

**STORMWATER MANAGEMENT FEATURES
OPERATION & MAINTENANCE MANUAL**

**794047 COUNTY ROAD 124
TOWNSHIP OF CLEARVIEW
REGION OF SIMCOE**

**PREPARED FOR:
JKI CANADA UTILITIES INC.**

**PREPARED BY:
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TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	FACILITY DESCRIPTION	1
3.0	FACILITY OPERATIONS AND MAINTENANCE	1
3.1	Maintenance and Operations for the Stormceptor EF04 Oil/Grit Separator ...	1
3.1.1	Access	1
3.1.2	Inspections.....	1
3.1.3	Sediment and Oil Removal and Maintenance.....	2
3.2	Maintenance for the Dry Stormwater Management Pond	2
3.2.1	Access	2
3.2.2	Inspections.....	2
3.2.3	Maintenance	2
3.3	Maintenance for the Storm Sewer Infrastructure Including the Control Structure.....	2
3.3.1	Access	2
3.3.2	Inspections.....	2
3.3.3	Maintenance	2
4.0	CONTACT INFORMATION	2
5.0	REFERENCES.....	3

LIST OF FIGURES

Drawing C102: General Site Servicing Plan

Drawing C105: Construction Notes and Standards Details

LIST OF APPENDICES

Appendix A: Stormceptor EF - Owner's Manual

1.0 INTRODUCTION

C.F. Crozier & Associates Inc. (Crozier) was retained by JKI Canada Utilities Inc. (Client) to prepare an Operations & Maintenance Manual Report (O&M Manual) for the site located at 794047 County Road 124 in the Township of Clearview, Simcoe County. The proposed development consists of a Tim Horton's fast-food restaurant addition to the existing gas station and convenience store.

794047 County Road 124 covers an area of approximately 0.54 ha (1.23 acres) in size (herein referred to as the 'Subject Site') and is legally described as Part Lot 17 & 18, Concession 12. The property is bounded by County Road 124 to the west, the Clearview Fire Station No. 5 to the north, and existing agricultural lands to the east and south.

This manual has been prepared to provide a detailed summary of the operation and maintenance procedures and protocols for the Stormceptor EF Oil/Grit Separator (OGS), the dry pond, and the onsite storm sewer system. The goal of the O&M manual is to ensure the long-term successful operation of the stormwater management system.

2.0 FACILITY DESCRIPTION

The management of stormwater and site drainage for the development must comply with the policies and standards of the various agencies including the Township of Clearview, the NVCA, and the MECP. The primary methods implemented to meet these standards is a Stormtech EF Oil/Grit Separator, underground storage and a dry pond with outflows controlled in a control manhole with two orifice plates. The location of the OGS and the pond are shown on Drawing C102 while additional details for the OGS can be found on Drawing C105. Discussion and calculations related to the detailed SWM design for the site are provided in the *Functional Servicing & Stormwater Management Implementation Report (Crozier, July 2021)*, provided under separate cover.

Drainage from site will be controlled and captured in a series of catchbasins and retained onsite in pipes and the dry pond. Flow will be conveyed through the onsite storm sewers towards a control maintenance hole. The controlled flows will then pass through the OGS and be directed to the outlet located in the existing ditch on Simcoe County Road No. 124.

3.0 FACILITY OPERATIONS AND MAINTENANCE

It is understood that JKI Canada Utilities Inc. will be responsible for the operation and maintenance of the treatment system post-construction. Maintenance procedures associated with the OGS, the Dry Pond, and the Storm Sewers are provided below.

3.1 Maintenance and Operations for the Stormceptor EF04 Oil/Grit Separator

3.1.1 Access

The OGS, located in northwest region of the site, can be accessed for maintenance through a frame and covers located on the structure. A VAC truck parked adjacent to the OGS, within the site, will be able to extend to the OGS for maintenance.

3.1.2 Inspections

Maintenance of most Stormtech units are performed using a vacuum truck at regular intervals. Visual inspections should be conducted every 6 months and immediately after oil, fuel, or other

chemical spills. A dipstick should be used to measure the depth of oil and sediment in the unit. Further information regarding this program begins on page 7 of the Stormtech EF Owner's Manual in Appendix A.

3.1.3 Sediment and Oil Removal and Maintenance

If a large presence of oil is measured, or if a spill is known to have occurred, the unit should be serviced immediately. A sediment depth reading of 203 mm would warrant a maintenance service for this unit.

3.2 **Maintenance for the Dry Stormwater Management Pond**

3.2.1 Access

The dry pond is located in the southeast region of the site.

3.2.2 Inspections

Regular inspections are to be conducted every 6 months for the presence of any debris, oil, or sediment which could block the flow through the sewer pipe. In addition, 24 hours after a large storm event, the pond should be visually inspected to see if water is still present. Water after 24 hours may indicate blockage in the system.

3.2.3 Maintenance

If a large presence of debris, sediment or oil is observed, the SWM pond should be cleaned. Regular grass maintenance is also expected to insure proper drainage out of the SWM pond.

3.3 **Maintenance for the Storm Sewer Infrastructure Including the Control Structure**

3.3.1 Access

Access to the storm sewers will be provided via manholes and catchbasins located within the parking lots. The control maintenance hole is located near the northern site entrance.

3.3.2 Inspections

Inspections are to be conducted every 6 months. The presence of sediment, debris, or oil in the catchbasins, manholes and sewers may be determined visually (or via CCTV inspection). The orifice plates within the control maintenance hole (CTRLMH1) must be inspected for blockages.

3.3.3 Maintenance

If a large presence of debris, sediment or oil is observed, the storm sewer infrastructure is to be flushed and cleaned.

4.0 **CONTACT INFORMATION**

The following table gives the relevant contact information for the operation and maintenance of the stormwater treatment system.

Agency	Contact Information	Contact Person
MOE Spill Action Centre	5775 Yonge Street 5th floor North York ON M2M 4J1 Toll Free: 1-800-268-6060 Tel: (416) 325-3000 Fax (416) 325-3011	
Forterra Stormceptor	2099 Roseville Rd, Cambridge, ON N1R 5S3 Tel: (519) 622-7574	
C.F. Crozier & Associates Inc. (Engineers)	40 Huron Street, Suite 301 Collingwood, ON L9Y 4R3 Tel: (705) 446-3510 Email: jproctor@cfcrozier.ca	Jon Proctor, P.Eng. Associate

5.0 REFERENCES

This O&M Manual was developed based on recommendations from:

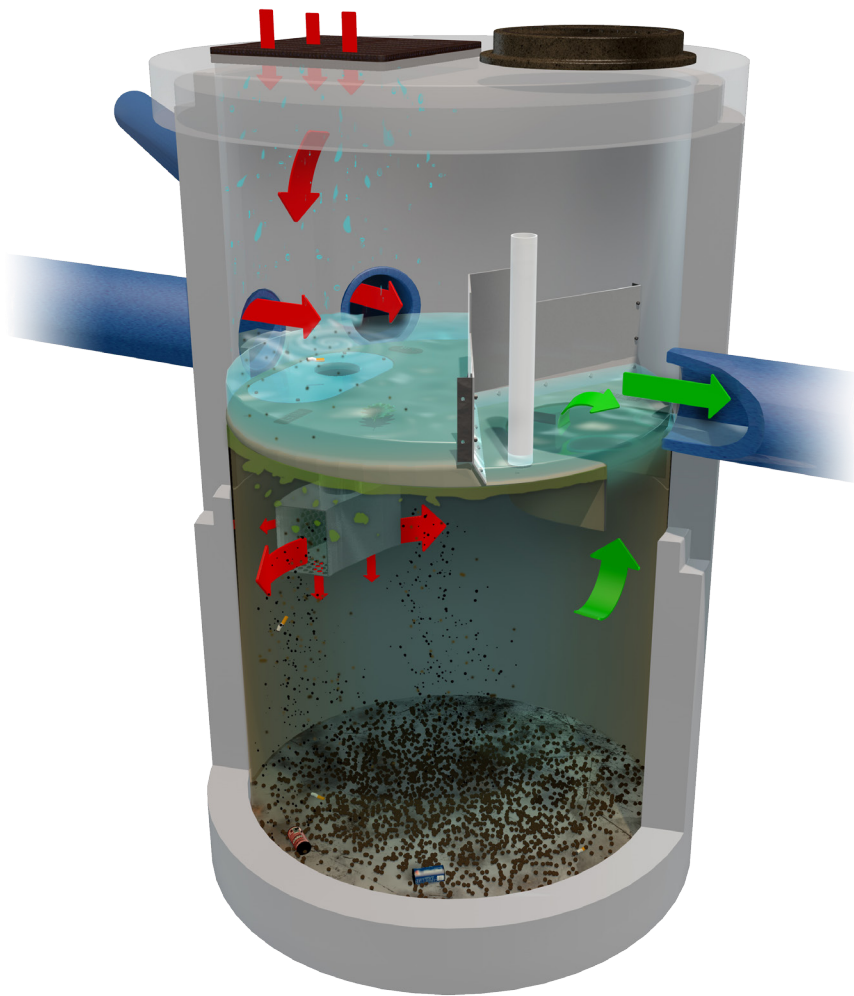
1. *Stormwater Planning and Design Manual*, Ministry of the Environment (2003)
2. *Stormceptor EF – Owner's Manual* [document attached]

APPENDIX A:

STORMCEPTOR EF – OWNER'S MANUAL

Stormceptor[®] **EF**

Owner's Manual



STORMCEPTOR® EF IS PATENT-PENDING.

