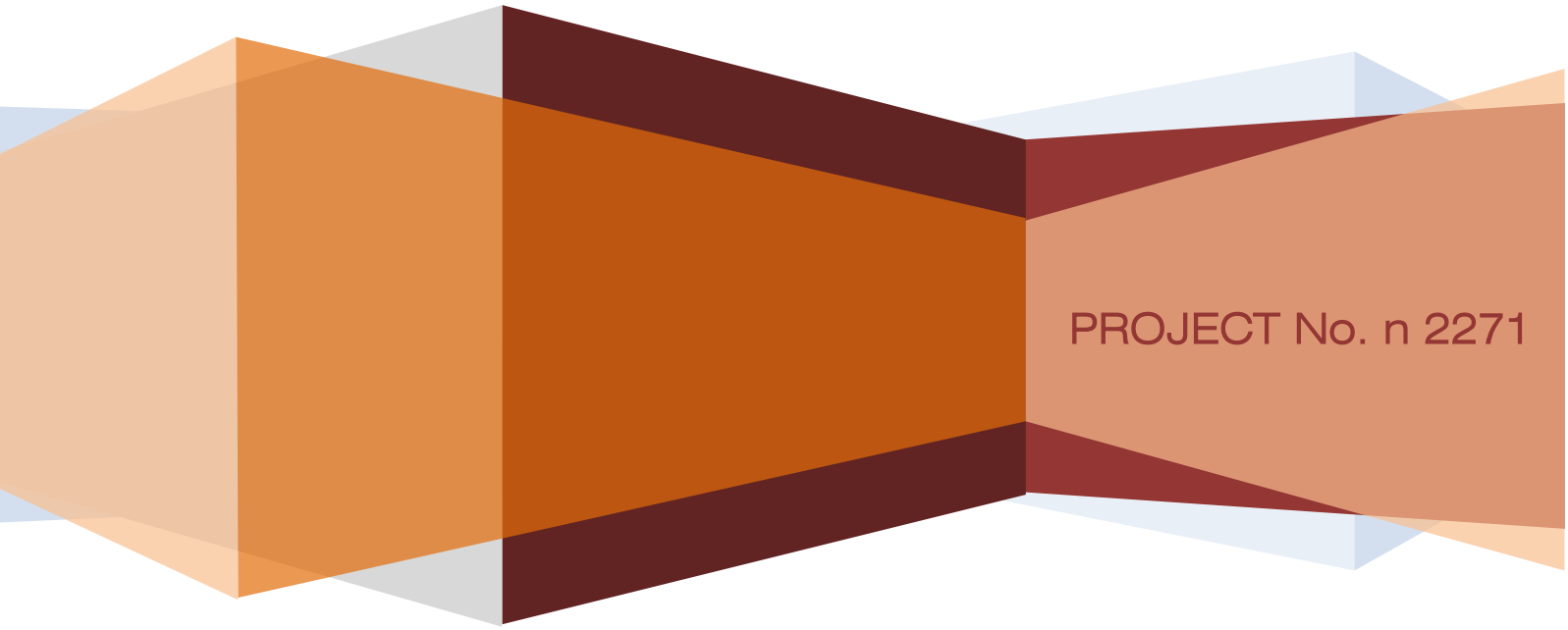
Proposed 3-Storey Mosque – 27 Winona Drive,

Whitchurch Stouffville, Ontario

Servicing and Stormwater Management Report



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December 08, 2025

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Revision History

Rev. #	Description	Date of Issue
01	Pre-Con#3	September 25, 2024 (DA1)
02	ZBA	March 19, 2025(DA2)
03	Storm sewer connection updated as per City STD.	May 13, 2025
04	Issued for ZBA-II	December 08, 2025(DA3)

REFERENCES

The preferred stormwater management for the proposed development utilizes the criteria and guidelines provided in the following reference documents:

- MOE Stormwater Planning and Design Manual;
- MTO Drainage Management Manual, MTO, 1997;
- Design Guidelines and Standard Drawings, Town of Whitchurch-Stouffville, January 2023

Some technical reports further provide data while selecting appropriate procedure in SWM:

- Survey Report for the site by Richmond Surveying Inc. dated on August 18th, 2024.
- Hydrogeological and Geotechnical Investigation by GHD. dated August 27th, 2024
- Plan and profile drawing of Main Street as built services Sheet No. 3.

1.0 INTRODUCTION

1.1 BACKGROUND

n Engineering Inc. was retained to prepare a Functional Servicing and Stormwater Management Report in support of a Site Plan Application for the proposed development, in Whitchurch-Stouffville. The purpose of this report is to provide site-specific information for the Town's review with respect to infrastructure required to support the proposed development regarding storm drainage, sanitary sewers and water supply.

More specifically, the report will present the following:

a. Identifying existing runoff pattern and quantity of runoff discharge from proposed development area;

b. Identifying post-development runoff from the site towards the existing municipality right of way;

c. Address the concerns from the reviewing agencies including: Town of Whitchurch-Stouffville.

d. New site servicing requirements for sanitary and water supply will also be discussed in the following sections

1.2 STUDY AREA

The subject site has a street address of 27 Winona Drive, Whitchurch-Stouffville, Ontario. The property is located to the North-east of the Winona and Main Street intersection. The location of the subject site is shown in Figure 1.

Figure 1 - Site Location Plan

1.3 EXISTING TOPOGRAPHY AND DRAINAGE PATTERN

The Site is located at the municipal address of 27 Winona Drive in Whitchurch-Stouffville, Ontario, northeast of the intersection of Winona Drive and Main Street. The Site encompasses an area of about 0.24 hectares (0.59 acres).

A legal and topographic survey has been prepared by Richmond Surveying Inc., dated 18th August 2024 which identifies the site as Part of Lot 26, registered plan 455, Town of Whitchurch-Stouffville, Regional Municipality of York.

The topographical survey plan has been attached in Appendix A. Locally; topography in the area of the Site is relatively flat with a gentle slope to the south. The highest elevation of the site is 271.60 at northeast side, which goes down to 270.50 at south-east side with a slope of approximately 2.9%. Based on the current drainage pattern, surface water flows overland from the property appears to drain partially toward the east side (Ninth Line) and partially toward the west side (Winona Drive).

The Figure 2 illustrates the current condition of the site. The property is characterized by a single building, pavement on the west of the building and landscape on the back of the building or east side of the property. Refer to DR-101 for existing drainage plan, attached in Appendix A.

Figure 2 - Site Existing Conditions

1.4 PROPOSED DEVELOPMENT

The site is designated for development as a Place of Worship, featuring a three-story building that includes ground-level and first-floor parking. A ramp will be incorporated to provide access to the upper parking level, accommodating a total of 76 parking spaces for the proposed development. It is also proposed that existing grades be preserved at the property boundaries to prevent any external water from entering the site.

2.0 STORMWATER MANAGEMENT CRITERIA

The criteria for proposed development are summarized below:

- **Water Quantity Control** – Post-development peak flow for the 100-year from the site to be controlled to the 2-year target flow.
- **Water Quality Control** –Stormwater discharged from the post-development site are required to meet:
  - A minimum 80% TSS removal or an enhanced (Level 1) removal as referenced in the MOECC SWMPD Manual; and
- **Roof Top Storage** –Roof-top detention will be proposed;
- **Erosion and Sediment Control During Construction** – The erosion potential of the study area to assessed using methods described in the 'MTO Drainage Management Manual' of temporary erosion and sediment control measures suitable for construction sites.
- **Water Balance –** As per the Hydrogeological investigation report, prepared by GHD dated August 27, 2024, approximately 18.3% of roof run-off from the building needs to be infiltrate for 10mm rain events.

3.0 STORMWATER MANAGEMENT STUDY

3.1 Comparison Existing Land Use and Proposed Conditions

Land-use under the proposed development was compared to land-use under existing conditions to assess the changes in runoff flows on the site. The comparison presented in Table 1. As revealed from the Table 1, there will be an overall 46 % increase in imperviousness under the proposed development condition in contrast of about 46 % decrease in grass area.

Table 1 – Comparison between Existing and Proposed Condition Land-use

LANS USE TYPE	PAVED AREA	ROOF AREA	GRASS AREA	TOTAL AREA
Existing Condition (m2)	546.24	573.30	1289.20	2408.74
Existing Condition (%)	23%	24%	54%	
Proposed Condition (m2)	89.03	2146.45	173.26	2408.74
Proposed Condition (%)	4%	89%	7%	
Increase/Decrease (%)	-19%	65%	-46%	

3.2 Runoff Coefficients

The runoff coefficient value (C) is determined based on the land use of the catchment. Runoff parameters used for site under existing and proposed conditions are shown in Table 2 below, can be found in Table D-7 of Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings.

