0.810	29.16	21.92%
	CICB1	MH1	OGS								0.47			1.12	3.24	11.83	0.09	11.92	70.43				228.27						228.27	239.68	4.46	600			0.14	0.821	11.40	4.76%
	POND	OGS	POND		0.14									0.10	3.34	11.92	0.16	12.07	70.15				234.17						234.17	239.68	7.71	600			0.14	0.821	5.50	2.30%
		POND	MH3											0.00	0.00	12.07	0.18	12.25	69.66								100.00	100.00	100.00	108.21	10.00	375			0.35	0.949	8.21	7.59%
		MH3	DITCH											0.00	0.00	12.25	0.30	12.55	69.12								100.00	100.00	100.00	108.21	17.01	375			0.35	0.949	8.21	7.59%

Definitions:

Q = 2.78CiA, where:
Q = Peak Flow in Litres per Second (L/s)
A = Area in Hectares (Ha)
i = Rainfall intensity in millimeters per hour (mm/hr)
[i = 732.951 / (TC+6.199)^0.810] 2 YEAR
[i = 998.071 / (TC+6.053)^0.814] 5 YEAR
[i = 1174.184 / (TC+6.014)^0.816] 10 YEAR
[i = 1735.688 / (TC+6.014)^0.820] 100 YEAR

Notes:

1. Mannings coefficient (n) = 0.013

Designed: WZ

Checked: RM

Dwg. Reference: 143219-500

No.	Revision	Date
1	Servicing Brief - Submission No. 1	2023-10-24
2	Servicing Brief - Submission No. 2	2024-03-12
3	Servicing Brief - Submission No. 3	2025-02-03

File Reference: 143219-6.04.04
Date: 2023-10-24
Sheet No: 1 of 1

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500-333 Preston Street
Ottawa, Ontario K1S 5N4 Canada
arcadis.com

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = 732.951 / (T_c+6.199)$^{0.810}$
i_{5yr} = 1:5 year Intensity = 998.071 / (T_c+6.053)$^{0.814}$
i_{100yr} = 1:100 year Intensity = 1735.688 / (T_c+6.014)$^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

Maximum Allowable Release Rate to Northern Outlet (Albion)

City Criteria per Pre-consult Meeting

Restricted Flowrate ($Q_{restricted}$ = 2.78*C*i_{2yr} *A_{site})

C =	0.5	
Starting Tc	10	
Length @ 1m/s	186	
T_c =	13.10	min
i_{2yr} =	66.65	mm/hr
A_{site} =	1.76	Ha
$Q_{restricted}$ =	163.05	L/s

Criteria per Shield's Creek SWS

Restricted Flowrate ($Q_{restricted}$ = 50%*2.78*C*i_{2yr} *A_{site})

C =	0.79	
Starting Tc	10	
Length @ 1m/s	186	
T_c =	13.10	min
i_{2yr} =	66.65	mm/hr
A_{site} =	1.76	Ha
	50%	
$Q_{restricted}$ =	128.81	L/s

Uncontrolled Release ($Q_{uncontrolled}$ = 2.78*1.25C*i_{100yr} *$A_{uncontrolled}$)

C =	0.25	
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.15	Ha
$Q_{uncontrolled}$ =	23.27	L/s

Maximum Allowable Release Rate to Southern Outlet (Mitch Owens)

City Criteria per Pre-consult Meeting

Restricted Flowrate ($Q_{restricted}$ = 2.78*C*i_{2yr} *A_{site})

C =	0.5	
Starting Tc	10	
Length @ 1m/s	0	
T_c =	10.00	min
i_{2yr} =	76.81	mm/hr
A_{site} =	0.34	Ha
$Q_{restricted}$ =	36.30	L/s

Criteria per Shield's Creek SWS

Restricted Flowrate ($Q_{restricted}$ = 50%*2.78*C*i_{2yr} *A_{site})

C =	0.59	
Starting Tc	10	
Length @ 1m/s	0	
T_c =	10.00	min
i_{2yr} =	76.81	mm/hr
A_{site} =	0.34	Ha
	50%	
$Q_{restricted}$ =	21.42	L/s

Uncontrolled Release ($Q_{uncontrolled}$ = 2.78*1.25C*i_{100yr} *$A_{uncontrolled}$)

C =	0.41	
T_c =	10	min
i_{100yr} =	178.56	mm/hr
$A_{uncontrolled}$ =	0.10	Ha
$Q_{uncontrolled}$ =	25.31	L/s

Summary - Overall Site

SWM Statistics of Modified Site Areas		
Controlled	**Area**	**ICD Flow**
North	1.76	85.00
South	0.34	15.00
Sum	**2.10**	**100.00**
Uncontrolled	**Area**	**Flow**
North	0.15	23.27
South	0.10	25.31
Sum	**0.25**	**48.58**
Total Sum	**2.10**	**148.58**
Allowable		**150.22**
		TRUE

Maximum Allowable Release Rate ($Q_{max\ allowable}$ = $Q_{restricted}$ - $Q_{uncontrolled}$)

$Q_{max\ allowable}$ = **105.54** L/s

MODIFIED RATIONAL METHOD (100-Year, 2-Year Ponding)

Drainage Area ***North*** *Albion Road*
Area (Ha) 1.69 | Restricted Flow ICD $_{Actual}$ (L/s)= 85.00
C = 0.86 | Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)= 85.00 | 50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr} A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQ$_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
30	91.87	371.32	85.00	286.32	515.38			
35	82.58	333.77	85.00	248.77	522.42			
40	75.15	303.73	85.00	218.73	**524.95**	364.47	279.47	**670.74**
45	69.05	279.09	85.00	194.09	524.05			
50	63.95	258.50	85.00	173.50	520.49			

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	524.95	695.90	0	0.00	0.00	670.74	0.00
					convert to flow with peak Tc (L/s)		0.00

overflows to: Albion Road

Drainage Area ***North*** Albion Road
Area (Ha) 1.69
C = 0.69 | Restricted Flow Q_r (L/s)= 85.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr} A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
13	66.93	216.42	85.00	131.42	102.51
14	64.23	207.70	85.00	122.70	103.07
15	61.77	199.73	85.00	114.73	**103.25**
16	59.50	192.41	85.00	107.41	103.11
17	57.42	185.66	85.00	100.66	102.67

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	103.25	695.90	0	0.00

overflows to: Albion Road

Drainage Area ***South*** *Mitch Owens Road*
Area (Ha) 0.16 | Restricted Flow ICD $_{Actual}$ (L/s)= 15.00
C = 0.58 | Restricted Flow $Q_{r\ for\ swm\ calc}$ (L/s)= 15.00 | 50% reduction for sub-surface storage

100-Year Ponding						100-Year +20% Ponding		
T_c Variable (min)	i_{100yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{100yr} A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 100yr (m^3)	100YRQ$_p$ 20% (L/s)	Qp - Qr (L/s)	Volume 100+20 (m^3)
6	226.01	59.53	15.00	44.53	16.03			
11	169.91	44.76	15.00	29.76	19.64			
16	137.55	36.23	15.00	21.23	**20.38**	43.48	28.48	**27.34**
21	116.30	30.63	15.00	15.63	19.70			
26	101.18	26.65	15.00	11.65	18.18			

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance	100+20 Overflow	100+20 Required	100+20 Balance
0.00	20.38	23.14	0	0.00	0.00	27.34	4.20
					convert to flow with peak Tc (L/s)		4.37

overflows to: Mitch Owens Road

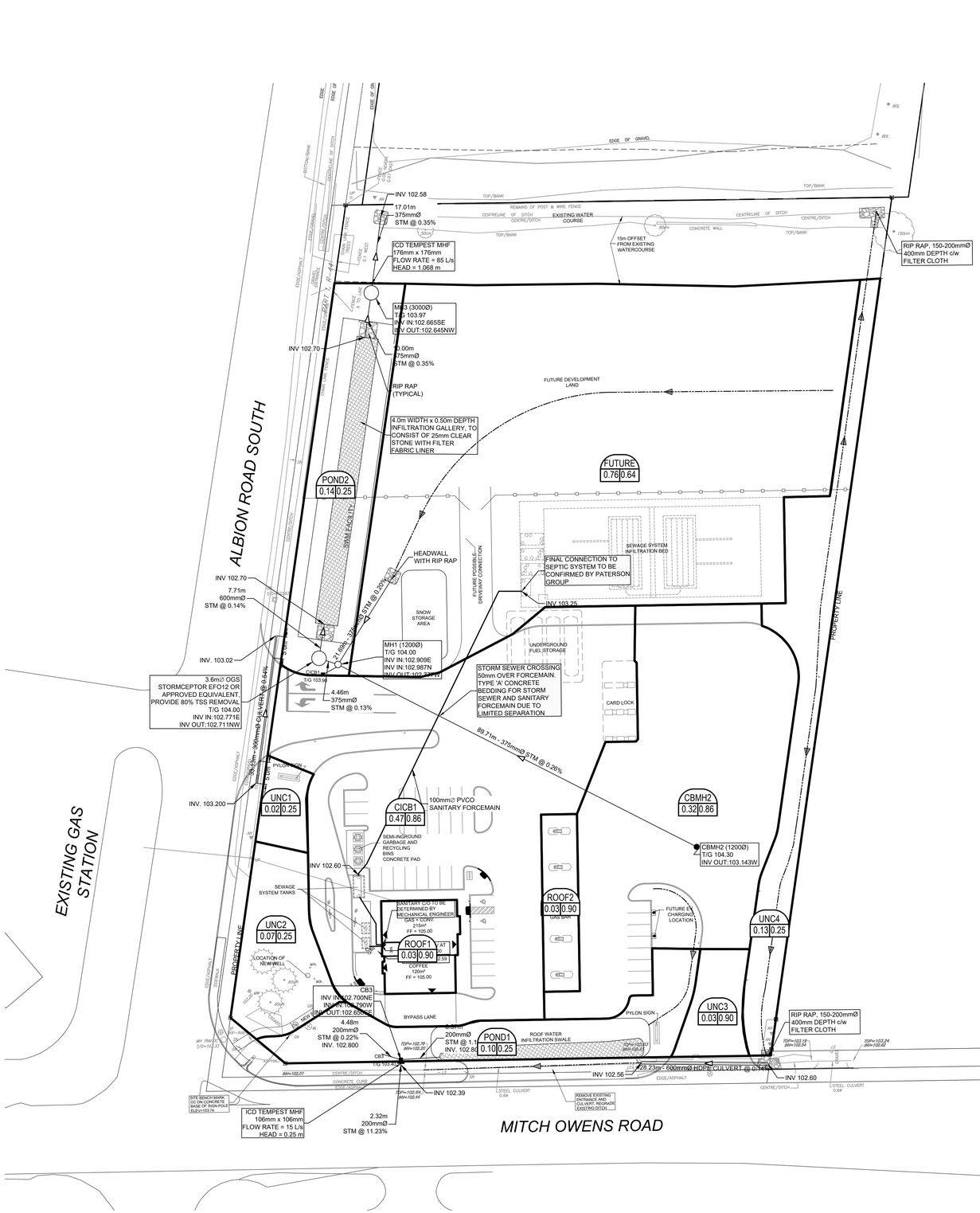
Drainage Area ***South*** Mitch Owens Road
Area (Ha) 0.16
C = 0.48 | Restricted Flow Q_r (L/s)= 15.00

2-Year Ponding					
T_c Variable (min)	i_{2yr} (mm/hour)	Peak Flow Q_p=2.78xCi_{2yr} A (L/s)	Q_r (L/s)	Q_p-Q_r (L/s)	Volume 2yr (m^3)
3	121.46	26.66	15.00	11.66	2.10
4	111.72	24.52	15.00	9.52	2.29
5	103.57	22.73	15.00	7.73	**2.32**
6	96.64	21.21	15.00	6.21	2.24
7	90.66	19.90	15.00	4.90	2.06

Storage (m^3)

Overflow	Required	Surface	Sub-surface	Balance
0.00	2.32	92.53	0	0.00

overflows to: Mitch Owens Road



LEGEND :

UNC3 / 0.56 | 0.20 — AREA NUMBER; RUNOFF COEFFICIENT; AREA IN HECTARES

DRAINAGE AREA LIMITS

CLIENT

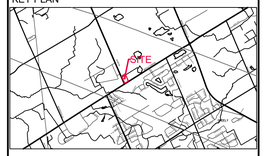
W.O. STINSON & SON LTD.

ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2023-11-24
2	SUBMISSION NO.2 FOR CITY REVIEW	2024-03-20
3	ADDED TANK SECTIONS	2024-07-25
4	REVISED PER NEW SITE PLAN	2025-02-03
5		
6		
7		
8		

SEE 010 FOR NOTES, LEGEND, CB TABLE AND DETAILS

KEY PLAN



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SEAL

LICENSED PROFESSIONAL ENGINEER
D. G. Yannoulopoulos
2025/02/03
PROVINCE OF ONTARIO

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT
W.O. STINSON
ALBION & MITCH OWENS

PROJECT NO: 143219	
DRAWN BY: D.D. / M.M.	CHECKED BY: R.M./D.G.Y.
PROJECT MGR: R.M.	APPROVED BY: D.G.Y.

