Stantec Consulting Ltd.
600 - 171 Queens Avenue London, Ontario N6A 5J7

October 23, 2023
File: 1614-14378

Attention: Devon Posthumus
Sifton Properties
1295 Riverbend Road, Suite 300
London ON N6K 0G2

Dear Devon,

Reference: 4040 Colonel Talbot Road, London, Ontario - Stormwater Management Brief

1.0 INTRODUCTION

Stantec Consulting Ltd. (Stantec) has been retained by Sifton Properties (Client) to assist with the consulting services, including the Stormwater Management (SWM) Plan for the proposed development located at 4040 Colonel Talbot Road, London, Ontario. The Site, approximately 0.80 ha, is bordered by Colonel Talbot Road to the west, open spaces and future Heathwoods Subdivision to the south, and undeveloped areas and open spaces to the north and east.

The following Design Brief outlines the SWM strategy for the proposed development. The approach involved the following components:

- Completion of background review of relevant, existing documents (listed in the following section).
- Design of the SWM Strategy for the proposed Site.
- Completion of a water balance analysis for the Site.
- Development of an erosion and sedimentation control plan.

2.0 BACKGROUND

In preparation of this report, the following documents and reports have been referenced:

- *Heathwoods Subdivision – Phase 4, Stormwater Management Brief Update,* Stantec Consulting Limited, September 2023.
- *Dingman Creek Subwatershed Servicing Study*, Aquafor Beech Limited, September 2020.
- *Erosion and Sediment Control Guide for Urban Construction*, Toronto and Region Conservation Authority, 2019.

- *Subdivision & Development Agreement Security Policy,* City of London, July 2014 (Enacted April 4, 2017, Amended June 26, 2018)
- *Design Specifications and Requirements Manual,* City of London, October 2003 (Updated March 2021).
- *Stormwater Management Planning and Design Manual (SWMPD Manual),* Ontario Ministry of the Environment, Conservation and Parks, March 2003.

3.0 STORMWATER MANAGEMENT CRITERIA

The SWM criteria for the Site are established as per the SWM criteria and environmental targets identified in the Ministry of the Environment, Conservation and Parks (MECP) and the Dingman Creek Sub-watershed Study standards in conjunction with the City of London standards and requirements. The SWM design criteria for the proposed development are:

- **Water Quality** – Provide sufficient treatment measures to meet the Ministry of the Environment, Conservation and Parks, (MECP) *Enhanced* (80% TSS Removal) criteria.
- **Water Quantity** – Provide sufficient water quantity control to maintain post-development peak flow rates up to and including the 100-year storm event to the allowable target flow rates from the Site to the Colonel Talbot right-of-way (ROW).
- **Infiltration and Water Balance** – Promote infiltration measures where possible and provide best efforts to match pre-development infiltration rates.
- **Erosion and Sediment Control** – Provide appropriate erosion and sediment control during construction/area grading to protect adjacent properties from potential siltation.

4.0 HYDROLOGIC ANALYSIS

4.1 TARGET DRAINAGE CONDITIONS

The existing property is located approximately 820 m north of the intersection of Colonel Talbot Road and Main Street on the east side of Colonel Talbot Road. The existing Site consists of a residential building, associated access road, and landscaped and undeveloped areas.

As part of the *Heathwoods Subdivision – Phase 4, Stormwater Management Brief Update* (Stantec, 2023), proposed catchment boundaries were delineated for the Heathwoods Subdivision and the external catchments draining to the Colonel Talbot Road right-of-way and are provided on the attached *Figure 2: 2021 Revised Proposed Catchment Boundary* (Stantec, 2021). The subject Site area, approximately 0.80 ha, is included in Catchment 302, therefore, allowable release rates for Catchment 302, approximately 3.34 ha in area, have been prorated to calculate the target flow rates from the Site area. The target flow rates are summarized in Table 1 below.

Table 1: Target Release Rate Summary

Catchment	Drainage Area (ha)	5 yr – Allowable Release Rate (m^3/s)	100 yr - Allowable Release Rate (m^3/s)
302	3.34	0.25	0.45
Site	0.80	0.06	0.11

The delineation of the existing drainage catchments is provided on the attached Pre-development Flows Figure and is summarized as follows:

- **Catchment A1 –** 0.80 ha Site area, including a residential building, associated access road, and landscaped and undeveloped areas, draining overland towards south and southeast.
- **Catchment X1 –** 0.30 ha of external area, including a portion of the neighboring residential building as well as undeveloped areas, draining overland towards the Site area.

4.2 PROPOSED DRAINAGE CONDITIONS

The proposed development consists of medium density apartments with associated parking areas, access road, and landscaped areas as shown on the attached Servicing Plan. The proposed development is comprised of 49% hard surface, 31% landscaped area, and 20% building rooftop area and has a runoff coefficient of 0.7.

The delineation of the proposed drainage catchments is provided on the attached Post-development Flows Figure and is summarized as follows:

- **Catchment B1 –** The proposed 0.8 ha residential development draining south and west to the Colonel Talbot ROW.
- **Catchment X1 –** 0.30 ha of external area, including a portion of the neighboring residential building as well as undeveloped areas, draining overland towards the Site area.

5.0 STORMWATER MANAGEMENT STRATEGY

Stormwater runoff from the Site will be provided with on-site water quality and water quantity controls to meet the above-mentioned SWM criteria. Minor and Major flows from the Site are proposed to be conveyed via pipe and overland to the proposed SWM measures for water quality and quantity control.

5.1 WATER QUANTITY CONTROLS

Quantity controls capable of mitigating the peak discharge for all storms up to and including the 100-year event from the proposed development are required to meet the water quantity control requirements.

Based on the attached calculations, controlling the proposed conditions 100-year storm from the proposed development and the external area contributing to the Site to the 5-year target discharge rate for the Site can be obtained by providing a storage volume of 284 m^3 which can be achieved using underground and surface storage on-site.

Water quantity control for the proposed Site and the contributing external areas will be provided using a combination of underground and surface storage. Controlling minor flows (i.e., 5-year storm) to the 5-year target discharge rate requires a storage volume of 83 m^3, which will be provided underground using ADS Chambers (consisting of MC-3500 chamber systems). The proposed quantity control strategy is summarized in Table 2 below while more details can be found in the attached SWM Calculations.

Table 2: Water Quantity Control Summary

Required Storage (m^3) - Controlling Proposed 100-year Flows to the 5-year Target Release Rate	284
Required Storage (m^3) - Controlling Proposed 5-year Flows to the 5-year Target Release Rate	83
Total Provided Storage (m^3)	294
Provided underground Storage (m^3)	114
Provided Surface Storage (m^3)	180

Flows from the Site and the contributing external areas will be controlled using a 140 mm orifice plate within the proposed R2 manhole located in the southwest portion of the Site. This orifice is sized to control the proposed flow rates to the existing target rate of 0.06 m^3/s and will be located upstream of the proposed Oil/Grit Separator (OGS). Orifice Sizing Calculations can be found in the attached SWM calculations.

The proposed 250-year flows will be accommodated in and conveyed safely via the proposed road ROWs and will be directed towards the Colonel Talbot ROW.

5.2 WATER QUALITY CONTROLS

Under the proposed conditions, quality control is required given the amount of surface parking proposed. The City of London standards state that an *Enhanced* water quality control (a minimum of 80% TSS removal) is required for the sites where the number of proposed/existing parking spaces exceeds 29.

Quality treatment for the Site will be provided using an Oil/Grit Separator (OGS) sized to provide a minimum of 80% TSS removal for the entire system to achieve the required quality controls dictated by the Dingman Creek Sub-watershed Study and the MECP standards. The characteristics of this OGS are summarized in Table 3 below while more details can be found in the attached ADS OGS Sizing Summary Report.

Table 3: Water Quality Control – OGS Sizing Summary

Drainage Area (ha)	OGS Location	Outlet	Runoff Coefficient (C)	Stormceptor Model	TSS Removal (%)
1.10	Downstream of ADS Chambers and the Orifice Plate	Proposed Manhole R10	0.56	FD-4HC	88

5.3 INFILTRATION AND WATER BALANCE

A water balance analysis completed as part of the current work determined that the development of the Site to a residential land use with an impervious coverage of 52% would result in significant impacts on the volume of water that is recharged to the groundwater system, if no infiltration augmentations were considered. The attached water balance analysis indicates that the estimated pre-development infiltration of 262 mm/year would see a 70% reduction to 79 mm/year, if no infiltration measures are implemented.

It is recommended that an increased topsoil depth of at least 300 mm be applied to all pervious areas under the proposed conditions. As per the *Evaluation of Residential Lot Level Stormwater Practices Technical Brief* (TRCA, 2014), increased topsoil depth of pervious areas can provide runoff reduction benefits. The study indicates that 5% reduction in runoff volume and, consequently, 5% increase in groundwater recharge can be expected as a result of applying increased topsoil depth.

Additionally, an infiltration swale is proposed along the eastern boundary of the Site to convey flows from 50% of the proposed rooftop areas and the swale itself, 0.09 ha in area, and to provide an opportunity for runoff to be infiltrated. Conservatively, it was assumed that groundwater recharge at the infiltration swale only occurs during the storm events that exceed the 10mm storm event of which 8mm was assumed to contribute to Site runoff. As per the Environment Canada's Canadian Climate Normals at London Int'l Airport Station, on average, 31.7 storm events exceed the 10mm storm event per year. As a part of the water balance analysis, it was calculated that the ratio of the annual runoff from the 0.09 ha area contributing to the infiltration swale during storm events greater than the 10mm event to the total annual Site runoff equals 3.7%. Consequently, 3.7% increase in groundwater recharge was assumed as a result of implementing onsite infiltration swale.

Based on the attached Water Balance Calculations, the proposed infiltration measures will result in a 68 mm/year increase in groundwater recharge over the post-development scenario with no measures which reduces infiltration deficit compared to pre-development conditions to 116 mm/year. Water balance and infiltration design will need to be revisited and completed during detail design stage based on hydrogeological data.

6.0 EROSION AND SEDIMENT CONTROL PLAN

This section describes the Erosion and Sediment Control Plan that will be implemented during and immediately after construction to reduce the possibility of sediment being deposited downstream.

6.1 TYPES OF SELECTED EROSION/SEDIMENT CONTROL METHODS

The details and locations of the proposed erosion and sediment control measures are shown on the attached Erosion and Sediment Control Plan. The proposed erosion and sediment control measures include the following:

- Heavy-duty silt fencing to be erected on all site boundaries where there is potential for runoff to be discharged offsite, to protect adjacent downstream lands from migration of sediment in overland flow. The location of this fencing will be adjacent to the limit of grading.