Table 2 – Runoff Coefficients

Land Use	Runoff Coefficient
Impervious Area (Asphalt, Concrete, Rooftop)	0.90
Pervious Area (Landscaped)	0.25

The scenarios in which a catchment has more than one land use or soil type, a representative or composite runoff coefficient is determined using areas of the different land cover as weighting factor. Pre-development composite runoff coefficients are calculated based on existing land use and presented in Appendix B (Calculation Sheet 1C). Post-development catchment area is shown in DR-102 in Appendix A. Calculations for pre-and post-development imperviousness are given in Appendix B and summarized below in Table 3.

Table 3 – Composite Runoff Coefficients

Drainage Area	Pre-Development	Post-Development
SITE	0.55	0.85

3.3 Peak Flow Rates

Given the size and characteristics of the site and catchment areas, the Rational Formula was used to determine the peak flows from the subject site under pre-development and post-development conditions. The rainfall-runoff relationship is as follows:

$$Q = 2.78ACCai$$

Where:
Q = Peak Flow in m^3/s;
A = Effective area of drainage basin in hectares (ha);
C = runoff coefficient; and
Ca= Antecedent Precipitation Factor
i = Rainfall intensity in mm/hr.

Rainfall intensities are calculated using the rainfall intensity-duration-frequency (IDF) values for the location coordinate of proposed site. The IDF values and Run-off Coefficient Modification Factors (Ca) are obtained from Table D-3 and Table D-8 of Town of Whitchurch-Stouffville Design Guidelines and Standard Drawings and are summarized in Table 4 and 5.

Table 4 – IDF Parameters

IDF PARAMETERS	2 Years	5 Years	10 Years	25 Years	50 Years	100 Years
A	696.679	1015.963	1279.709	1546.810	1802.604	2051.707
B	4.957	5.255	5.715	5.746	6.029	6.230
C	0.811	0.826	0.841	0.845	0.853	0.860

Table 5 – Run-off Coefficient Modification Factors

Design Storm Return Period	Run-off Coefficient Modification Factor (Ca)
5 Years	1.00
25 Years	1.10
50Years	1.20
100 Years	1.25

Note: C x Ca cannot exceed 1.00

3.4 Pre-development Peak Flow

Based on the topographic survey, the existing property exhibits drainage patterns flowing partially toward the east side (Ninth Line) and partially toward the west side (Winona Drive). Utilizing a Civil 3D model, the current drainage pattern was analyzed (refer to DR101). Pre-development peak flows were determined in accordance with the existing drainage characteristics and land use patterns. These calculations are detailed in Calculation Sheets 1A and 1B, located in Appendix B, with the results summarized in Table 6.

Table 6 – Pre-development Peak Flow (l/s)

Drainage Area	**2 Years**	**5 Years**	**10 Years**	**25 Years**	**50 Years**	**100 Years**
A1 - Flow Towards East	1.65	2.27	2.68	3.19	3.59	3.96
A2- Flow Towards West	**27.05**	37.26	43.94	52.44	58.88	65.03
Total Flow from the site (l/s)	28.69	39.53	46.62	55.64	62.47	68.99

3.5 Post-Development Drainage Pattern and Peak Flow Rate

The proposed site encloses a mix of paved and grassed areas. Proposed site grades are selected to ensure vehicular access was unimpeded.

For the proposed development condition, the side is divided into sub-catchments as shown in Figure DR-102 (Appendix A). In the proposed condition most of the area is covered by roof. The area around the building is considered as uncontrolled area. These areas are identified as UC1, UC2 and UC3 on DR-102 (Appendix A), which will remain uncontrolled under post-development conditions. Post-development peak flows from both the controlled and uncontrolled area are calculated and presented in Appendix B, Calculation Sheets 2 & 3 respectively. The results are summarized in Table 7.

Table 7 – Post-development Peak Flow and Uncontrolled Flow

Development Condition	**2 Years**	**5 Years**	**10 Years**	**25 Years**	**50 Years**	**100 Years**
Post-development Flow (Whole Site) (l/s)	44.34	61.09	72.05	94.58	113.15	124.96
Uncontrolled (l/s)	0.96	1.32	1.56	2.05	2.51	2.88

3.6 Comparison of Existing and Proposed Runoff Rates

Flow rates under 2 year to 100 years storm events are calculated for both existing and proposed conditions using the Rational Method. Catchment areas and land use information are shown in Figures DR-101 and DR-102 in Appendix A.

The primary goal of the drainage and hydrologic analysis is to examine the effect of the development on local storm drainage. This analysis was used to create goals for the SWM design. Table 8 presents the comparison of peak flow rates between existing and proposed conditions; detailed flow calculations have been presented in Appendix B. It should be noted that the post-development flows in Tables 7 and Table 8 address the impact of the development only, and do not represent the final SWM design flows.

Table 8 – Comparison of Pre-and Post-Development Flow (l/s)

Return Period (Years)	**2**	**5**	**10**	**25**	**50**	**100**
Pre-Development Flow	28.69	39.53	46.62	55.64	62.47	68.99
Post-Development Flow	44.34	61.09	72.05	94.58	113.15	124.96
Peak Flow Increase	15.65	21.56	25.43	38.95	50.68	55.97

3.7 Orifice Control

3.7.1 Allowable Discharge Rate and Orifice Control (Ground Surface)

To control the post-development peak flows from 2-year to 100-year rainfall event to the 2-year pre-development conditions for the ground surface, a target discharge rate of 14.41 L/s must be achieved (refer to Table 1, Appendix D). A 75 mm diameter orifice plate is to be installed at the outlet of MH1 (Control). Please refer to Drawing C2 for the locations of the orifice plate and MH1. The orifice sizing calculations are provided in Appendix D. The allowable discharge rates and the corresponding controlled flow rates are summarized in Table 9.

Table 9 – Orifice Controlled Sizing

Type of Device	Location	Size (mm)	Allowable Flow[1] (l/s)	Controlled Flow(l/ s)
Orifice Plate	MH1 (Control)	75	14.41	14.16

3.7.2 Storage for Ground surface Quantity Control[2]

Based on the ground surface storage calculations, the available detention storage volumes under controlled flow conditions are documented in Appendix D. A summary of the available storage and the required detention storage is presented in Table 10. The 100-year High-Water Level (HWL) has been determined to be 270.64 m. As the proposed pipe inverts are below the HWL, the full pipe capacities can be utilized as part of the detention storage. In addition, the manhole storage volumes have been calculated relative to the HWL.

[1] Allowable Flow = 2-Years pre flow from A2 – 100 years Uncontrolled flow (UC1, UC2 and UC3) – 100 years Roof (R2, R3,R4, R5, R7 and R11) Controlled Flow

[2] Ground surfaceA1 and A2, Roof area (R1, R6, R8, R9 and R10) are considered in onsite storage calculation from ground surface.

Table 10 – Summary of 100-yr Detention Storage (m^3) - Ground Surface

Maximum Required Storage	**8.36**
CB/ Manhole	2.82
Pipes	4.46
Stormwater Infiltration Chamber	9.84
Surface Ponding	42.67
Total Proposed Storage	**59.88**

For the 100-year design storm event, the required controlled flow demands a maximum detention storage capacity of 8.36 m³ from ground surface. Currently, there is 59.88 m³ of available storage volume within the CB, manholes, piping systems and Stormwater Infiltration Chamber.

Therefore, the proposed storage is higher than the required in post development condition.

3.7.3 Storage for Roof Quantity Control

Stormwater flow from the roofs is proposed to be controlled through the installation of parabolic weirs (Zurn Z105 Control Flow Drain—refers to Appendix A) on roofs R2, R3, R4, R5, R7 and R11. Based on the controlled flow from these roof drains, the required storage volume on the roof has been calculated as 61.54 m³ (Refer to Appendix D, Table 2B). The proposed locations of the roof drains and the roof ponding details are illustrated in DR-103. A summary of roof control and storage calculations is provided in Table 11.

Table 11: Summary of 100 years Roof detention storage and Controlled flow

Roof Location	*Available Roof Area (m^2)	Area Covered by roof Ponding (m^2)	Allowable Flow (OBC) (l/s)	Design Controlled Flow (l/s)	Calculated Storage Volume (m^3)	Ponding Depth (mm)
R2	180.71	165.12	0.8	1.625	7.00	128.50
R3	292.68	225.00	1.2	1.625	11.14	150.00
R4	364.31	225.00	1.5	1.625	11.14	150.00
R5	342.94	225.00	1.4	1.625	11.14	150.00
R7	341.78	225.00	1.4	1.625	11.14	150.00
R11	271.20	225.00	1.1	1.625	11.14	150.00
TOTAL	1793.62	1290.12	7.5	9.75	62.69	
Note: *Area covered by skylights is excluded for available roof ponding area calculation.						