SHEET TITLE
STORM DRAINAGE AREA PLAN

SHEET NUMBER C-500 | ISSUE 4

SCALE CHECK 1 in XXXXX 10mm

PC20240353

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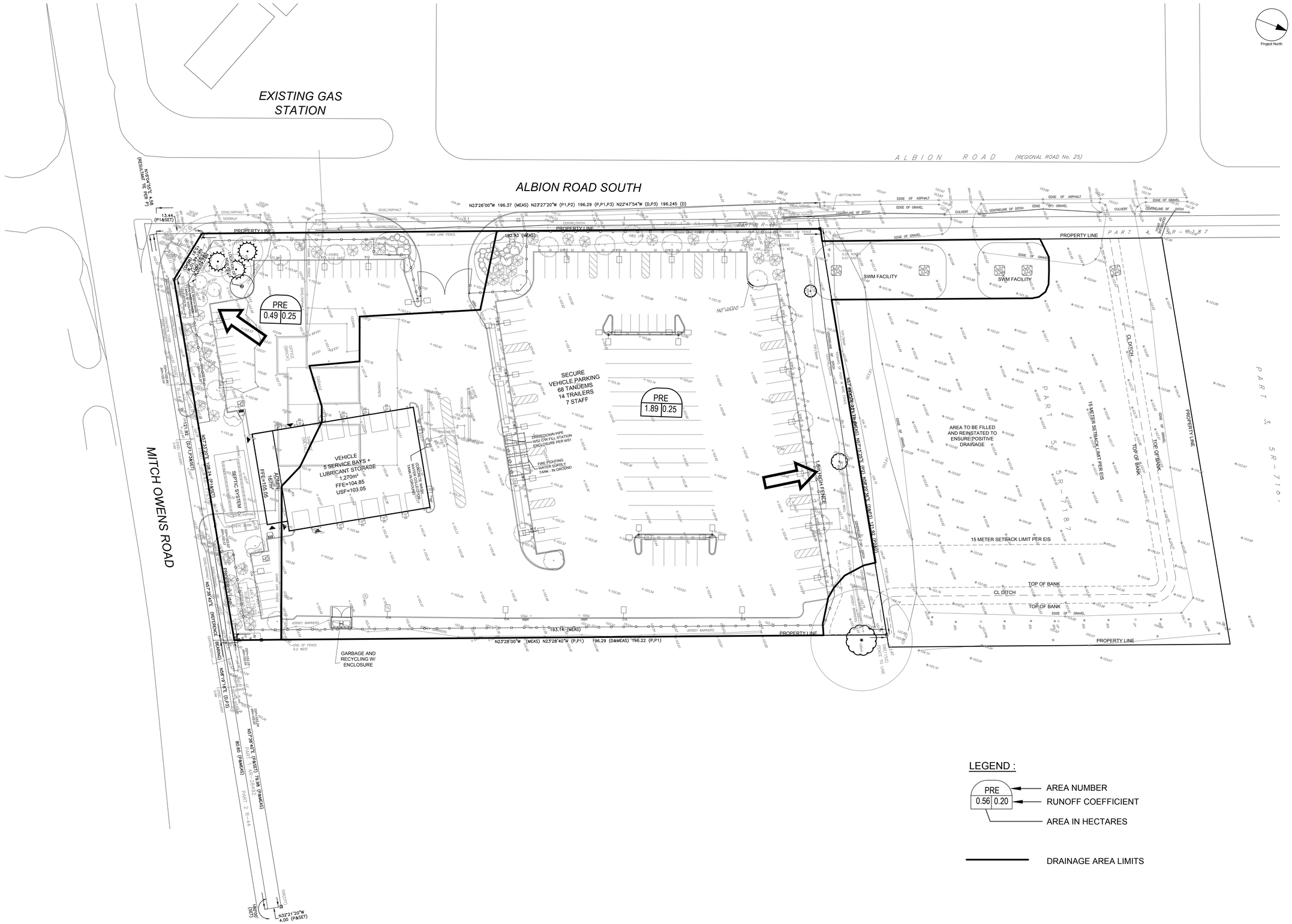

LEGEND :

PRE
0.56 | 0.20
AREA NUMBER
RUNOFF COEFFICIENT
AREA IN HECTARES

DRAINAGE AREA LIMITS

CLIENT

W.O. STINSON & SON LTD.

ISSUES

No.	DESCRIPTION	DATE
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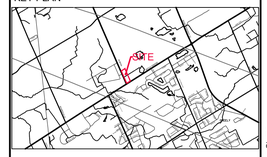
SEE 010 FOR NOTES, LEGEND, CB TABLE AND DETAILS

KEY PLAN



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2024/07/25
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PROJECT
W.O. STINSON

ALBION & MITCH OWENS

PROJECT NO: 143219

DRAWN BY:	CHECKED BY:
D.D. / M.M.	R.M./D.G.Y.
PROJECT MGR:	APPROVED BY:
R.M.	D.G.Y.

SHEET TITLE
PRE-DEVELOPMENT STORM DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-501	3

SCALE CHECK 1 in

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PC2023-0365

Tdsm XXXXX

LEGEND:

DRAINAGE AREA LIMITS

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5		
6		
7		
8		

SEE 010 FOR NOTES, LEGEND, CB TABLE AND DETAILS

KEY PLAN

1:500 0 5 15 25m

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D. G. Yannoulopoulos
2025/02/03
PROVINCE OF ONTARIO

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Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT

W.O. STINSON

ALBION & MITCH OWENS

PROJECT NO: 143219	
DRAWN BY: **D.D. / M.M.**	CHECKED BY: **R.M./D.G.Y.**
PROJECT MGR: **R.M.**	APPROVED BY: **D.G.Y.**

SHEET TITLE

EXTERNAL STORM DRAINAGE AREA PLAN

SHEET NUMBER	ISSUE
C-502	4

SCALE CHECK 1 in 13mm XXXXX

PC20240353

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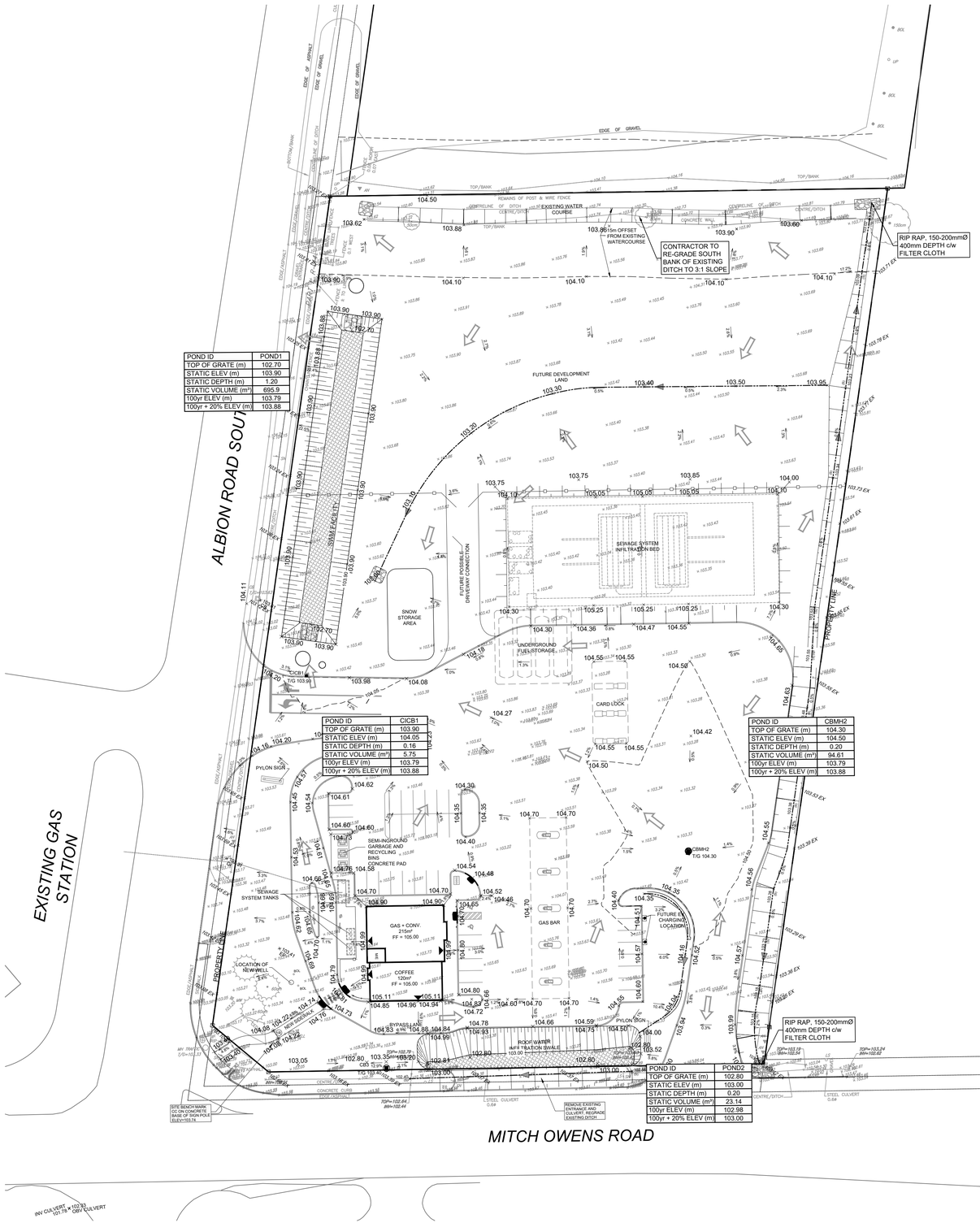

POND ID	POND1
TOP OF GRATE (m)	102.70
STATIC ELEV (m)	103.90
STATIC DEPTH (m)	1.20
STATIC VOLUME (m³)	695.9
100yr ELEV (m)	103.79
100yr + 20% ELEV (m)	103.88

POND ID	CICB1
TOP OF GRATE (m)	103.90
STATIC ELEV (m)	104.05
STATIC DEPTH (m)	0.16
STATIC VOLUME (m³)	5.75
100yr ELEV (m)	103.79
100yr + 20% ELEV (m)	103.88

POND ID	CBMH2
TOP OF GRATE (m)	104.30
STATIC ELEV (m)	104.50
STATIC DEPTH (m)	0.20
STATIC VOLUME (m³)	94.61
100yr ELEV (m)	103.79
100yr + 20% ELEV (m)	103.88

POND ID	POND2
TOP OF GRATE (m)	102.80
STATIC ELEV (m)	103.00
STATIC DEPTH (m)	0.20
STATIC VOLUME (m³)	23.14
100yr ELEV (m)	102.98
100yr + 20% ELEV (m)	103.00

CLIENT

W.O. STINSON & SON LTD.

ISSUES

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8		

SEE 010 FOR NOTES, LEGEND, CB TABLE AND DETAILS

KEY PLAN

1:500 0 5 15 25m

SEAL

LICENSED PROFESSIONAL ENGINEER
L.D. of: Yannoulopoulos
2025/02/03
PROVINCE OF ONTARIO

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Ottawa ON K1S 5N4 Canada
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PROJECT
W.O. STINSON

ALBION & MITCH OWENS

PROJECT NO: 143219

DRAWN BY:	CHECKED BY:
D.D. / M.M.	R.M./D.G.Y.
PROJECT MGR: R.M.	APPROVED BY: D.G.Y.

SHEET TITLE
PONDING PLAN

SHEET NUMBER	ISSUE
C-600	4

SCALE CHECK 1 in 10mm XXXXX

PC2024-0353

File Location: J:\143219_WO_Stinson\7.0_Production\7.03_Design\04_Civil\Sheets\600 PONDING PLAN.dwg Last Saved: January 30, 2025, by mlinem4526 Plotted: January 31, 2025 4:33:10 PM by Milne, Marian

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RUN-OFF COEFFICIENTS

5545 Albion Road | W.O. Stinson & Son Ltd.
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Prepared By: WZ | Checked By: RM

	North Outlet - Pre-dev.			South Outlet - Pre-dev.			CICB1			CBMH2		
	GRASS	GRAVEL	ASPHALT	GRASS	GRAVEL	ASPHALT	GRASS	ROOF	ASPHALT	GRASS	ROOF	ASPHALT
	506	15867	1194	1513	0	1876	284		4423	169		3063
TOTAL (m^2)	506	15867	1194	1513	0	1876	284	0	4423	169	0	3063
	17567			3389			4707			3232		
Runoff Coefficient (C) :	0.2	0.8	0.9	0.2	0.8	0.9	0.2	0.9	0.9	0.2	0.8	0.9
Ave. Runoff Coefficient (C):	0.79			0.59			0.86			0.86		
Runoff Coefficient Used(C):	**0.79**			**0.59**			**0.86**			**0.86**		

	FUTURE			UNC2 + UNC3			POND1			POND2		
	GRASS	SITE AVE.	ASPHALT	GRASS	ROOF	ASPHALT	GRASS	ROOF	ASPHALT	GRASS	FUTURE	ASPHALT
	2557	4726	270	694		301	985	660		284		4423
										169		3063
										2557	4726	270
										1365		
	2557	4726	270	694	0	301	985	660	0	4375	4726	7756
	7553			995			1645			16857		
Runoff Coefficient (C) :	0.2	0.86	0.9	0.2	0.9	0.9	0.2	0.9	0.9	0.2	0.8	0.9
Ave. Runoff Coefficient (C):	0.64			0.41			0.48			0.69		
Runoff Coefficient Used(C):	**0.64**			**0.41**			**0.48**			**0.69**		

