# STORMWATER MANAGEMENT REPORT

FOR THE PROPERTY LOCATED AT

**8605 PROMENADE CAMPEAU DRIVE, OTTAWA, ON**

Prepared By:

J+B Engineering Inc.
25 Centurian Drive, Suite 201
Markham, Ontario
L3R 5N8

December 18, 2020

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CALGARY
707 – 10TH AVE SW, SUITE 200, CALGARY, AB, T2R 0B3
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# 1. INTRODUCTION

## 1.1 Study Area

The subject property is located at the south-east corner of Campeau Drive & Palladium Drive, Ottawa ON. The civic address for this property is 8605 Campeau Drive, Ottawa and is shown in FIGURE 1.

The proposed development will consist of two commercial buildings with associated drive-thru and a retail gas station and are described as follows:

- Commercial building 1: C-store + A&W restaurant and associated drive-thru
- Commercial building 2: commercial space and associated drive-thru. Tenant not yet selected.
- Retail Gas Station: fuel dispensers, underground tanks and canopy

## 1.2 Objectives of Drainage and Stormwater Management Study

The objectives of the stormwater management study are to develop a strategy for the project that will:

- Identify potential stormwater runoff impacts to the receiving watercourses from the proposed development area.
- Address concerns from the review agencies including the City of Ottawa and the Ministry of Environment (MOE) for the preparation of a Stormwater Management study for quantity & quality purposes.
- Provide an appropriate site drainage system for safe operational use.

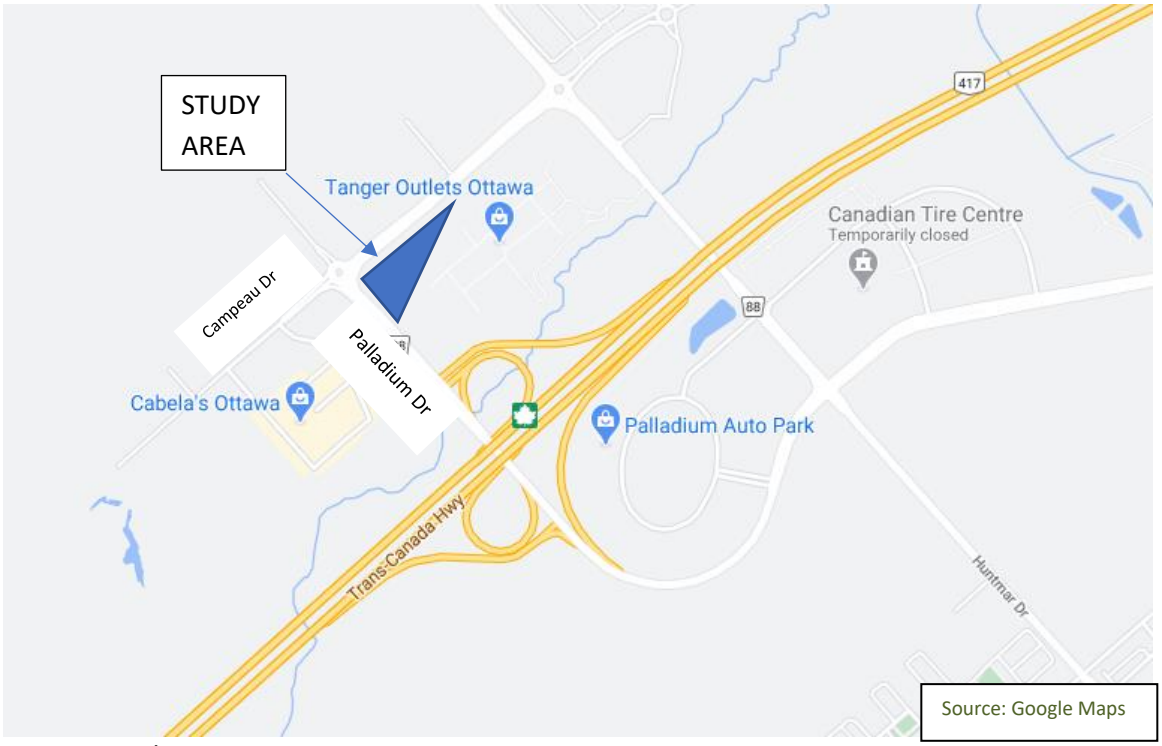


Figure 1 Study Area



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## 2. EXISTING SITE DRAINAGE CONDITIONS

The subject property is approximately 1.18ha in size and is currently undeveloped with no storm infrastructure in place. Based on existing topography, the site drains in the south east direction into an existing conveyance swale and eventually towards the Tanger Mall Outlet parking lot.

According to the Design Brief - Kanata West Business Park (KWBP) – Phase 5, 425 Huntmar Drive report prepared by IBI, the subject property is part of the overall development and is identified as Block 135A (Table 4.2) with a contribution area of 1.12 ha with an established allowable release rate of 257 L/s and required storage of 111m$^3$. This parcel is designed to discharge to Pond 6 East (Figure 1 of KWBP – Phase 5 Design Brief) located to the east of the Tanger Mall Outlet and will provide both quantity and quality treatment.

## 3. PROPOSED STORMWATER MANAGEMENT PLAN

### 3.1 Quantity Control

Considering the proposed development is approximately ~5% larger in size 1.18ha when compared the KWBP Design Brief, in which Block 135A was based on 1.12ha, we have increased the required storage by 5% to 116.55m$^3$ and maintained the same allowable release rate.

To achieve the required-on site storage, an orifice pipe is provided by utilizing the following formula:

$$Q = C\ A\ \sqrt{2\ g\ h} \quad \leftarrow Equation\ (2)$$

$$Where\ Q := Flow\ Rate\ Through\ Orifice\ (m^3/sec) = Q_{Allowable}$$

$$C := Contraction\ Coefficient = 0.60\ (For\ Orifice\ Plate)$$

$$A := Area\ of\ Orifice\ Plate\ (m^2)$$

$$g := Acceleration\ Due\ To\ Gravity\ (m/sec^2) = 9.81\ (m/sec^2)$$

$$h := Pressure\ Head\ To\ Be\ Dissipated\ (m)$$

By trial and error calculations, and setting the maximum ponding elevation at 102.90, a 200mm orifice pipe is required to control the flow to below the allowable release rate of 0.257 m$^3$/s.

$$Q = (0.80)\pi\left(\frac{0.200}{2}\right)^2\sqrt{2 * 9.81 * \left(103.20 - 100.18 - \left(\frac{0.200}{2}\right)\right)}$$

$$Q = 0.1902\ \text{m}^3/\text{sec}\ <\ 0.257\ m^3/\sec$$

The 200mm orifice tube will create a total of 140.37m$^3$ of storage within the subject property utilizing a combination of surface ponding and storm infrastructure which is summarize in the following table.