For the 100-year design storm event, the maximum roof detention storage required for controlled flow is 61.54 m³ with 62.69 m³ of available roof storage; the proposed design provides a surplus capacity, exceeding the required storage volume.

3.8 Water Quality Control

To significantly improve the water quality of stormwater discharging from the site, a long-term average removal rate of 80% of Total Suspended Solids (TSS) from all runoff is required. This will achieved through a treatment train approach that incorporates various elements, including soft landscape areas, rooftops, and a catch basin treatment unit Enviro-basin (50% of TSS

removal capacity). The detailed sizing calculation, ETV verification, Owner's manual of the proposed Enviro- Basin is attached in Appendix E.

As reveled from the Table 12, the overall TTS removal from the site in the post development condition will be 98%.

Cumulative quality control measures calculated based on the proposed conditions are summarized in Table 12.

Table 12: TSS Removal Summary

AREA TYPE	AREA (M^2)	Weighted (%) Area	TSS Removal % Target	Cumulative Removal %
Landscape Area	173.26	7%	100%	7%
Asphalt/ Concrete* (Passes through Enviro basin)	57.14	2%	50%	1%
Total Roof Area that Generates runoff (DR103)	2242.12	91%	100%	91%
Total	2472.52	100%		
Over All Total TSS Removal				**98%**
* ETV veriffication statement for Enviro basin CB, Refer Appendix E of SWM report.				

3.9 Erosion and Sediment Control during Construction

The erosion potential of the study area was assessed using methods described in the 'MTO Drainage Management Manual' of temporary erosion and sediment control measures suitable for construction sites close to highways. During site construction, various temporary measures will be implemented to prevent the discharge of sediment laden stormwater from the site. These measures include silt fencing, catch basin buffers and mud mats.
In addition to the above, the following 'good housekeeping' measures are recommended:

- All exposed soils shall be stabilized as soon as possible with seed and mulch application as directed by the Engineer;
- All construction vehicles shall leave the site via the designated location (proposed mud mat) as shown on the ESC plan (DWG. C-3)
- No construction activity or machinery shall intrude beyond the silt/snow fence or limit of construction area;
- Cleaning and repairs of mud mats and any other temporary sediment control measures shall be completed as deemed necessary through regular inspections;
- Sediment/silt shall be removed from the sediment control devices after each storm event and deposited in areas as approved by the engineer; and
- All re-graded areas within the development which are not occupied by buildings, roadways, sidewalks, or driveways shall be top-soiled and sodded/seeded immediately after completion of final grading operations as directed by the engineer.

4.0 WATER BALANCE

According to the Hydrogeological Investigation report section 5.4.1 (prepared by GHD dated 27 August 2024,) stated that –

"To maintain the pre-development infiltration and minimize impacts to groundwater base flow, the predicted infiltration volume of 41 m3/year for the undeveloped areas of the Site plus an additional 244 m3/year of infiltration from the rooftop would be required. Based upon LID literature, an underground chamber can infiltrate up to 85% of rooftop runoff resulting in an infiltration surplus of nearly 900 m3/year compared to the pre-development infiltration. Thus, only about 18.3% of the rooftop runoff is required to maintain the pre-development infiltration values."

Based on GHD recommendation water balance quantity calculated for 18.3% area to infiltrate up to 10mm rainfall as follows:

Water Balance required for the Site: = 18.3% Total roof area X 10mm
= 18.3 % of 2146.45 X 10 mm
= 392.80 m^2 X 10/1000 m^3
= 3.93m^3

To achieve the water balance criteria a stormwater infiltration chamber is proposed to achieve the infiltration deficit in post-development condition.

4.1 Stormwater Infiltration Chamber

To accommodate the necessary retention storage a stormwater infiltration chamber (Model ADS- SC-310 or approved eq.) is proposed. Sizing and outlet location of the infiltration chamber was selected in a manner to ensure that sufficient retention volume is provided. Volume of water proposed to be retained by the Stormwater infiltration chamber unit has been provided by the manufacturer. Location of the chamber is shown in Drawing C 2. The required water balance is achieved through runoff directed from the roof areas (R1, R6, R8, R9 and R10 with a total contributing area of 393.15m^2. Required and proposed storage capacity of infiltration chamber is summarized in Table 13 and the details are presented in Appendix F.

Table 13: Water Balance Summary

Description	Volume (m^3)
Total volume of Infiltration Chamber (m^3)	14.33
Volume provided for Detention storage (m^3)	9.84
Required Volume for Retention (m^3)	3.93
Volume Provided for Retention (m^3)	4.49

4.2 Permeability and Drawdown Calculation for Stormwater Infiltration Chamber

As per the Hydrogeological and Geological investigation Report Section 4.4, prepared by GHD dated 27 August 2024, the infiltration rate estimated as 48 mm/hr.

Based on the TRCA Stormwater Management Criteria Table C 3 (Safety Correction factors for calculating design infiltration rates),

Ratio of Mean Measured Infiltration = (48 mm/hr) / (48 mm/hr) = 1

Safety Correction Factor = 2.5

Design Infiltration Rate = (48 mm/hr) / 2.5 = 19.2 mm/hr
The proposed water balance volume to be infiltrated is 3.93 m^3. The Ministry of Environment's Stormwater Management and Planning Manual, March 2003 method of infiltration will be implemented. The infiltration of this remainder volume of runoff will be through a pervious bottom of an underground device.

This Manual sizes the bottom area of the infiltration device by applying the following equation:

$$A = \frac{1000V}{Pn\Delta t}$$

Where:

A = Bottom area of the infiltration trench (m^2)
V = Runoff volume to be infiltrated (m^3)
P = Percolation rate of surrounding native soil (mm / hr.)
n = Porosity of the storage media (0.40 for storm chambers)
Δt = Retention time (48 hours)

The above equation assumes that all of the infiltration occurs through the bottom of the device.

The retention time in the underground device is calculated on the conservative side, namely 48 hours.

Substituting the known values in the above equation:
A = (1000 x 3.93m^3) / (19.2 mm per hour x 0.40 x 48 hours) = 10.66 m^2
It is proposed to provide an open bottom storm water infiltration chamber with an available bottom surface area of 39.79m^2. The maximum draw down time considering safety correction factors as per TRCA guidelines for the provided storm chamber will be 14.69 hrs.
Δt = (1000 x 4.49 m^3) / (19.2 mm per hour x 0.40 x 39.79m^2) = 14.69 hrs.

5.0 MINOR SYSTEM DRAINAGE

Minor storm drainage (100-year storm event) is designed to convey stormwater to existing storm sewer (Refer: Drawing C2). Storm Sewer Design sheet attached in Appendix C.

6.0 MAJOR SYSTEM DRAINAGE

The overland flow will not impact the building since the grading of the site ensures storm flows greater than 100 years will be able to flow overland through the site without any impact to proposed buildings and adjacent site. The overland flow direction presented in Grading Plan (DWG. C1).

7.0 SANITARY SEWAGE FLOW

Sanitary demand calculated as per Town of Whitchurch-Stouffville Guideline.

Average Design Flow	= 28.0 m^3/ha/day
Area of Development:	=0.2408 ha.
Average Demand:	=28 x 0.2408 m^3/day = 6.74 m^3/day = 0.078 L/sec
Population	= 80 people/ ha
	= 80 X 0.2408
	= 20 people

Peaking Factor

Harmon's Equation

$$M = 1 + \frac{14}{4 + P^{1/2}}$$

$= 1 + (14/4+ (20/1000)^{0.5})$
$= 4.38$

Peak Demand	= 0.078 L/sec x 4.38 = **0.34 L/sec**
Extraneous Flow	= 0.23 L/s.ha
Total Extraneous Flow	=0.23 x 0.2408 m^3/day = 0.055 L/sec
Total Sanitary Demand	= Peak Demand + Extraneous Flow
	= 0.34 + 0.055
	= 0.39 L/sec = 0.00039 m^3/sec

By considering the min velocity of 0.6 m/sec the size of pipe is as below:

$Q = AV \rightarrow 0.00039 = A \times 0.6$
$A = 0.00125m^2 \rightarrow D= 29.01$ mm$\rightarrow$ D= 50mm
A 150 mm sanitary sewer pipe is proposed for the sanitary sewer.