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ORIFICE SIZING
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Prepared By: WZ | Checked By: RM

Orifice coefficients	
Cv =	0.60

							Theoretical		Recommended	
	Invert	Diameter	Centre ICD	Max. Pond Elevation	Hydraulic Slope	Target Flow	Orifice	Actual Flow	Orifice	Actual Flow
	(m)	(mm)	(m)	(m)	(m)	(l/s)	(m)	(l/s)	(m)	(l/s)
MH3	102.645	375	102.833	103.900	1.068	85.00	0.1759	85.00	0.176	85.00
CB3	102.650	200	102.750	103.000	0.250	15.00	0.1062	15.00	0.106	15.00
						100.00				**100.00**

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OVERFLOW DEPTH CALCULATIONS
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Prepared By: WZ | Checked By: RM

Overflow Pond 1 - South (Mitch Owens)

1:100 year flow =			**0**	l/s	or	**0.000**	Cu m/sec				
1:100 year + 20% flow =			**4.37**	l/s	or	**0.004**	Cu m/sec				
Overflow Slope			Overflow X-Section						Overflow Capacity - Q		
Length =	**48.40**	m	Side Slope 1 =	**33.00**	%				From Seelye n =	0.030	(Channels)
Up Stream Ground Elev =	**103.00**	m	Side Slope 2 =	**33.00**	%						
Down Stream Ground Elev =	**102.48**	m	Bottom Width =	**43.80**	m				100 Year Q =	**0.000**	Cu M/sec
Difference =	0.52	m		100 Year		100 Year + 20%			100 Year Velocity =	0.00	M/s
Ditch Slope =	1.07	%	Water depth =	**0.000**	m	**0.002**	m				
			X-Sect. Area =	0.00	m^2	0.08	m^2		100 Y +20% Q =	**0.004**	Cu M/sec
			Wetted Per. =	43.80	m	43.81	m		100 Y + 20% Velocity =	0.05	M/s

Q = A*(1.0/n)*R^2/3*S^1/2

where:

A = cross sectional area in Sq. m
n = friction coefficient
R = hydraulic radius = A/wetted perimetre (wp) in m

Formulas and Descriptions

i_{2yr} = 1:2 year Intensity = $732.951 / (T_c+6.199)^{0.810}$
i_{5yr} = 1:5 year Intensity = $998.071 / (T_c+6.053)^{0.814}$
i_{100yr} = 1:100 year Intensity = $1735.688 / (T_c+6.014)^{0.820}$
T_c = Time of Concentration (min)
C = Average Runoff Coefficient
A = Area (Ha)
Q = Flow = 2.78CiA (L/s)

100 Year Flow to Ditch Section 1 - Natural Areas Upstream/East of the Site

Existing Flowrate (Q_{100yr} = 2.78*1.25*C*$i100_{yr}$ *A_{site} based on C=0.20)

C =	0.20		
Starting Tc	10		
Length @ 0.03m/s	715		
T_c =	407.22	min	(Tc per Uplands Method with an average slope of 0.5%)
i_{100yr} =	12.42	mm/hr	
A_{site} =	27.690	Ha	
Q_{100yr} =	239.05	L/s	

100 Year Flow to Ditch Section 2 - Flow from Ditch Section 1 + Flow from the 5545 Albion

Existing Flowrate (Q_{100yr} = 2.78*1.25*C*$i100_{yr}$ *A_{site})

Restricted ICD rate from the site	85.00	L/s
Uncontrolled Flow	23.27	L/s
Ditch 1 Q_{100yr} =	239.05	L/s
Q_{100yr} =	347.32	L/s

100 Year Flow to Ditch Section 3 - Flow from Ditch Section 2 + Flow from the 5505 & 5457 Albion & East side of Albion Road

Existing Flowrate (Q_{100yr} = 2.78*1.25*C*$i100_{yr}$ *A_{site} based on C=0.65)

C =	0.65		
Starting Tc	20		
Length @ 0.6m/s	253		
T_c =	27.03	min	(Tc per Uplands Method with an average slope of 2.0% for gravel lots)
i_{100yr} =	98.59	mm/hr	
A_{site} =	3.050	Ha	
Q_{100yr} =	543.37	L/s	
Ditch 2 Q_{100yr} =	347.32	L/s	
Q_{100yr} =	890.70	L/s	

100 Year Flow to Ditch Section 4 - Flow from Ditch Section 3 + Flow from the Existing Residential Area

Existing Flowrate (Q_{100yr} = 2.78*1.25*C*$i100_{yr}$ *A_{site} based on C=0.50)

C =	0.50		
Starting Tc	20		
Length @ 0.3m/s	198		
T_c =	31.00	min	(Tc per Uplands Method with an average slope of 2.0% for gravel lots)
i_{100yr} =	89.83	mm/hr	
A_{site} =	3.520	Ha	
Q_{100yr} =	439.51	L/s	
Ditch 3 Q_{100yr} =	890.70	L/s	
Q_{100yr} =	1330.21	L/s	

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DITCH SIZING CALCULATIONS

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Prepared By: WZ | Checked By: RM

Q = A*(1.0/n)*R^2/3*S^1/2 where: A = cross sectional area in Sq. m
n = friction coefficient
R = hydraulic radius = A/wetted perimetre (wp) in m

Ditch Section 1 - Upstream of the Site

New Flow Section Required 1:100 year flow =			**239.05** l/s	or	**0.239** Cu m/sec
Overflow Slope			Overflow X-Section		Overflow Capacity - Q
Length =	**111.00**	m	Side Slope 1 = **33.00** %		From Seelye n = 0.030 (Channels)
Up Stream Ground Elev =	**102.98**	m	Side Slope 2 = **33.00** %		
Down Stream Ground Elev =	**102.54**	m	Bottom Width = **1.00** m		100 Year Q = **3.274** Cu M/sec
Difference =	0.44	m	100 Year		100 Year Velocity = 1.22 M/s
Ditch Slope =	0.40	%	Water depth = **0.790** m		
			X-Sect. Area = 2.68 m^2		
			Wetted Per. = 6.04 m		

Ditch Section 2 - Downstream of the Site

New Flow Section Required 1:100 year flow =			**347.32** l/s	or	**0.347** Cu m/sec
Overflow Slope			Overflow X-Section		Overflow Capacity - Q
Length =	**30.00**	m	Side Slope 1 = **33.00** %		From Seelye n = 0.030 (Channels)
Up Stream Ground Elev =	**102.49**	m	Side Slope 2 = **33.00** %		
Down Stream Ground Elev =	**102.35**	m	Bottom Width = **1.00** m		100 Year Q = **3.869** Cu M/sec
Difference =	0.14	m	100 Year		100 Year Velocity = 1.35 M/s
Ditch Slope =	0.47	%	Water depth = **0.820** m		
			X-Sect. Area = 2.86 m^2		
			Wetted Per. = 6.23 m		

Ditch Section 3

New Flow Section Required 1:100 year flow =			**890.70** l/s	or	**0.891** Cu m/sec
Overflow Slope			Overflow X-Section		Overflow Capacity - Q
Length =	**10.00**	m	Side Slope 1 = **33.00** %		From Seelye n = 0.030 (Channels)
Up Stream Ground Elev =	**102.55**	m	Side Slope 2 = **33.00** %		
Down Stream Ground Elev =	**102.48**	m	Bottom Width = **1.00** m		100 Year Q = **3.983** Cu M/sec
Difference =	0.07	m	100 Year		100 Year Velocity = 1.59 M/s
Ditch Slope =	0.70	%	Water depth = **0.760** m		
			X-Sect. Area = 2.51 m^2		
			Wetted Per. = 5.85 m		

Ditch Section 4

New Flow Section Required 1:100 year flow =			**1330.21** l/s	or	**1.330** Cu m/sec
Overflow Slope			Overflow X-Section		Overflow Capacity - Q
Length =	**54.70**	m	Side Slope 1 = **33.00** %		From Seelye n = 0.030 (Channels)
Up Stream Ground Elev =	**102.09**	m	Side Slope 2 = **33.00** %		
Down Stream Ground Elev =	**101.62**	m	Bottom Width = **1.00** m		100 Year Q = **2.318** Cu M/sec
Difference =	0.47	m	100 Year		100 Year Velocity = 1.49 M/s
Ditch Slope =	0.86	%	Water depth = **0.570** m		
			X-Sect. Area = 1.55 m^2		
			Wetted Per. = 4.64 m		

This study prepared by CCL performed a hydrological and hydraulic analysis of the North, Middle and South Branch of the Castor River. Peak flows (1:100 year) generated at the confluence of Findlay and Shields Creeks in this study are 60.3 m^3/s using OTTHYMO and 6 hour- United States Soil Conservation Service (SCS) design storm distribution. Hydrological modeling of the North Castor River utilized the HEC-2 model.

The North Castor River Subwatershed Plan, South Nation River Conservation Authority, 1995

The North Castor River Subwatershed Plan, developed by the South Nation River Conservation Authority compiled an inventory of existing information in the watershed. Recommendations to implement a subwatershed plan, continued monitoring of the river, improvements to existing stormwater management practices and protection of groundwater resources were provided.

Greely / Shields Creek Stormwater and Drainage Study, City of Ottawa, 2002

This study prepared by Stantec performed an inventory of existing conditions in the study area and developed a hydrological model of existing and future conditions (with and without stormwater management controls). Hydrological conditions were appraised using a 3-hour Chicago storm distribution. Peak flows for the study area at the 1:100 year condition were modeled using SWMHYMO. Peak flows of 72.5 m^3/s (existing –draft approved development condition), 80.89 m^3/s for future flow conditions and 73.75 for future development conditions with stormwater management (SWM) controls. The recommended SWM strategy is to control the 2-year post development flow to 50% of pre-development peak flow and control 5-year to 100-year post development peak flows to match pre-development conditions.

4.6.2 Hydrologic Objectives

The objectives of the current hydrologic analysis are to:

- Develop a continuous hydrological model of the Shields Creek Subwatershed;
- Assess potential impacts of future land use changes;
- Evaluate stormwater management control opportunities; and
- Appraise impacts.

Hydrological assessments in the Shield Creek / North Castor River have been carried out for a number watershed condition scenarios as noted below using a continuous simulation model.

- Existing Conditions;

- Interim Future Conditions
  - Uncontrolled
  - Controlled

- Post-development conditions:
  - Future development within Greely Village area only
  - Ultimate buildout including all downstream catchments (excluding any Level 1 protection areas)

- Post-development conditions incorporating stormwater management control(s):
  - Future development within Greely Village area only

providing peak flow control, with the exception of the Orchard View Phase IV pond which does not meet the peak flow reduction requirement specified in the SWM Report.

4.7 Hydraulics

The hydraulic assessment was conducted by Stantec and provided in their Greely/Shields Creek Stormwater and Drainage Study. A combination of the HEC-2 model and manual hydraulic calculations were used to provide the assessment. Data used in the hydraulic models included the following:

- Cross-sections were obtained from Engineers' Reports for the Municipal Drains and available 1:10000 scale topographic maps
- Size of the low flow channels obtained from the 1:10000 scale topographic maps were estimated based on visual inspection and spot measurements
- HEC-2 Model data developed in the 1992 Flood Plain Mapping Study was used to represent the present analysis for the section of the North Castor River from the confluence with Findlay Creek to Meadow Drive and Grey's Creek MD/Middle Castor from Apple Orchard Road to the outlet of the study area (1992 flows were revised based on the results on the present analysis)

Water levels were not assessed for the smaller watercourses within the study area. In many cases, water levels were found to overtop the banks/top of road at a number of locations under each of the 2, 5, 10, 25, and 100-year design storms. In particular, the North Castor River has the most instances of overtopping. Any flooding problems will have to be addressed in future development plans and the capacity for each watercourse must meet the criteria for the adjacent road type. The Shields Creek side of the watershed appears to consistently have a low capacity. Additional flood plain mapping may be required to further analyze the flooding in the watershed.

Table 4.7.1 provides a summary of the hydraulic capacities of the structures found in the study area. The information presented in this table was extracted from Stantec's Greely/Shields Creek Stormwater and Drainage Study.

Table 4.7.1: Hydraulic Capacities of Structures within Study Area

Area	Drainage Structure	Capacity
Spratt Municipal Drain	Drain	Up to 100-year return period
	Culverts at Bowesville Road	100-year flow
	Culvert at Abandoned CP Rail	100-year flow
Dancy Municipal Drain	Mitch Owens Road	100-year flow will overtop road
Grey's Creek Municipal Drain	Drain	All storms
	Culvert at Nick Adams	100-year flow
	Culvert at Apple Orchard	100-year flow
	Culverts within Deer Meadow Subdivision	100-year flow
Neulist Municipal Drain	Drain	Up to 25-year flow
	Floodplain	100-year flow
North Castor River/Shields Creek	North Castor River Banks downstream of Sale Barn Road	<2-year flow
	Culverts downstream of Old Prescott Road	100-year flow
	Old Prescott Road culvert	<5-year flow

Table 4.7.1: Hydraulic Capacities of Structures within Study Area		
Area	**Drainage Structure**	**Capacity**
Quailles Municipal Drain and the Benson Branch	Drain downstream of confluence with Quinn Branch	<2-year flow
	Upstream of confluence with Quinn Brand (including Benson Branch)	Generally up to 100-year flow
Osgoode Gardens Municipal Drain	Drain	2-year to 100-year flows
	Culvert at Parkway Road	100-year flow
	Culvert at Stagecoach Road	100-year flow
Findlay Creek Municipal Drain	Findlay Creek upstream of confluence with Shields Creek (Sta. 28750)	Up to 2-year flow
	Findlay Creek further upstream of confluence with Shields Creek (Sta. 29400)	Up to 10-year flow
Boundary Road Municipal Drain	Drain	Generally up to 25-year flow
	Outlet of Moore Estates Subdivision	100-year flood level is below bank elevation
	Outlet of Phase 1	100-year flood level is 0.4m above the bank elevation

4.8 Surface Water Quality

4.8.1 Chemistry

Data collected by the City of Ottawa in the Castor River Watershed, including Shields Creek, are summarized in **Appendix F** – Water Quality Summary Statistics. Sampling Stations included in the analysis are listed below.