- Stabilize all disturbed areas where work will not take place for a period of 30 days or more according to OPSS 572.
- Perform street sweeping as necessary to remove soil accumulation caused by construction traffic.
- Installation of a mud mat at the main entrance to site.
- Dewatering effluent discharge areas complete with sediment traps and energy diffusers shall be constructed, as necessary, within the proposed construction limits. Filter socks will be used where necessary to further filter the discharge.
- Install and maintain inlet protections at all catchbasins to prevent sediment from entering the proposed storm sewer.

The proposed temporary erosion & sediment control measures have been selected based on the site's susceptibility to erosion, sensitivity of the downstream environment, site slopes, and total drainage area. The proposed measures should provide adequate erosion and sediment control for the proposed project without the need for additional measures; however, the site will be monitored during construction, and additional measures will be added, if required. Such measures may include additional rows of silt fence or rock check dams in areas that are susceptible to erosion.

6.2 CONTINGENCY PLAN

The purpose of the Contingency Plan is to help minimize the risk or consequence of failure of the erosion and sediment control works. Failure could result from insufficient measures, lack of maintenance, or severe weather conditions. The Contingency Plan includes two (2) areas of consideration: the procedures that will be followed where a failure has occurred; and the contingency measures that will be implemented where there is potential for failure.

The Contractor shall be responsible for following the Contingency Plan, and will prepare the following items:

- The Contractor will create an emergency contact list for emergency situations.
- Workers shall be on call for emergency situations for all aspects of the emergency from design to construction of emergency sediment and erosion control measures. Any associated health and safety issues are the responsibility of Contractor.
- Heavy duty silt fence, erosion control blanket, straw bales and stakes, sandbags, appropriately sized rip-rap, and clean gravel fill shall be available for emergency installation.
- Gas powered pumps, appropriately sized hoses, filtration hose socks, and filter cloth shall be available for emergency dewatering.
- Heavy equipment shall be on standby for emergency works.

- Fuel spill equipment shall be available for emergency spills of deleterious substances.
- A contact list for any further required equipment or materials shall be prepared and made available for emergency use.

Contingency Measures in Case of Failure

In the event of a failure, the Contractor will cease all construction related work and focus on erosion and sediment control as required to effectively stabilize the site where a failure has occurred or is imminent. The work shall be completed to the satisfaction of the Contract Administrator and any regulatory agencies that have been consulted.

Any unexpected discharge of silt or sediment or other deleterious substance outside of the work limits shall be reported to the City within a period of 2 hours. If significant long-term damage to fish habitat or property is suspected, a Restoration Plan will be developed by the Owner's Engineer. Development of the initial Restoration Plan will begin within 24 hours of the discovery of sediment discharge, and will be implemented as soon as possible, following consultation and approval from the MECP, UTRCA, DFO and City of London (EESD). The Plan will address:

- Removal and disposal of sediment from outside of the work limits
- Restoration of the affected area
- Restoration of any areas disturbed through deposition or removal.

Contingency Measures Where There is a High Risk of Failure

Conditions that may potentially cause failures can be identified through two (2) methods: monitoring of the erosion and sediment control measures, and weather forecasts that anticipate severe weather conditions.

High Risk Identified through Monitoring

Where monitoring has identified a high potential for failure, steps shall be immediately taken to reduce the risk. These measures may include repair to existing measures, modification of existing measures, and the addition of new measures.

The Contractor shall document the proposed approach and submit it to the Contract Administrator for immediate review and response. Where no response is forthcoming, the Contractor shall immediately proceed with implementation.

The Contract Administrator shall immediately provide a copy of the proposed approach to the City of London. As time may be of the essence, it will be the City's responsibility to respond forthwith, otherwise the Contractor shall proceed with the proposed measures.

Severe Weather Anticipated

In cases where the weather forecast indicates that significant rainfall is expected within a 24-hour period, the Contractor shall immediately complete the following:

- Verify that all erosion and sediment control measures are secure and that there is no exposed soil that could erode and be deposited downstream
- Verify that any exposed slopes are covered with erosion control blankets or other stabilization measures
- Verify that all other measures are in good working order
- Cease all dewatering operations
- Remove all equipment and stockpiled materials to an appropriate location
- Monitor all measures during the rainfall event, and where a potential for failure is identified, take corrective measures.

The Contract Administrator shall document the status of the above-listed steps.

If unforeseen events cause the strategies set out in the Contingency Plan to be insufficient or inappropriate to meet the objective of containing sediment within the work limits, the Contractor, either independently or as directed by the Contract Administrator, will respond in a timely manner with all reasonable measures consistent with safety, to prevent, counteract or remedy any effects on fish or fish habitat, human interest (i.e., safety, property value) and general watercourse slope stabilization.

6.3 WHEN AND WHERE DEVICES WILL BE INSTALLED

Construction of this project will likely begin during 2024. The locations of the proposed erosion and sediment control measures are shown on the Erosion and Sediment Control Plan. The order in which the proposed measures will be implemented is summarized in the following table.

Table 6: Erosion and Sediment Control Sequencing

Stage	Erosion and Sediment Control Measure
Pre-Construction	Create contact list for emergency Contingency Plan operations.
Construction	Monitor weather reports for significant precipitation events for contingency planning.
	Install heavy duty silt fencing along all the necessary site limits.
	Installation of a mud mat at the main entrance to site.
	Install catchbasin inserts in catchbasins.
	Perform street sweeping as necessary.
	Complete final grading and perform seeding.
	Remove dewatering sediment traps and energy diffusers.
Post-Construction	Remove any remaining erosion and sediment control measures.
	In consultation with the City, reestablish any downstream area showing signs of

	erosion or sedimentation.

6.4 LAND SLOPES AND PROPOSED LAND ALTERATIONS

The proposed work is a medium density residential development associated parking areas, access roads, and landscaped areas. In general, substantial alteration in the Site topography caused by the proposed Site grading is not expected.

6.5 NEED FOR ENHANCED EROSION/SEDIMENT CONTROL MEASURES

The proposed erosion and sediment control measures should convey the typical summer runoff during construction, while simultaneously preventing sediment transport. Additional measures will likely not be required. However, the site will be monitored during construction and additional measures (i.e., rock check dams and/or additional rows of silt fence) may be installed, at the discretion of the Contract Administrator. The triggers for the installation of enhanced erosion and sediment control measures would include breaching of the proposed erosion and sediment control measures, and / or reevaluation based on site conditions during construction. In any event, site conditions and erosion / sediment control measures will be monitored on a regular basis by onsite inspection staff.

6.6 DOWNSTREAM SENSITIVITY OF WATER RESOURCES

The subject site is located within the Dingman Creek Sub-watershed, which outlets to the Thames River. The Thames River system provides habitat for various rare fish and mollusk species and is also used as a source of drinking water and provides extensive recreational opportunities, particularly in its lower reaches. Thus, care will be required to prevent the discharge of suspended sediment from the proposed construction limits to Dingman Creek.

6.7 PROXIMITY TO ENVIRONMENTALLY SIGNIFICANT/SENSITIVE AREAS

No Environmentally Sensitive Areas (ESA) are noted in the proximity of the subject site.

6.8 INFILTRATION MEASURES AND EXISTING GROUNDWATER LEVELS

Erosion & sediment infiltration measures have not been included in the proposed Erosion and Sediment Control Plan.

6.9 DEWATERING REQUIREMENTS

If dewatering in excess of 50,000 Lpd is required, the Contractor will be responsible for obtaining an MECP Permit to Take Water (PTTW). Regardless, all dewatering effluent must be discharged to a sediment trap. Under no circumstances will dewatering effluent be discharged directly to the downstream sewer system. Both the Contractor and the Contract Administrator will be responsible for monitoring the water quality leaving the sediment traps.

If, during construction, the dewatering volume is significantly greater than initially expected, additional dewatering sediment traps will be constructed within the proposed work limits. The exact location of the dewatering sediment traps will depend on what work has been completed and the location of the excavation to be dewatered. Thus, the locations of any additional dewatering areas will be identified by the Owner's Engineer in consultation with the Contractor and the Contract Administrator.

6.10 PROPOSED REPORTING SYSTEM

The Contract Administrator shall prepare weekly erosion and sediment control monitoring reports for the duration of construction and submit them to the City of London by April 1, July 1, and November 1 of each year until all works and services of the plan are assumed. The Monitoring Reports should document the status of the ESC Plan, any repairs, rainfall or pumping that has occurred since the last report, and any failure of the erosion and sediment control measures shall be reported as described in the Contingency Plan.

6.11 INSPECTION REQUIREMENTS

In order to monitor the effectiveness of the erosion and sediment control measures during construction, frequent inspections will be required. The inspection activities will include the following tasks:

- The Developer's Contract Administrator and the Developer shall inspect the erosion control works on all days when construction is active
- The Developer and Developer's Contract Administrator shall monitor weather reports on a daily basis and record daily temperatures and rainfall
- The Developer's Contract Administrator and the Developer shall inspect the erosion control works following periods of excessive precipitation (i.e., rainfall depths that exceed 25 millimeters). Any deficiencies will be corrected by the Developer within 24 hours
- The Developer's Contract Administrator will document all inspection activities in weekly erosion and sediment control inspection reports
- The Developer shall be responsible for constructing and maintaining all erosion and sediment control measures
- Maintenance will be the responsibility of the Developer and shall include maintaining all erosion and sediment control measures. These shall include, but not be limited to, the following: maintaining fencing, erosion control blankets, and dewatering traps, and removing accumulated sediment
- Prior to removal of erosion and sediment control measures, the Owner's Engineer and the City of London shall conduct a joint inspection of the construction site to confirm that the measures can be removed and discuss the methods that will be used for removal. Removal of the erosion and sediment control measures will be the responsibility of the Owner.

6.12 SECURITY ALLOCATION FOR POTENTIAL RESTORATION WORKS

The *City of London Subdivision & Development Agreement Security Policy* (July 2014) states:

"Security for "Erosion and Sediment Control Measures" shall be provided to the satisfaction of the City, for all plans of subdivision and site alteration agreements based on the size (in hectares) of the development as follows:

- Less than 5.0 ha - $40,000
- Greater than or equal to 5.0 ha - $60,000"

Reference: **4040 Colonel Talbot Road, London, Ontario - Stormwater Management**

7.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the preceding documentation, the following conclusions can be drawn:

- The proposed SWM measures provide sufficient storage to maintain the target flow rates.
- The proposed OGS provides water quality control for the Site to achieve an '*Enhanced*' water quality control in order to meet MECP water quality requirements.
- It is recommended that the erosion and sediment control measures documented herein be implemented.