8. 0 WATER DEMAND

8.1 Domestic Water Demand

Domestic water demand calculated as per Town of Whitchurch-Stouffville Guideline

Average demand:	= 28 m^3/ha/day
Area of Development:	=0.2408 ha.
Average Demand:	=28 x 0.2408 m^3/day = 6.74 m^3/day = 0.078 L/sec
Max Day Factor	= 2.0
Maximum Hour Factor	= 3.0
Maximum Day Demand	= 0.078 L/sec x 2 = **0.156 L/sec**
Peak Hour Demand	= 0.078 L/sec x 3 = **0.234 L/sec**

8.2 Fire Demand

As per the Town of Whitchurch-Stouffville Guideline section E2.02, minimum fire flow required for the institutional development is **175 L/s**

8.3 Total Water Demand

The total water demand for the development will be maximum day demand plus fire flow or the peak hour demand whichever is greater.

Total Water Demand = Maximum Day Demand + Fire Demand
= 0.156 + 175
= 175.156 L/s
Peak Hour Demand = 0.234 L/s

Therefore, the total water demand for the proposed development is **175.156 L/s**

8.4 Water Supply Availability

Flow test was conducted by Hydratest, based on the results from the test the following flow volume can be supplied from the main street watermain while maintaining a residual pressure of 140 kPa in water trunk. The following calculation is done based on Design guidelines -Town of Whitchurch-Stouffville, January 2023. The test results attached in Appendix G.

$$Q_R = Q_F * \frac{h_r^{0.54}}{h_f^{0.54}}$$

Where,

Q_R = flow predicted at desired residual pressure (20 psi)
Q_F = total flow measured during test
hr = Static pressure – desired residual pressure (20psi)
hf = static pressure – residual pressure during fire flow test

Thus,

$Q_R = 1986 * ((70-20)/ (70-60))^{0.54}$

$Q_R = 4440.83$ USGPM

= **280.17 L/sec**

Therefore, based on the hydrant flow test results, there is enough flow available for domestic and fire flows for the proposed watermain connection to the site.

8.5 Hydrant Coverage

A new fire hydrant is proposed by the Town as part of the Capital Project on Winona Drive, located approximately at the midpoint of the west side of the property. The hydrant is within 45 m of the furthest entrance to the proposed development, ensuring adequate fire protection coverage for the site.

9.0 SERVICE CONNECTIONS

9.1 Sanitary

According to the plan and profile provided by the Town for the reconstruction of Winona Drive as part of a Capital Project, a 150mm Ø sanitary sewer plug proposed to be installed at the property line with the service cost to be borne by the developer.

The proposed development will be connected to this plug via a 150mm Ø sanitary sewer line, which will pass through a proposed sanitary control manhole (SAN MH1A). The layout and associated details are outlined in Drawing C2.

9.2 Water

In accordance with the plan and profile provided by the Town for the reconstruction of Winona Drive (as part of the Capital Project), a 150mm diameter water valve proposed to be installed at the property line with the service cost to be borne by the developer.

The proposed development will be served by a 150mm diameter fire water service, which will be connected to this valve. Additionally, the domestic water service will be connected through a TEE fitting to the proposed fire service, utilizing a 50mm domestic water service line. The layout and details of the water service are depicted on Drawing C2.

10.0 SUMMARY & CONCLUSIONS

This report presents a detailed SWM control plan addressing both quantity and quality controls required to meet all design criteria. Drainage boundaries have been established to estimate flows to the proposed drainage collection system for the site in order to develop a comprehensive drainage and SWM plan for the proposed development. There will be no negative impact or increase in stormwater peak flows under proposed controlled conditions.

The summary of our findings and drainage analyses for the subject property is as follows:

- The hydrologic and hydraulic analyses address the existing and proposed site conditions;
- SWM criteria of external agencies are collected and reviewed during the course of the study and all other available information are retrieved and reviewed;
- Impervious areas are calculated under both existing and proposed conditions and a significant increase in impervious areas was found;
- SWM design was performed for the subject site to provide flow quantity and quality control;
- A proposed storm sewer network has been designed to convey the minor system;
- Recommended quantity control measures for the site will be achieved through an Orifice plate and roof controlled;
- A stormwater infiltration chamber is proposed to mitigate the water balance deficit associated with the change from pre-development to post-development conditions.
- Quality control will be achieved through the treatment trench approach.
- These measures will provide the necessary quantity and quality control to meet the criteria of Town of Whitchurch Stouffville.

We trust that this proposed stormwater management plan will provide appropriate service to the proposed site.

Respectfully Submitted,

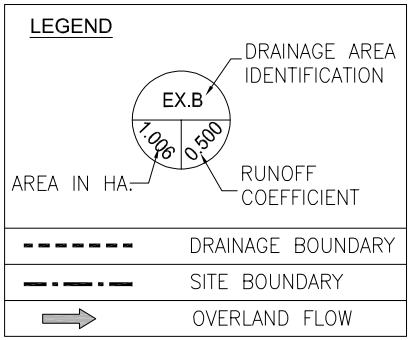
n Engineering Inc.

Abu. S. Ziauddin M. Eng P. Eng.
Head of Engineering

Lekhnath Upadhyaya- M.Eng P.Eng
Municipal Engineer

Appendix A
Figures

LEGEND



PRE-DEVELOPMENT LAND USE TABLE

LAND COVER	HATCH	AREA (SQ.M.)	RUNOFF CO-EFFICIENT
ROOF		573.30	0.90
LANDSCAPE		1289.20	0.25
CONCRETE/ASPHALT		546.24	0.90
TOTAL		2408.74	

SUBCATCHMENT AREA

SUBCATCHMENT	ROOF	ASPHALT /CONCRETE	LANDSCAPED	TOTAL
A1	0.00	0.00	305.44	305.44
A2	573.30	546.24	983.76	2103.3
TOTAL	573.30	546.24	1289.20	2408.74

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PROJECT:

27 WINONA DR, WHITCHURCH STOUFFVILLE, ON PLACE OF WORSHIP-MOSQUE

DRAWING TITLE:

PRE-DEVELOPMENT DRAINAGE PLAN

DRAWN BY: SJ	DATE: 26 JUNE 2024
CHECKED BY: AZ	SCALE: 1:1500
PROJECT NO.: **22-71**	DRAWING NO.: **DR-101**

N (GEODETIC NORTH)
PROJECT NORTH

SUBCATCHMENT AREA

SUBCATCHMENT	ROOF	ASPHALT /CONCRETE	LANDSCAPED	TOTAL
A1	0.00	0.00	42.35	42.35
A2	0.00	57.14	67.90	125.04
B1	2146.45	0.00	0.00	2146.45
UC1	0.00	31.89	0.00	31.89
UC2	0.00	0.00	29.62	29.62
UC3	0.00	0.00	33.39	33.39
TOTAL	2146.45	89.03	173.26	2408.74

POST-DEVELOPMENT LAND USE TABLE

LAND COVER	HATCH	AREA (SQ.M.)	RUNOFF CO-EFFICIENT
ROOF		2146.45	0.90
LANDSCAPE		173.26	0.25
CONCRETE/ASPHALT		89.03	0.90
TOTAL		2408.74	