Sequence Upstream to Downstream

Shields Cr	Plot #	
CK63-254	SH-1	North Castor River @ Bank St north of Blais Rd
CK63-264	SH-2	North Castor River @ Old Prescott Rd, south of Parkway Rd
CK63-262	SH-3	North Castor River @ Bank St north of Parkway Rd
CK63-208	SH-4	North Castor River Branch, @ Parkway Rd west of 7th Line Rd
CK63-206	SH-5	North Castor River @ 8th Line Rd (RR#27), 1km south of Mitch Owens Rd
CK63-202	SH-6	North Castor River @ Pana Rd east of Yorks Corners Rd

Middle Castor

CK63-007	MC-1	Middle Castor Rd – Stagecoach Rd (RR25)
CK63-265	MC-2	Middle Castor River @ Hwy 31, 0.5km south of Victoria Rd
CK63-002	MC-3	Middle Castor Rd – Yorks Corners Rd (RR#29) south of RR#6
CK63-266	MC-4	Middle Castor River @ Intersection of Gregorie Rd and Victoria Rd

South Castor

CK63-001	SC-1	South Castor River at Gregorie Rd. 250m south of Victoria Rd

Figure 4.8.1 shows the approximate locations of the water quality sampling locations.

protection of the outlet flows with rock filled trenches or riparian plantings to provide shade could be considered.

6.3.4.5 Major Flow Patterns

Existing major flow paths are to be maintained to provide overland flow under flood events. The overall drainage pattern is provided primarily through the drainage system including all of the stream network. The overall drainage pattern must be maintained even with potential modification to the stream system as indicated in the management approach for the streams. In addition, as development proceeds the overland drainage pattern as provided by existing contours must also be maintained. As part of any development proposal, the maintenance of the major overland drainage system must be indicated on any drainage plans submitted. The major overland flow pattern should not be provided through a pipe system. The major overland flow system should be provided either through a swell system or through the use of some form of overland flow. The major overland flow path is to be indicated on any drainage proposals and must correspond to City of Ottawa drainage criteria standards.

6.3.4.6 SWM Plans

A stormwater management study is necessary to finalize facility size, location and concept details. See **Figure 7.2.1** and **Section 7.4.** Current Municipal and Provincial criteria should be applied (i.e. design event, etc.) in conjunction with the targets outlined above. This includes the current MOE guidelines for stormwater management (ref. MOEE, 2003).

Water Quantity
During the preparation of Stormwater Management Plans as part of development proposals, hydrologic modelling is to be carried out to size drainage and stormwater management facilities. To maintain consistency in modelling, the peak flows, timing and volume (i.e. hydrograph) calculated in this study should be used as targets in future modelling. The QHM model was used in this study; however, alternate hydrologic models can be used for design, but must be calibrated to the study results (i.e. peak flows, timing and volume). The target flows by point of interest are provided in **Section 5.4** and summarized in **Table 6.3.1.** The target flow should be pro-rated to the drainage area under consideration using a unit area method.

Water Quality
Any SWM facilities in the plan are to be designed to meet the objectives and targets set out in this Management Strategy. Any SWM ponds are to be designed to avoid problems as encountered in the past. In particular, a pond outlet should be designed to not increase temperatures in the receiving watercourse through the use of measures such as bottom-draw and underground rock filtration, prior to entering the receiving stream.

Table 6.3.1: Summary of Peak Flood Flow Estimates

Point of Interest	1:2 yr	1:5 yr	1:10 yr	1:20 yr	1:50 yr	1:100 yr	1:200 yr	1:500 yr
Control Point NCR 135C – John Quinn Road	6.72	10.4	13.5	16.9	22	26.4	31.2	38.4
Control Point NCR 152A – MD Branch	7.27	11.2	14.5	18.1	23.4	28	33	40.5
Control Point NCR 152C – Entire System	17.6	26.6	33.6	41.1	51.9	60.9	70.6	84.7

Note: All flows in m^3/s.

Another component of the stormwater management plan is channel erosion. Erosion has been assessed in a fairly comprehensive manner in this study. Various thresholds have been provided. It is recommended that the sensitivity of the receiving watercourse be assessed and specific erosion thresholds determined as part of the stormwater management design. Once erosion thresholds have been quantified, they would be subjected to an exceedence analysis to ensure that post-development conditions do not exacerbate channel erosion.

6.3.4.7 Infiltration/Groundwater Protection

Existing infiltration levels are to be maintained as part of a stormwater management plan for future development to protect the groundwater resources and maintain current hydrologic functions for flow regime protection, erosion control, and low flow maintenance (fisheries). Infiltration management should primarily focus on high infiltration areas where feasibility is greatest. Innovative SWM measures should be considered throughout (in soak-away pits, roadside ditches, cisterns, etc.) to ensure that infiltration is provided where possible. In carrying out the additional infiltration studies during implementation (part of EIS) the areas of highest potential for recharge should be delineated to target highest infiltration potential. Preliminary infiltration targets have been developed and summarized in **Table 6.3.2**. Soil types are illustrated on **Figures 4.3.4** and **5.5.1**. These targets are based upon the input into the hydrologic model. Actual targets would be expected to have ranges on the order of 10% on either side of the specified rate and may be refined on a sub-area scale based on the monitoring.

Table 6.3.2: Infiltration Targets (See Figure 5.5.1)

Soil	Infiltration Rate (mm/yr)
Beach Formations	200 – 350
Deltaic and Estuarian Deposits	100 – 350
Erosional Terraces	100 – 350
Floodplains	100 – 200
Fluvial Terraces	100 – 200
Glaciofluvial Deposits	100 – 250
Marine Deposits	25 – 100
Organic Deposits	50 – 150
Paleozoic Bedrock	50 – 250
Precambrian Bedrock	10 – 100
Reworked Marine Sediments	25 – 100
Sand, reworked glaciofluvial	100 – 250
Till, drumlinized	50 – 100
Till, hummocky	50 – 150
Till, plain	50 – 100

Additional Management Measures Required for the Groundwater System include:

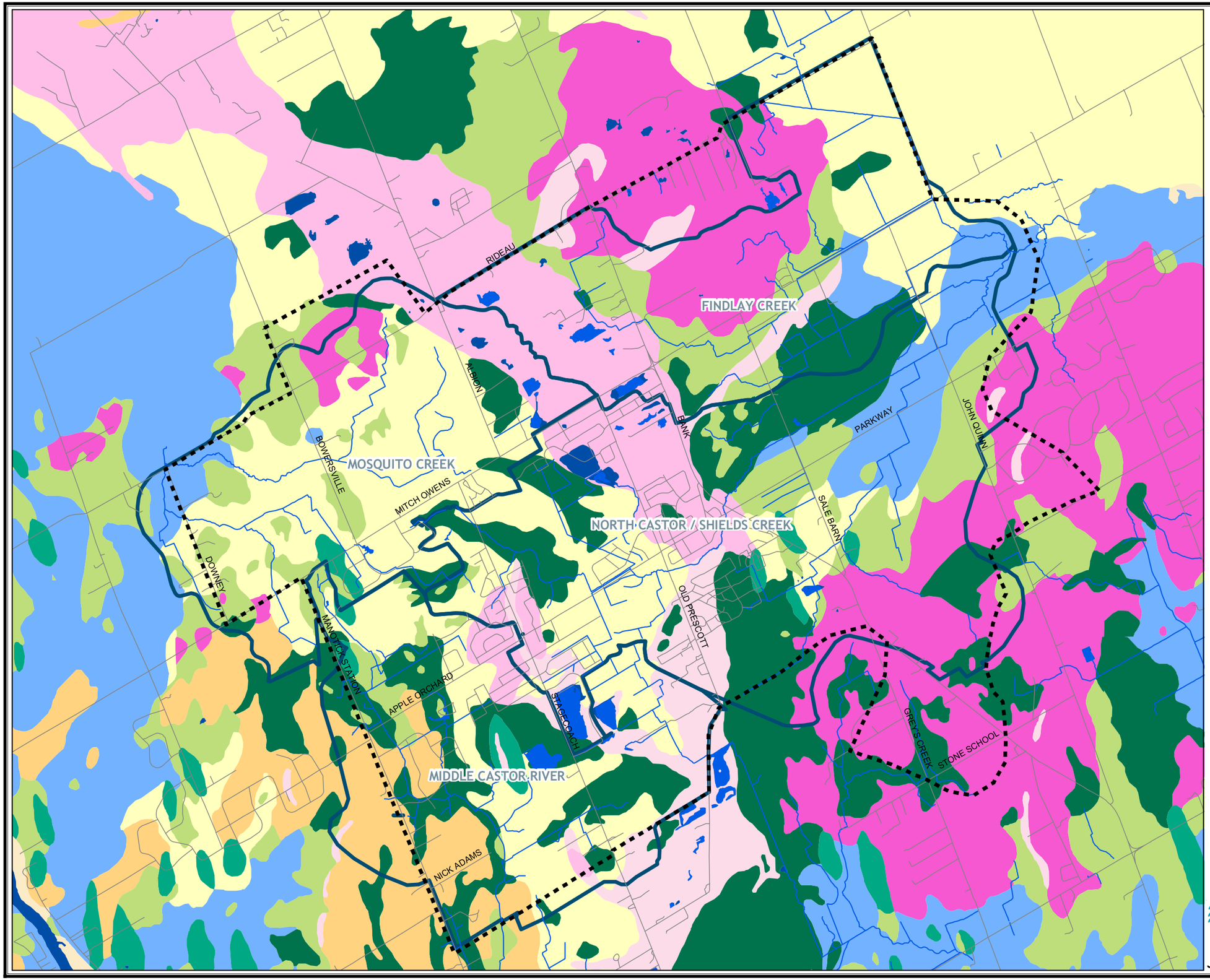
- Provide stormwater quantity storage facilities to attenuate stormwater runoff prior to discharge to receiving watercourses.
- Efforts should be made to maintain or enhance the volume of recharge in areas where the overburden is thin, bedrock outcrops, where layers of sand and gravel are found at or near ground surface, or in areas that can be characterized as such during site specific studies.
- Best Management Practices (BMPs) to address stormwater recharge should be designed to provide for a water quality to meet ODWQO prior to recharging any local aquifer systems in order to protect the integrity of local well users.
- Bringing water from outside subcatchment areas or the subwatershed and from deeper confined aquifers can increase local recharge and potential baseflow.
- Locations of services can short-circuit groundwater flow through the permeable underfill and may modify local groundwater flow systems. Facilities exist to potentially enhance baseflow but care must be taken not to intercept groundwater feeding existing springs or local discharge.
- Properties with storage tanks, either surface or subsurface, should be monitored with appropriate monitoring wells and a groundwater sampling program, where the stored products pose a contaminant threat if leakage occurs (i.e., petroleum products).
- The application of fertilizers, pesticides, roadsalt etc. should be assessed during, and subsequent to the detailed groundwater quality study currently being carried out.
- An inspection and education program should be considered for the existing and/or continued use of private septic systems and wells.
- A study area wide groundwater monitoring program should be developed to assess ongoing trends in groundwater quality and groundwater levels.
- Land use policies, source protection and pollution prevention programs are needed to protect the quality of groundwater, particularly in the Shields Creek area given the sensitivity of water supply sources.

6.3.4.8 Pollution Prevention/Spill Control

The City of Ottawa Sewer Use By-law (By-law 2003 514 – also Ottawa Regulatory Code, Part 5.2 Sewers, Sewage Works and Control of Discharges) has several provisions regarding stormwater that can be used to control potential spills. The Sewer Use By-law establishes limits for various pollutants being discharged into sewers and specifies provisions to permit the discharge of otherwise prohibited waste. The By-law also identifies requirements which industrial facilities have to meet before they discharge their wastewater into the sewer system or have their liquid waste hauled to the wastewater treatment plant. It enables the City to monitor and control contaminants discharged into the sewer system.

The Sewer Use By-law applies to all discharges to any sanitary, storm, or combined sewer within Ottawa, regardless of the source of the waste. While the focus of the Sewer Use Program is on industrial discharges, these limits and restrictions also apply to residential discharges.

The By-law outlines activities which are part of the Sewer Use Program, including reporting; sampling and inspections; approvals and agreements; and notification requirements for unusual discharge or spills. The City has the authority to charge an individual or industrial facility that does not comply with the Sewer Use By-law.