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| Structure | Diameter (mm) | Area ($m^2$) | Maximum. Water level | Invert | Volume ($m^3$) |
|---|---|---|---|---|---|
| CB#01 | 600x600 | 0.36 | 103.20 | 101.45 | 0.63 |
| CB#02 | 600x600 | 0.36 | 103.20 | 101.03 | 0.78 |
| CB#03 | 600x600 | 0.36 | 102.90 | 101.00 | 0.68 |
| CB.MH#01 | 1200.00 | 1.13 | 103.20 | 101.16 | 2.31 |
| CB.MH#02 | 1200.00 | 1.13 | 103.20 | 100.84 | 2.67 |
| CB.MH#03 | 1200.00 | 1.13 | 103.20 | 100.55 | 3.00 |
| STM.MH#01 | 1200.00 | 1.13 | 103.18 | 100.18 | 3.39 |
| **Sum** | | | | | **13.46** |

| U/G Conduit | Diameter (m) | Area ($m^2$) | Length (m) | Volume ($m^3$) |
|---|---|---|---|---|
| 1 | 150.00 | 0.02 | 106.50 | 1.88 |
| 2 | 250.00 | 0.05 | 153.50 | 7.53 |
| **Sum** | | | | **9.42** |

| **Surface ponding** | |
|---|---|
| Ponding Area 1 | 84.87 |
| Ponding Area 2 | 32.62 |
| **Total Surface Ponding** | **117.49** |

| **Storage Volume For 100-Year Event ($m^3$)** | |
|---|---|
| **Catch Basins & Manholes** | 13.46 |
| **Surface Ponding** | 117.49 |
| **Underground Pipes** | 9.42 |
| **Total Provided** | **140.37** |

Table 1: Provided Storage Volume based on 100 Year Event

Therefore, the 200mm orifice tube will control the release rate of the site to 0.1902$m^3$/s which is lower than the allowable rel ease rate of 0.257$m^3$/s and will be providing 140.37$m^3$ of storage is more than the required storage of 116.55$m^3$.

## 3.2 Quality Control

For quality control purposes, a Stormceptor EFO8 is placed at the outlet of the storm system prior to discharge into the existing municipal storm system on Campeau Drive. The EFO8 is sized for the full development of the property which has a contribution area of 1.18ha and imperviousness 70%. The EFO8 is projected to remove approximately 84% of TSS and treat 99% of runoff as per pg. 5 of STC sizing report located in the Appendix.



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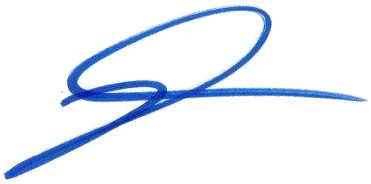
## 4. SUMMARY AND CONCLUSIONS

In summary, all required conditions for the City of Ottawa have been satisfied as follows:

- There is no increase in Stormwater flow from the Site and within the established allowable release rate as per the KWBP Design Brief.
- The SWM facilities provide ENHANCED LEVEL of protection.
- The proposed development will not have adverse affects on adjacent properties.

This SWM Report satisfies all requirements for stormwater quantity & quality control.

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# Appendix
## SITE SERVICING PLAN
## STORMCEPTOR EFO8 TANK



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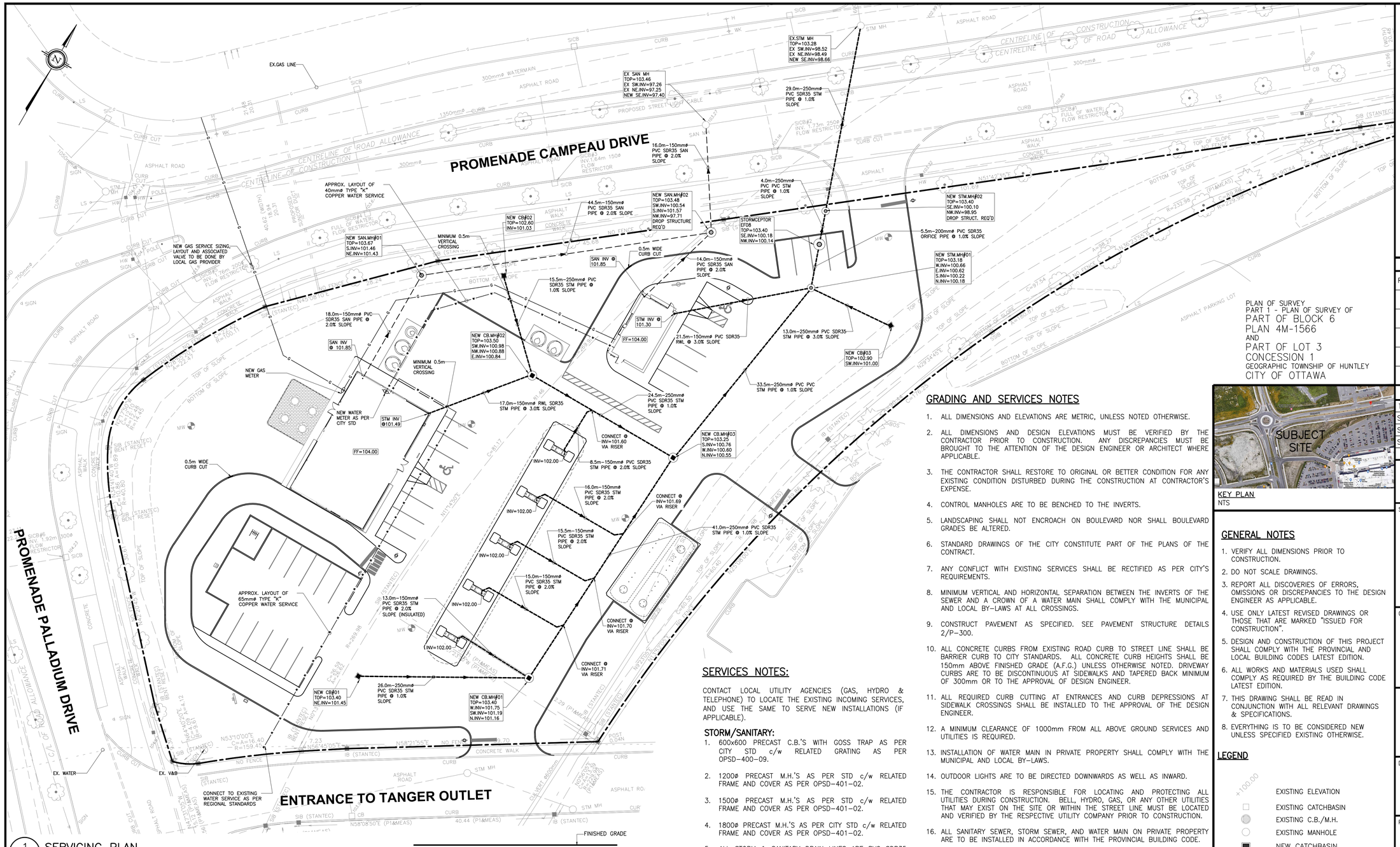
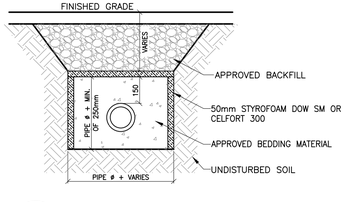
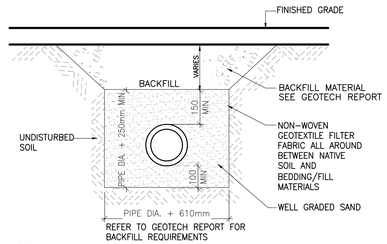