Based on the preceding report, the proposed SWM strategy is sufficient to provide water quality and water quantity control requirements for the subject site. We trust this meets your needs at this time; however, should you have any questions, please do not hesitate to contact the undersigned at your convenience.

Regards,

STANTEC CONSULTING LTD.

Digitally signed by Yavarikia, Maryam
Date: 2023.10.23 13:45:30 -04'00'

LICENSED PROFESSIONAL ENGINEER
A.K. KRISTOFERSON
100170788
PROVINCE OF ONTARIO

Digitally signed by Adam Kristoferson
Date: 2023.10.23 15:18:45 -04'00'

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Adam.kristoferson@stantec.com

Attachment:
Figure 2: 2021 Revised Proposed Catchment Boundary (Stantec, 2021)
Pre-development Flows Figure
Servicing Plan
Post-development Flows Figure
SWM Calculations and Chamber Sizing Report
ADS OGS Sizing Summary Report
Water Balance Calculations
Erosion and Sediment Control Plan

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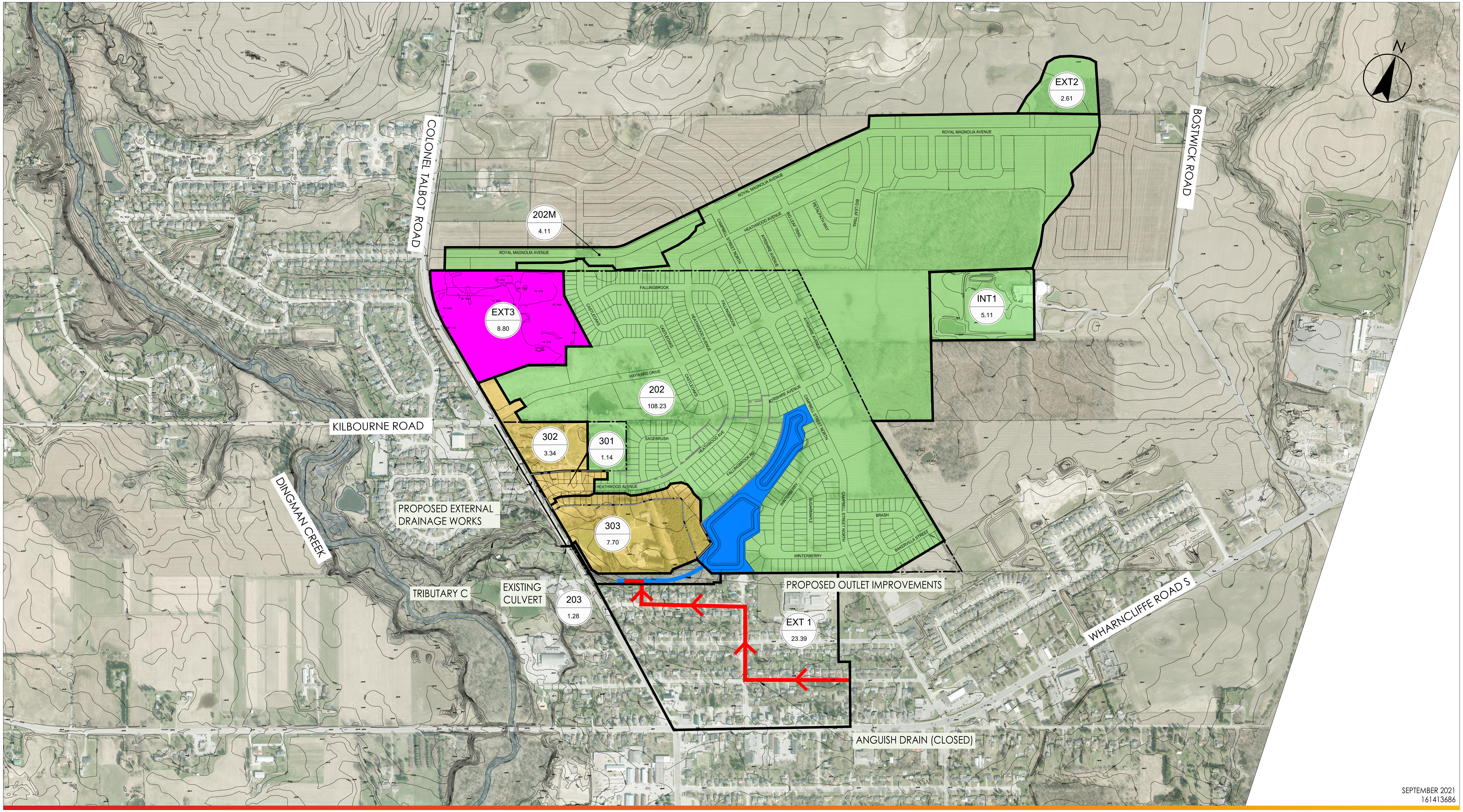

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Legend

- PROPOSED SWM POND
- DRAINAGE TO ON-SITE SWM CONTROLS
- DRAINAGE TO SWM POND
- DRAINAGE TO DINGMAN CREEK BY TRIBUTARY 12
- PROPOSED DRAINAGE BOUNDARY
- ANGUISH DRAIN
- 100 CATCHEMENT ID
- 0.25 AREA (ha)

0 100 300 500

1:10,000

Client/Project

City of London

STORM SERVICING & TRIBUTARY WORKS FOR THE NORTH TALBOT No. P-9 SWM FACILITY

Figure No.

2.0

Title

2021 REVISED PROPOSED CATCHMENT BOUNDARY

Stantec

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LEGEND

INTERNAL STORM DRAINAGE AREAS

DRAINAGE AREA BOUNDARY

DIRECTION OF MAJOR OVERLAND FLOWS

UNCONTROLLED DRAINAGE AREA

A1 — DRAINAGE AREA IDENTIFIER

0.32 — AREA CO–EFFICIENT

2.32 — AREA IN HECTARES

SCALE

1:750

0 7.5 22.5 37.5m

Client/Project

SIFTON PROPERTIES LTD.

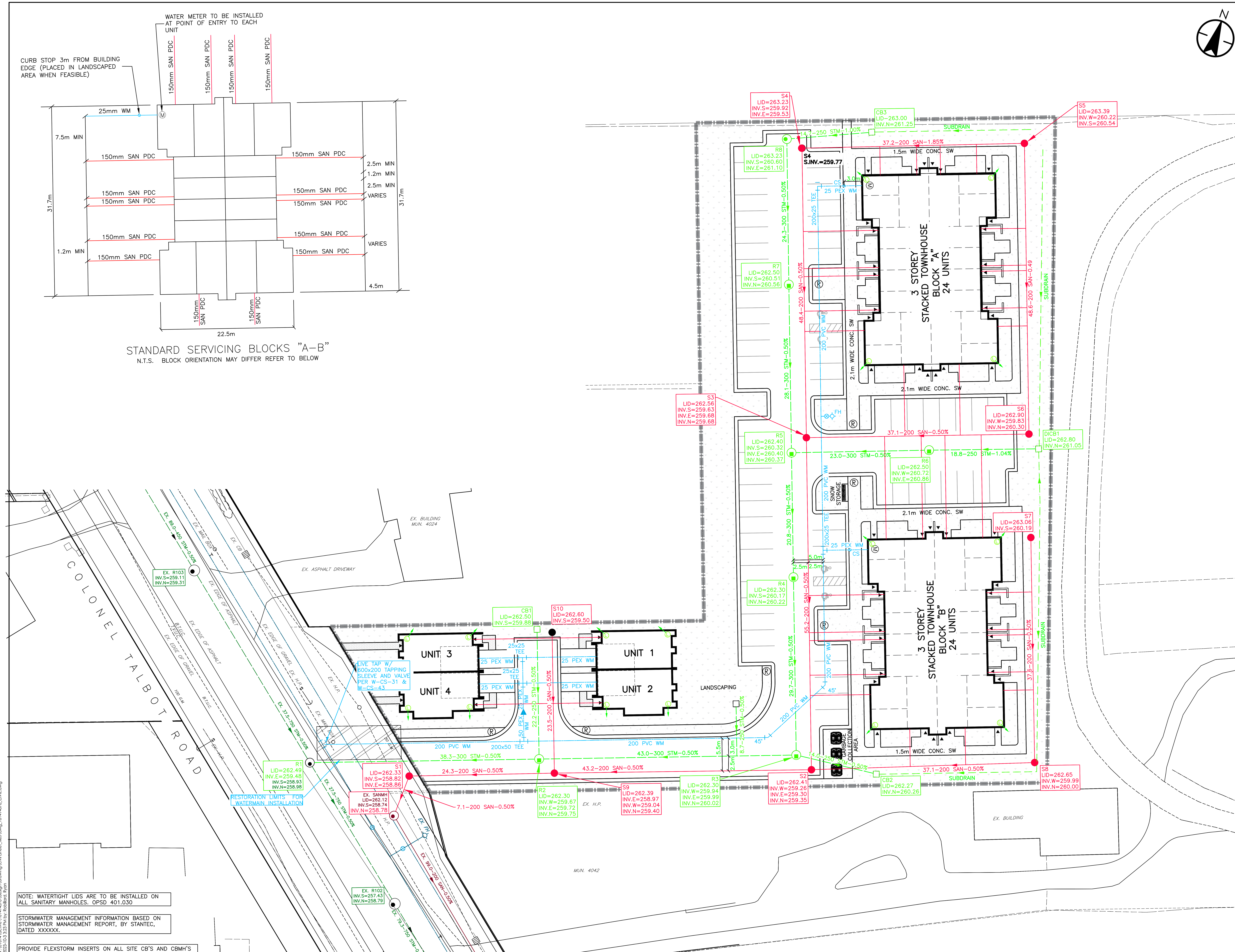
FIGURE

FIGURE 1.0

PRE-DEVELOPMENT FLOWS

PROJ. No. - 1614-14378

SEPT 18, 2023



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Liability Note

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.