TABLE OF CONTENTS

- **STORMCEPTOR EF OVERVIEW**
- **STORMCEPTOR EF OPERATION AND COMPONENTS**
- **STORMCEPTOR EF MODEL DETAILS**
- **STORMCEPTOR EF IDENTIFICATION**
- **STORMCEPTOR EF INSPECTION AND MAINTENANCE**
- **STORMCEPTOR CONTACTS**

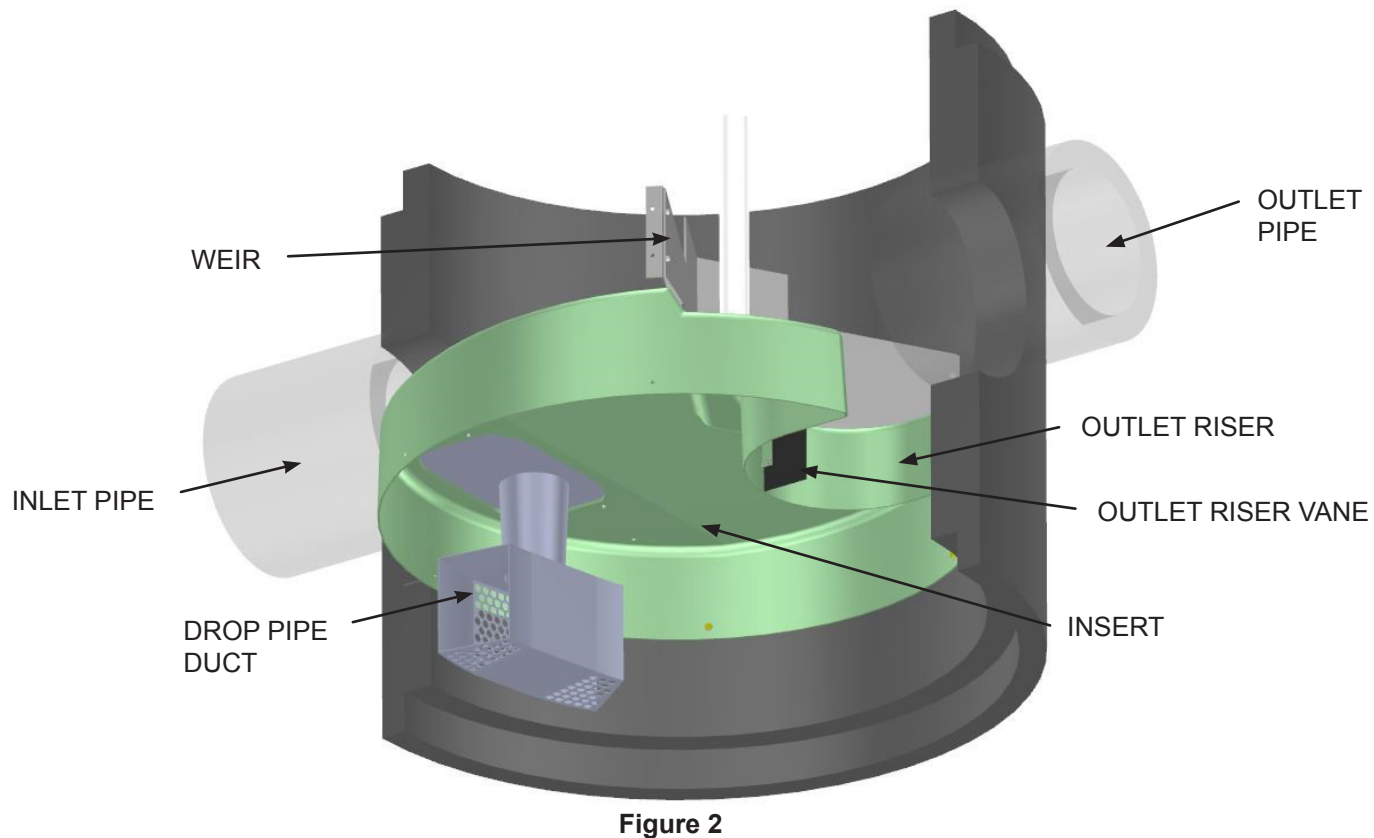
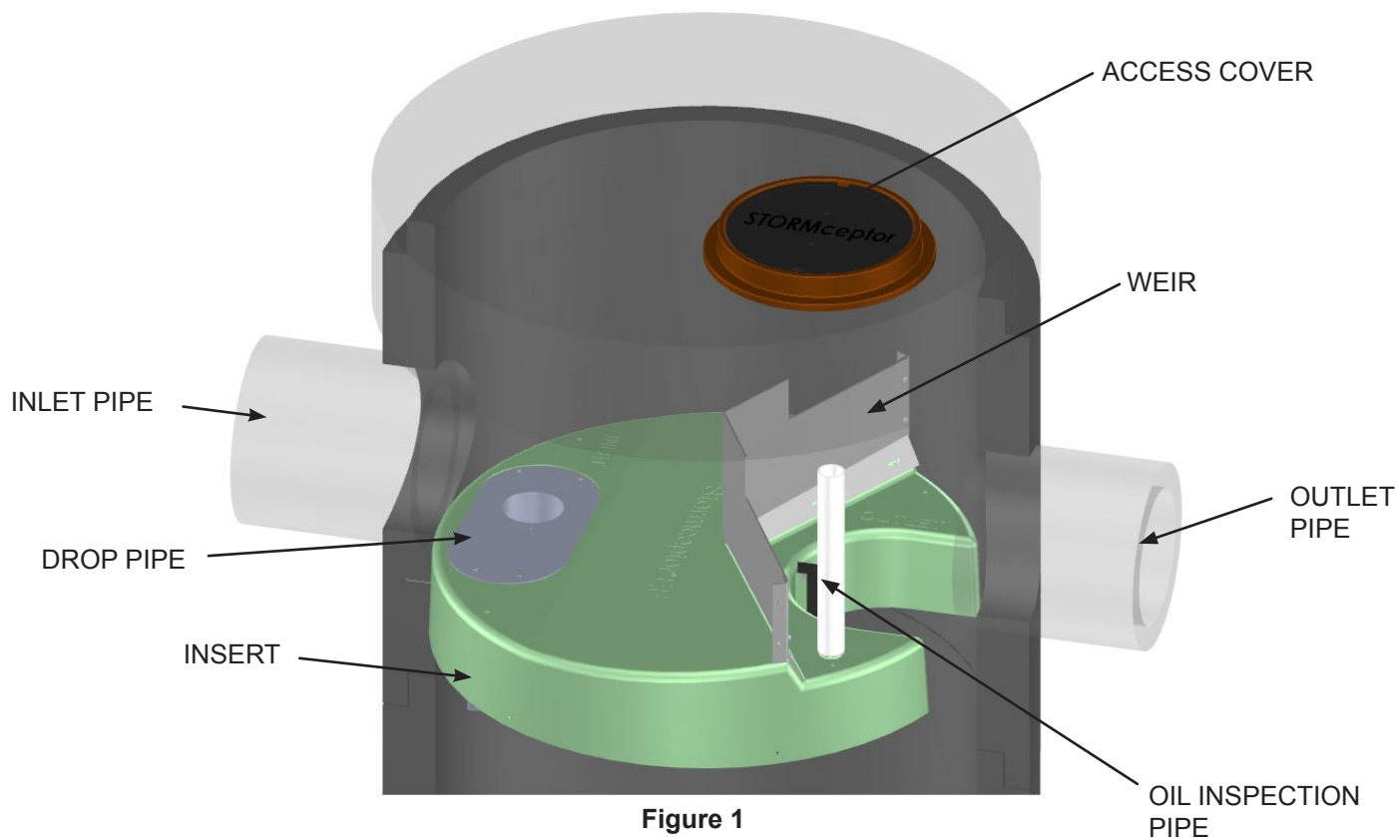
OVERVIEW

The **Stormceptor® EF** is a continuation and evolution of the most globally recognized oil-grit separator (OGS) stormwater treatment technology - **Stormceptor®**. Also known as a hydrodynamic separator, the enhanced flow Stormceptor EF is a high performing oil-grit separator that effectively removes a wide variety of pollutants from stormwater and snowmelt runoff at higher flow rates as compared to the original Stormceptor. Stormceptor EF captures and retains sediment (TSS), free oils, gross pollutants and other pollutants that attach to particles, such as nutrients and metals. Stormceptor EF's patent-pending treatment and scour prevention technology and internal bypass ensures sediment is retained during all rainfall events..

Stormceptor EF offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe, multiple inlet pipes, and/or from the surface through an inlet grate. Stormceptor EF can also serve as a junction structure, accommodate a 90-degree inlet to outlet bend angle, and be modified to ensure performance in submerged conditions. With its scour prevention technology and internal bypass, Stormceptor EF can be installed online, eliminating the need for costly additional bypass structures.