Shields Creek Subwatershed Study

INFILTRATION RATES

Legend

- Study Area Boundary
- Roads
- Watercourse
- Ponds
- Subwatershed

Infiltration Rate (mm/yr)

- 200 - 350
- 100 - 350
- 100 - 350
- 100 - 200
- 100 - 200
- 100 -250
- 25 - 100
- 50 -150
- 50 -250
- 10 -100
- 25 -100
- 100 -250
- 50 - 100
- 50 - 150
- 50 - 100

N

0 500 1,000 1,500

Meters

TSH engineers architects planners

PARISH geomorphic

Jacques Whitford Environmental, Geotechnical and Risk Management Consultants

Blackport & Associates

Donald G. Weatherbe Associates Inc.

June 28, 2004

Figure 5.5.1

Project Summary Report: 5545 Albion Road Stormceptor Sizing

Project Information & Location			
Project Name	5545 Albion Road	**Project Number**	62648
City	Ottawa	**State/ Province**	Ontario
Country	Canada	**Date**	9/21/2023
Designer Information		**EOR Information (optional)**	
Name	Anton Chetrar	**Name**	
Company	Arcadis	**Company**	
Phone #	613-882-8197	**Phone #**	
Email	anton.chetrar@arcadis.com	**Email**	

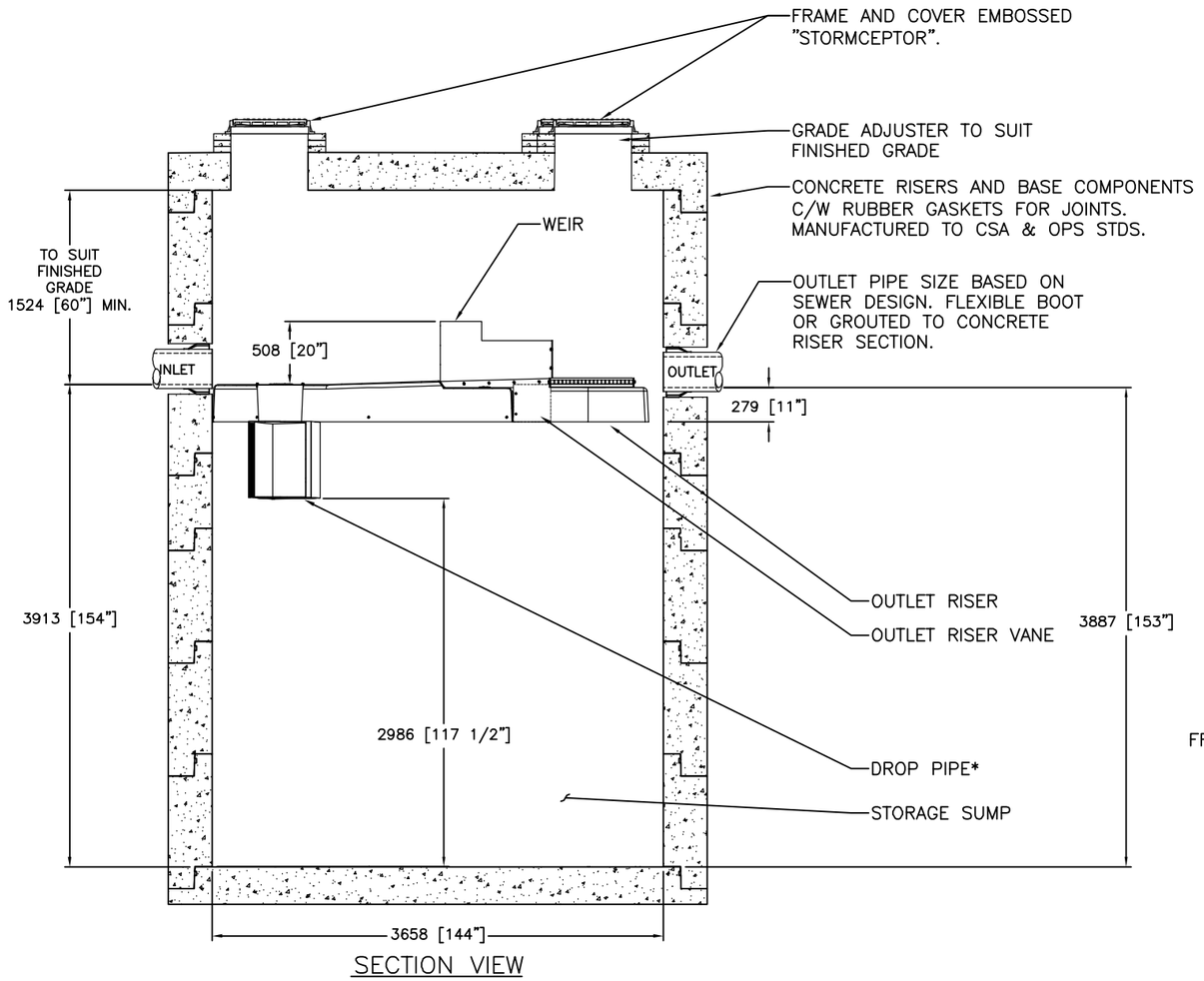
Stormwater Treatment Recommendation
The recommended Stormceptor Model(s) which achieve or exceed the user defined water quality objective for each site within the project are listed in the below Sizing Summary table.

Project Summary						
Site Name	**Drainage Area (ha)**	**Imperviousness %**	**PSD**	**Target TSS Removal (%)**	**TSS Removal (%) Provided**	**Recommended Model**
5545 Albion Road	2.19	0.90		60	62	EFO12

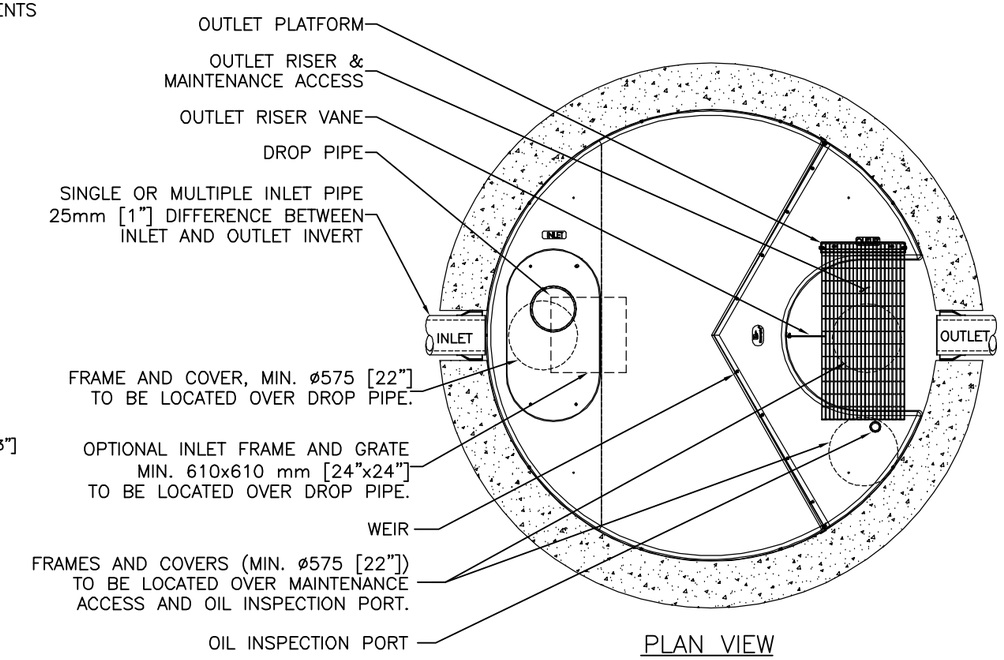
Notes

• Stormceptor performance estimates are based on simulations using PCSWMM for Stormceptor, which uses the EPA Rainfall and Runoff modules.
• Design estimates listed are only representative of specific project requirements based on total suspended solids (TSS) removal defined by the selected PSD, and based on stable site conditions only, after construction is completed.
• For submerged applications or sites specific to spill control, please contact your local Stormceptor representative for further design assistance.

DRAWING NOT TO BE USED FOR CONSTRUCTION



SECTION VIEW



PLAN VIEW

GENERAL NOTES:

* MAXIMUM SURFACE LOADING RATE (SLR) INTO LOWER CHAMBER THROUGH DROP PIPE IS 1135 L/min/m^2 (27.9 gpm/ft^2) FOR STORMCEPTOR EF12 AND 535 L/min/m^2 (13.1 gpm/ft^2) FOR STORMCEPTOR EFO12 (OIL CAPTURE CONFIGURATION).

1. ALL DIMENSIONS INDICATED ARE IN MILLIMETERS (INCHES) UNLESS OTHERWISE SPECIFIED.
2. STORMCEPTOR STRUCTURE INLET AND OUTLET PIPE SIZE AND ORIENTATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
3. UNLESS OTHERWISE NOTED, BYPASS INFRASTRUCTURE, SUCH AS ALL UPSTREAM DIVERSION STRUCTURES, CONNECTING STRUCTURES, OR PIPE CONDUITS CONNECTING TO COMPLETE THE STORMCEPTOR SYSTEM SHALL BE PROVIDED AND ADDRESSED SEPARATELY.
4. DRAWING FOR INFORMATION PURPOSES ONLY. REFER TO ENGINEER'S SITE/UTILITY PLAN FOR STRUCTURE ORIENTATION.
5. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

INSTALLATION NOTES

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE (LIFTING CLUTCHES PROVIDED)
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT)
D. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT THE DEVICE FROM CONSTRUCTION-RELATED EROSION RUNOFF.
E. DEVICE ACTIVATION, BY CONTRACTOR, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE STORMCEPTOR UNIT IS CLEAN AND FREE OF DEBRIS.

FOR SITE SPECIFIC DRAWINGS PLEASE CONTACT YOUR LOCAL STORMCEPTOR REPRESENTATIVE. SITE SPECIFIC DRAWINGS ARE BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME. SOME FIELD REVISIONS TO THE SYSTEM LOCATION OR CONNECTION PIPING MAY BE NECESSARY BASED ON AVAILABLE SPACE OR SITE CONFIGURATION REVISIONS. ELEVATIONS SHOULD BE MAINTAINED EXCEPT WHERE NOTED ON BYPASS STRUCTURE (IF REQUIRED).

STANDARD DETAIL
NOT FOR CONSTRUCTION

SITE SPECIFIC DATA REQUIREMENTS

STORMCEPTOR MODEL	EFO12				
STRUCTURE ID					*
HYDROCARBON STORAGE REQ'D (L)					*
WATER QUALITY FLOW RATE (L/s)					*
PEAK FLOW RATE (L/s)					*
RETURN PERIOD OF PEAK FLOW (yrs)					*
DRAINAGE AREA (HA)					*
DRAINAGE AREA IMPERVIOUSNESS (%)					*
PIPE DATA:	I.E.	MAT'L	DIA	SLOPE %	HGL
INLET #1	*	*	*	*	*
INLET #2	*	*	*	*	*
OUTLET	*	*	*	*	*

* PER ENGINEER OF RECORD

MARK	DATE	REVISION DESCRIPTION	BY
1	6/8/18	OUTLET PLATFORM	JSK
0	5/26/17	INITIAL RELEASE	JSK

Stormceptor® EF

SCALE = NTS

imbrium®
407 FAIRVIEW DRIVE, WHITBY, ON L1N 9A9
TF 800-565-4801 CA 416-665-8600 INTL +1-416-665-8600

DATE:	10/24/2017
DESIGNED:	JSK
DRAWN:	JSK
CHECKED:	BSF
APPROVED:	SP
PROJECT No.:	EFO12
SEQUENCE No.:	*
SHEET:	1 OF 1

Chetrar, Anton

From: Brandon O'Leary <brandon.oleary@RinkerPipe.com>
Sent: Thursday, September 21, 2023 7:13 PM
To: Chetrar, Anton
Subject: Stormceptor MAX Sizings

Follow Up Flag: Flag for follow up
Flag Status: Flagged

Hello Anton,

I hope that all is well! I wanted to let you know that if you require any help with Stormceptor/Jellyfish sizings for large sites (parallel units or our MAX unit) to please let me know. I also would like to let you know that **if you are using the ETV PSD for sizing that 60% TSS removal is typically the target**; this is equivalent to 80% TSS removal of the coarser MoE FINE PSD, which is also available for sizing the EFO and EF units on the online sizing tool. In order to achieve 80% TSS removal of the ETV PSD, the Jellyfish would be required (a sizing can be provided by myself). If you need anything, feel free to let me know.

Looking forward to hearing from you,
Brandon O'Leary, P.Eng., B.A.Sc.
Stormwater Specialist
Bowmanville/Cambridge Plant
Cell: (905) 630-0359

Rinker MATERIALS
A QUIKRETE COMPANY

We are excited to announce that Forterra is now Rinker Materials

Stormceptor

Protecting the water for future generations

Our Online Sizing Tool for the Stormceptor EFO: https://www.imbriumsystems.com/login?returnurl=%2flaunch-pcswmm-for-stormceptor

◆ 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_VR2023-11-15_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, 2023
Vancouver, BC, Canada

Verification Body
GLOBE Performance Solutions
404 – 999 Canada Place | Vancouver, B.C | Canada |V6C 3E2

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.