Legend

SITE BOUNDARY
PROPOSED WATERMAIN & VALVE
EX. WATERMAIN
PROPOSED WATER SERVICE & CURBSTOP
PROPOSED 3-WAY FIRE HYDRANT C/W STORZ CONNECTION AS PER W-CS-1
EX. FIRE HYDRANT
PROPOSED STORM SEWER
SUBDRAIN LOCATION
EXISTING STORM SEWER
PROPOSED STORM MAINTENANCE HOLE
PROPOSED CATCHBASIN MAINTENANCE HOLE
PROPOSED CATCHBASIN
PROPOSED SANITARY SEWER
EXISTING SANITARY SEWER
SANITARY MAINTENANCE HOLE
WATER METER
SUMP
LIGHT STANDARD
ROOF LEADER & DIRECTION OF OUTLET
SUMP LOCATION

FOR SERVICING NOTES & DETAILS SEE SHEET C-5

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD
DRAFT ISSUE FOR CLIENT REVIEW	IRA	DV	23.08.18

File Name: dwg_161414378_civil	IRA	DV	IRA	23.08.08
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

30/05/2023

..\IMAGE\DV_stamp.JPG

Client/Project

SIFTON

4040 Colonel Talbot Road

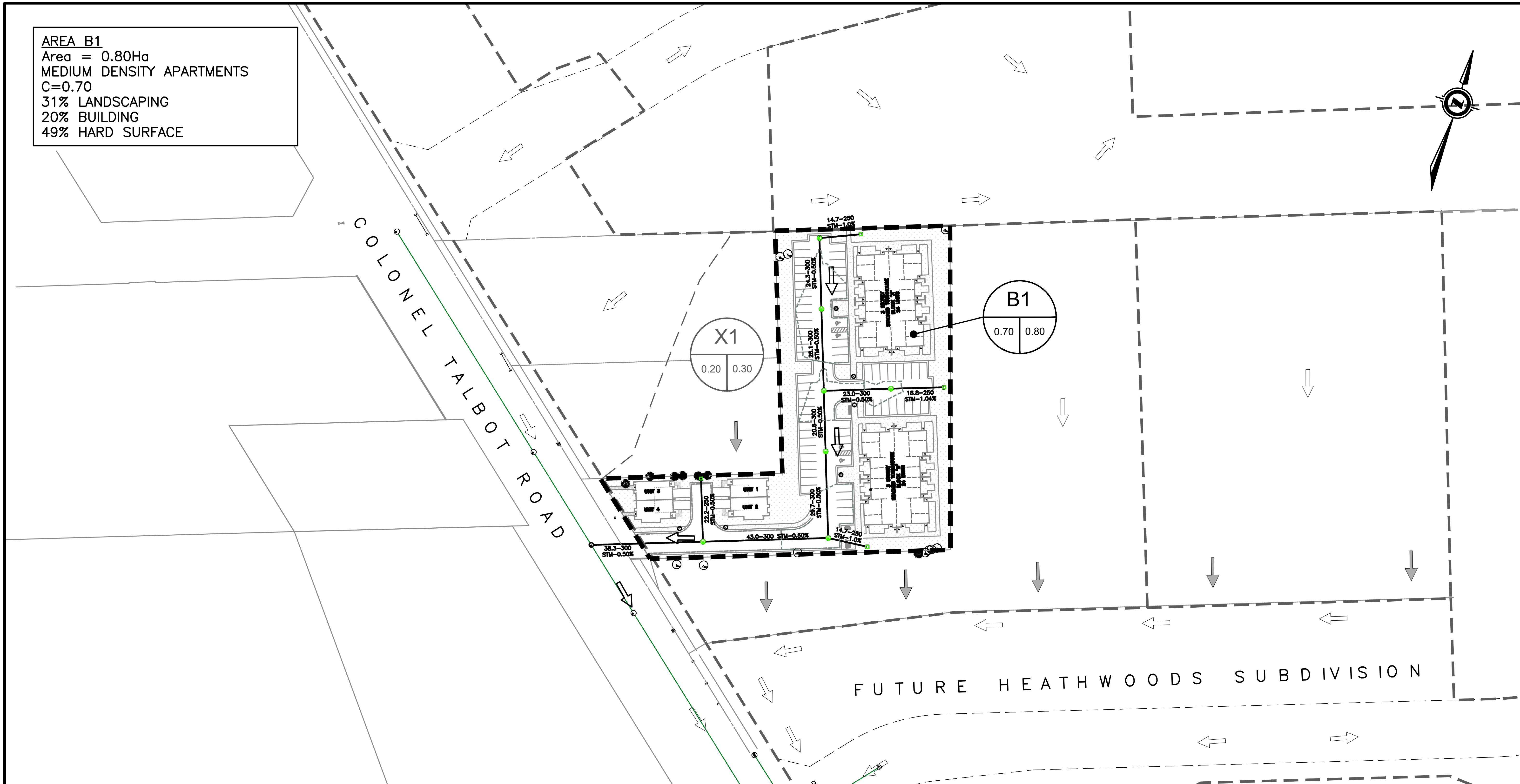
London, ON Canada

Title

SERVICING PLAN

Project No.	Scale
161414378	1:300 (0 3 9 15m)

Drawing No.	Sheet	Revision
C-2	2	0



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LEGEND

- INTERNAL STORM DRAINAGE AREAS
- DRAINAGE AREA BOUNDARY
- DIRECTION OF MAJOR OVERLAND FLOWS
- DIRECTION OF INTERIM MAJOR OVERLAND FLOWS - TO REMAIN UNTIL DRAINAGE AREA IS DEVELOPED BY OTHERS

B1 — DRAINAGE AREA IDENTIFIER
0.32 — AREA CO-EFFICIENT
2.32 — AREA IN HECTARES

SCALE

1:1250

0 12.5 37.5 62.5m

Client/Project

SIFTON PROPERTIES LTD.

FIGURE

FIGURE 2.0
POST-DEVELOPMENT FLOWS

PROJ. No. - 1614-14378

SEPT 18, 2023

Subject:	**Target Flows**
Project:	**4040 Col Talbot Rd**
Project No.:	**161414378**
Date:	**October 13, 2023**

Target Controls

Area 302	3.34 ha
Developed Area	0.80 ha
	24.0%

5yr Release Rate	0.25 m^3/s
Prorated Rate	0.060 m^3/s

Orifice Sizing

Target Flow	**0.060 m^3/s**
Orifice C:	0.6
Invert (m):	259.67
Diameter (mm):	**140**
Centre (m):	259.74
Area (m^2):	0.015
Head (m):	1.981
Q=CA(2gh)^0.5	
Design Q	0.058 m^3/s

Subject: Modified Rational Method
Project: 4040 Col Talbot Rd
Project No.: 161414378
Date: October 13, 2023

Drainage Area - Medium Density Block

	Area (ha)	C	AC
B1	0.8	0.7	0.56
X1	0.3	0.2	0.06
	1.1		0.62
Composite C		0.56	
TIMP		52%	

Total Drainage Area: 1.10 ha

Composite Runoff Coefficient: 0.56
Event Adjusted C: 0.70

(25% increase as per MTO guidelines for severe storm events 0.95 max)

Rainfall Intensity

$$I = A/(T+B)^C$$

I = Intensity of rainfall in mm/hour
T = Time of concentration in hours
A = 2619.363
B = 10.5
C = 0.884

Time Step 5 minutes

Storage Calculation 100-year

Target Release Rate: 0.06 m³/s

max Storage= 284

Time (min.)	Rainfall Intensity (mm/hr)	Peak Runoff Rate (cms)	Incremental Runoff Volume (cu. m)	Incremental Outflow Volume (cu. m)	Storage Volume (cu. m)
10	181.4	0.390	234	35	200
15	149.6	0.322	290	52	238
20	127.7	0.275	330	69	261
25	111.6	0.240	360	86	274
30	99.4	0.214	385	104	281
35	89.6	0.193	405	121	284
40	81.7	0.176	422	138	284
45	75.2	0.162	437	155	282
50	69.7	0.150	450	173	277
55	65.0	0.140	461	190	271
60	60.9	0.131	472	207	264
65	57.3	0.123	481	225	256
70	54.1	0.117	489	242	248
75	51.3	0.110	497	259	238
80	48.8	0.105	504	276	228
85	46.5	0.100	511	294	217

Subject: **Modified Rational Method**
Project: **4040 Col Talbot Rd**
Project No.: **161414378**
Date: **October 13, 2023**

Drainage Area - Medium Density Block

	Area (ha)	C	AC
B1	0.8	0.7	0.56
X1	0.3	0.2	0.06
	1.1		0.62
Composite C		0.56	
TIMP		52%	

Total Drainage Area: 1.10 ha

Composite Runoff Coefficient: 0.56
Event Adjusted C: 0.56

Rainfall Intensity

$$I = A/(T+B)^C$$

I = Intensity of rainfall in mm/hour
T = Time of concentration in hours
A = 1183.74
B = 7.641
C = 0.838

Time Step 5 minutes

Storage Calculation 5-year

Target Release Rate: 0.06 m³/s max Storage= 83

Time (min.)	Rainfall Intensity (mm/hr)	Peak Runoff Rate (cms)	Incremental Runoff Volume (cu. m)	Incremental Outflow Volume (cu. m)	Storage Volume (cu. m)
10	106.8	0.184	110	35	76
15	86.7	0.149	134	52	83
20	73.3	0.126	152	69	82
25	63.8	0.110	165	86	78
30	56.6	0.097	175	104	72
35	51.0	0.088	184	121	63
40	46.5	0.080	192	138	54
45	42.7	0.074	199	155	43
50	39.6	0.068	205	173	32
55	36.9	0.064	210	190	20
60	34.6	0.060	215	207	7
65	32.6	0.056	219	225	-5
70	30.9	0.053	223	242	-19
75	29.3	0.050	227	259	-32
80	27.9	0.048	230	276	-46
85	26.6	0.046	234	294	-60

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

ADS SiteAssist™
FOR STORMTECH INSTALLATION INSTRUCTIONS VISIT OUR APP

4040 COLONEL TALBOT ROAD

LONDON, ON, CANADA

MC-3500 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH MC-3500.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL BE CERTIFIED TO CSA B184, "POLYMERIC SUB-SURFACE STORMWATER MANAGEMENT STRUCTURES", AND MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE CSA S6 CL-625 TRUCK AND THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED, TESTED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 75 mm (3").
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 23° C / 73° F), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF MC-3500 CHAMBER SYSTEM

1. STORMTECH MC-3500 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 150 mm (6") SPACING BETWEEN THE CHAMBER ROWS.
7. INLET AND OUTLET MANIFOLDS MUST BE INSERTED A MINIMUM OF 300 mm (12") INTO CHAMBER END CAPS.
8. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE WELL GRADED BETWEEN ¾" AND 2" (20-50 mm)..
9. STONE MUST BE PLACED ON THE TOP CENTER OF THE CHAMBER TO ANCHOR THE CHAMBERS IN PLACE AND PRESERVE ROW SPACING.
10. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
11. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH MC-3500 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
2. THE USE OF EQUIPMENT OVER MC-3500 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADER, DUMP TRUCK, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "STORMTECH MC-3500/MC-4500 CONSTRUCTION GUIDE".
3. FULL 900 mm (36") OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY USING THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT STORMTECH AT 1-888-892-2694 WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