OPERATION

- Stormwater enters the Stormceptor upper chamber through the inlet pipe(s) or a surface inlet grate. A specially designed insert reduces the influent velocity by creating a pond upstream of the insert's weir. Sediment particles immediately begin to settle. Swirling flow sweeps water, sediment, and floatables across the sloped surface of the insert to the inlet opening of the drop pipe, where a strong vortex draws water, sediment, oil, and debris down the drop pipe cone.
- Influent exits the cone into the drop pipe duct. The duct has two large rectangular outlet openings as well as perforations in the backside and floor of the duct. Influent is diffused through these various opening in multiple directions and at low velocity into the lower chamber.
- Free oils and floatables rise up and are trapped beneath the insert, while sediment settles to the sump. Pollutants are retained for later removal during maintenance cleaning.
- Treated effluent enters the outlet riser, moves upward, and discharges to the top side of the insert downstream of the weir, where it flows out the outlet pipe.
- During intense storm events with very high influent flow rates, the pond height on the upstream side of the weir may exceed the height of the weir, and the excess flow passes over the top of the weir to the downstream side of the insert, and exits through the outlet pipe. This internal bypass feature allows for online installation, avoiding the cost of additional bypass structures. During bypass, the pond separates sediment from all incoming flows, while full treatment in the lower chamber continues at the maximum flow rate.
- Stormceptor EF's patent-pending enhanced flow and scour prevention technology ensures pollutants are captured and retained, allowing excess flows to bypass during infrequent, high intensity storms.



- Insert – separates vessel into upper and lower chambers, and provides double-wall containment of hydrocarbons
- Weir – creates stormwater ponding and driving head on top side of insert
- Drop pipe – conveys stormwater and pollutants into the lower chamber
- Outlet riser – conveys treated stormwater from the lower chamber to the outlet pipe, and provides primary inspection and maintenance access into the lower chamber
- Outlet riser vane – prevents formation of a vortex in the outlet riser during high flow rate conditions
- Oil inspection pipe – primary access for measuring oil depth, and oil removal

IDENTIFICATION

Each Stormceptor EF/EFO unit is easily identifiable by the trade name **Stormceptor®** embossed on the access cover at grade as shown in **Figure 3**. The tradename **Stormceptor®** is also embossed on the top of the insert upstream of the weir as shown in **Figure 3**.

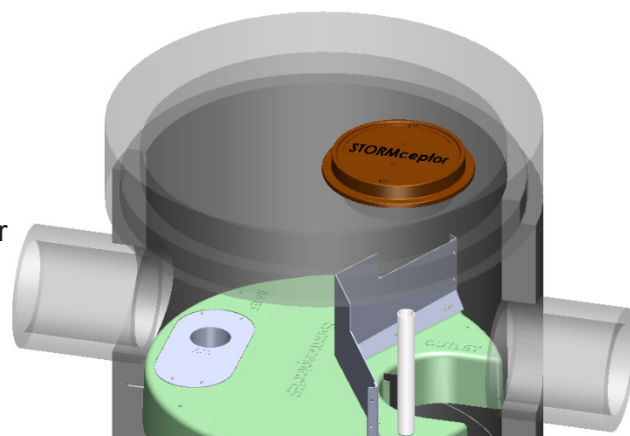


Figure 3

The unit serial number is identified on the top of the insert upstream of the weir as shown in **Figure 4**.

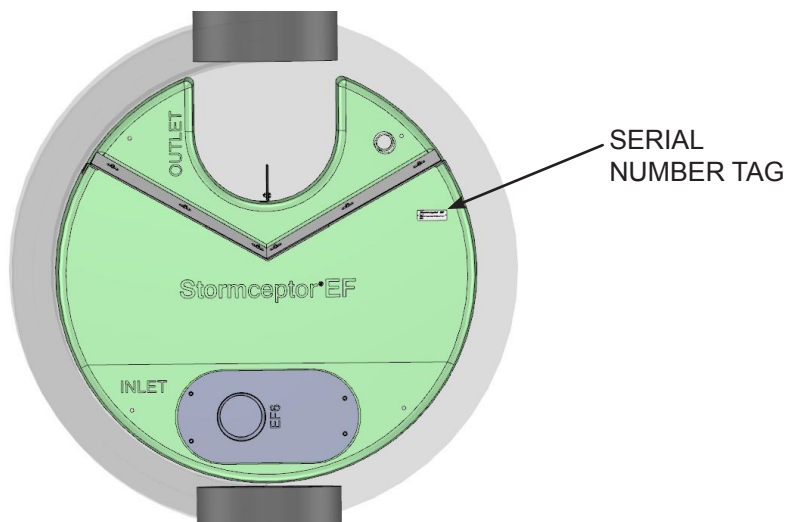


Figure 4

MODEL DETAILS

TABLE 1. METRIC DIMENSIONS AND CAPACITIES

Stormceptor Model	Inside Diameter	Minimum Surface to Outlet Invert Depth	Depth Below Outlet Pipe Invert	Wet Volume	Sediment Capacity ¹	Hydrocarbon Storage Capacity ²	Maximum Flow Rate into Lower Chamber ³	Peak Conveyance Flow Rate ⁴
	(m)	(mm)	(mm)	(L)	(m ³)	(L)	(L/s)	(L/s)
EF4 / EFO4	1.22	915	1524	1780	1.19	265	22.1 / 10.4	425
EF6 / EFO6	1.83	915	1930	5070	3.47	610	49.6 / 23.4	990
EF8 / EFO8	2.44	1219	2591	12090	8.78	1070	88.3 / 41.6	1700
EF10 / EFO10	3.05	1219	3251	23700	17.79	1670	138 / 65	2830
EF12 / EFO12	3.66	1524	3886	40800	31.22	2475	198.7 / 93.7	2830

TABLE 2. U.S. DIMENSIONS AND CAPACITIES

Stormceptor Model	Inside Diameter	Minimum Surface to Outlet Invert Depth	Depth Below Outlet Pipe Invert	Wet Volume	Sediment Capacity ¹	Hydrocarbon Storage Capacity ²	Maximum Flow Rate into Lower Chamber ³	Peak Conveyance Flow Rate ⁴
	(ft)	(in)	(in)	(gal)	(ft ³)	(gal)	(cfs)	(cfs)
EF4 / EFO4	4	36	60	471	42	70	0.78 / 0.37	15
EF6 / EFO6	6	36	76	1339	123	160	1.75 / 0.83	35
EF8 / EFO8	8	48	102	3194	310	280	3.12 / 1.47	60
EF10 / EFO10	10	48	128	6261	628	440	4.87 / 2.30	100
EF12 / EFO12	12	60	153	10779	1103	655	7.02 / 3.31	100

1. Sediment Capacity is measured from the floor to the bottom of the drop pipe cone. Sediment Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
2. Hydrocarbon Storage Capacity is measured from the bottom of the outlet riser to the underside of the insert. Hydrocarbon Storage Capacity can be increased to accommodate specific site designs and pollutant loads. Contact your local representative for assistance.
3. EF Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 1135 L/min/m² (27.9 gpm/ft²). EFO Maximum Flow Rate into Lower Chamber is based on a maximum surface loading rate (SLR) into the lower chamber of 535 L/min/m² (13.1 gpm/ft²).
4. Peak Conveyance Flow Rate is limited by a maximum velocity of 1. m/s (5 fps).

INSPECTION AND MAINTENANCE

It is important to perform regular inspection and maintenance. Regular inspection and maintenance ensures maximum operation efficiency, keeps maintenance costs low, and provides continued protection of natural waterways.

Quick Reference

- Typical inspection and maintenance is performed from grade
- Remove manhole cover(s) or inlet grate to access insert and lower chamber
NOTE: If an inlet grate is present, EF4/EFO4 requires the removal of a flow deflector beneath inlet grate
- Use Sludge Judge® or similar sediment probe to check sediment depth through the outlet riser
- Oil dipstick can be inserted through the oil inspection pipe
- Visually inspect the insert for debris, remove debris if present
- Visually inspect the drop pipe opening for blockage, remove blockage if present
- Visually inspect insert and weir for damage, schedule repair if needed
- Insert vacuum hose and jetting wand through the outlet riser and extract sediment and floatables
- Replace flow deflector (EF4/EFO4), inlet grate, and cover(s)

When is inspection needed?

- Post-construction inspection is required prior to putting the Stormceptor into service.
- Routine inspections are recommended during the first year of operation to accurately assess pollutant accumulation.
- Inspection frequency in subsequent years is based on the maintenance plan developed in the first year.
- Inspections should also be performed immediately after oil, fuel, or other chemical spills.

What equipment is typically required for inspection?

- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones and caution tape
- Hard hat, safety shoes, safety glasses, and chemical-resistant gloves

When is maintenance cleaning needed?

- If the post-construction inspection indicates presence of construction sediment of a depth greater than a few inches, maintenance is recommended at that time. For optimum performance and normal operation the unit should be cleaned out once the sediment depth reaches the recommended maintenance sediment depth, see **Table 3**.
- Maintain immediately after an oil, fuel, or other chemical spill.

TABLE 3		
RECOMMENDED SEDIMENT DEPTHS FOR MAINTENANCE SERVICE*		
MODEL	Sediment Depth	
	in	mm
EF4 / EFO4	8	203
EF6 / EFO6	12	305
EF8 / EFO8	24	610
EF10 / EFO10	24	610
EF12 / EFO12	24	610

* Based on a minimum distance of 40 inches (1,016 mm) from bottom of outlet riser to top of sediment bed

The frequency of inspection and maintenance may need to be adjusted based on site conditions to ensure the unit is operating and performing as intended. Maintenance costs will vary based on the size of the unit, site conditions, local requirements, disposal costs, and transportation distance.