LEGEND

DRAINAGE AREA IDENTIFICATION

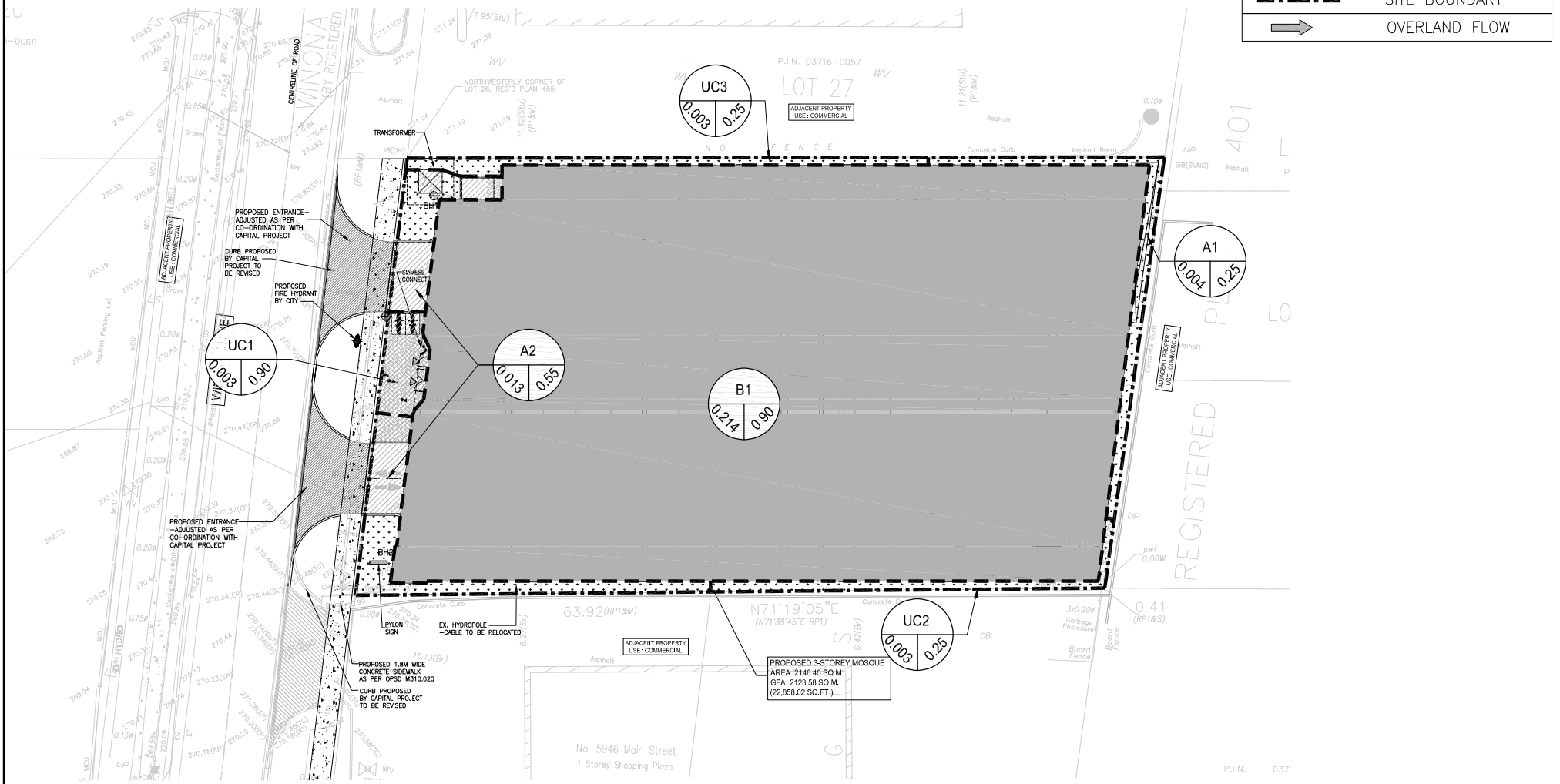
A1 (1.006 / 0.500)

AREA IN HA. — RUNOFF COEFFICIENT

DRAINAGE BOUNDARY

SITE BOUNDARY

OVERLAND FLOW



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PROJECT:

27 WINONA DR, WHITCHURCH STOUFFVILLE, ON PLACE OF WORSHIP-MOSQUE

DRAWING TITLE:

POST-DEVELOPMENT DRAINAGE PLAN

DRAWN BY: SJ	DATE: 26 JUNE 2024
CHECKED BY: AZ	SCALE: 1:1500
PROJECT NO.: 22-71	DRAWING NO.: DR-102

N (GEODETIC NORTH)

PROJECT NORTH

ROOF DRAINAGE

SUB AREA	ROOF (m)²	SKYLIGHT (m^2)	TOTAL AREA (m²)
R1	29.05	0.00	29.29
R2	180.71	0.00	180.68
R3	292.68	0.00	292.68
R4	364.31	8.55	372.86
R5	342.94	0.00	342.94
R6	261.56	0.00	261.56
R7	341.78	17.10	358.88
R8	61.25	0.00	60.40
R9	30.26	0.00	30.26
R10	11.03	0.00	11.03
R11	271.20	29.70	301.54
TOTAL	2186.77	55.35	2242.12

ROOF DRAINAGE LAND USE TABLE

LAND COVER	HATCH	AREA (SQ.M.)	RUNOFF CO-EFFICIENT
ROOF AREA ACCOUNTED FOR ROOF STORAGE CALCULATION		1848.97	0.90
ROOF AREA ACCOUNTED FOR WATER BALANCE CALCULATION		393.15	0.90
TOTAL		2242.12	

LEGEND

DRAINAGE AREA IDENTIFICATION

A1

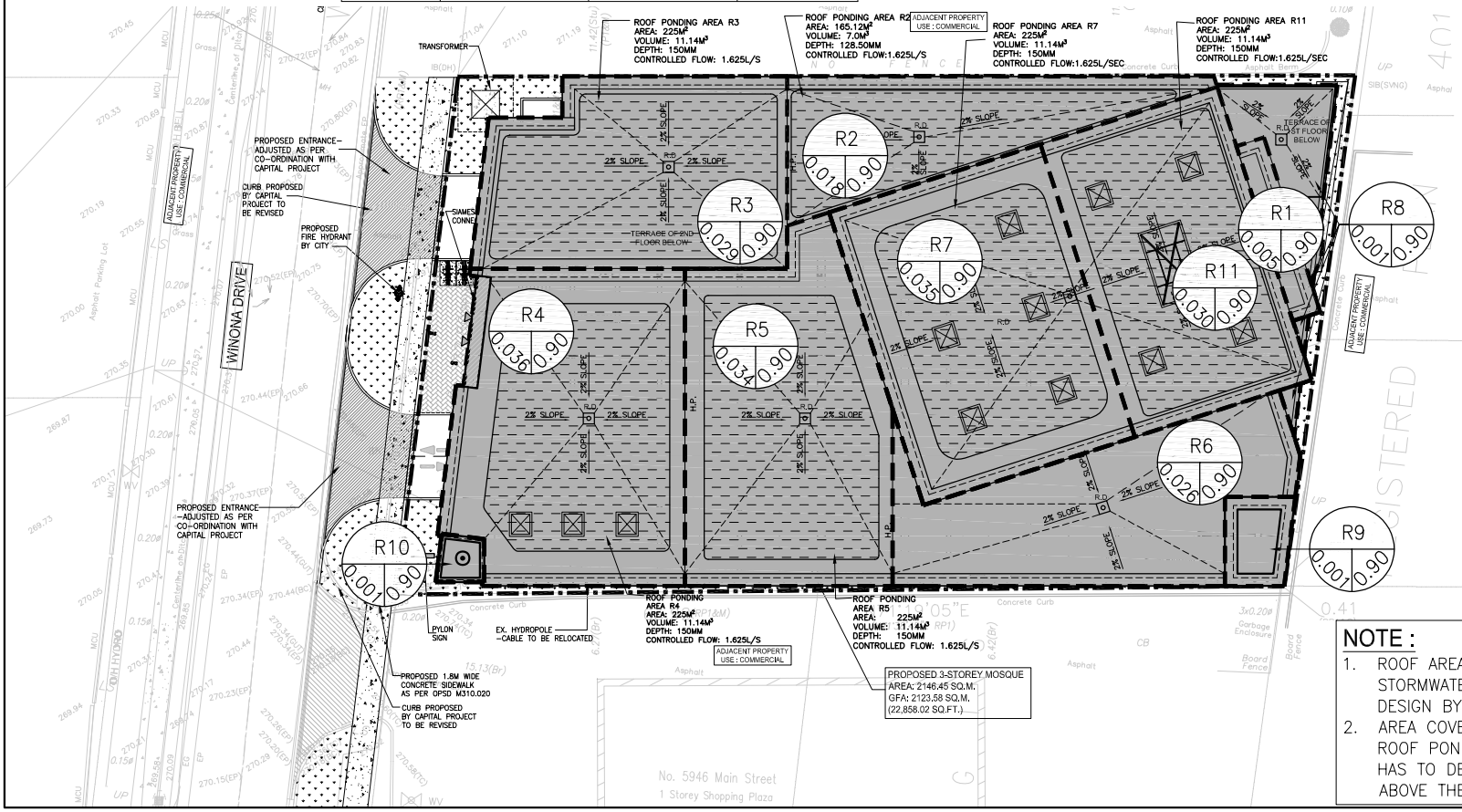
1.006 0.500

AREA IN HA. RUNOFF COEFFICIENT

DRAINAGE BOUNDARY

SITE BOUNDARY

OVERLAND FLOW



NOTE :

1. ROOF AREA R1, R6, R8, R9 & R10 ARE RESERVED FOR STORMWATER RETENTION CHAMBER A ROOF DRAIN TO BE DESIGN BY OTHERS.
2. AREA COVERED BY SKYLIGHTS ARE EXCLUDED FROM THE ROOF PONDING CALCULATION. MECHANICAL ENGINEER HAS TO DESIGN THE SKYLIGHTS AND SOLAR PANEL ABOVE THE PONDING DEPTH.