PROPOSED LAYOUT

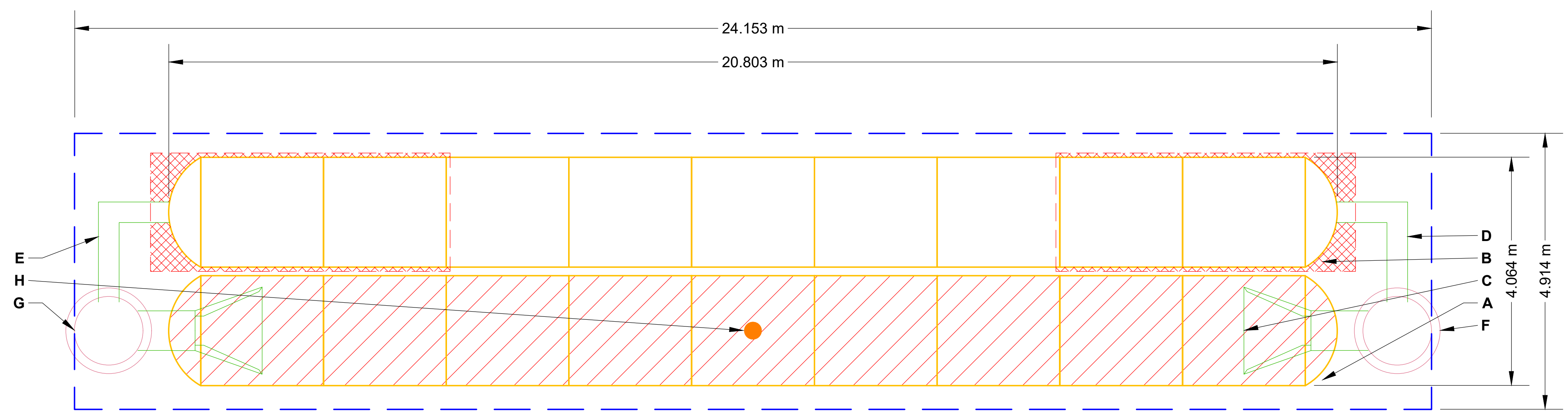
18	STORMTECH MC-3500 CHAMBERS
4	STORMTECH MC-3500 END CAPS
305	STONE ABOVE (mm)
229	STONE BELOW (mm)
40	STONE VOID
114.2	INSTALLED SYSTEM VOLUME (m^3) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)
118.7	SYSTEM AREA (m^2)
58.1	SYSTEM PERIMETER (m)

PROPOSED ELEVATIONS:

MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	264.089
MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	262.260
MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	262.108
MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	262.108
MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	262.108
TOP OF STONE:	261.955
TOP OF MC-3500 CHAMBER:	261.651
300 mm x 300 mm TOP MANIFOLD INVERT:	261.177
300 mm x 300 mm TOP MANIFOLD INVERT:	261.177
600 mm ISOLATOR ROW PLUS INVERT:	260.560
600 mm ISOLATOR ROW PLUS INVERT:	260.560
BOTTOM OF MC-3500 CHAMBER:	260.508
BOTTOM OF STONE:	260.279

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PREFABRICATED END CAP	A	600 mm BOTTOM CORED END CAP, PART#: MC3500IEPP24BC / TYP OF ALL 600 mm BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS	52 mm	
PREFABRICATED END CAP	B	300 mm TOP CORED END CAP, PART#: MC3500IEPP12T / TYP OF ALL 300 mm TOP CONNECTIONS	670 mm	
FLAMP	C	INSTALL FLAMP ON 600 mm ACCESS PIPE / PART#: MCFLAMP (TYP 2 PLACES)		
MANIFOLD	D	300 mm x 300 mm TOP MANIFOLD, ADS N-12	670 mm	
MANIFOLD	E	300 mm x 300 mm TOP MANIFOLD, ADS N-12	670 mm	
CONCRETE STRUCTURE	F	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		70 L/s IN
CONCRETE STRUCTURE	G	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		70 L/s IN
INSPECTION PORT	H	150 mm SEE DETAIL		



ISOLATOR ROW PLUS (SEE DETAIL)

PLACE MINIMUM 5.334 m OF ADSPLUS175 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

- MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE.
- DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
- THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
- THIS CHAMBER SYSTEM WAS DESIGNED WITHOUT SITE-SPECIFIC INFORMATION ON SOIL CONDITIONS OR BEARING CAPACITY. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR DETERMINING THE SUITABILITY OF THE SOIL AND PROVIDING THE BEARING CAPACITY OF THE INSITU SOILS. THE BASE STONE DEPTH MAY BE INCREASED OR DECREASED ONCE THIS INFORMATION IS PROVIDED.
- **NOT FOR CONSTRUCTION:** THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

4040 COLONEL TALBOT ROAD
LONDON, ON, CANADA

DATE:
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PROJECT #:
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DATE	DRW	CHK	DESCRIPTION

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Chamber System
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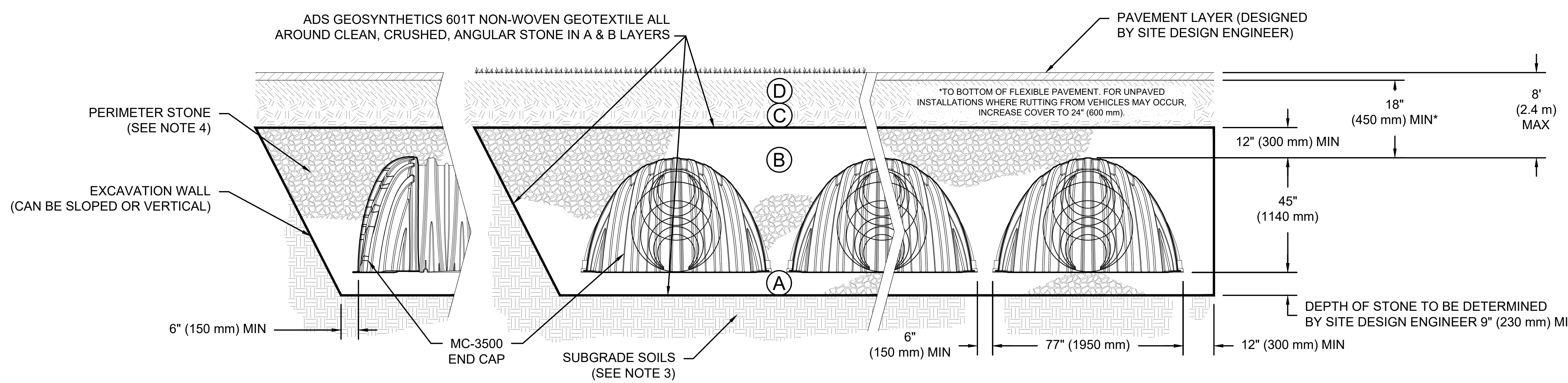
ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

SCALE = 1 : 100

ACCEPTABLE FILL MATERIALS: STORMTECH MC-3500 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 24" (600 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 24" (600 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 12" (300 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS.
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 4	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 9" (230 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS" CHAMBER CLASSIFICATION 45x76 DESIGNATION SS.
2. MC-3500 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 3".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 450 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

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THIS DRAWING HAS BEEN PREPARED BASED ON INFORMATION PROVIDED TO ADS UNDER THE DIRECTION OF THE SITE DESIGN ENGINEER OR OTHER PROJECT REPRESENTATIVE. THE SITE DESIGN ENGINEER SHALL REVIEW THIS DRAWING PRIOR TO CONSTRUCTION. IT IS THE ULTIMATE RESPONSIBILITY OF THE SITE DESIGN ENGINEER TO ENSURE THAT THE PRODUCT(S) DEPICTED AND ALL ASSOCIATED DETAILS MEET ALL APPLICABLE LAWS, REGULATIONS, AND PROJECT REQUIREMENTS.

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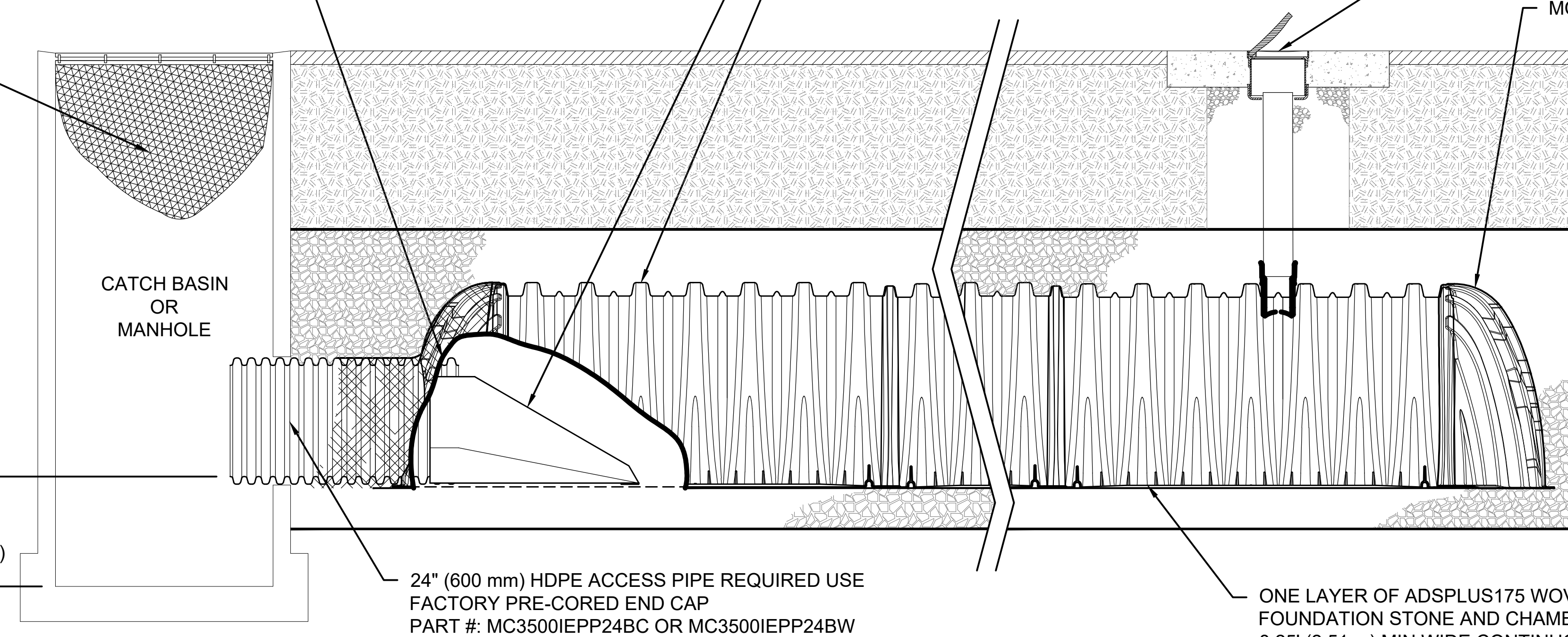