1 P–301 SERVICING PLAN
SCALE: 1:300




2 P–301 TYP. FROST PROTECTION DETAIL
SCALE: NTS




3 P–301 PIPE BEDDING DETAIL
SCALE: NTS

## SERVICES NOTES:

CONTACT LOCAL UTILITY AGENCIES (GAS, HYDRO & TELEPHONE) TO LOCATE THE EXISTING INCOMING SERVICES, AND USE THE SAME TO SERVE NEW INSTALLATIONS (IF APPLICABLE).

### STORM/SANITARY:

1. 600x600 PRECAST C.B.'S WITH GOSS TRAP AS PER CITY STD c/w RELATED GRATING AS PER OPSD–400–09.
2. 1200ø PRECAST M.H.'S AS PER STD c/w RELATED FRAME AND COVER AS PER OPSD–401–02.
3. 1500ø PRECAST M.H.'S AS PER STD c/w RELATED FRAME AND COVER AS PER OPSD–401–02.
4. 1800ø PRECAST M.H.'S AS PER CITY STD c/w RELATED FRAME AND COVER AS PER OPSD–401–02.
5. ALL STORM & SANITARY DRAIN LINES ARE PVC SDR35 PIPE.

### WATERMAINS:

1. ALL NEW WATERMAIN CONNECTIONS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CITY STANDARDS.
2. WATERMAIN AND/OR WATER SERVICES TO HAVE A MINIMUM OF 1.0m HORIZONTAL SEPARATION FROM OTHER UTILITIES AS PER CITY STANDARDS.
3. WHERE WATERMAIN AND/OR WATER SERVICES CROSSES UNDER SANITARY OR STORM SEWER A MINIMUM CLEARANCE OF 0.5m SHALL BE PROVIDED.
4. BEDDING MATERIAL TO BE INSTALLED AS PER CITY STANDARDS.
5. WATER SERVICE TO HAVE MIN. 1.8m COVER AS PER CITY STANDARDS.

## GRADING AND SERVICES NOTES

1. ALL DIMENSIONS AND ELEVATIONS ARE METRIC, UNLESS NOTED OTHERWISE.
2. ALL DIMENSIONS AND DESIGN ELEVATIONS MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER OR ARCHITECT WHERE APPLICABLE.
3. THE CONTRACTOR SHALL RESTORE TO ORIGINAL OR BETTER CONDITION FOR ANY EXISTING CONDITION DISTURBED DURING THE CONSTRUCTION AT CONTRACTOR'S EXPENSE.
4. CONTROL MANHOLES ARE TO BE BENCHED TO THE INVERTS.
5. LANDSCAPING SHALL NOT ENCROACH ON BOULEVARD NOR SHALL BOULEVARD GRADES BE ALTERED.
6. STANDARD DRAWINGS OF THE CITY CONSTITUTE PART OF THE PLANS OF THE CONTRACT.
7. ANY CONFLICT WITH EXISTING SERVICES SHALL BE RECTIFIED AS PER CITY'S REQUIREMENTS.
8. MINIMUM VERTICAL AND HORIZONTAL SEPARATION BETWEEN THE INVERTS OF THE SEWER AND A CROWN OF A WATER MAIN SHALL COMPLY WITH THE MUNICIPAL AND LOCAL BY–LAWS AT ALL CROSSINGS.
9. CONSTRUCT PAVEMENT AS SPECIFIED. SEE PAVEMENT STRUCTURE DETAILS 2/P–300.
10. ALL CONCRETE CURBS FROM EXISTING ROAD CURB TO STREET LINE SHALL BE BARRIER CURB TO CITY STANDARDS. ALL CONCRETE CURB HEIGHTS SHALL BE 150mm ABOVE FINISHED GRADE (A.F.G.) UNLESS OTHERWISE NOTED. DRIVEWAY CURBS ARE TO BE DISCONTINUOUS AT SIDEWALKS AND TAPERED BACK MINIMUM OF 300mm OR TO THE APPROVAL OF DESIGN ENGINEER.
11. ALL REQUIRED CURB CUTTING AT ENTRANCES AND CURB DEPRESSIONS AT SIDEWALK CROSSINGS SHALL BE INSTALLED TO THE APPROVAL OF THE DESIGN ENGINEER.
12. A MINIMUM CLEARANCE OF 1000mm FROM ALL ABOVE GROUND SERVICES AND UTILITIES IS REQUIRED.
13. INSTALLATION OF WATER MAIN IN PRIVATE PROPERTY SHALL COMPLY WITH THE MUNICIPAL AND LOCAL BY–LAWS.
14. OUTDOOR LIGHTS ARE TO BE DIRECTED DOWNWARDS AS WELL AS INWARD.
15. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. BELL, HYDRO, GAS, OR ANY OTHER UTILITIES THAT MAY EXIST ON THE SITE OR WITHIN THE STREET LINE MUST BE LOCATED AND VERIFIED BY THE RESPECTIVE UTILITY COMPANY PRIOR TO CONSTRUCTION.
16. ALL SANITARY SEWER, STORM SEWER, AND WATER MAIN ON PRIVATE PROPERTY ARE TO BE INSTALLED IN ACCORDANCE WITH THE PROVINCIAL BUILDING CODE.
17. ALL WATER MAIN AND HYDRANT INSTALLATIONS ARE TO BE CARRIED OUT IN ACCORDANCE WITH THE LATEST PLANS, STANDARDS, AND SPECIFICATIONS OF THE LOCAL UTILITIES COMMISSION.
18. NO BLASTING IS PERMITTED ON THE CITY RIGHT–OF–WAY AND NEAR ANY ADJACENT BUILDING.
19. THE TOP OF CONCRETE CURBS ABUTTING CITY'S SIDEWALKS SHALL BE KEPT LEVEL WITH THE SIDEWALKS FOR A DISTANCE OF 600mm FROM THE SIDEWALK.
20. THE PROPERTY IS TO BE GRADED AND SELF–CONTAINED SO THAT SURFACE DRAINAGE IS DIRECTED AWAY FROM THE BUILDINGS.
21. THE OWNER AND/OR CONTRACTOR IS REQUIRED TO OBTAIN A "ROAD CUT PERMIT" FROM THE COUNTY BEFORE COMMENCING ANY WORK ON THE CITY'S ROAD ALLOWANCE.
22. WHEN THE DEPTH OF THE COVER OVER THE PROP. SANITARY OR STORM SEWERS IS LESS THAN 1.6m SEWER LINES ARE TO BE INSULATED. THE INSULATION TO BE STYROFOAM BRAND H.I. TYPE IV OR EQUAL