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www.nengineering.com

PROJECT:

27 WINONA DR, WHITCHURCH STOUFFVILLE, ON PLACE OF WORSHIP-MOSQUE

DRAWING TITLE:

ROOF STORAGE AND DRAINAGE PLAN

DRAWN BY: SJ	DATE: 26 JUNE 2024
CHECKED BY: AZ	SCALE: 1:1500
PROJECT NO.: 22-71	DRAWING NO.: DR-103

N (GEODETIC NORTH)

PROJECT NORTH

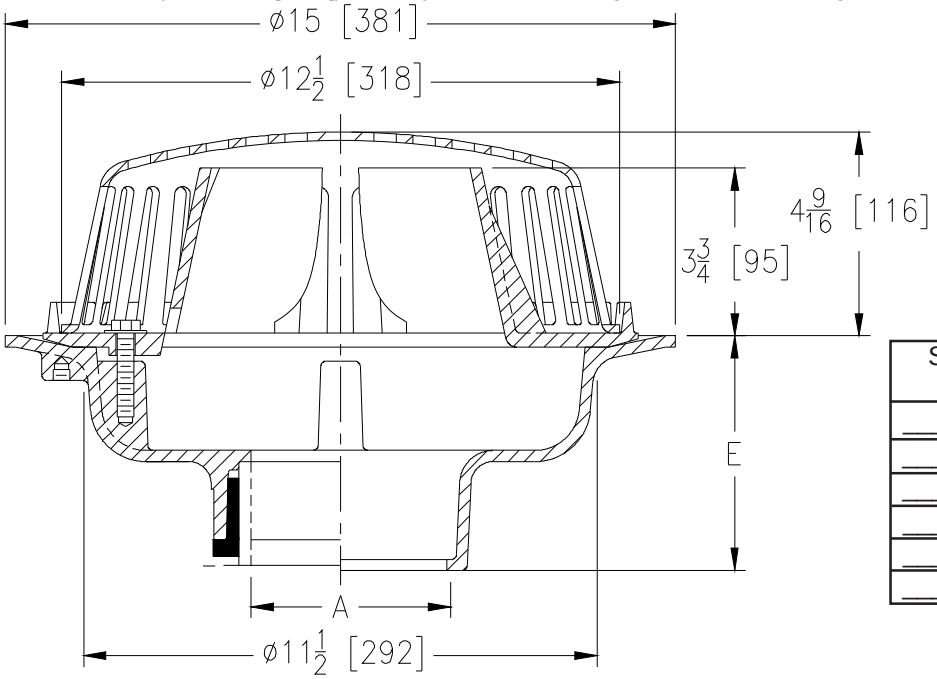
Z105

CONTROL-FLO ROOF DRAIN
W/ PARABOLIC WEIR

SPECIFICATION SHEET

TAG _____

Dimensional Data (inches and [mm]) are Subject to Manufacturing Tolerances and Change Without Notice



Specify Number of Notches in Weir	
___-N1	One Notch
___-N2	Two Notches
___-N3	Three Notches
___-N4	Four Notches
___-N5	Five Notches
___-N6	Six Notches

A- Pipe Size In.[mm]	Approx. Wt. Lbs. [kg]	Dome Open Area Sq. In. [cm²]
2,3,4 [51,76,102]	34 [15]	103 [665]

ENGINEERING SPECIFICATION: ZURN Z105
15" [381mm] Diameter Control-Flo roof drain for dead-level roof construction, Dura-Coated cast iron body, Control-Flo weir shall be linear functioning with integral membrane flashing clamp/gravel guard and Poly-Dome. All data shall be verified proportional to flow rates. Each notch will allow 10 GPM [LPM] of flow per 1" [25mm] of rain water build up above the drain.

OPTIONS (Check/specify appropriate options)

PIPE SIZE
3, 4 [76, 102]
2 , 3, 4 [51, 76, 102]
2 , 3, 4 [51, 76, 102]

(Specify size/type) **OUTLET**
_____ IC Inside Caulk
_____ NH No-Hub
_____ NL Neo-Loc

E BODY HT. DIM.
5-1/4 [133]
5-1/4 [133]
4-9/16 [116]

PREFIXES
_____ Z D.C.C.I. Body with Poly-Dome*
_____ ZA D.C.C.I. Body with Aluminum Dome
_____ ZC D.C.C.I. Body with Cast Iron Dome

SUFFIXES
_____ -C Underdeck Clamp
_____ -DP Top-Set® Deck Plate (Replaces both -C & -R)
_____ -E Static Extension 1 [25] thru 4 [102] (Specify Ht.)
_____ -EA Adjustable Extension Assembly 2-1/8 [54] thru 3-1/2 [89]
_____ -G Galvanized Cast Iron
_____ -R Roof Sump Receiver
_____ -TC Neo-Loc Test Cap Gasket (2,3,4 [51,76,102] NL Bottom Outlet Only)
_____ -VP Vandal Proof Secured Top
_____ -10 6 [152] High Parabolic Weir for Sloped Roof (ZC or ZA)

* Regularly furnished unless otherwise specified.

Zurn Industries, LLC | **Specification Drainage Operation**
1801 Pittsburgh Avenue, Erie, PA U.S.A. 16502 · Ph. 855-663-9876, Fax 814-454-7929
In Canada | **Zurn Industries Limited**
3544 Nashua Drive, Mississauga, Ontario L4V 1L2 · Ph. 905-405-8272, Fax 905-405-1292
www.zurn.com