What equipment is typically required for maintenance?

- Vacuum truck equipped with water hose and jet nozzle
- Small pump and tubing for oil removal
- Manhole access cover lifting tool
- Oil dipstick / Sediment probe with ball valve (typically ¾-inch to 1-inch diameter)
- Flashlight
- Camera
- Data log / Inspection Report
- Safety cones
- Hard hats, safety shoes, safety glasses, chemical-resistant gloves, and hearing protection for service providers
- Gas analyzer, respiratory gear, and safety harness for specially trained personnel if confined space entry is required (adhere to all OSHA / CCOSH standards)

What conditions can compromise Stormceptor performance?

- Presence of construction sediment and debris in the unit prior to activation
- Excessive sediment depth beyond the recommended maintenance depth
- Oil spill in excess of the oil storage capacity
- Clogging or restriction of the drop pipe inlet opening with debris
- Downstream blockage that results in a backwater condition

MAINTENANCE PROCEDURES

- Maintenance should be conducted during dry weather conditions when no flow is entering the unit.
- Stormceptor is maintained from grade through a standard surface manhole access cover or inlet grate.
- In the case of submerged or tailwater conditions, extra measures are likely required, such as plugging the inlet and outlet pipes prior to conducting maintenance.
- Inspection and maintenance of upstream catch basins and other stormwater conveyance structures is also recommended to extend the time between future maintenance cycles.
- Sediment depth inspections are performed through the **Outlet Riser** and oil presence can be determined through the **Oil Inspection Pipe** (see **Figures 6 and 7**).
- Oil presence and sediment depth are determined by inserting a Sludge Judge® or measuring stick to quantify the pollutant depths.
- Visually inspect the insert, weir, and drop pipe inlet opening to ensure there is no damage or blockage.

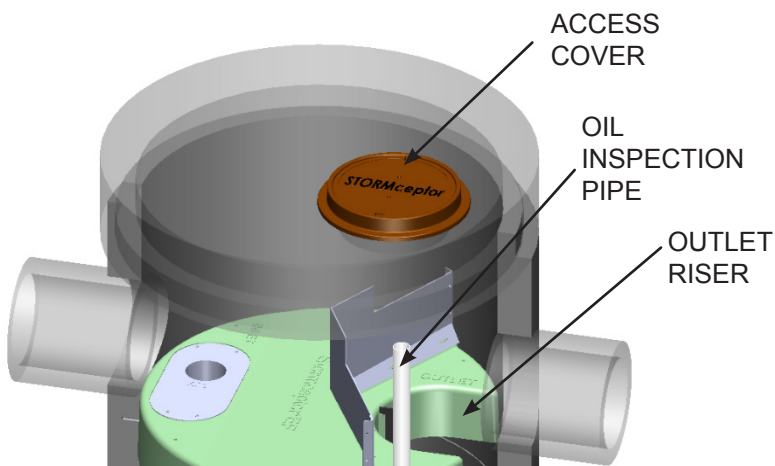


Figure 5

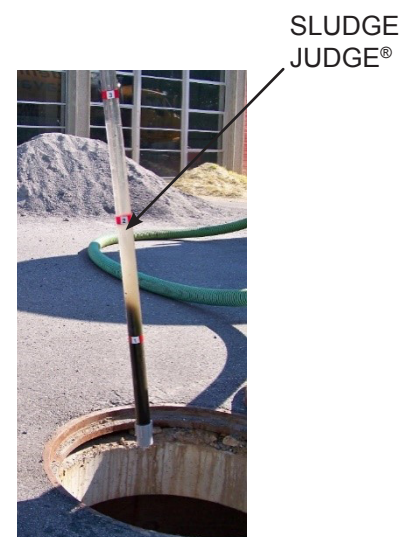


Figure 6

- When maintenance is required, a standard vacuum truck is used to remove the pollutants from the lower chamber of the unit through the **Outlet Riser** (see **Figure 7**).



Figure 7

- The Outlet Riser Vane is durable and flexible and designed to allow maintenance activities with minimal, if any, interference (see **Figure 8**).

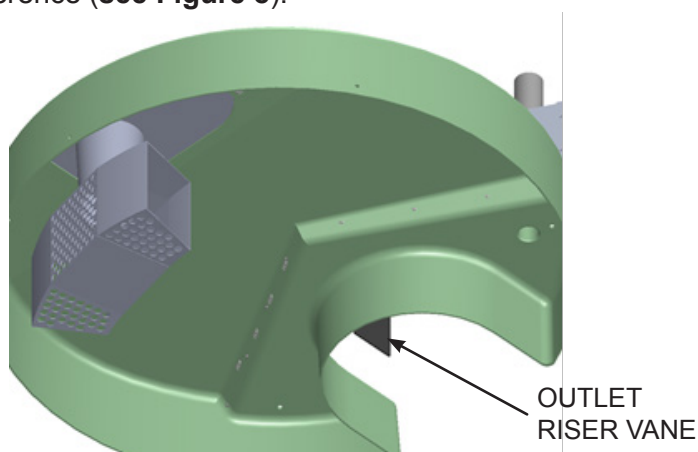


Figure 8

REMOVABLE FLOW DEFLECTOR

- Grated inlets for the Stormceptor EF4/EFO4 model requires a removable flow deflector staged underneath a 24-inch x 24-inch (600 mm x 600 mm) square inlet grate to direct flow towards the inlet side of the insert, and avoid flow and pollutants from entering the outlet side of the insert from grade (See **Figure 9**). The EF6/EFO6 and larger models do not require the flow deflector.

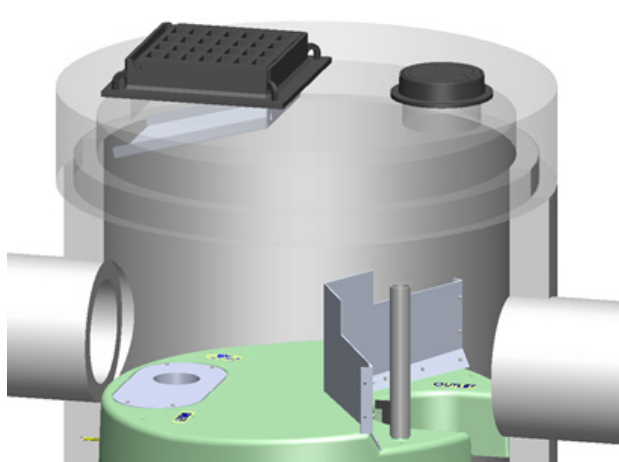
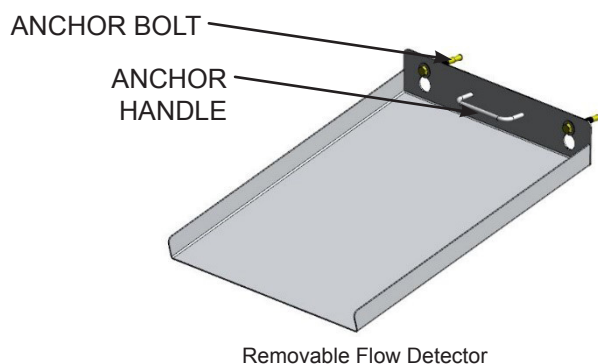


Figure 9



HYDROCARBON SPILLS

Stormceptor is often installed on high pollutant load hotspot sites with vehicular traffic where hydrocarbon spill potential exists. Should a spill occur, or presence of oil be identified within a Stormceptor EF/EFO, the unit should be cleaned immediately by a licensed liquid waste hauler.

Disposal

Maintenance providers are to follow all federal, state/ provincial, and local requirements for disposal of material.

Oil Sheens

When oil is present in stormwater runoff, a sheen may be noticeable at the Stormceptor outlet. An oil rainbow or sheen can be noticeable at very low oil concentrations (< 10 mg/L). Despite the appearance of a sheen, Stormceptor EF/EFO may still be functioning as intended.

Oil Level Alarm

To mitigate spill liability with 24/7 detection, an electronic Oil Level Alarm monitoring system can be employed to trigger a visual and audible alarm when a pre-set level of oil is captured within the lower chamber or when an oil spill occurs. The oil level alarm is available as an optional feature to include with Stormceptor EF/EFO as shown in **Figure 10**.

For additional details about the Oil Level Alarm, please visit www.imbriumsystems.com/stormwater-treatment-solutions/stormceptor-systems.