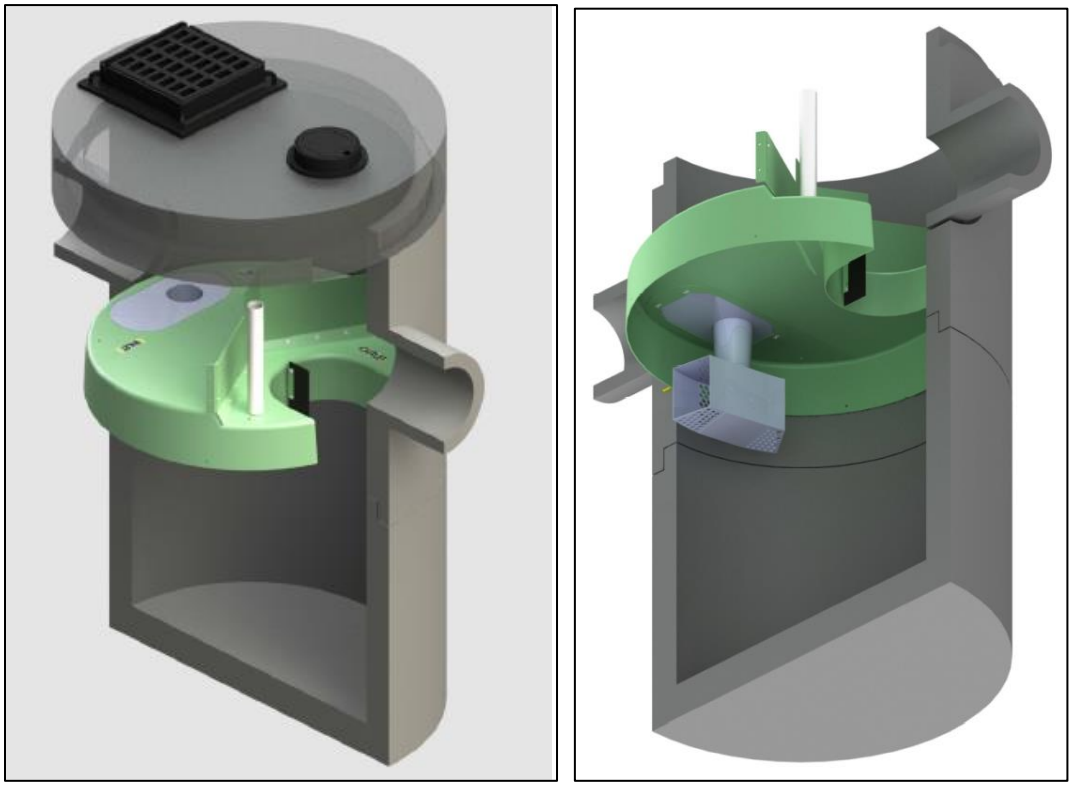


Figure 1. Graphic of typical inline Stormceptor® unit and core components.

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.

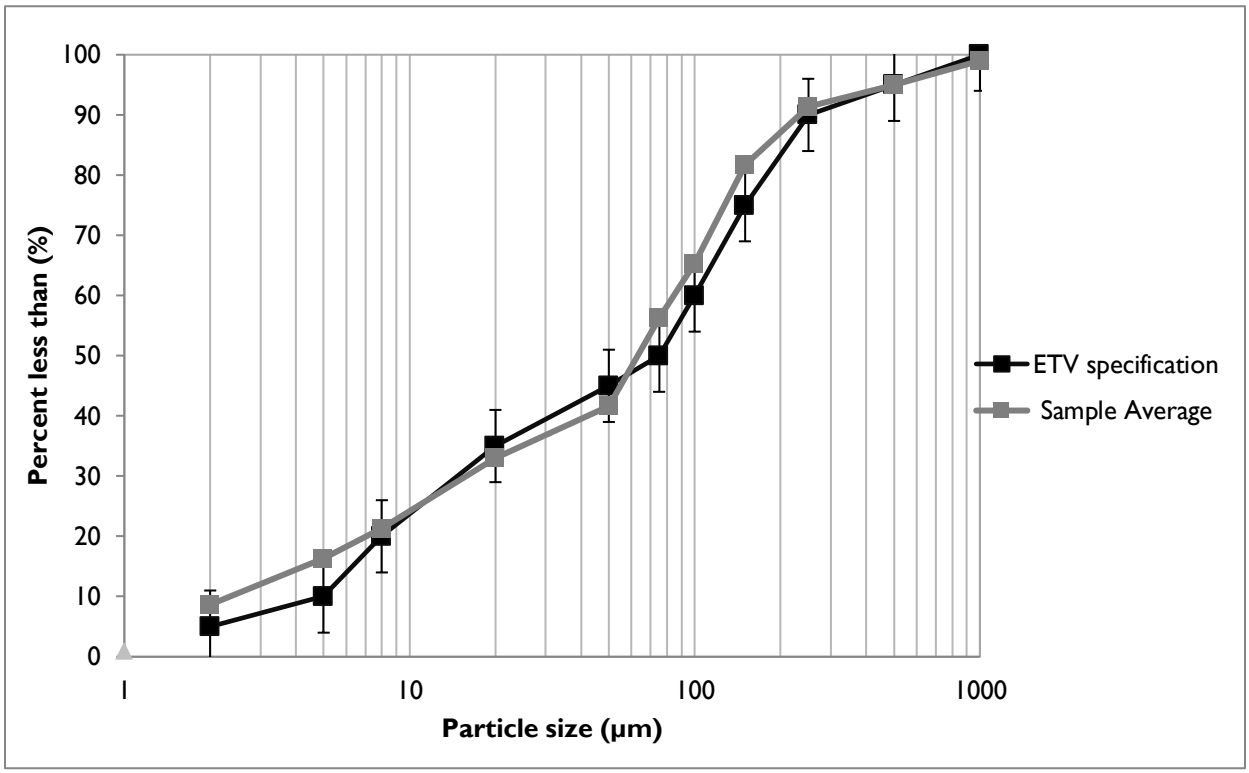


Figure 2. The three sample average particle size distribution (PSD) of the test sediment used for the capture and scour test compared to the specified PSD.

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.

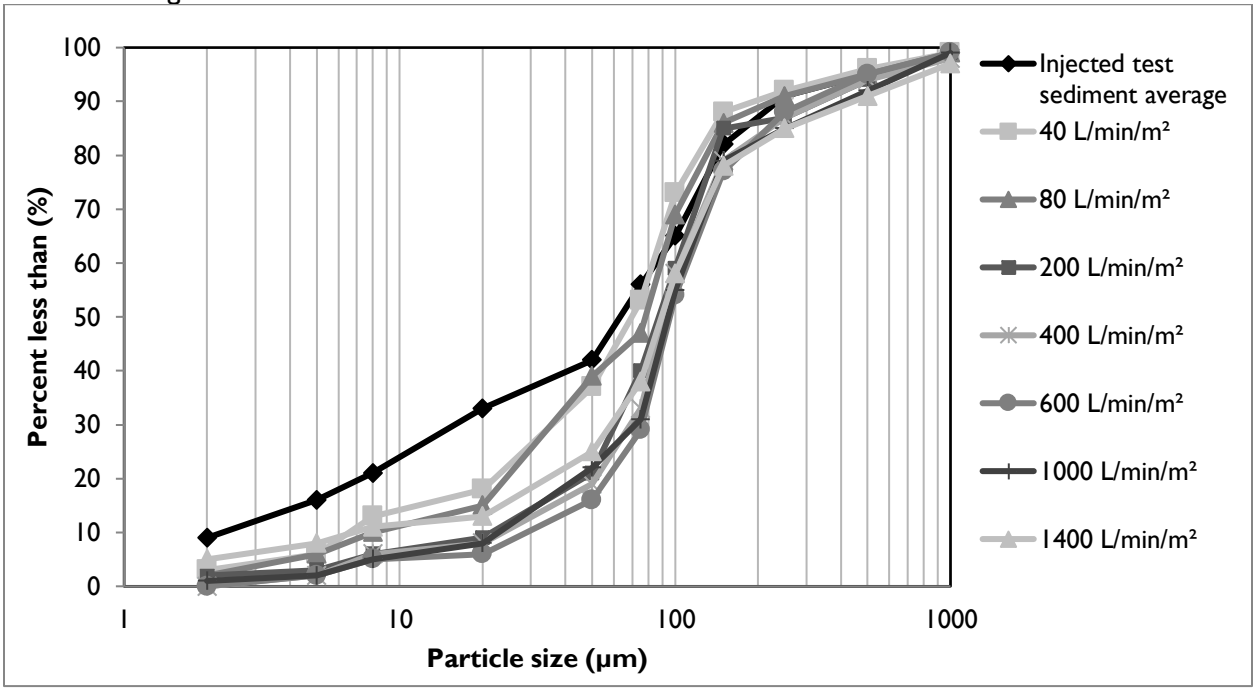


Figure 3. Particle size distribution of sediment retained in the EF4 in relation to the injected test sediment average.

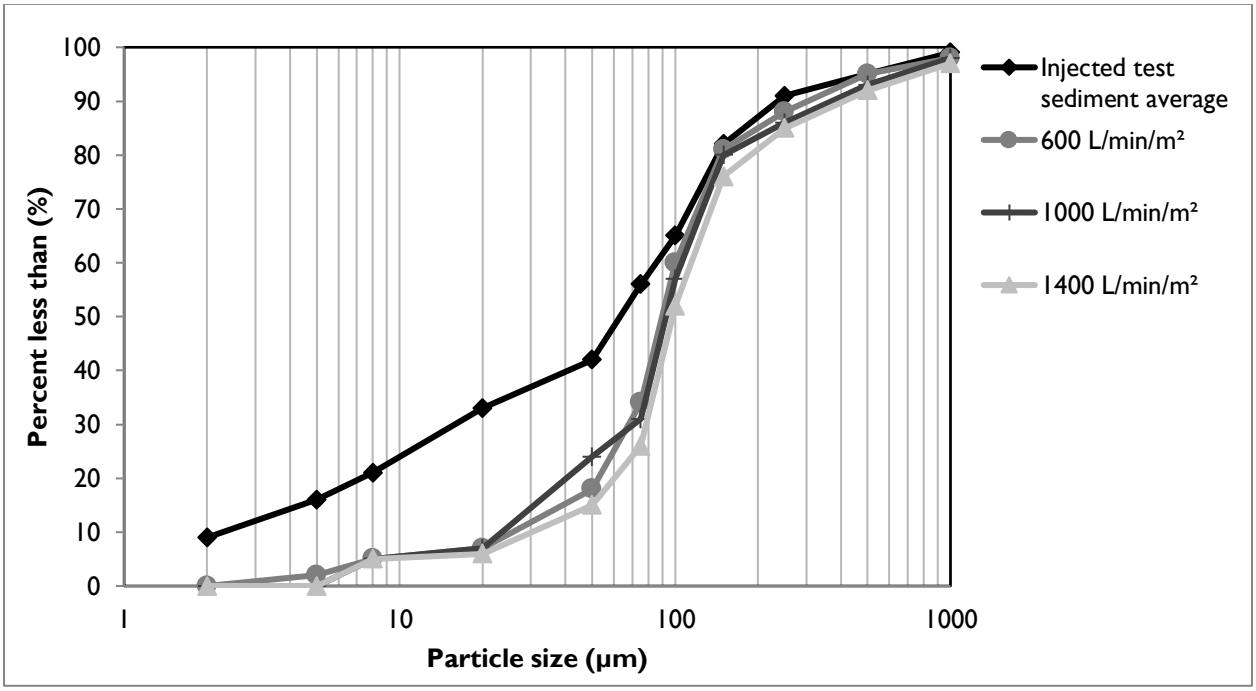


Figure 4. Particle size distribution of sediment retained in the EFO4 in relation to the injected test sediment average at surface loading rates above the bypass rate of 535 L/min/m²

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.

For more information on the Stormceptor® EF and EFO OGS please contact:

Imbrium Systems, Inc.
407 Fairview Drive
Whitby, ON
L1N 3A9, Canada
Tel: 416-960-9900
info@imbriumsystems.com

For more information on ISO 14034:2016 / ETV please contact:

GLOBE Performance Solutions
World Trade Centre
404 – 999 Canada Place
Vancouver, BC
V6C 3E2 Canada
Tel: 604-695-5018 / Toll Free: 1-855-695-5018
etv@globeperformance.com

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ADVANCED

MOZZIE PREVENTION

The Next Generation in Rain Heads!

- Advanced debris shedding technology
- Designed to prevent water shedding
- High flow rate performance
- Self cleaning
- Low maintenance

Prevent leaves and debris from entering your Rain Harvesting System

Suitable for vertical and horizontal (rear outlet) pipe installations

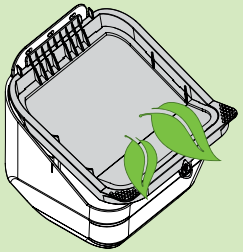
VH pivot OUTLET™

FITS 4" round downspouts (adaptor included)

clean shield™
NEXT GENERATION TECHNOLOGY

Next generation technology for advanced debris shedding.

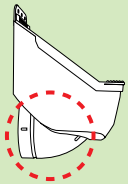
- ✓ Directs leaves & debris away from the flow of water
- ✓ Improves tank water quality
- ✓ Single screen for easy installation
- ✓ Self cleaning - low maintenance
- ✓ 1/32" aperture stainless steel mosquito proof screen
- ✓ Superior flow rate - collect more rainwater



VH pivot OUTLET™

VH Pivot Outlet makes installation easy!