KEY PLAN
NTS

## GENERAL NOTES

1. VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION.
2. DO NOT SCALE DRAWINGS.
3. REPORT ALL DISCOVERIES OF ERRORS, OMISSIONS OR DISCREPANCIES TO THE DESIGN ENGINEER AS APPLICABLE.
4. USE ONLY LATEST REVISED DRAWINGS OR THOSE THAT ARE MARKED "ISSUED FOR CONSTRUCTION".
5. DESIGN AND CONSTRUCTION OF THIS PROJECT SHALL COMPLY WITH THE PROVINCIAL AND LOCAL BUILDING CODES LATEST EDITION.
6. ALL WORKS AND MATERIALS USED SHALL COMPLY AS REQUIRED BY THE BUILDING CODE LATEST EDITION.
7. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS & SPECIFICATIONS.
8. EVERYTHING IS TO BE CONSIDERED NEW UNLESS SPECIFIED EXISTING OTHERWISE.

## LEGEND

- +100.00 — EXISTING ELEVATION
- EXISTING CATCHBASIN
- EXISTING C.B./M.H.
- EXISTING MANHOLE
- NEW CATCHBASIN
- NEW C.B./M.H.
- NEW MANHOLE
- EXISTING STORM LINE
- EXISTING SANITARY LINE
- PROPERTY LINE
- SETBACK LINE
- NEW SANITARY LINE
- NEW STORM LINE
- W — NEW WATER LINE

PLAN OF SURVEY
PART 1 – PLAN OF SURVEY OF
PART OF BLOCK 6
PLAN 4M–1566
AND
PART OF LOT 3
CONCESSION 1
GEOGRAPHIC TOWNSHIP OF HUNTLEY
CITY OF OTTAWA

REVISION TABLE

| REV. | DESCRIPTION | DRAWN | APP'D. |
|---|---|---|---|
| | | DATE | |
| 0 | REVISED AS PER THE CLIENT'S COMMENTS | RP | JS |
| | | 11 FEB 21 | |

ISSUE TABLE

| TO | FOR | DATE |
|---|---|---|
| SUNCOR | 75% REVIEW | 11 NOV 20 |
| SUNCOR | PRICING | 04 DEC 20 |
| SUNCOR | ISSUED FOR SPA | 18 DEC 20 |

METRIC
ALL DIMENSIONS ARE IN MILLIMETRES U.N.O.. CONTRACTOR TO CHECK/VERIFY ALL DIMENSIONS PRIOR TO COMMENCEMENT OF WORK. ALL DESCREPANCIES TO BE REPORTED TO THE PROJECT DESIGNER. DO NOT SCALE DRAWINGS.

SEAL:

CONSULTANT:
J+B ENGINEERING INC.
TORONTO
20 CENTURIAN DR.
SUITE 201
MARKHAM ON L3R 8N8
416 229 2636
CALGARY
707 10TH AVE. SW
SUITE 150
CALGARY AB T2R 0B3
403 355 2295

PETRO–CANADA
A Suncor Energy Business

DRAWING TITLE:
SERVICING PLAN

PROJECT:
PROMENADE PALLADIUM DRIVE
@ PROMENADE CAMPEAU DRIVE
OTTAWA, ON

| | |
|---|---|
| DRAWN BY: | RP |
| DRAWING SCALE: | 1:300 |
| DATE DRAWN: | 2020–10–14 |
| CHECKED BY: | BR |
| APPROVED BY: | JS |

CAD INFO.:
SHEET SIZE
D (559 x 864)
PETRO–CANADA
CAD FILE No.
CONSULTANT
CAD FILE No. 200258–P301
PLOT SCALE
1:1
PLOT DATE
PLOT CONFIGURATION

STD No./OUTLET No.
10565

P301

Stormceptor® EF Sizing Report

## STORMCEPTOR®
## ESTIMATED NET ANNUAL SEDIMENT (TSS) LOAD REDUCTION

12/18/2020

| | |
|---|---|
| Province: | Ontario |
| City: | Ottawa |
| Nearest Rainfall Station: | OTTAWA MACDONALD-CARTIER INT'L AP |
| NCDC Rainfall Station Id: | 6000 |
| Years of Rainfall Data: | 37 |

| | |
|---|---|
| Project Name: | Kanata |
| Project Number: | 200258 |
| Designer Name: | Binay Rajbhandari |
| Designer Company: | J+B Engineering |
| Designer Email: | b.rajbhandari@jandb-inc.com |
| Designer Phone: | 416-229-2636 |
| EOR Name: | |
| EOR Company: | |
| EOR Email: | |
| EOR Phone: | |

| | |
|---|---|
| Site Name: | 8605 Promenade Campeau |
| Drainage Area (ha): | 1.18 |
| Runoff Coefficient 'c': | 0.69 |
| Particle Size Distribution: | Fine |
| Target TSS Removal (%): | 80.0 |
| Required Water Quality Runoff Volume Capture (%): | 90.00 |
| Estimated Water Quality Flow Rate (L/s): | 29.43 |
| Oil / Fuel Spill Risk Site? | Yes |
| Upstream Flow Control? | No |
| Peak Conveyance (maximum) Flow Rate (L/s): | |
| Site Sediment Transport Rate (kg/ha/yr): | |

**Net Annual Sediment (TSS) Load Reduction Sizing Summary**

| Stormceptor Model | TSS Removal Provided (%) |
|---|---|
| EFO4 | 69 |
| EFO6 | 79 |
| EFO8 | 84 |
| EFO10 | 87 |
| EFO12 | 89 |