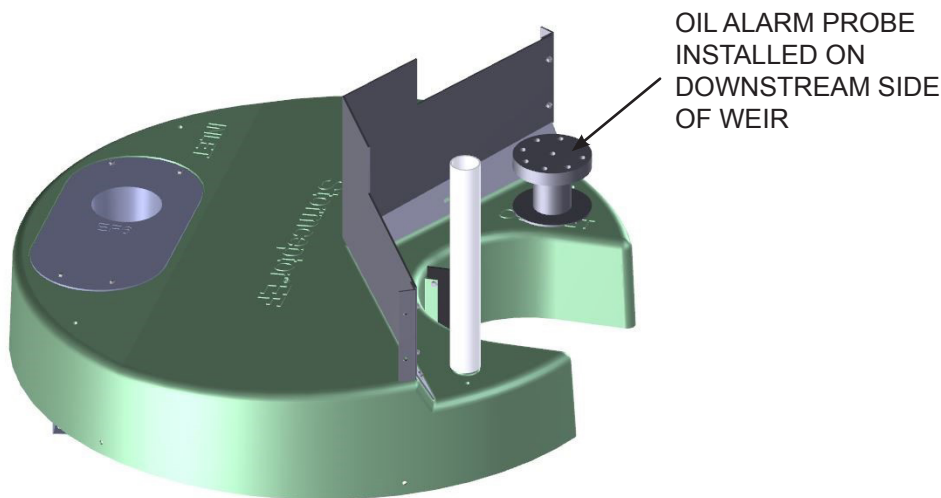


Figure 10



Optional Oil Alarm

REPLACEMENT PARTS

Stormceptor has no moving parts. Therefore, inspection and maintenance activities are generally focused on pollutant removal. Since there are no moving parts during operation in a Stormceptor, broken, damaged, or worn parts are not typically encountered. However, if replacement parts are necessary, they may be purchased by contacting your local Stormceptor representative.

STORMCEPTOR INSPECTION AND MAINTENANCE LOG

Stormceptor Model No: _____

Serial Number: _____

Installation Date: _____

Location Description of Unit: _____

Recommended Sediment Maintenance Depth: _____

DATE	SEDIMENT DEPTH	OIL DEPTH (inches or mm)	SERVICE REQUIRED (Y/N)	MAINTENANCE PERFORMED	MAINTENANCE PROVIDER	COMMENTS

Other Comments: _____

CONTACT INFORMATION

Questions regarding Stormceptor EF/EFO can be addressed by contacting your local Stormceptor representative.

Imbrium Systems Inc.

1-416-960-9900 / 1-800-565-4801 / 888-279-8826

www.imbriumsystems.com

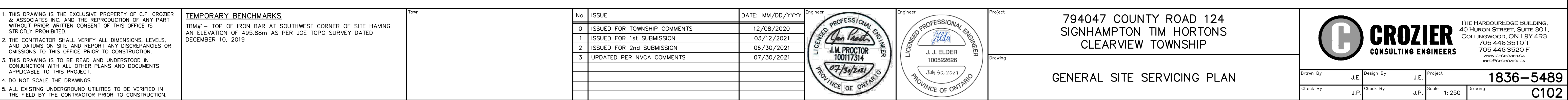
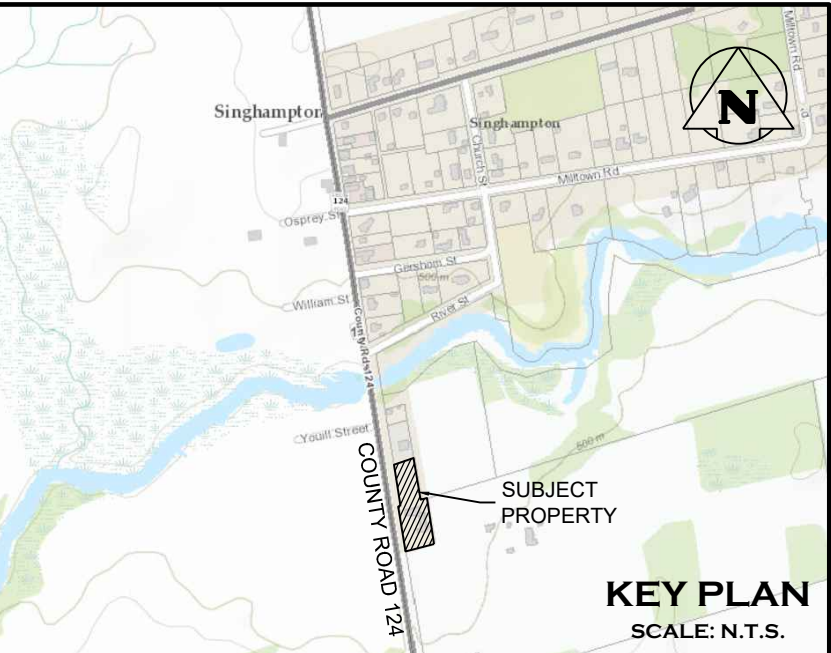
www.stormceptor.com

info@imbriumsystems.com

FIGURES

Drawing C102: General Site Servicing Plan

Drawing C105: Construction Notes and Standards Details



CONSTRUCTION NOTES

GENERAL

- ALL MEASUREMENTS ARE IN METRES, PIPE SIZES IN MILLIMETERS, UNLESS OTHERWISE NOTED.
- ALL EXISTING UTILITIES AND SERVICES TO BE LOCATED ON SITE BY THE CONTRACTOR PRIOR TO CONSTRUCTION. LOCATION OF EXISTING SERVICES ARE NOT GUARANTEED. THE CONTRACTOR IS REQUIRED TO NOTIFY THE VARIOUS UTILITY COMPANIES 48 HOURS PRIOR TO THE COMMENCEMENT OF ANY WORK.
- ALL RELEVANT ONTARIO PROVINCIAL STANDARDS SPECIFICATIONS (OPSS), ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD), AND THE TOWNSHIP OF CLEARVIEW'S STANDARDS SHALL APPLY TO THIS CONTRACT.
- THE ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY TOWNSHIP OF CLEARVIEW STANDARD DRAWINGS (STD), AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD).
- MAINTENANCE HOLE SAFETY PLATFORMS SHALL CONFORM TO OPSD 404.020.
- MAINTENANCE HOLE TOPS (FRAMES) AND CATCHBASIN (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE WHEN THE TOP LIFT OF ASPHALT IS PLACED. (SEE ROAD NOTES 10, 11, 12, 13 & 14).
- A ROAD OCCUPANCY PERMIT IS REQUIRED FROM THE ENGINEERING DEPARTMENT PRIOR TO THE COMMENCEMENT OF WORK WITHIN ANY TOWNSHIP RIGHT-OF-WAY.
- NATIVE MATERIAL SUITABLE FOR BACKFILL SHALL BE COMPACTED TO 98% STANDARD PROCTOR MAXIMUM DRY DENSITY, UNLESS OTHERWISE NOTED. ENGINEERING FILL (ON LOTS), SHALL BE COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
- GRANULAR MATERIAL AND BEDDING MATERIAL SHALL BE PLACED IN LAYERS 150mm IN DEPTH AND COMPACTED TO 100% (ROAD GRAN 'A' & GRAN 'B') OR 100% (PIPE BEDDING AND COVER) STANDARD PROCTOR MAXIMUM DRY DENSITY OR AS DIRECTED BY THE GEOTECHNICAL CONSULTANT.
- UTILITY CROSSING, WHERE REQUIRED, AND ANY EXISTING STRUCTURES SHALL BE PROPERLY SUPPORTED. ALL UTILITY CROSSINGS TO BE REVIEWED BY THE TOWNSHIP OF CLEARVIEW.
- DRIVEWAY ACCESS TO OCCUPIED RESIDENCES SHALL BE RESTORED AT THE END OF EACH WORKING DAY.
- CONTRACTOR SHALL COORDINATE HIS WORK SUCH THAT HE DOES NOT INTERFERE WITH WORK BEING UNDERTAKEN BY A UTILITY COMPANY.
- ALL GRADING MUST CONFORM TO THE TOWNSHIP OF CLEARVIEW LOT GRADING POLICIES CURRENTLY IN EFFECT.
- THE UNDERSIDE OF FLOOR SLAB AND ASSOCIATED DRAINS SHALL BE ENTIRELY LOCATED A MINIMUM OF 0.4 M ABOVE THE SEASONAL HIGH GROUNDWATER LEVELS. THE HIGH GROUNDWATER ELEVATION SHALL BE RAISED, WITH CORRESPONDING INCREASE IN CONSTRUCTION ELEVATIONS, IF HIGHER GROUNDWATER CONDITIONS ARE EVIDENT AT THE TIME OF CONSTRUCTION. THE HIGH GROUNDWATER ELEVATION SHALL BE THE HIGHEST DOCUMENTED GROUNDWATER OBSERVATION.