Rev. K
Date: 09/25/17
C.N. No. 137793
Prod. | Dwg. No. Z105

Selecta-Drain Chart

LOCATION	SQUARE METRE (SQUARE FOOT) NOTCH AREA RATING	ROOF LOAD FACTOR KGS. (LBS.)	TOTAL ROOF SLOPE											
			DEAD LEVEL			51mm (2") RISE			102mm (4") RISE			152mm (6") RISE		
			L.P.M. (G.P.M.) Discharge	**Draindown Time Hrs.**	mm (in.) Water Depth	L.P.M. (G.P.M.) Discharge	**Draindown Time Hrs.**	mm (in.) Water Depth	L.P.M. (G.P.M.) Discharge	**Draindown Time Hrs.**	mm (in.) Water Depth	L.P.M. (G.P.M.) Discharge	**Draindown Time Hrs.**	mm (in.) Water Depth
Ottawa, Ontario	232 (2,500)	4.7 (10.4)	45.5 (10)	**7**	51 (2)	59 (13)	**6.5**	66 (2.6)	77.5 (17)	**4.5**	86.5 (3.4)	86.5 (19)	**3.2**	96.5 (3.8)
	465 (5,000)	5.9 (13)	57 (12.5)	**17**	63.5 (2.5)	68 (15)	**14**	76 (3)	86.5 (19)	**10**	96.5 (3.8)	100 (22)	**7.5**	112 (4.4)
	697 (7,500)	6.4 (14)	61.5 (13.5)	**27**	68.5 (2.7)	75 (16.5)	**23**	84 (3.3)	93 (20.5)	**16**	104 (4.1)	107 (23.5)	**12**	119.5 (4.7)
	929 (10,000)	6.6 (14.6)	63.5 (14)	**36**	71 (2.8)	79.5 (17.5)	**32**	89 (3.5)	97.5 (21.5)	**22**	109 (4.3)	113.5 (25)	**18**	127 (5)
St. Thomas, Ontario	232 (2,500)	5.7 (12.5)	54.5 (12)	**8**	61 (2.4)	68 (15)	**7**	76 (3.0)	86.5 (19)	**5**	96.5 (3.8)	104.5 (23)	**4**	117 (4.6)
	465 (5,000)	6.6 (14.6)	63.5 (14)	**19**	71 (2.8)	77.5 (17)	**16**	86.5 (3.4)	97.5 (21.5)	**11**	109 (4.3)	118 (26)	**9**	132 (5.2)
	697 (7,500)	7.1 (16.6)	68 (15)	**29**	76 (3.0)	82 (18)	**26**	91.5 (3.6)	102.5 (22.5)	**18**	114.5 (4.5)	125 (27.5)	**15**	139.5 (5.5)
	929 (10,000)	7.5 (16.6)	72.5 (16)	**40**	81.5 (3.2)	86.5 (19)	**34**	96.5 (3.8)	107 (23.5)	**24**	119.5 (4.7)	132 (29)	**20**	147.5 (5.8)
Timmins, Ontario	232 (2,500)	4.3 (9.4)	41 (9)	**7**	45.5 (1.8)	57 (12.5)	**6**	63.5 (2.5)	72.5 (16)	**4**	81.5 (3.2)	86.5 (19)	**3.3**	96.5 (3.8)
	465 (5,000)	5.7 (12.5)	54.5 (12)	**16**	61 (2.4)	63.5 (14)	**14**	71 (2.8)	82 (18)	**9**	91.5 (3.6)	97.5 (21.5)	**7.5**	109 (4.3)
	697 (7,500)	6.4 (14)	61.5 (13.5)	**27**	68.5 (2.7)	70.5 (15.5)	**22**	78.5 (3.1)	86.5 (19)	**15**	96.5 (3.8)	104.5 (23)	**12**	117 (4.6)
	929 (10,000)	6.6 (14.6)	63.5 (14)	**36**	71 (2.8)	72.5 (16)	**30**	81.5 (3.2)	91 (20)	**21**	101.5 (4.0)	109 (24)	**17**	122 (4.8)
Toronto, Ontario	232 (2,500)	5.7 (12.5)	54.5 (12)	**8**	61 (2.4)	66 (14.5)	**7**	73.5 (2.9)	82 (18)	**4.5**	91.5 (3.6)	97.5 (21.5)	**3.5**	109 (4.3)
	465 (5,000)	6.8 (15.1)	66 (14.5)	**19**	73.5 (2.9)	77.5 (17)	**16**	86.5 (3.4)	93 (20.5)	**11**	104 (4.1)	111.5 (24.5)	**9**	124.5 (4.9)
	697 (7,500)	8.0 (17.7)	77.5 (17)	**30**	86.5 (3.4)	84 (18.5)	**26**	94 (3.7)	100 (22)	**18**	112 (4.4)	120.5 (26.5)	**14**	134.5 (5.3)
	929 (10,000)	8.7 (19.2)	82 (18)	**42**	91.5 (3.6)	86.5 (19)	**34**	96.5 (3.8)	104.5 (23)	**24**	117 (4.6)	127.5 (28)	**20**	142 (5.6)
Windsor, Ontario	232 (2,500)	6.1 (13.5)	59 (13)	**8.5**	66 (2.6)	70.5 (15.5)	**7.5**	78.5 (3.1)	84 (18.5)	**4.5**	94 (3.7)	107 (23.5)	**4**	119.5 (4.7)
	465 (5,000)	7.1 (15.6)	68 (15)	**20**	76 (3.0)	79.5 (17.5)	**16**	89 (3.5)	97.5 (21.5)	**11**	109 (4.3)	118 (26)	**9**	132 (5.2)
	697 (7,500)	8.0 (17.7)	77.5 (17)	**30**	86.5 (3.4)	86.5 (19)	**26**	96.5 (3.8)	107 (23.5)	**18**	119.5 (4.7)	125 (27.5)	**15**	139.5 (5.5)
	929 (10,000)	8.7 (19.2)	82 (18)	**42**	91.5 (3.6)	91 (20)	**36**	101.5 (4.0)	113.5 (25)	**26**	127 (5.0)	129.5 (28.5)	**20**	145 (5.7)
Charlottetown, Prince Edward Island	232 (2,500)	4.9 (10.9)	47.5 (10.5)	**7.5**	53.5 (2.1)	57 (12.5)	**6**	63.5 (2.5)	68 (15)	**3.8**	76 (3.0)	79.5 (17.5)	**3**	89 (3.5)
	465 (5,000)	6.6 (14.6)	63.5 (14)	**19**	71 (2.8)	75 (16.5)	**15.5**	84 (3.3)	88.5 (19.5)	**10**	99 (3.9)	100 (22)	**7.5**	112 (4.4)
	697 (7,500)	7.8 (17.2)	75 (16.5)	**31**	84 (3.3)	86.5 (19)	**26**	96.5 (3.8)	102.5 (22.5)	**18**	114.5 (4.5)	113.5 (25)	**13**	127 (5.0)
	929 (10,000)	8.7 (19.2)	84 (18.5)	**42**	94 (3.7)	97.5 (21.5)	**37**	106.5 (4.2)	111.5 (24.5)	**26**	124.5 (4.9)	125 (27.5)	**20**	139.5 (5.5)
Montreal, Quebec	232 (2,500)	5.2 (11.4)	50 (11)	**7.5**	56 (2.2)	61.5 (13.5)	**7**	68.5 (2.7)	79.5 (17.5)	**4.5**	89 (3.5)	97.5 (21.5)	**3.5**	109 (4.36)
	465 (5,000)	5.9 (13)	57 (12.5)	**17**	63.5 (2.5)	70.5 (15.5)	**15**	78.5 (3.1)	88.5 (19.5)	**10**	99 (3.9)	109 (24)	**8**	122 (4.8)
	697 (7,500)	6.1 (13.5)	59 (13)	**27**	66 (2.6)	72.5 (16)	**23**	81.5 (3.2)	93 (20.5)	**16**	104 (4.1)	113.5 (25)	**13**	127 (5.0)
	929 (10,000)	6.4 (14)	61.5 (13.5)	**36**	68.5 (2.7)	77.5 (17)	**31**	86.5 (3.4)	95.5 (21)	**22**	106.5 (4.2)	120.5 (26.5)	**19**	134.5 (5.3)
Quebec City, Quebec	232 (2,500)	5.4 (12)	52.5 (11.5)	**8**	58.5 (2.3)	63.5 (14)	**7**	71 (2.8)	79.5 (17.5)	**4.5**	89 (3.5)	97.5 (21.5)	**3.5**	109 (4.3)
	465 (5,000)	6.4 (14)	61.5 (13.5)	**18**	68.5 (2.7)	70.5 (15.5)	**15**	78.5 (3.1)	84 (18.5)	**10**	94 (3.7)	104.5 (23)	**8**	117 (4.6)
	697 (7,500)	6.6 (14.6)	63.5 (14)	**28**	71 (2.8)	72.5 (16)	**23**	81.5 (3.2)	86.5 (19)	**15**	96.5 (3.8)	107 (23.5)	**12**	119.5 (4.7)
	929 (10,000)	7.1 (15.6)	68 (15)	**37**	76 (3.0)	77.5 (17)	**31**	86.5 (3.4)	88.5 (19.5)	**20**	99 (3.9)	109 (24)	**17**	122 (4.8)

Appendix B
Flow Analysis

Calculation Sheet 1A

PRE- DEVELOPMENT FLOW - TOWARDS EAST(NINTH LINE)- A1

n Engineering Inc

Project:	**Mosque, Place of Worship**
Address:	**27 Winona Dr.**
Town/Township/City	**Whitcurch Stouffville, ON**
Project No.	**n2271**
Proposed Development Area (m^2)	**2408.74**

PRE-DEVELOPMENT RUNOFF COEFFICIENT

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "C"	AREA x C
ASPHALT/CONC.	0.00	0.90	0.00
BUILDING	0.00	0.90	0.00
LANDSCAPED AREA	305.44	0.25	76.36
		ΣAREA X C	76.36
		WEIGHTED AVERAGE "C"	**0.25**
		DEVELOPABLE AREA "A" (Hectares)	0.03

Rainfall intensity:

$$i = \frac{A}{(t+B)^C}$$

Where:

I = Rainfall Intensity (mm/hr)

A = coefficient

B = coefficient

t =Time of concentration(min) 10.00

Design Flow:

Q=2.778 (ACCai)

Where:

Q= Flow (m^3/second)

C = Runoff coefficient

A = Draingae Area (hectares)

I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	696.679	1015.963	1279.709	1546.810	1802.604	2051.707
B	4.957	5.255	5.715	5.746	6.029	6.230
c	0.811	0.826	0.841	0.845	0.853	0.860
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	77.67	107.00	126.19	150.60	169.09	186.74
C	0.25	0.25	0.25	0.25	0.25	0.25
Q (m^3/sec)	0.00	0.00	0.00	0.00	0.00	0.00
Q (l/sec)	**1.65**	2.27	2.68	3.19	3.59	3.96

Calculation Sheet 1B

PRE- DEVELOPMENT FLOW TOWARDS WEST (WINONA DRIVE)- A2

n Engineering Inc

Project:	**Mosque, Place of Worship**
Address:	**27 Winona Dr.**
Town/Township/City	**Whitcurch Stouffville, ON**
Project No.	**n2271**
Proposed Development Area (m^2)	**2408.74**

PRE-DEVELOPMENT RUNOFF COEFFICIENT

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "C"	AREA x C
ASPHALT/CONC.	546.24	0.90	491.62
BUILDING	573.30	0.90	515.97
LANDSCAPED AREA	983.76	0.25	245.94
		ΣAREA X C	1253.53
		WEIGHTED AVERAGE "C"	**0.60**
		DEVELOPABLE AREA "A" (Hectares)	0.21

Rainfall intensity:

$$i = \frac{A}{(t+B)^C}$$

Where:

I = Rainfall Intensity (mm/hr)

A = coefficient

B = coefficient

t =Time of concentration(min) 10.00

Design Flow:

Q=2.778 (ACCai)