**Recommended Stormceptor EFO Model: EFO8**

**Estimated Net Annual Sediment (TSS) Load Reduction (%): 84**

**Water Quality Runoff Volume Capture (%): > 90**

## THIRD-PARTY TESTING AND VERIFICATION

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

## PERFORMANCE

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

## PARTICLE SIZE DISTRIBUTION (PSD)

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

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

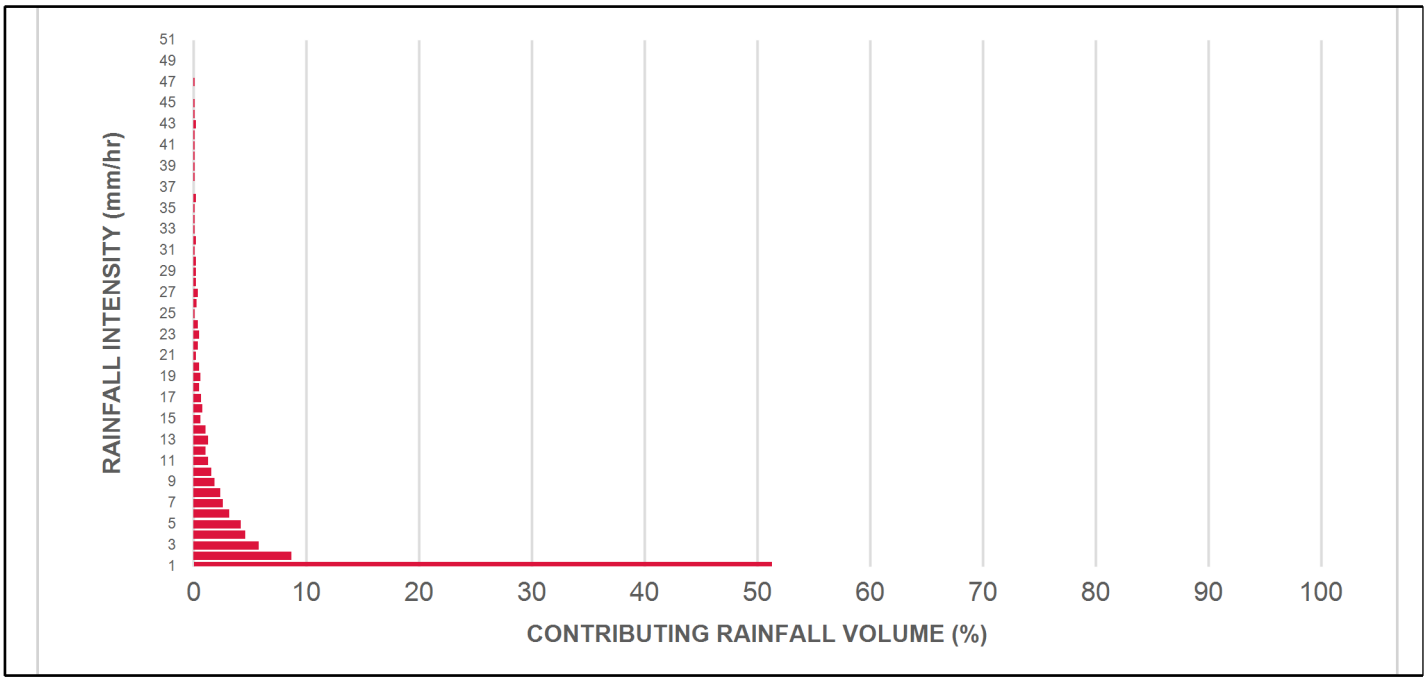
# Stormceptor® EF Sizing Report

| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|---|---|---|---|---|---|---|---|
| 1 | 51.3 | 51.3 | 2.26 | 136.0 | 29.0 | 93 | 47.7 | 47.7 |
| 2 | 8.7 | 60.0 | 4.53 | 272.0 | 58.0 | 92 | 8.0 | 55.7 |
| 3 | 5.8 | 65.8 | 6.79 | 407.0 | 87.0 | 89 | 5.2 | 60.9 |
| 4 | 4.6 | 70.4 | 9.05 | 543.0 | 116.0 | 86 | 3.9 | 64.8 |
| 5 | 4.2 | 74.6 | 11.32 | 679.0 | 144.0 | 83 | 3.5 | 68.3 |
| 6 | 3.2 | 77.8 | 13.58 | 815.0 | 173.0 | 79 | 2.5 | 70.8 |
| 7 | 2.6 | 80.4 | 15.84 | 951.0 | 202.0 | 76 | 2.0 | 72.8 |
| 8 | 2.4 | 82.8 | 18.11 | 1086.0 | 231.0 | 73 | 1.8 | 74.6 |
| 9 | 1.9 | 84.7 | 20.37 | 1222.0 | 260.0 | 71 | 1.3 | 75.9 |
| 10 | 1.6 | 86.3 | 22.63 | 1358.0 | 289.0 | 69 | 1.1 | 77.0 |
| 11 | 1.3 | 87.6 | 24.90 | 1494.0 | 318.0 | 66 | 0.9 | 77.9 |
| 12 | 1.1 | 88.7 | 27.16 | 1630.0 | 347.0 | 63 | 0.7 | 78.6 |
| 13 | 1.3 | 90.0 | 29.43 | 1766.0 | 376.0 | 61 | 0.8 | 79.3 |
| 14 | 1.1 | 91.1 | 31.69 | 1901.0 | 405.0 | 58 | 0.6 | 80.0 |
| 15 | 0.6 | 91.7 | 33.95 | 2037.0 | 433.0 | 57 | 0.3 | 80.3 |
| 16 | 0.8 | 92.5 | 36.22 | 2173.0 | 462.0 | 56 | 0.5 | 80.8 |
| 17 | 0.7 | 93.2 | 38.48 | 2309.0 | 491.0 | 55 | 0.4 | 81.2 |
| 18 | 0.5 | 93.7 | 40.74 | 2445.0 | 520.0 | 54 | 0.3 | 81.4 |
| 19 | 0.6 | 94.3 | 43.01 | 2580.0 | 549.0 | 54 | 0.3 | 81.8 |
| 20 | 0.5 | 94.8 | 45.27 | 2716.0 | 578.0 | 53 | 0.3 | 82.0 |
| 21 | 0.2 | 95.0 | 47.53 | 2852.0 | 607.0 | 52 | 0.1 | 82.1 |
| 22 | 0.4 | 95.4 | 49.80 | 2988.0 | 636.0 | 52 | 0.2 | 82.3 |
| 23 | 0.5 | 95.9 | 52.06 | 3124.0 | 665.0 | 52 | 0.3 | 82.6 |
| 24 | 0.4 | 96.3 | 54.32 | 3259.0 | 693.0 | 52 | 0.2 | 82.8 |
| 25 | 0.1 | 96.4 | 56.59 | 3395.0 | 722.0 | 51 | 0.1 | 82.8 |