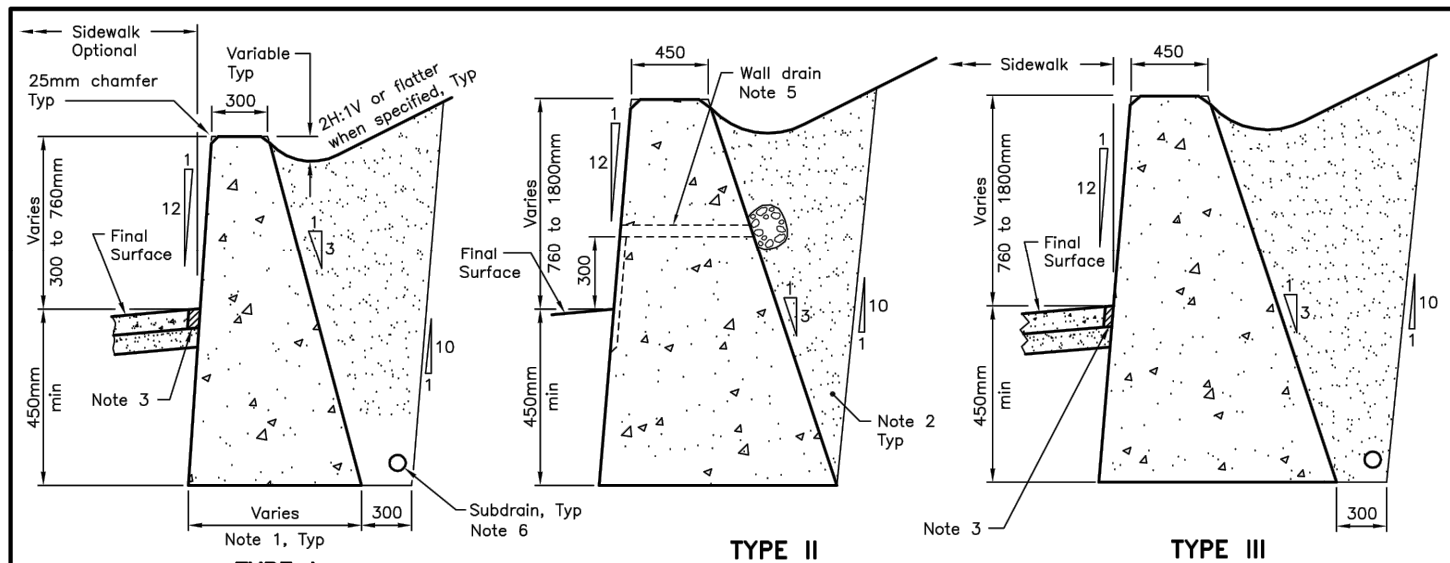
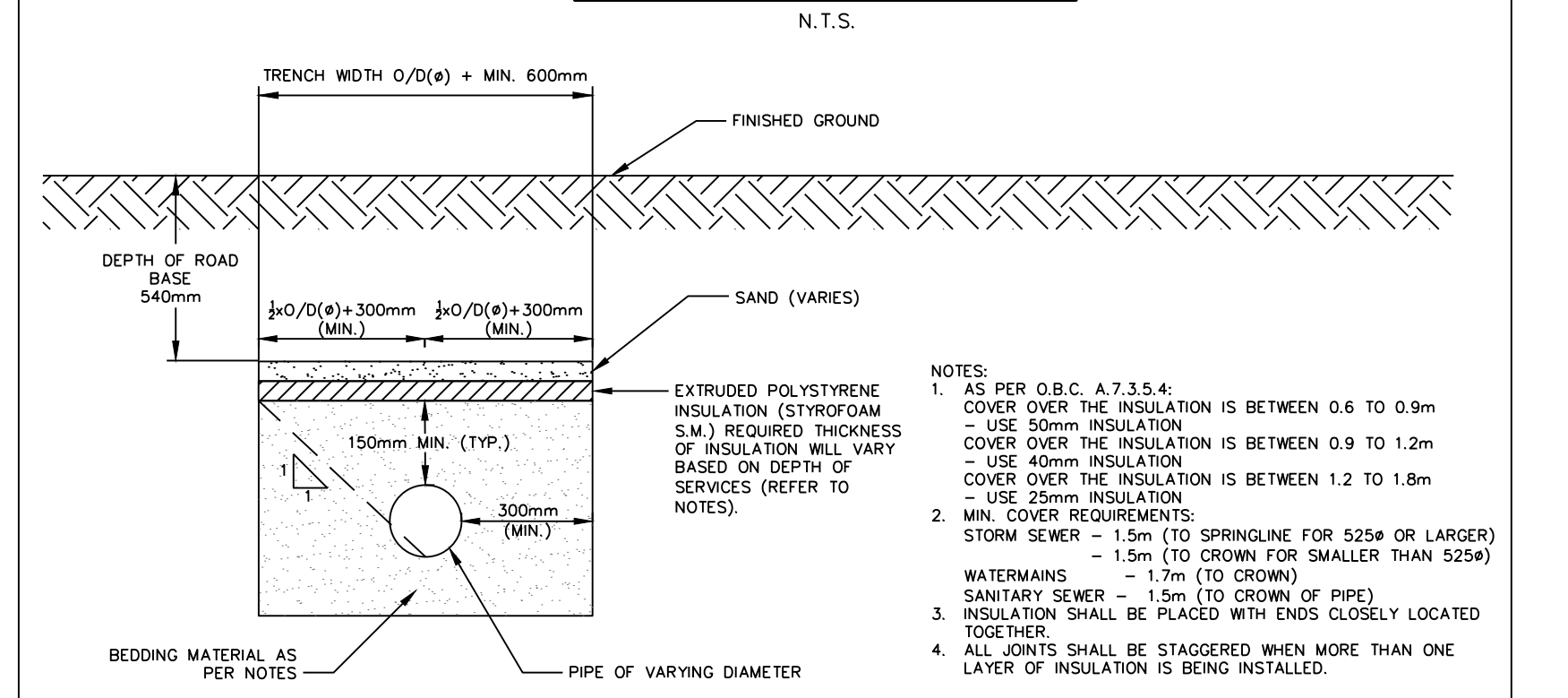
ROADS AND PAVING

- CURB AND GUTTER TO BE BARRIER CURB AS PER OPSD-600.110.
- ROADS SHALL BE KEPT CLEAN DURING CONSTRUCTION AT THE CONTRACTOR'S EXPENSE.
- SIDEWALKS TO COMPLY WITH OPSD 310.010 AND ARE TO BE 1.5 METERS WIDE. MINIMUM THICKNESS AS FOLLOWS:
 - RESIDENTIAL DRIVEWAY 150mm
 - COMMERCIAL/INDUSTRIAL DRIVEWAY 200mm (REINFORCEMENT AS PER OPSS IF REQUIRED)
 - WHEN NO DRIVEWAY IS PRESENT, 125mm.
- NATIVE SUBGRADE SHALL HAVE A CROSSFALL OF 3% AND THE MATERIAL SHALL BE APPROVED BY A GEOTECHNICAL CONSULTANT WITH THE REVIEW OF A PROOF ROLL WITH A LOADED TANDEM AXLE DUMP TRUCK AND IS SUBJECT TO APPROVAL BY THE TOWNSHIP OF CLEARVIEW.
- ALL CURB RADII TO BE MINIMUM OF 10.0 METRES AT THE EDGE OF ASPHALT.
- NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 98% STANDARD PROCTOR MAXIMUM DRY DENSITY AND SHALL BE TESTED BY THE GEOTECHNICAL CONSULTANT.
- THE ROAD AND CROSS SECTION SHALL INCORPORATE 150mm DIA. SUBDRAIN WITH FACTORY INSTALLED FILTER FABRIC (OPSD 216.021) AS REQUIRED.
- GRADE AND CROSS FALL ADJUSTMENT OF MAINTENANCE HOLE AND CATCHBASIN FRAMES SHALL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. CAST IRON ADJUSTMENT UNITS SHALL BE USED FOR ALL MAINTENANCE HOLE AND CATCH BASIN GRATES TO BE SET AT PROPER GRADES FOR SURFACE COURSE ASPHALT ONLY. ALL OTHER ADJUSTMENTS UNITS FOR ALL MAINTENANCE AND CATCHBASIN FRAME AND GRATES SHALL BE CONCRETE (PER OPSD 704.010). ALL MAINTENANCE, CATCH BASINS, ETC SHALL HAVE MINIMUM OF 150mm TO A MAX OF 300mm OF ADJUSTMENT TO ALLOW FOR FUTURE ADJUSTMENT UP OR DOWN.
- ADJUSTMENT UNITS SHALL BE CERTIFIED TO MEET ALL PERTINENT OPS, CSA, ASTM, AND MTO-DSM LIST, OR OTHER INDUSTRY GUIDELINES FOR MATERIALS, PERFORMANCE AND USE AS APPLICABLE.
- ADJUSTMENTS UNITS AND JOINTS SHALL BE SEALED AND OR PARGED IN COMPLIANCE WITH MANUFACTURERS SPECIFICATIONS AND GUIDELINES.
- MORTAR SHALL BE USED FOR LEVELING OF PRECAST UNITS ONLY. THE THICKNESS OF MORTAR SHALL BE 10mm TO FILL ALL VOIDS CREATED BY IRREGULARITIES IN THE PRECAST UNITS TO ENSURE AN EVEN SURFACE ONLY.
- NON-COMPRESSIBLE BACKFILL SHALL BE USED DURING REBUILDING, ADJUSTING, OR ANY OTHER APPLICABLE CATCHBASIN OR MAINTENANCE HOLES WORKS.