MC-3500 ISOLATOR ROW PLUS DETAIL

NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT

A. INSPECTION PORTS (IF PRESENT)

A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN

A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED

A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG

A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)

A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

B. ALL ISOLATOR PLUS ROWS

B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS

B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE

i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY

ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE

B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS

A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED

B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN

C. VACUUM STRUCTURE SUMP AS REQUIRED

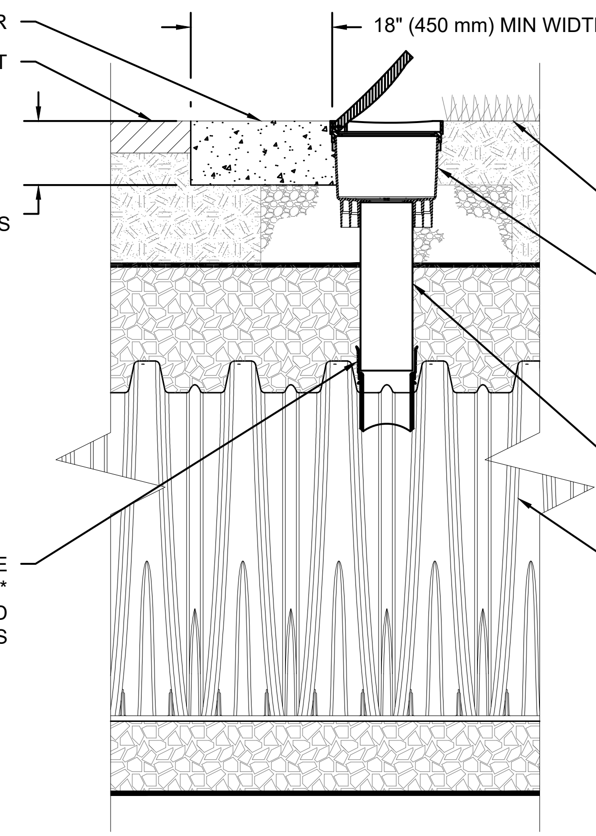
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



* THE PART# **2712AG6IPKIT** CAN BE USED TO ORDER ALL NECESSARY COMPONENTS FOR A SOLID LID INSPECTION PORT INSTALLATION

MC-3500 6" (150 mm) INSPECTION PORT DETAIL

NTS

4040 COLONEL TALBOT ROAD

LONDON, ON, CANADA

DATE: | DRAWN: CN

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MC-3500 TECHNICAL SPECIFICATION

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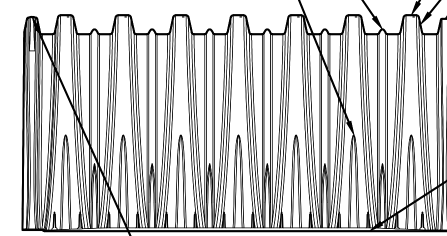
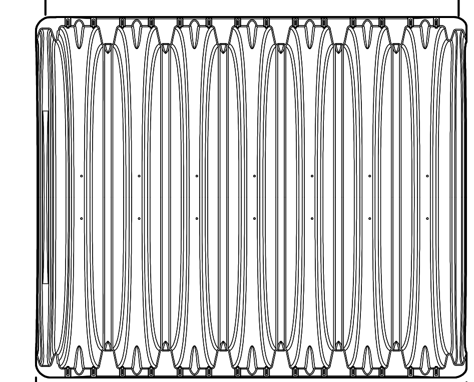
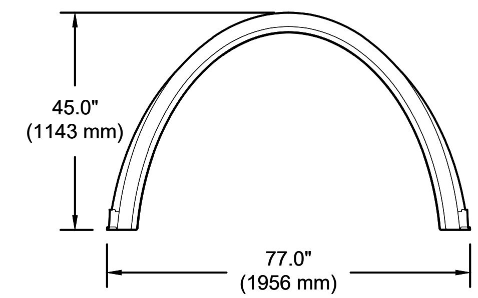
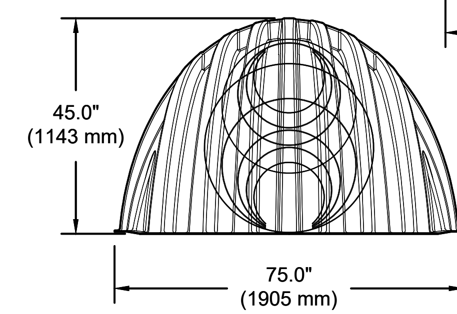
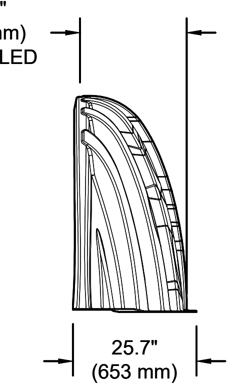










NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	77.0" X 45.0" X 86.0"	(1956 mm X 1143 mm X 2184 mm)
CHAMBER STORAGE	109.9 CUBIC FEET	(3.11 m³)
MINIMUM INSTALLED STORAGE*	175.0 CUBIC FEET	(4.96 m³)
WEIGHT	134 lbs.	(60.8 kg)

NOMINAL END CAP SPECIFICATIONS

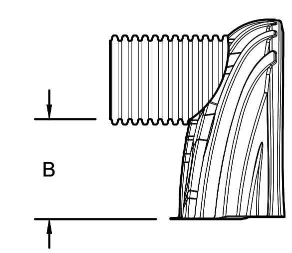
SIZE (W X H X INSTALLED LENGTH)	75.0" X 45.0" X 22.2"	(1905 mm X 1143 mm X 564 mm)
END CAP STORAGE	14.9 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	45.1 CUBIC FEET	(1.28 m³)
WEIGHT	49 lbs.	(22.2 kg)

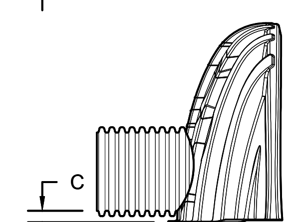
*ASSUMES 12" (305 mm) STONE ABOVE, 9" (229 mm) STONE FOUNDATION, 6" SPACING BETWEEN CHAMBERS, 6" (152 mm) STONE PERIMETER IN FRONT OF END CAPS AND 40% STONE POROSITY

STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"
END CAPS WITH A WELDED CROWN PLATE END WITH "C"
END CAPS WITH A PREFABRICATED WELDED STUB END WITH "W"

PART #	STUB	B	C
MC3500IEPP06T	6" (150 mm)	33.21" (844 mm)	---
MC3500IEPP06B		---	0.66" (17 mm)
MC3500IEPP08T	8" (200 mm)	31.16" (791 mm)	---
MC3500IEPP08B		---	0.81" (21 mm)
MC3500IEPP10T	10" (250 mm)	29.04" (738 mm)	---
MC3500IEPP10B		---	0.93" (24 mm)
MC3500IEPP12T	12" (300 mm)	26.36" (670 mm)	---
MC3500IEPP12B		---	1.35" (34 mm)
MC3500IEPP15T	15" (375 mm)	23.39" (594 mm)	---
MC3500IEPP15B		---	1.50" (38 mm)
MC3500IEPP18TC	18" (450 mm)	20.03" (509 mm)	---
MC3500IEPP18TW			
MC3500IEPP18BC		---	1.77" (45 mm)
MC3500IEPP18BW			
MC3500IEPP24TC	24" (600 mm)	14.48" (368 mm)	---
MC3500IEPP24TW			
MC3500IEPP24BC		---	2.06" (52 mm)
MC3500IEPP24BW			
MC3500IEPP30BC	30" (750 mm)	---	2.75" (70 mm)

NOTE: ALL DIMENSIONS ARE NOMINAL

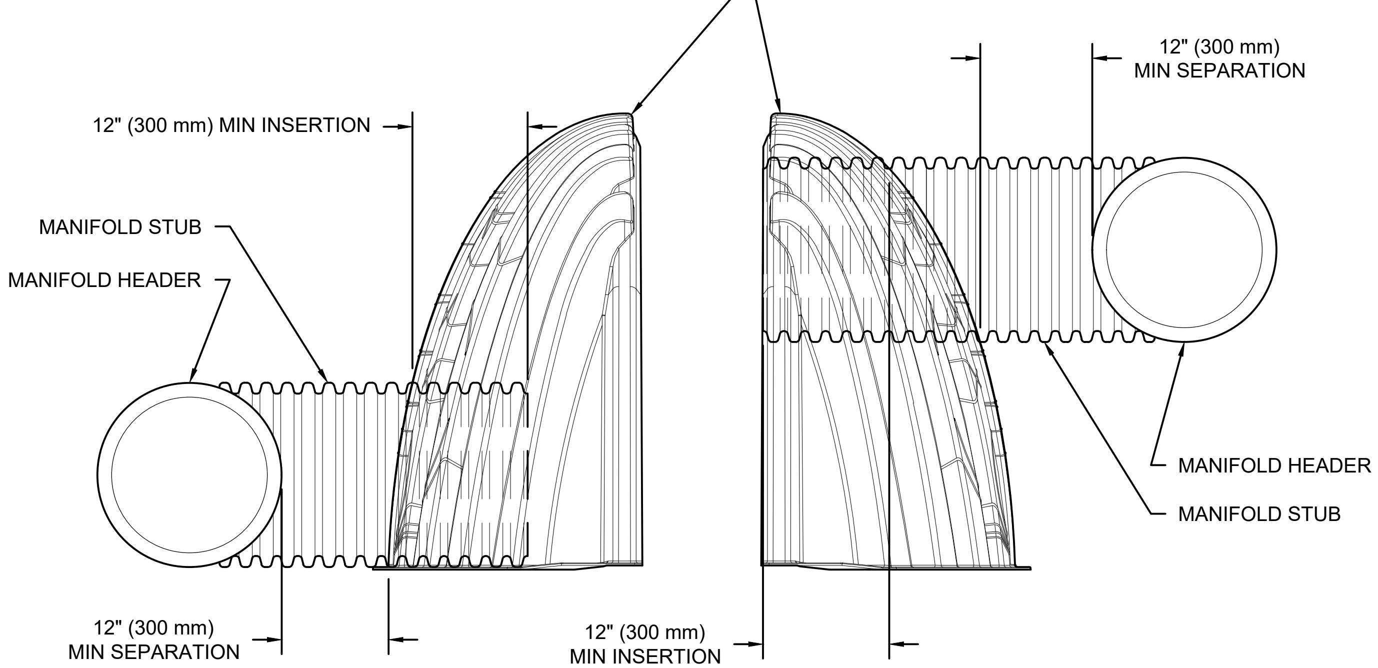




CUSTOM PRECORED INVERTS ARE AVAILABLE UPON REQUEST. INVENTORIED MANIFOLDS INCLUDE 12-24" (300-600 mm) SIZE ON SIZE AND 15-48" (375-1200 mm) ECCENTRIC MANIFOLDS. CUSTOM INVERT LOCATIONS ON THE MC-3500 END CAP CUT IN THE FIELD ARE NOT RECOMMENDED FOR PIPE SIZES GREATER THAN 10" (250 mm). THE INVERT LOCATION IN COLUMN 'B' ARE THE HIGHEST POSSIBLE FOR THE PIPE SIZE.