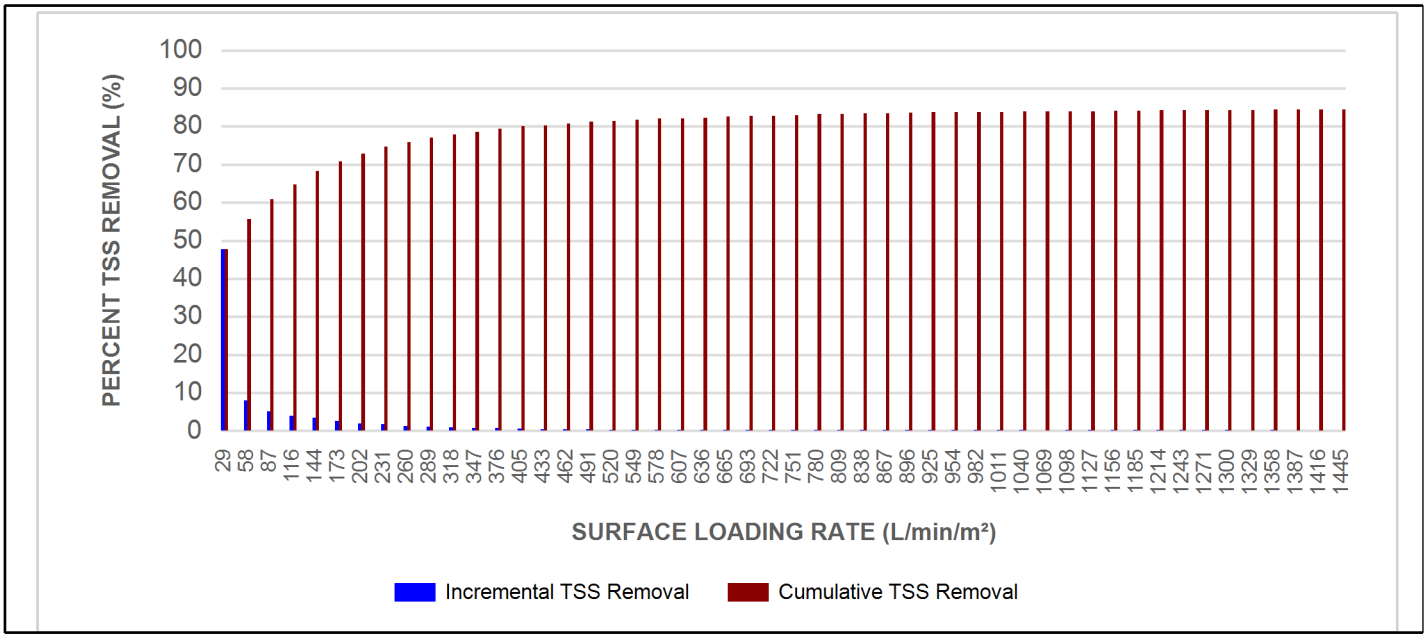
## Stormceptor® EF Sizing Report

| Rainfall Intensity (mm / hr) | Percent Rainfall Volume (%) | Cumulative Rainfall Volume (%) | Flow Rate (L/s) | Flow Rate (L/min) | Surface Loading Rate (L/min/m²) | Removal Efficiency (%) | Incremental Removal (%) | Cumulative Removal (%) |
|---|---|---|---|---|---|---|---|---|
| 26 | 0.3 | 96.7 | 58.85 | 3531.0 | 751.0 | 51 | 0.2 | 83.0 |
| 27 | 0.4 | 97.1 | 61.11 | 3667.0 | 780.0 | 51 | 0.2 | 83.2 |
| 28 | 0.2 | 97.3 | 63.38 | 3803.0 | 809.0 | 51 | 0.1 | 83.3 |
| 29 | 0.2 | 97.5 | 65.64 | 3938.0 | 838.0 | 51 | 0.1 | 83.4 |
| 30 | 0.2 | 97.7 | 67.90 | 4074.0 | 867.0 | 51 | 0.1 | 83.5 |
| 31 | 0.1 | 97.8 | 70.17 | 4210.0 | 896.0 | 51 | 0.1 | 83.6 |
| 32 | 0.2 | 98.0 | 72.43 | 4346.0 | 925.0 | 50 | 0.1 | 83.7 |
| 33 | 0.1 | 98.1 | 74.69 | 4482.0 | 954.0 | 50 | 0.1 | 83.7 |
| 34 | 0.1 | 98.2 | 76.96 | 4617.0 | 982.0 | 50 | 0.1 | 83.8 |
| 35 | 0.1 | 98.3 | 79.22 | 4753.0 | 1011.0 | 50 | 0.1 | 83.8 |
| 36 | 0.2 | 98.5 | 81.49 | 4889.0 | 1040.0 | 50 | 0.1 | 83.9 |
| 37 | 0.0 | 98.5 | 83.75 | 5025.0 | 1069.0 | 49 | 0.0 | 83.9 |
| 38 | 0.1 | 98.6 | 86.01 | 5161.0 | 1098.0 | 49 | 0.0 | 84.0 |
| 39 | 0.1 | 98.7 | 88.28 | 5297.0 | 1127.0 | 49 | 0.0 | 84.0 |
| 40 | 0.1 | 98.8 | 90.54 | 5432.0 | 1156.0 | 49 | 0.0 | 84.1 |
| 41 | 0.1 | 98.9 | 92.80 | 5568.0 | 1185.0 | 48 | 0.0 | 84.1 |
| 42 | 0.1 | 99.0 | 95.07 | 5704.0 | 1214.0 | 48 | 0.0 | 84.2 |
| 43 | 0.2 | 99.2 | 97.33 | 5840.0 | 1243.0 | 48 | 0.1 | 84.2 |
| 44 | 0.1 | 99.3 | 99.59 | 5976.0 | 1271.0 | 47 | 0.0 | 84.3 |
| 45 | 0.1 | 99.4 | 101.86 | 6111.0 | 1300.0 | 47 | 0.0 | 84.3 |
| 46 | 0.0 | 99.4 | 104.12 | 6247.0 | 1329.0 | 47 | 0.0 | 84.3 |
| 47 | 0.1 | 99.5 | 106.38 | 6383.0 | 1358.0 | 47 | 0.0 | 84.4 |
| 48 | 0.0 | 99.5 | 108.65 | 6519.0 | 1387.0 | 46 | 0.0 | 84.4 |
| 49 | 0.0 | 99.5 | 110.91 | 6655.0 | 1416.0 | 46 | 0.0 | 84.4 |
| 50 | 0.0 | 99.5 | 113.17 | 6790.0 | 1445.0 | 45 | 0.0 | 84.4 |
| **Estimated Net Annual Sediment (TSS) Load Reduction =** | | | | | | | | **84 %** |