STORM SEWER

- STORM SEWER TO BE PVC (MINIMUM STIFFNESS 320 KPA) PIPE OR REINFORCED CONCRETE PIPE (MIN. CLASS 65-D). PIPE MATERIAL FOR REINFORCED CONCRETE TO HAVE A MINIMUM STRENGTH OF 65 N/m²/mm AND BE CERTIFIED TO C.S.A. STANDARD A247.2-1982M CLASS 65-D (PREVIOUSLY C.S.A. STANDARD A257.2-1974, CLASS II). PVC MATERIAL TO BE CERTIFIED TO C.S.A. STANDARDS 182.2 AND 182.4, UNLESS OTHERWISE NOTED.
- STORM SEWERS SHALL BE CONSTRUCTED WITH BEDDING AS PER OPSD-802.010 (GRAN 'A' OR HIGH-PERFORMANCE EMBEDMENT MATERIAL) FOR FLEXIBLE PIPES AND OPSD-802.030 OR 802.031 CLASS B (GRAN'A' OR HIGH-PERFORMANCE BEDDING MATERIAL) FOR RIGID PIPE UNLESS OTHERWISE APPROVED BY THE TOWNSHIP.
- PRECAST STORM MAINTENANCE HOLES SHALL CONFORM WITH OPSD 701.010 (1200mm) OR 701.011 (1500mm) WITH FRAME & COVER OPSD 401.010 TYPE 'A' AND SOLID RECTANGULAR RUNGS, OPSD 405.020.
- MAINTENANCE HOLE BENCHING SHALL CONFORM WITH OPSD 701.021. CATCH BASIN MAINTENANCE HOLES SHALL HAVE A 300mm SUMP AND NO BENCHING.
- PIPE JOINTS TO CONFORM TO CSA STANDARDS (B-182.2,3,4 AND A257.3).
- MAINTENANCE HOLE TOPS (FRAMES) AND CATCH BASIN (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE WHEN THE TOP LIFT OF ASPHALT IS PLACED. A MINIMUM OF 150mm TO A MAXIMUM OF 300mm OF ADJUSTMENT UNITS SHALL BE PROVIDED. ALL ADJUSTMENT SHALL IN ACCORDANCE WITH ROAD NOTES 10, 11, 12, 13 AND 14.
- ALL CONNECTIONS TO THE STORM MAIN SHALL BE MADE WITH A STORM MAINTENANCE HOLE OR APPROVED FACTORY TEE CONNECTION AS PER OPSD-708.01 OR 708.03.
- STORM SEWER TO BE MINIMUM 300mm DIAMETER WITH JOINTS CONFORMING TO C.S.A. STANDARD A257.3.
- NO FLEXIBLE PIPE SEWERS WILL BE INSTALLED WITH A DEPTH OF COVER GREATER THAN 6 METRES UNLESS SPECIFICALLY APPROVED BY THE TOWNSHIP PUBLIC WORKS DEPARTMENT.
- ALL PIPE HANDLING INSTALLATIONS SHALL BE IN STRICT COMPLIANCE WITH MANUFACTURERS INSTALLATION GUIDES AND THE O.C.P.A. OR UNIBELL GUIDELINES.

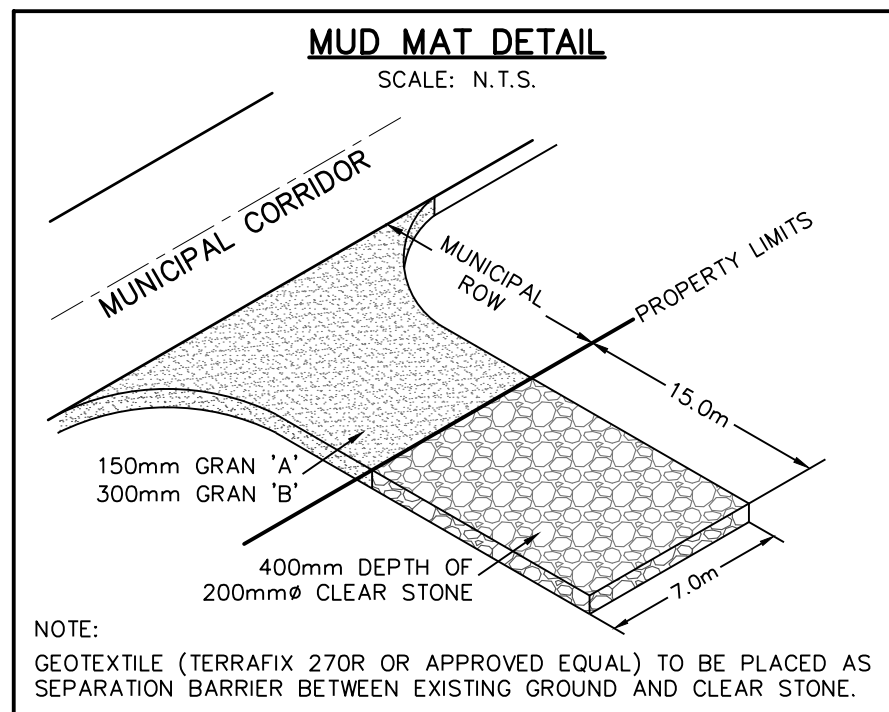
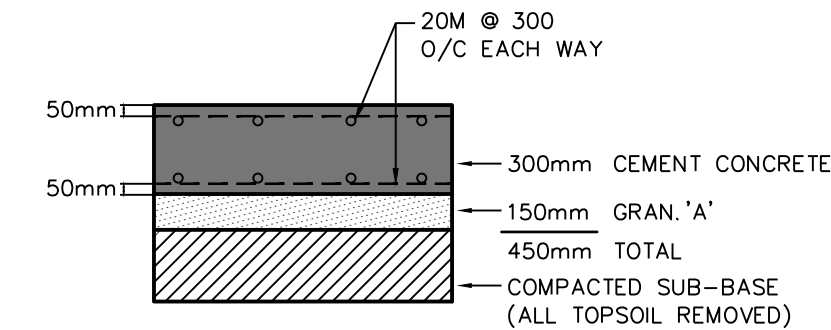
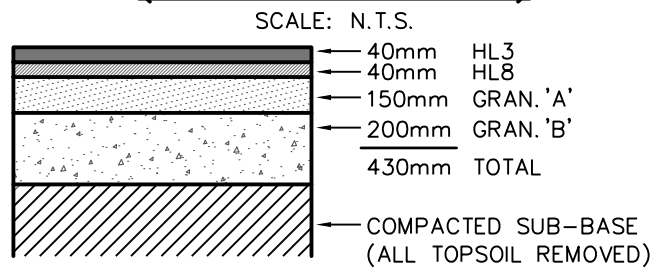
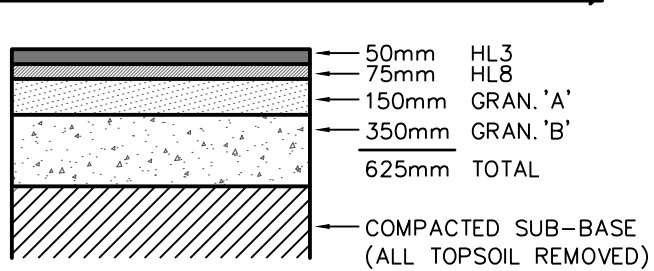
INSULATION FOR VARIOUS INFRASTRUCTURE



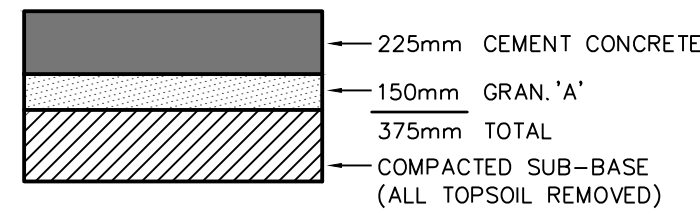
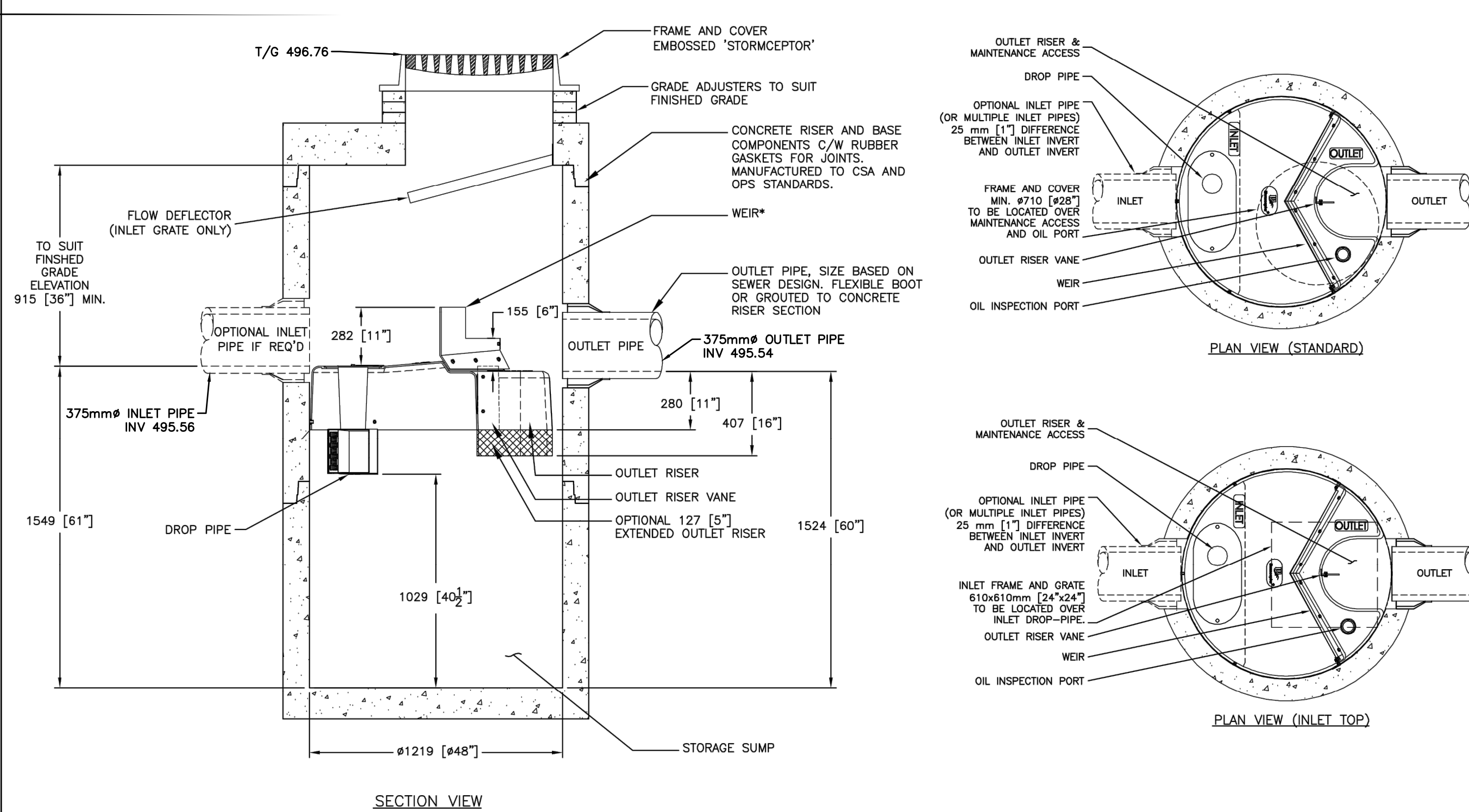
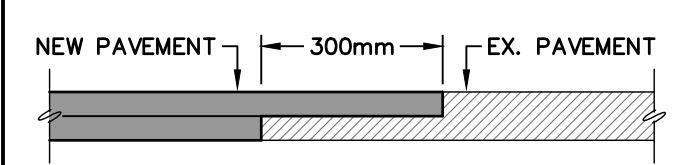
NOTES:

- Walls shall be founded on undisturbed soil having a minimum bearing capacity at ultimate limit states of 200kPa for Type I and 300kPa for Type II and Type III.
- Excavation for toe walls shall be backfilled with free draining granular material.
- 10mm preformed joint filler, Type A, non-extruding and resilient bituminous type as specified.
- Cold applied rubber asphalt joint sealing compound.
- Where specified, wall drains shall be installed as per OPSD 3190.100.
- 150mm dia perforated pipe subdrain wrapped in geotextile.
- A Maximum height of slope above top of wall is 4m.
- B Concrete for toe walls shall be 30MPa.
- C All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2010	Rev 2
WALLS RETAINING CONCRETE TOE WALL		
OPSD 3120.100		

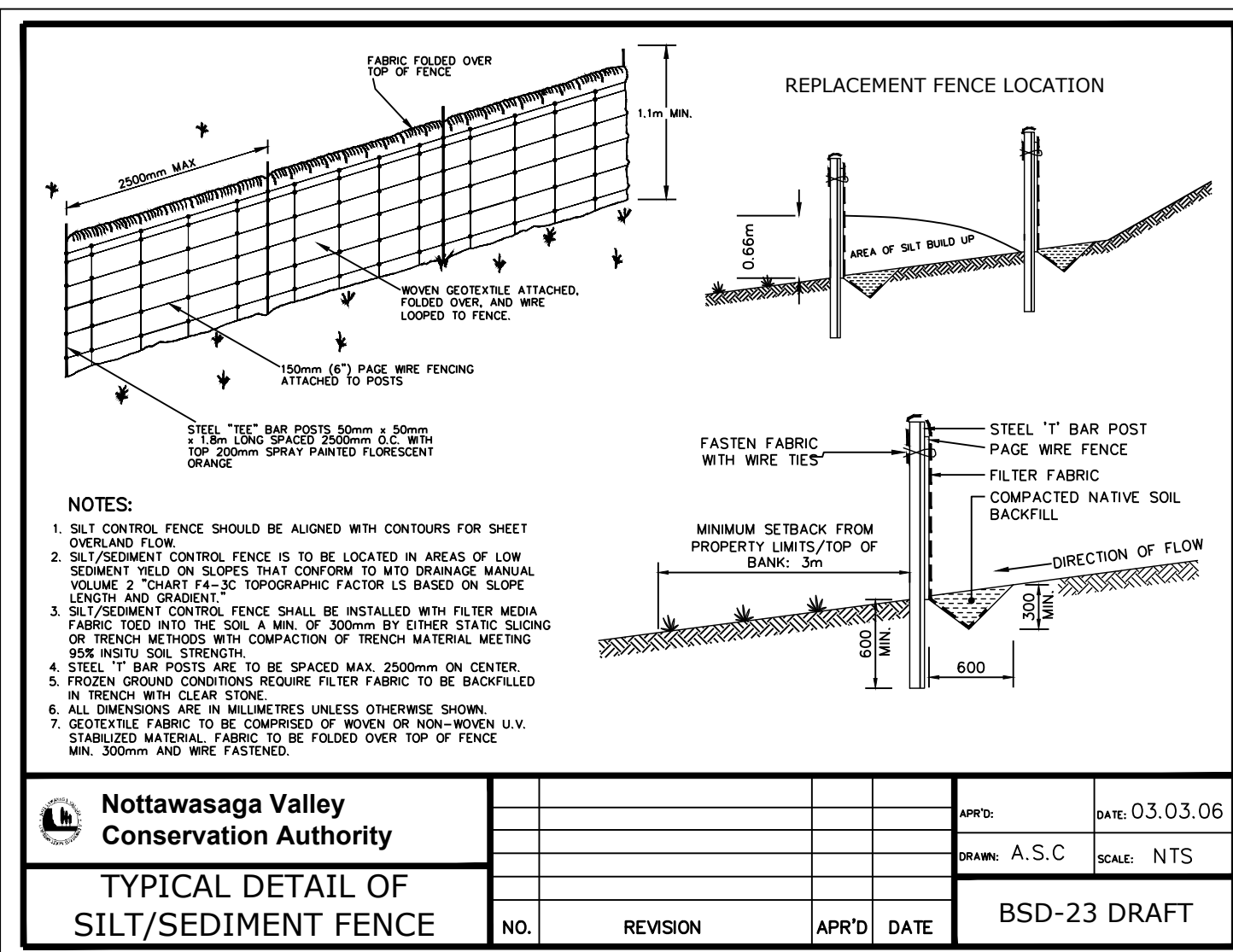
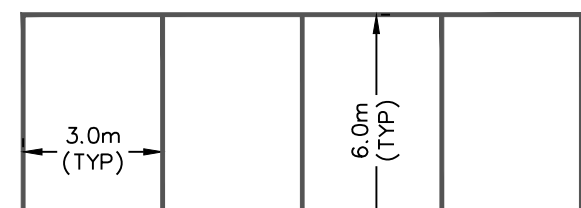
CONCRETE STRUCTURE
(GENERATOR PAD)PAVEMENT STRUCTURE
(LIGHT DUTY - CARS)PAVEMENT STRUCTURE
(HEAVY DUTY - DELIVERY TRUCKS)

CONCRETE STRUCTURE

STC EFO4 DETAIL
n.t.s.LAP JOINT DETAIL
N.T.S.

TYPICAL PARKING STALL DETAIL

SCALE: N.T.S.



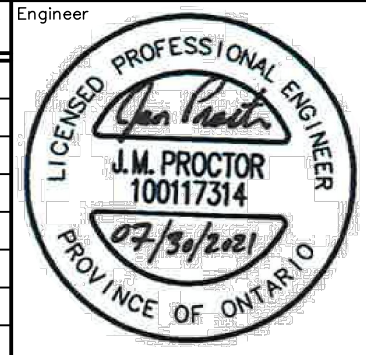
- THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.
- THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.
- THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
- DO NOT SCALE THE DRAWINGS.
- ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

TEMPORARY BENCHMARKS

TM#1- TOP OF IRON BAR AT SOUTHWEST CORNER OF SITE HAVING AN ELEVATION OF 495.88m AS PER JOE TOPO SURVEY DATED DECEMBER 10, 2019

Town

No.	ISSUE	DATE: MM/DD/YYYY	Engineer
0	ISSUED FOR TOWNSHIP COMMENTS	12/08/2020	
1	ISSUED FOR 1st SUBMISSION	03/12/2021	
2	ISSUED FOR 2nd SUBMISSION	06/30/2021	
3	UPDATED PER NVCA COMMENTS	07/30/2021	



Project

794047 COUNTY ROAD 124
SIGNHAMPTON TIM HORTONS
CLEARVIEW TOWNSHIP

Drawing

CONSTRUCTION NOTES
AND STANDARD DETAILS

THE HARBOUREDGE BUILDING,
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COLLINGWOOD, ON L9Y 4R3
705-446-3510 T
705-446-3520 F
WWW.CROZIER.CA
INFO@CROZIER.CA

Drawn By	J.E.	Design By	J.E.	Project	1836-5489
Check By	J.P.	Check By	J.P.	Scale	AS SHOWN
				Drawing	C105