MC-SERIES END CAP INSERTION DETAIL

NTS



NOTE: MANIFOLD STUB MUST BE LAID HORIZONTAL FOR A PROPER FIT IN END CAP OPENING.

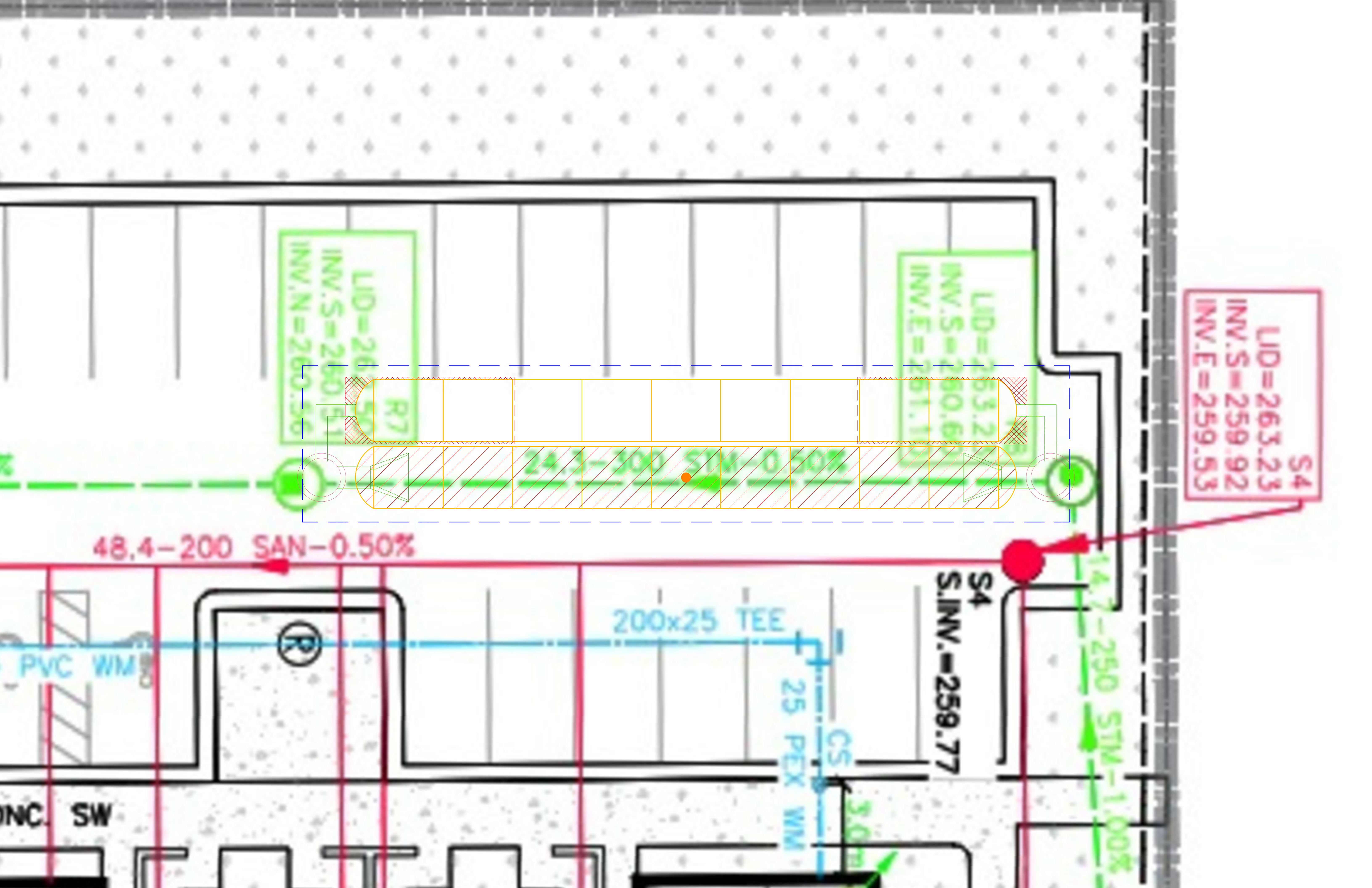
4040 COLONEL TALBOT ROAD
LONDON, ON, CANADA

DATE:
DRAWN: CN
PROJECT #:
CHECKED: N/A

DATE	DRW	CHK	DESCRIPTION

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

StormTech®
Chamber System
888-892-2694 | WWW.STORMTECH.COM


48.4-200 SAN-0.50%
24.3-300 STM-0.50%
S4
LID=263.23
INV.S=259.92
INV.E=259.53
S4
S.INV.=259.77
14.7-250 STM-1.00%
200x25 TEE
25 PEX WM
CS
PVC WM
SW

ADS OGS Sizing Summary

Project Name: 4040 Colonel Talbot Road
Consulting Engineer: Stantec
Location: London, ON
Sizing Completed By: C. Neath **Email:** cody.neath@ads-pipe.com

Treatment Requirements		
Treatment Goal:	Enhanced (MOE)	
Selected Parameters:	80% TSS	90% Volume
Selected Unit:	**FD-4HC**	

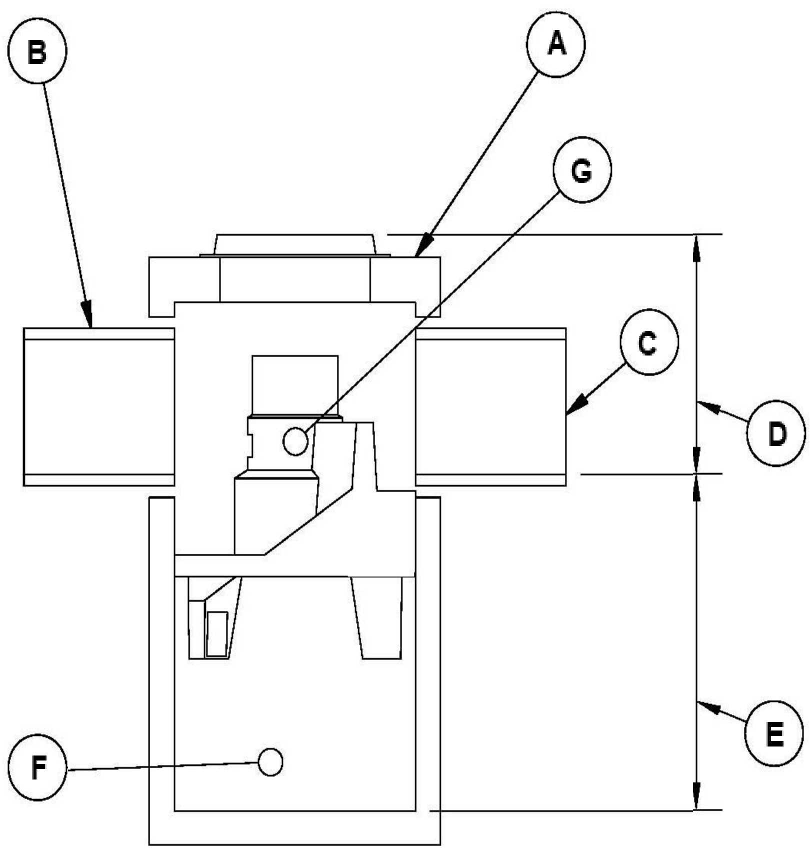
Site Details	
Site Area:	1.1 ha
% Impervious:	---
Rational C:	0.56
Rainfall Station:	London Intl Airport, ON
Particle Size Distribution:	Fine
Peak Flowrate:	60 L/s

Summary of Results

Model	TSS Removal	Volume Treated
FD-4HC	88.0%	>90%
FD-5HC	92.0%	>90%
FD-6HC	94.0%	>90%
FD-8HC	96.0%	>90%
FD-10HC	98.0%	>90%

FD-4HC Specification	
Unit Diameter (A):	1,200 mm
Inlet Pipe Diameter (B):	300 mm
Outlet Pipe Diameter (C):	300 mm
Height, T/G to Outlet Invert (D):	2700 mm
Height, Outlet Invert to Sump (E):	1515 mm
Sediment Storage Capacity (F):	0.78 m^3
Oil Storage Capacity (G):	723 L
Recommended Sediment Depth for Maintenance:	440 mm
Max. Pipe Diameter:	600 mm
Peak Flow Capacity:	510 L/s

Site Elevations:	
Rim Elevation:	262.30
Inlet Pipe Elevation:	259.60
Outlet Pipe Elevation:	259.60



Notes:

Removal efficiencies are based on NJDEP Test Protocols and independently verified.

All units supplied by ADS have numerous local, provincial, and international certifications (copies of which can be provided upon request). The design engineer is responsible for ensuring compliance with applicable regulations.