## RAINFALL DATA FROM OTTAWA MACDONALD-CARTIER INT'L AP RAINFALL STATION




## INCREMENTAL AND CUMULATIVE TSS REMOVAL FOR THE RECOMMENDED STORMCEPTOR® MODEL



**Maximum Pipe Diameter / Peak Conveyance**

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

## SCOUR PREVENTION AND ONLINE CONFIGURATION

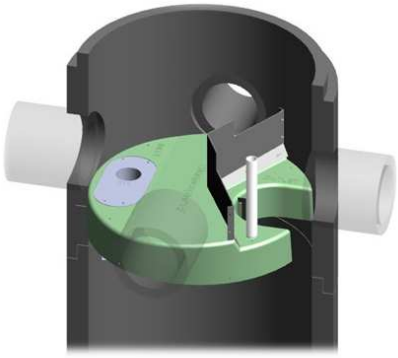
►**Stormceptor® EF and EFO** feature an internal bypass and superior scour prevention technology that have been demonstrated in third-party testing according to the scour testing provisions of the Canadian ETV **Procedure for Laboratory Testing of Oil-Grit Separators**, and the exceptional scour test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

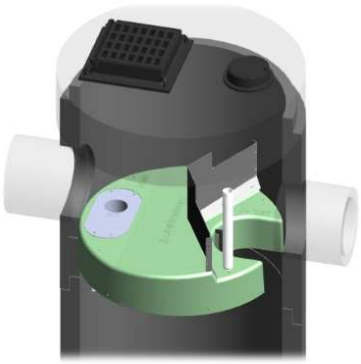
## DESIGN FLEXIBILITY

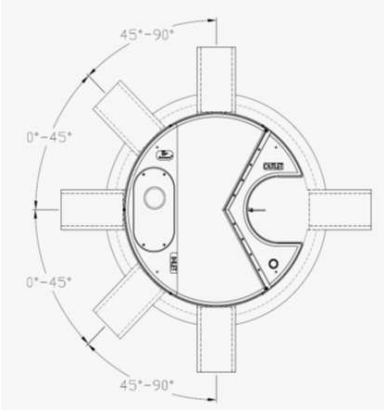
►**Stormceptor® EF** and **EFO** offers design flexibility in one simplified platform, accepting stormwater flow from a single inlet pipe or multiple inlet pipes, and/or surface runoff through an inlet grate. The device can also serve as a junction structure, accommodate a 90-degree inlet-to-outlet bend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

## OIL CAPTURE AND RETENTION

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








**INLET-TO-OUTLET DROP**

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

**HEAD LOSS**

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

**Pollutant Capacity**

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

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

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

**STANDARD STORMCEPTOR EF/EFO DRAWINGS**

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

**STANDARD STORMCEPTOR EF/EFO SPECIFICATION**

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

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

**PART 1 – GENERAL**

1.1 WORK INCLUDED

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

1.2 REFERENCE STANDARDS & PROCEDURES

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

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

1.3 SUBMITTALS

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

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

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

**PART 2 – PRODUCTS**

2.1 OGS POLLUTANT STORAGE

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

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

**PART 3 – PERFORMANCE & DESIGN**

3.1 GENERAL

The OGS stormwater quality treatment device shall be verified in accordance with ISO 14034:2016 Environmental management – Environmental technology verification (ETV). The OGS stormwater quality treatment device shall

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

3.2 SIZING METHODOLOGY

The OGS device shall be engineered, designed and sized to provide stormwater quality treatment based on treating a minimum of 90 percent of the average annual runoff volume and a minimum removal of an annual average 60% of the sediment (TSS) load based on the Particle Size Distribution (PSD) specified in the sizing report for the specified device. Sizing shall be determined using historical rainfall data and a sediment removal performance curve derived from the actual third-party verified laboratory testing data. The OGS device shall also have sufficient annual sediment storage capacity as specified and calculated in Section 2.1.

3.3 CANADIAN ETV or ISO 14034 ETV VERIFICATION OF SCOUR TESTING

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

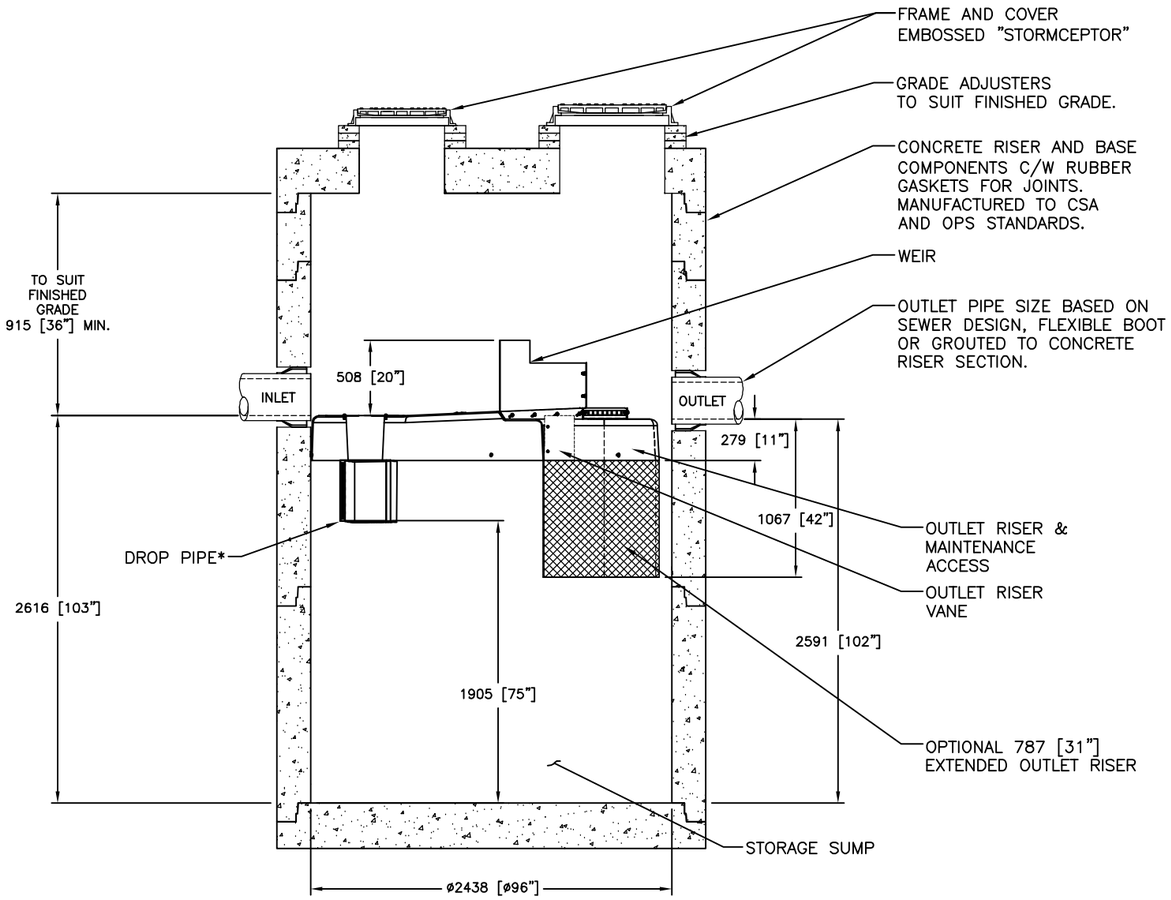
3.3.1 To be acceptable for on-line installation, the OGS device must demonstrate an average scour test effluent concentration less than 10 mg/L at each surface loading rate tested, up to and including 2600 L/min/$m^2$.