- Pivot the outlet to suit vertical or horizontal (rear outlet) downspout
- One product adaptable to different installations.
- Rubber o-ring included for water tight seal


Horizontal Position


Vertical Position

Rain Harvesting™
www.rainharvesting.com
Rain Harvesting Pty Ltd, 1005 N Common Drive Aurora, Illinois 60504
Toll Free: +1 866 506 3047 | Ph: +1 (630) 405 – 0579 | Fax: +1 (630) 851 – 7744
info@rainharvesting.com | Made in China

PO300
9317118999876
9 317118 010229

INSTALLATION INSTRUCTIONS

GUTTER & MID-MOUNT INSTALLATION

STEP 1 **Gutter:** Measure 8" from the underside of the gutter and remove this section of downspout. Ensure the cut edge is clean and smooth.

Mid-Mount: Remove 8" of downspout where the Leaf Eater Advanced™ is to be situated. Ensure all cut edges are clean and smooth. **(FIGURE 1)**

STEP 2 Using the quick release tabs remove the Cleanshield™ screen by lifting it up and then out. **(FIGURE 2)**

STEP 3 Insert the Leaf Eater Advanced™ by sliding it up over the cut section and then down into position. The Leaf Eater Advanced™ outlet should be slid firmly onto the bottom downspout until it can be pushed no further. **(FIGURE 3)**

STEP 4 Screw the Leaf Eater Advanced™ into position through the screw slots provided. Ensure appropriate screws and anchors (if required) are used. **(FIGURE 5)**

STEP 5 Insert the Cleanshield™ screen into the Leaf Eater Advanced™. Ensure the Cleanshield™ screen is sitting firmly in place and check installation is secure. **(FIGURE 6)**

HORIZONTAL (REAR OUTLET) INSTALLATION

STEP 1 Using the quick release tabs remove the Cleanshield™ screen by lifting it up and then out. **(FIGURE 2)**

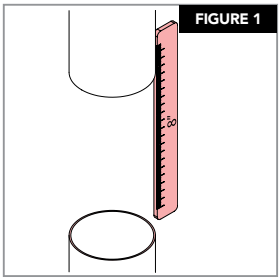
STEP 2 Swivel the outlet to the horizontal position - some force may be required.

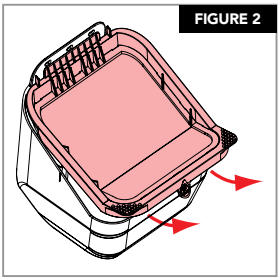
STEP 3 Position the Leaf Eater Advanced™ next to existing pipework, mark and cut top and bottom cut lines as per **FIGURE 4** . Ensure the cut edge is clean and smooth.

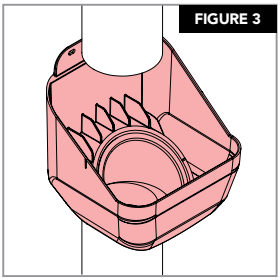
STEP 4 Insert the Leaf Eater Advanced™ by sliding the rear outlet into the horizontal pipe. The back fixing plate must sit behind the top section of downspout. **(FIGURE 3)**

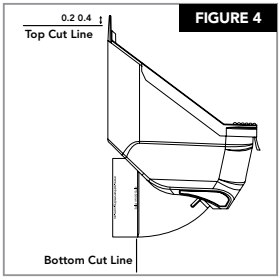
STEP 5 Screw the Leaf Eater Advanced™ into position through the screw slots provided. Ensure appropriate screws and anchors (if required) are used. **(FIGURE 5)**

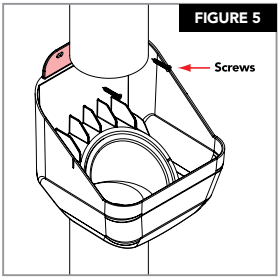
STEP 6 Insert the Cleanshield™ screen into the Leaf Eater Advanced™. Ensure the Cleanshield™ screen is sitting firmly in place and check installation is secure. **(FIGURE 6)**

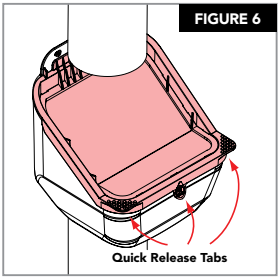












HANDY HINTS

PAINTING

Remove the Cleanshield™ screen when painting. It is not recommended to paint the frame of the Cleanshield™ screen.

CLEANING

The Cleanshield™ screen is mostly self cleaning. If cleaning is required simply lift the Cleanshield™ screen out by taking hold of the quick release tabs and pull the Cleanshield™ screen upwards and outwards, then hose or brush off.

PROTECTING THE HOME

General stormwater application
Rain Heads help ensure gutters and downspouts do not block up with leaves and debris.

Appendix E

Grading Plan 143219-C-200

Erosion and Sediment Control Plan 143219-C-900

GRADING LEGEND

- PROPOSED DITCH C/W FLOW DIRECTION AND SLOPE
- SLOPE C/W FLOW DIRECTION
- MAJOR OVERLAND FLOW ROUTE
- PROPOSED SPOT GRADE
- PROPOSED SWALE GRADE
- PROPOSED SWALE HIGH POINT GRADE
- LOT CORNER GRADE C/W EXISTING GRADE
- FULL STATIC PONDING GRADE
- RETAINING WALL C/W TOP OF WALL AND GRASS GRADE
- TERRACING 3:1 MAXIMUM UNLESS NOTED OTHERWISE
- 1 RISER
- FINISHED FLOOR ELEVATION
- TOP OF FOUNDATION ELEVATION
- UNDERSIDE OF FOOTING ELEVATION
- MINIMUM UNDERSIDE OF FOOTING (Based on the higher of the sewer obverts, or hydraulic grade line)
- MINIMUM GARAGE GRADE
- NOISE BARRIER LOCATION
- NOISE BARRIER GATE
- RIP-RAP

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ISSUES

No.	DESCRIPTION	DATE
1	SUBMISSION NO.1 FOR CITY REVIEW	2023-11-24
2	SUBMISSION NO.2 FOR CITY REVIEW	2024-03-20
3	ADDED TANK SECTIONS	2024-07-25
4	REVISED PER NEW SITE PLAN	2025-02-03
5		
6		
7		
8		

SEE 010 FOR NOTES, LEGEND, CB TABLE AND DETAILS

KEY PLAN

1:500 0 5 15 25m

SEAL

LICENSED PROFESSIONAL ENGINEER
L.D. K. Yannoulopoulos
2025/02/03
PROVINCE OF ONTARIO

ARCADIS
333 Preston Street - Suite 500
Ottawa ON K1S 5N4 Canada
tel 613 225 1311
www.arcadis.com

PROJECT
W.O. STINSON

ALBION & MITCH OWENS

PROJECT NO: 143219

DRAWN BY:	CHECKED BY:
D.D. / M.M.	R.M./D.G.Y.
PROJECT MGR:	APPROVED BY:
R.M.	D.G.Y.

SHEET TITLE
GRADING PLAN

SHEET NUMBER C-200 | ISSUE 4

SCALE CHECK 1 in 10mm XXXXX

PC2024-0353

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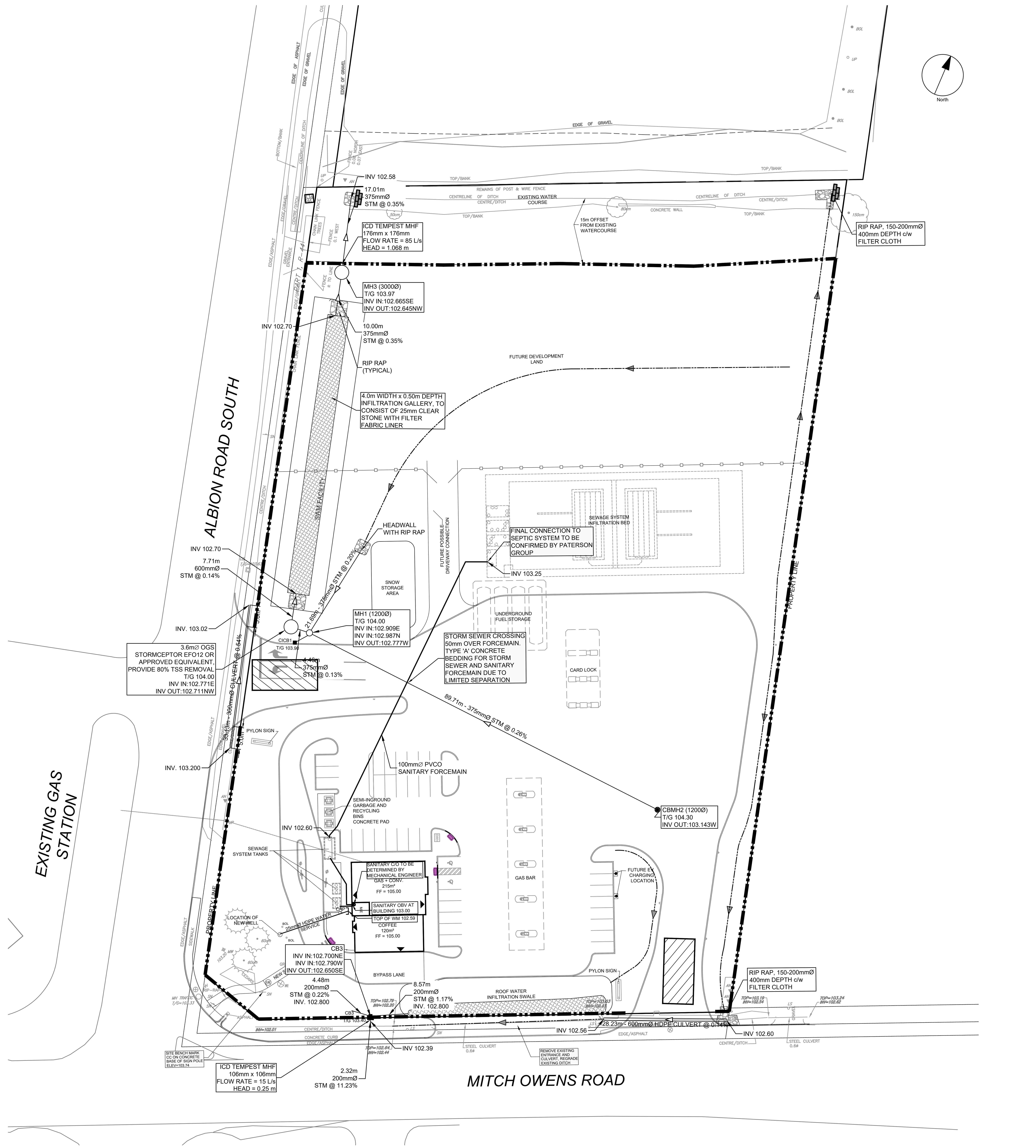


NOTES:

1. THE CONTRACTOR SHALL IMPLEMENT BEST MANAGEMENT PRACTICES, TO PROVIDE FOR PROTECTION OF THE AREA DRAINAGE SYSTEM AND THE RECEIVING WATERCOURSE, DURING CONSTRUCTION ACTIVITIES. THE CONTRACTOR ACKNOWLEDGES THAT FAILURE TO IMPLEMENT APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES MAY BE SUBJECT TO PENALTIES IMPOSED BY ANY APPLICABLE REGULATORY AGENCY.
2. SILT FENCE TO BE ERECTED PRIOR TO EARTH WORKS BEING COMMENCED. SILT FENCE TO BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED OR UNTIL START OF SUBSEQUENT PHASE.
3. STRAW BALE SEDIMENT TRAPS TO BE CONSTRUCTED IN EXISTING ROAD SIDE DITCHES. TRAPS TO REMAIN AND BE MAINTAINED UNTIL VEGETATION IS ESTABLISHED.
4. SILT SACK TO BE PLACED AND MAINTAINED UNDER COVER OF ALL CATCHBASINS. GEOTEXTILE SILT SACK IN STREET CBs TO REMAIN UNTIL ALL CURBS ARE CONSTRUCTED. GEOTEXTILE FABRIC IN RYCBs TO REMAIN UNTIL VEGETATION IS ESTABLISHED. ALL CATCHBASINS TO BE REGULARLY INSPECTED AND CLEANED, AS NECESSARY, UNTIL SOD AND CURBS ARE CONSTRUCTED.
5. CONTRACTOR TO PROVIDE DETAILS ON LOCATION(S) AND DESIGN OF DEWATERING TRAP(S) PRIOR TO COMMENCING WORK. CONTRACTOR ALSO RESPONSIBLE FOR MAINTAINING TRAP(S) AND ADJUSTING SIZE(S) IF DEEMED REQUIRED BY THE ENGINEER DURING CONSTRUCTION.
6. CONTRACTOR TO PROTECT EXISTING CATCHBASINS WITH FILTER CLOTH UNDER THE COVERS TO TRAP SEDIMENTATION. REFER TO IDENTIFIED STRUCTURES.
7. WORKS NOTED ABOVE ARE TO BE INSTALLED, INSPECTED, MAINTAINED AND ULTIMATELY REMOVED BY SERVICING CONTRACTOR.
8. THIS IS A "LIVING DOCUMENT" AND MAY BE MODIFIED IN THE EVENT THE PROPOSED CONTROL MEASURES ARE INSUFFICIENT.