Project Name:	4040 Colonel Talbot Road
Consulting Engineer:	Stantec
Location:	London, ON

Net Annual Removal Efficiency Summary: FD-4HC

Rainfall Intensity(1)	Fraction of Rainfall(1)	FD-4HC Removal Efficiency(2)	Weighted Net-Annual Removal Efficiency
mm/hr	%	%	%
0.50	0.2%	100.0%	0.2%
1.00	13.7%	98.9%	13.6%
1.50	17.3%	95.3%	16.5%
2.00	13.5%	92.7%	12.5%
2.50	2.7%	90.8%	2.5%
3.00	2.3%	89.3%	2.0%
3.50	8.5%	88.0%	7.5%
4.00	4.7%	87.0%	4.1%
4.50	1.5%	86.0%	1.2%
5.00	5.2%	85.2%	4.4%
6.00	4.1%	83.7%	3.4%
7.00	4.4%	82.5%	3.7%
8.00	3.3%	81.5%	2.7%
9.00	2.4%	80.6%	1.9%
10.00	2.3%	79.9%	1.9%
20.00	9.2%	74.9%	6.9%
30.00	2.5%	72.1%	1.8%
40.00	1.1%	70.2%	0.7%
50.00	0.4%	68.8%	0.3%
100.00	0.6%	64.5%	0.4%
150.00	0.1%	62.1%	0.1%
200.00	0.0%	60.4%	0.0%
		Total Net Annual Removal Efficiency:	88.3%
		Total Runoff Volume Treated:	99.9%

Notes:

(1) Rainfall Data: 1960:2002, HLY03, London AP, ONT, 6144475.

(2) Based on third party verified data and appoximating the removal of a PSD similar to the STC Fine distribution

(3) Rainfall adjusted to 5 min peak intensity based on hourly average.

Monthly Water Balance Analysis
161414378 - 4040 Col Talbot Rd
Existing Condition

Main Site Area (ha)	0.8	
Land Description Factors		
Topography	0.30	
Soils	0.20	
Cover	0.05	
Sum (Infiltration Factor)	0.55	
Soil Moisture Capacity (mm)	125	
Site Area	0.8	
Percentage of Total Site Area	100%	**100%** **OK**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Comment
Climate Data (Data from LONDON INT'L AIRPORT - Climate Normals from 1981-2010)														
Average Daily Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6	**7.9**	Daily average temperature in each month
Precipitation (mm)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	**1011.5**	
Evapotranspiration Analysis														
Saturation Vapour Pressure (mb)	4.02	4.37	6.07	9.89	15.10	21.08	24.63	23.01	17.65	11.65	7.80	5.04		
PET (Malstrom, 1969) (mm/month)	0.00	0.00	0.00	40.46	61.78	86.24	100.75	94.12	72.18	47.66	31.91	0.00	**535.1**	
Infiltration - PET (mm)	74.20	65.50	71.50	42.94	28.02	5.46	-18.05	-11.22	30.82	33.64	66.09	87.50		
Weighted Soil Storage Capacity (mm)	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00		
Actual Soil Moisture (mm)	125.00	125.00	125.00	125.00	125.00	125.00	106.95	95.73	125.00	125.00	125.00	125.00		Assume April soil moisture is at max capacity (i.e., saturated)
Change in Soil Moisture (mm)	0.00	0.00	0.00	0.00	0.00	0.00	-18.05	-11.22	29.27	0.00	0.00	0.00		
Actual Evapotranspiration (mm)	**0.00**	**0.00**	**0.00**	**40.46**	**61.78**	**86.24**	**100.75**	**94.12**	**72.18**	**47.66**	**31.91**	**0.00**	**535.1**	
Recharge/Runoff Analysis														
Surplus	74.2	65.5	71.5	42.9	28.0	5.5	0.0	0.0	1.5	33.6	66.1	87.5	**476.4**	
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
Weighted Infiltration Factor	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55		Based on MOE SWM Manual (2003)
Runoff (mm)	**0.00**	**0.00**	**0.00**	**153.74**	**12.61**	**2.46**	**0.00**	**0.00**	**0.70**	**15.14**	**29.74**	**0.00**	**214.4**	Assume no runoff in sub-zero months
Recharge (mm)	**0.00**	**0.00**	**0.00**	**187.90**	**15.41**	**3.01**	**0.00**	**0.00**	**0.85**	**18.50**	**36.35**	**0.00**	**262.0**	
													0	Balance Check

Volume-Based Balance (m^3)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	
Precipitation	594	524	572	667	718	734	662	663	824	650	784	700	8,092	1012 mm/year
Evapotranspiration	0	0	0	324	494	690	806	753	577	381	255	0	4,281	535 mm/year
Runoff	0	0	0	1,230	101	20	0	0	6	121	238	0	1,715	214 mm/year
Groundwater Recharge	0	0	0	1,503	123	24	0	0	7	148	291	0	2,096	262 mm/year
													0	Balance Check

Notes:
MECP SWMPP Manual (2003), Water Balance Parameter Estimates, have been used to derive land description factors.

Monthly Water Balance Analysis

161414378 - 4040 Col Talbot Rd

Proposed Condition

Main Site Area (ha)	0.8		
Impervious Cover	70%		
Land Description Factors			**Impervious**
Topography	0.30		-
Soils	0.20		-
Cover	0.05		-
Sum (Infiltration Factor)	0.55		-
Soil Moisture Capacity (mm)	125		-
Site Area	0.2		0.56
Percentage of Total Site Area	30%		70%

100% **OK**

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year	Comment
Climate Data (Data from LONDON INT'L AIRPORT - Climate Normals from 1981-2010)														
Average Daily Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6	**7.9**	Daily average temperature in each month
Precipitation (mm)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	**1011.5**	
Evapotranspiration Analysis - Pervious Area														
Saturation Vapour Pressure (mb)	4.02	4.37	6.07	9.89	15.10	21.08	24.63	23.01	17.65	11.65	7.80	5.04		
PET (Malstrom, 1969) (mm/month)	0.00	0.00	0.00	40.46	61.78	86.24	100.75	94.12	72.18	47.66	31.91	0.00	**535.1**	
Infiltration - PET (mm)	74.20	65.50	71.50	42.94	28.02	5.46	-18.05	-11.22	30.82	33.64	66.09	87.50		
Weighted Soil Storage Capacity (mm)	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00		
Actual Soil Moisture (mm)	125.00	125.00	125.00	125.00	125.00	125.00	106.95	95.73	125.00	125.00	125.00	125.00		Assume April soil moisture is at max capacity (i.e., saturated)
Change in Soil Moisture (mm)	0.00	0.00	0.00	0.00	0.00	0.00	-18.05	-11.22	29.27	0.00	0.00	0.00		
Actual Evapotranspiration (mm)	**0.00**	**0.00**	**0.00**	**40.46**	**61.78**	**86.24**	**100.75**	**94.12**	**72.18**	**47.66**	**31.91**	**0.00**	**535.1**	
Recharge/Runoff Analysis - Pervious Areas														
Surplus	74.2	65.5	71.5	42.9	28.0	5.5	0.0	0.0	1.5	33.6	66.1	87.5	**476.4**	
Deficit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.0**	
Weighted Infiltration Factor	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55		Based on MOE SWM Manual (2003)
Runoff (mm)	**0.00**	**0.00**	**0.00**	**153.74**	**12.61**	**2.46**	**0.00**	**0.00**	**0.70**	**15.14**	**29.74**	**0.00**	**214.4**	Assume no runoff in sub-zero months
Recharge (mm)	**0.00**	**0.00**	**0.00**	**187.90**	**15.41**	**3.01**	**0.00**	**0.00**	**0.85**	**18.50**	**36.35**	**0.00**	**262.0**	
													0	Balance Check
Volume-Based Balance (m^3)	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Year**	
Precipitation	**594**	**524**	**572**	**667**	**718**	**734**	**662**	**663**	**824**	**650**	**784**	**700**	**8,092**	
Evapotranspiration	0	0	0	97	148	207	242	226	173	114	77	0	1,284	
Total Evap	**0**	**0**	**0**	**97**	**148**	**207**	**242**	**226**	**173**	**114**	**77**	**0**	**1,284**	161 mm/year
Pervious Runoff	0	0	0	369	30	6	0	0	2	36	71	0	515	64 mm/year
Impervious Runoff	0	0	0	2,140	503	514	463	464	577	455	549	0	5,664	708 mm/year
Total Runoff	**0**	**0**	**0**	**2,509**	**533**	**519**	**463**	**464**	**578**	**492**	**620**	**0**	**6,179**	772 mm/year
Groundwater Recharge from Pervious Areas	**0**	**0**	**0**	**451**	**37**	**7**	**0**	**0**	**2**	**44**	**87**	**0**	**629**	79 mm/year
													0	Balance Check
Infiltration Augmentation														
Groundwater Recharge from the increased topsoil	**0**	**0**	**0**	**125**	**27**	**26**	**23**	**23**	**29**	**25**	**31**	**0**	309	39 mm/year - Assuming a minimum of 300 mm topsoil will be added to all pervious areas
Groundwater Recharge from the infiltration Swale	**0**	**0**	**0**	**93**	**20**	**19**	**17**	**17**	**21**	**18**	**23**	**0**	228	29 mm/year
Final Recharge	**0**	**0**	**0**	**669**	**83**	**52**	**40**	**40**	**52**	**87**	**141**	**0**	**1,166**	146 mm/year
Final Runoff	**0**	**0**	**0**	**2,291**	**487**	**474**	**423**	**424**	**528**	**449**	**566**	**0**	**5,642**	705 mm/year
Final Recharge Surplus	0	0	0	-834	-40	28	40	40	46	-61	-150	0	-930	-116 mm/year
Final Runoff Surplus	0	0	0	1,061	386	455	423	424	523	328	328	0	3,927	491 mm/year

Notes:

MECP SWMPP Manual (2003), Water Balance Parameter Estimates, have been used to derive land description factors.

Stantec
600-171 Queens Avenue
London ON N6A 5J7
Tel. 519-645-2007
www.stantec.com

Liability Note

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.

Legend

- FILTREXX INLET PROTECTION (REFER TO DETAIL ON SHEET 3)
- INLET PROTECTION (REFER TO DETAIL ON SHEET 3)
- HEAVY DUTY SILT FENCE AS PER OPSD 219.130
- TREE PROTECTION FENCE

FOR SERVICING NOTES & DETAILS
SEE SHEET C-5

Revision	By	Appd.	YY.MM.DD

Issued	By	Appd.	YY.MM.DD
DRAFT ISSUED FOR CLIENT REVIEW	IRA	DV	23.08.12

File Name: dwg_161414378_civil	IRA	DV	RAR	23.08.02
	Dwn.	Chkd.	Dsgn.	YY.MM.DD

Permit-Seal

30/05/2023

Client/Project
SIFTON

4040 Colonel Talbot Road
London, ON Canada

Title

EROSION & SEDIMENT CONTROL PLAN

Project No. 161414378
Scale 1:300

Drawing No. C-4
Sheet 4
Revision 0