3.4 LIGHT LIQUID RE-ENTRAINMENT SIMULATION TESTING

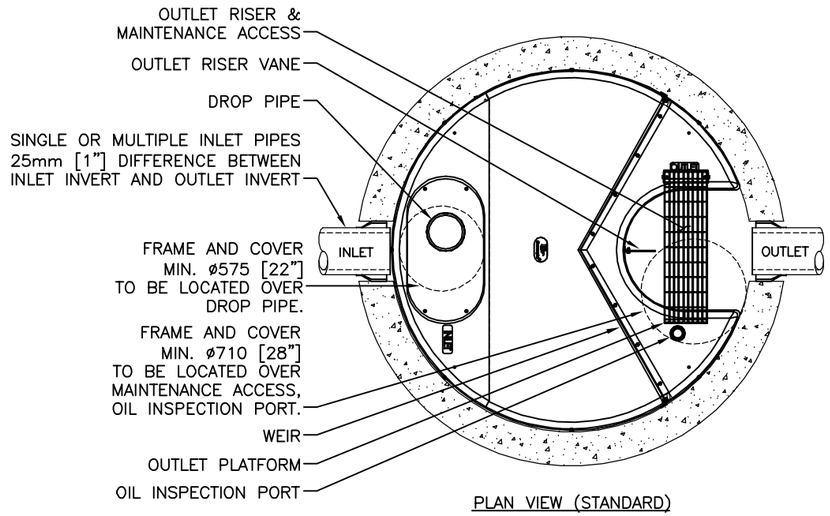
The OGS device shall have Canadian ETV or ISO 14034 ETV Verification of completed third-party Light Liquid Re-entrainment Simulation Testing in accordance with the Canadian ETV **Program's Procedure for Laboratory Testing of Oil-Grit Separators,** with results reported within the Canadian ETV or ISO 14034 ETV verification. This re-entrainment testing is conducted with the device pre-loaded with low density polyethylene (LDPE) plastic beads as a surrogate for light liquids such as oil and fuel. Testing is conducted on the same OGS unit tested for sediment removal to assess whether light liquids captured after a spill are effectively retained at high flow rates.

3.4.1 For an OGS device to be an acceptable stormwater treatment device on a site where vehicular traffic occurs and the potential for an oil or fuel spill exists, the OGS device must have reported verified performance results of greater than 99% cumulative retention of LDPE plastic beads for the five specified surface loading rates (ranging 200 L/min/m2 to 2600 L/min/m2) in accordance with the Light Liquid Re-entrainment Simulation Testing within the Canadian ETV Program's **Procedure for Laboratory Testing of Oil-Grit Separators.**However, an OGS device shall not be allowed if the Light Liquid Re-entrainment Simulation Testing was performed with screening components within the OGS device that are effective at retaining the LDPE plastic beads, but would not be expected to retain light liquids such as oil and fuel.

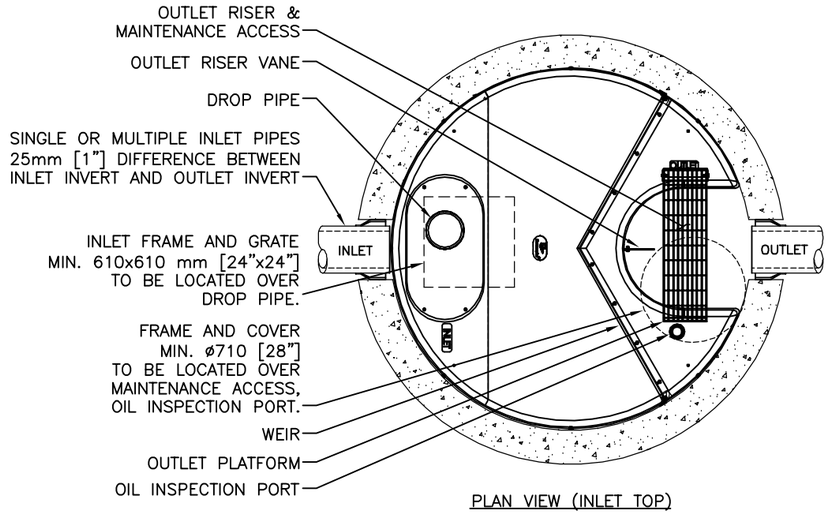
# DRAWING NOT TO BE USED FOR CONSTRUCTION




SECTION VIEW




PLAN VIEW (STANDARD)




PLAN VIEW (INLET TOP)

**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 EF8 AND 535 L/min/m$^2$ (13.1 gpm/ft$^2$) FOR STORMCEPTOR EFO8 (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 | EFO8 | | | | |
| 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 800-565-6801 CA 416-665-8600 INTL +1-416-665-8600

| | |
|---|---|
| DATE: | 10/13/2017 |
| DESIGNED: JSK | DRAWN: JSK |
| CHECKED: BSF | APPROVED: * |
| PROJECT No.: EFO8 | SEQUENCE No.: * |
| SHEET: | 1 OF 1 |