LIGHT DUTY SILT FENCE AS PER OPSD-219.110

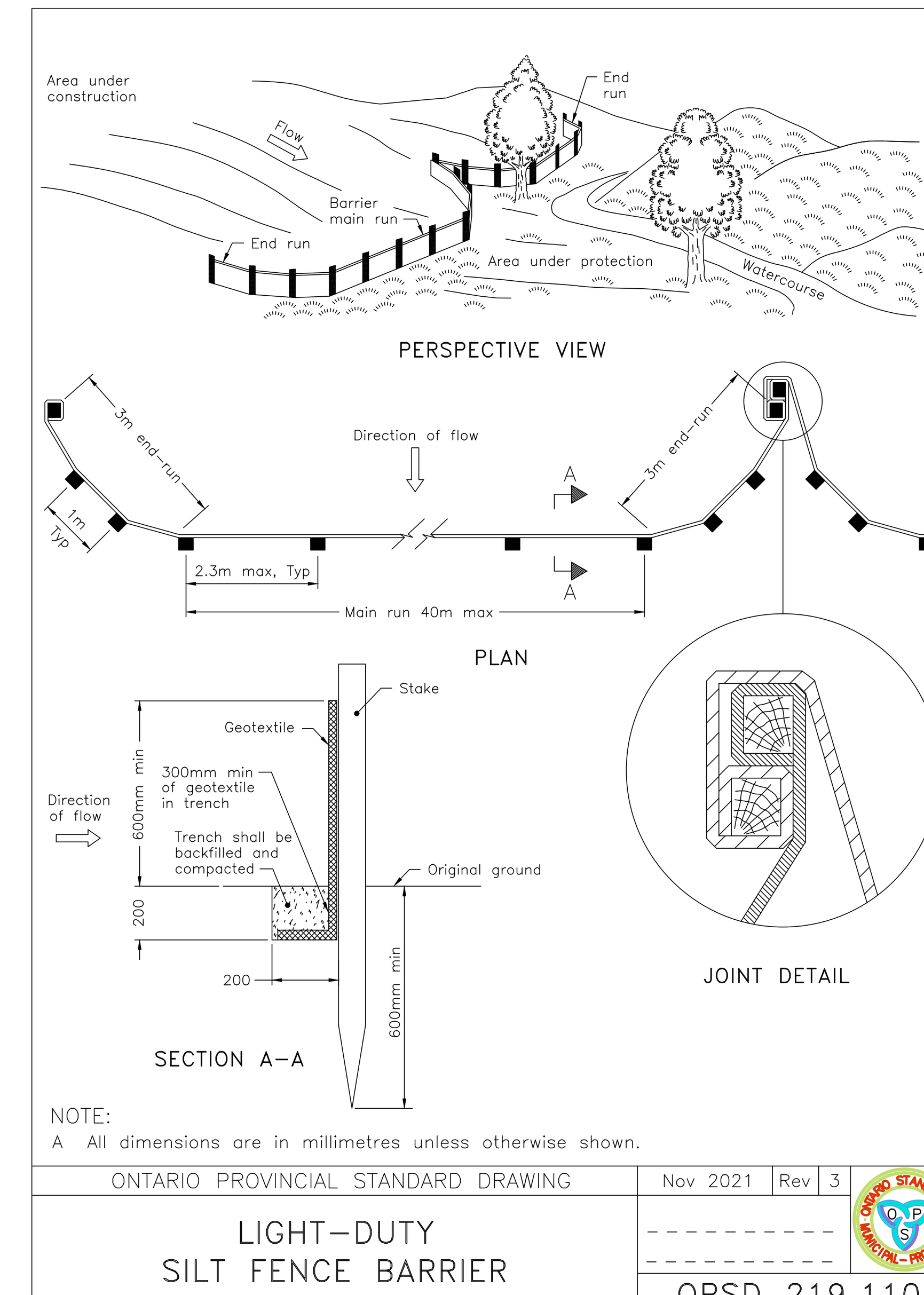
SNOW FENCE

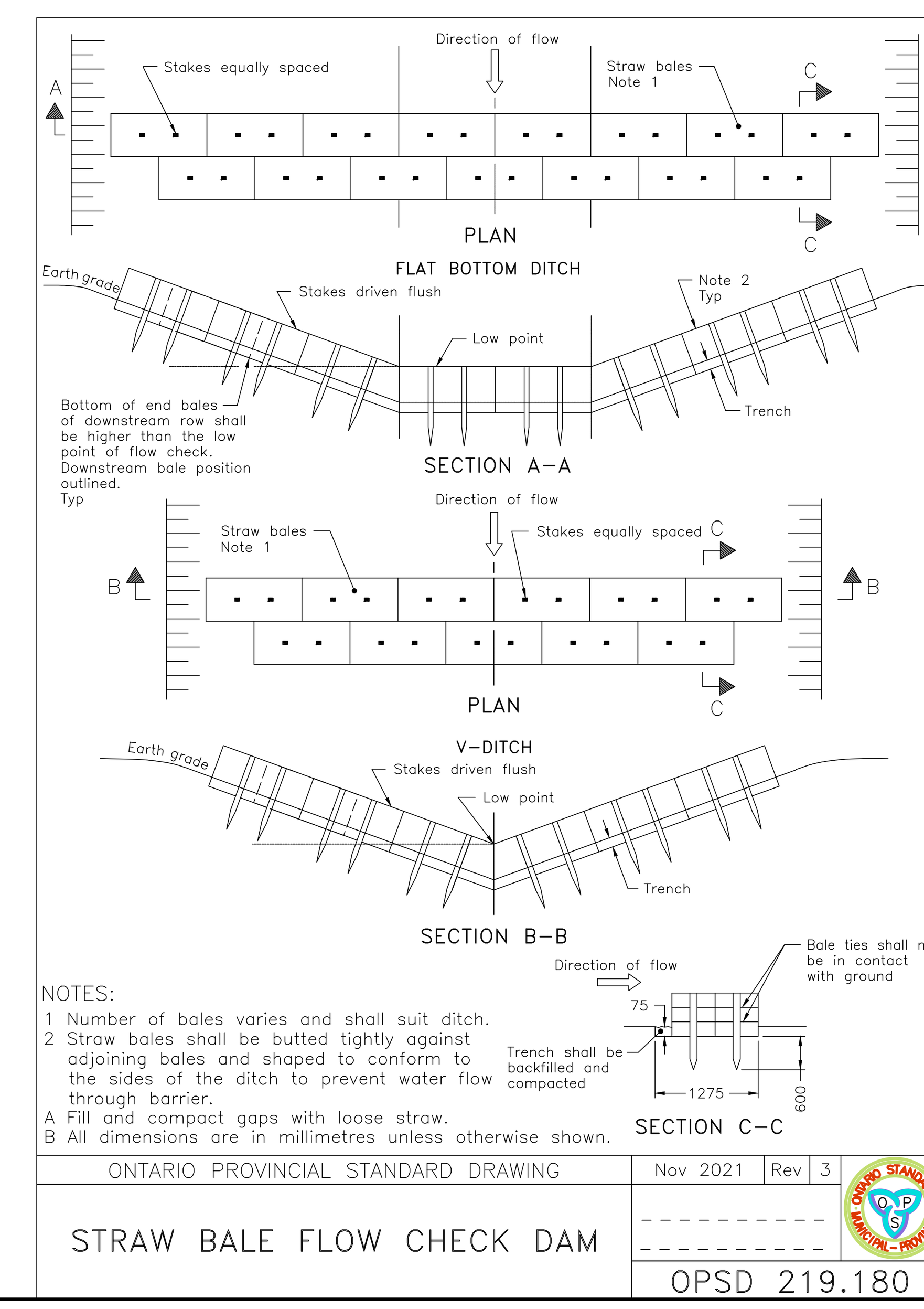
STRAW BALE CHECK DAM AS PER OPSD-219.180

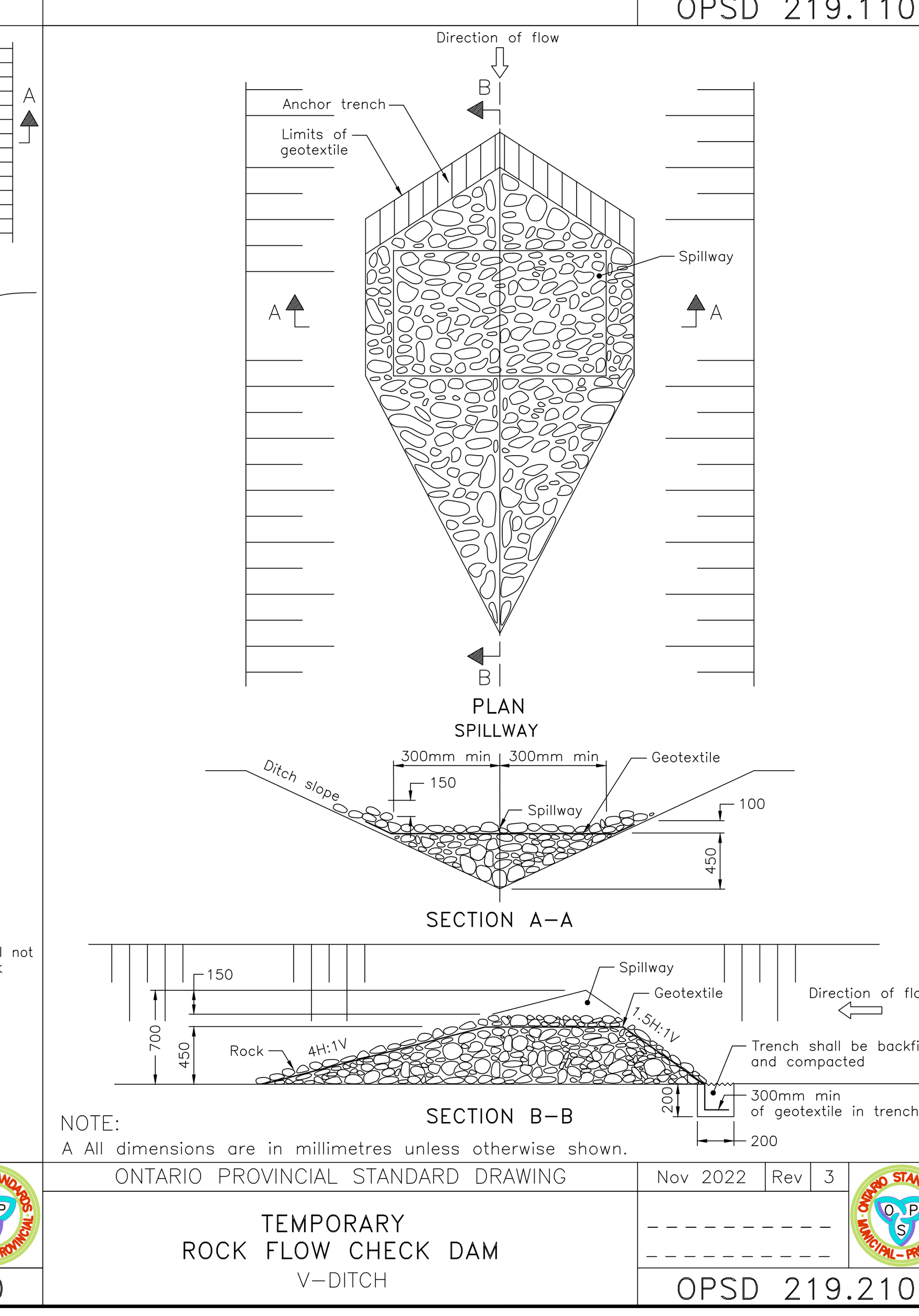
ROCK CHECK DAM AS PER OPSD-219.210

SILT SACK PLACED UNDER EXISTING CB COVER

TEMPORARY MUD MAT 0.15m THICK 50mm CLEAR STONE ON NON WOVEN FILTER CLOTH







CLIENT

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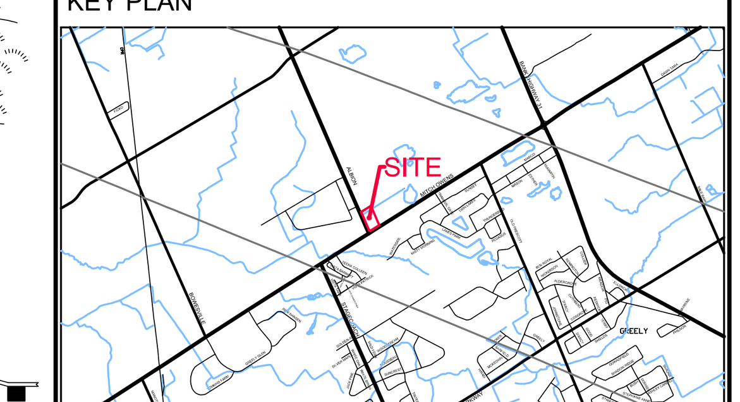
KEY PLAN



1:500 0 5 15 25m

SEAL

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PROJECT

W.O. STINSON

ALBION & MITCH OWENS

PROJECT NO:	
143219	
DRAWN BY: D.D. / M.M.	CHECKED BY: R.M./D.G.Y.
PROJECT MGR: R.M.	APPROVED BY: D.G.Y.

SHEET TITLE

SEDIMENT & EROSION CONTROL PLAN

SHEET NUMBER C-900

ISSUE 4

PC2024-0353

File Location: J:\143219_WO_Stinson\7.0_Production\7.03_Design\04_Civil\Sheets\900 EROSION - SEDIMENT PLAN.dwg Last Saved: January 6, 2025, by milnem4626 Plotted: January 31, 2025 4:34:23 PM by Milne, Marian

SCALE CHECK 1 in 10mm

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