Where:

Q= Flow (m^3/second)

C = Runoff coefficient

A = Draingae Area (hectares)

I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	696.679	1015.963	1279.709	1546.810	1802.604	2051.707
B	4.957	5.255	5.715	5.746	6.029	6.230
c	0.811	0.826	0.841	0.845	0.853	0.860
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	77.67	107.00	126.19	150.60	169.09	186.74
C	0.60	0.60	0.60	0.60	0.60	0.60
Q (m^3/sec)	0.03	0.04	0.04	0.05	0.06	0.07
Q (l/sec)	**27.05**	37.26	43.94	52.44	58.88	65.03

Calculation Sheet 1C

PRE- DEVELOPMENT FLOW WHOLE SITE

n Engineering Inc

Project:	**Mosque, Place of Worship**
Address:	**27 Winona Dr.**
Town/Township/City	**Whitcurch Stouffville, ON**
Project No.	**n2271**
Proposed Development Area (m^2)	**2408.74**

PRE-DEVELOPMENT RUNOFF COEFFICIENT

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "C"	AREA x C
ASPHALT/CONC.	546.24	0.90	491.62
BUILDING	573.30	0.90	515.97
LANDSCAPED AREA	1289.20	0.25	322.30
		ΣAREA X C	1329.89
		WEIGHTED AVERAGE "C"	**0.55**
		DEVELOPABLE AREA "A" (Hectares)	0.24

Rainfall intensity:

$$i = \frac{A}{(t+B)^C}$$

Where:

I = Rainfall Intensity (mm/hr)

A = coefficient

B = coefficient

t =Time of concentration(min) 10.00

Design Flow:

Q=2.778 (ACCai)

Where:

Q= Flow (m^3/second)

C = Runoff coefficient

A = Draingae Area (hectares)

I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	696.679	1015.963	1279.709	1546.810	1802.604	2051.707
B	4.957	5.255	5.715	5.746	6.029	6.230
c	0.811	0.826	0.841	0.845	0.853	0.860
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	77.67	107.00	126.19	150.60	169.09	186.74
C	0.55	0.55	0.55	0.55	0.55	0.55
Q (m^3/sec)	0.03	0.04	0.05	0.06	0.06	0.07
Q (l/sec)	**28.69**	39.53	46.62	55.64	62.47	68.99

Calculation Sheet 2

POST - DEVELOPMENT FLOW (WHOLE SITE)

n Engineering Inc

Project:	**Mosque, Place of Worship**
Address:	**27 Winona Dr.**
Town/Township/City	**Whitcurch Stouffville, ON**
Project No.	**n2271**
Proposed Development Area (m^2)	**2408.74**
Date:	**12/8/2025**

POST DEVELOPMENT RUNOFF COEFFICIENT FROM SITE

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "C"	AREA x C_5
ASPHALT/CONC.	89.03	0.90	80.13
BUILDING	2146.45	0.90	1931.81
LANDSCAPED AREA	173.26	0.25	43.32
		ΣAREA X C	2055.25
		WEIGHTED AVERAGE "C"	**0.85**
		DEVELOPABLE AREA "A" (Hectares)	0.24

Rainfall intensity:

$$i = \frac{A}{(t+B)^C}$$

Where:

I = Rainfall Intensity (mm/hr)

A = coefficient

B = coefficient

t =Time of concentration(min) 10.00

Design Flow:

Q=2.778 (ACCai)

Where:

Q= Flow (m^3/second)

C = Runoff coefficient

A = Draingae Area (hectares)

I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	696.68	1015.96	1279.71	1546.81	1802.60	2051.71
B	4.957	5.255	5.715	5.746	6.029	6.230
c	0.811	0.826	0.841	0.845	0.853	0.860
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	77.67	107.00	126.19	150.60	169.09	186.74
C	0.85	0.85	0.85	0.85	0.85	0.85
Run-Off Coefficient Modification Factor (Ca)	1.00	1.00	1.00	1.10	1.20	1.25
C*	0.85	0.85	0.85	0.94	1.00	1.00
Q (m^3/sec)	0.04	0.06	0.07	0.09	0.11	0.12
Q (l/sec)	44.34	61.09	72.05	94.58	113.15	124.96

n Engineering Inc

Calculation Sheet 2A

POST - DEVELOPMENT FLOW- FROM GROUND SURFACE (A1& A2) AND ROOF R1, R6, R8,R9 and R10)

Project:	**Mosque, Place of Worship**
Address:	**27 Winona Dr.**
Town/Township/City	**Whitcurch Stouffville, ON**
Project No.	**n2271**
Proposed Development Area (m^2)	**2408.74**
Date:	**12/8/2025**

POST DEVELOPMENT RUNOFF COEFFICIENT FROM SITE

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "C"	AREA x C_5
ASPHALT/CONC.	57.14	0.90	51.43
BUILDING ROOFS(R1,R6,R8,R9 and R10)	393.15	0.90	353.84
LANDSCAPED AREA	110.25	0.25	27.56
		ΣAREA X C	432.82
		WEIGHTED AVERAGE "C"	**0.77**
		DEVELOPABLE AREA "A" (Hectares)	0.06

Rainfall intensity:

$$i = \frac{A}{(t+B)^C}$$

Where:
I = Rainfall Intensity (mm/hr)
A = coefficient
B = coefficient
t =Time of concentration(min) 10.00

Design Flow:

Q=2.778 (ACCai)

Where:
Q= Flow (m^3/second)
C = Runoff coefficient
A = Draingae Area (hectares)
I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	696.68	1015.96	1279.71	1546.81	1802.60	2051.71
B	4.957	5.255	5.715	5.746	6.029	6.230
c	0.811	0.826	0.841	0.845	0.853	0.860
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	77.67	107.00	126.19	150.60	169.09	186.74
C	0.77	0.77	0.77	0.77	0.77	0.77
Run-Off Coefficient Modification Factor (Ca)	1.00	1.00	1.00	1.10	1.20	1.25
C*	0.77	0.77	0.77	0.85	0.93	0.97
Q (m^3/sec)	0.01	0.01	0.02	0.02	0.02	0.03
Q (l/sec)	9.34	12.87	15.17	19.92	24.40	28.07

Calculation Sheet 3

POST - DEVELOPMENT UNCONTROLLED FLOW

n Engineering Inc

Project:	**Mosque, Place of Worship**
Address:	**27 Winona Dr.**
Town/Township/City	**Whitcurch Stouffville, ON**
Project No.	**n2271**
Proposed Development Area (m^2)	**2408.74**
Date:	**12/8/2025**

UNCONTROLLED RUNOFF COEFFICIENT

AREA TYPE	AREA (M^2)	RUNOFF COEFFICIENT "C"	AREA x C
ASPHALT/CONC..	31.890	0.90	28.70
BUILDING	0	0.90	0.00
LANDSCAPED AREA	63.010	0.25	15.75
		ΣAREA X C	44.45
		WEIGHTED AVERAGE "C"	**0.47**
		AREA "A" (Hectares)	0.01

Rainfall intensity:

Where: $$i = \frac{A}{(t+B)^C}$$

I = Rainfall Intensity (mm/hr)

A = coefficient

B = coefficient

t =Time of concentration(min) 10.00

Design Flow:

Q=2.778 (ACCai)

Where:

Q= Flow (m^3/second)

C = Runoff coefficient

A = Draingae Area (hectares)

I= Average rainfall intensity (milimeters/hour)

Return Period (Years)	2 -Years	5-Years	10 -Years	25 -Years	50 -Years	100-Years
A	696.68	1015.96	1279.71	1546.81	1802.60	2051.71
B	4.957	5.255	5.715	5.746	6.029	6.230
C	0.811	0.826	0.841	0.845	0.853	0.860
t (mins)	10.00	10.00	10.00	10.00	10.00	10.00
I (mm/hr)	77.67	107.00	126.19	150.60	169.09	186.74
Adjustment Multiplier	1.00	1.00	1.00	1.10	1.20	1.25
C*	0.47	0.47	0.47	0.52	0.56	0.59
Q (m^3/sec)	0.001	0.00	0.00	0.00	0.00	0.00
Q (l/sec)	0.96	1.32	1.56	2.05	2.51	**2.88**

Appendix C
Storm Drainage Design Sheet

n Engineering Inc

Date Prepared	11-Dec-25
Project	Mosque, Place of Worship
Project No.	n2271
t_c (start):	10.0 minutes

Storm Drainage Design Chart
For Circular Drains Flowing Full
27 Winona Dr.
Whitcurch Stouffville, ON

IDF Curve	
Constants	**100-yrs**
A	2051.7
B	6.2
C	0.9

Catchments								Hydrology		Hyraulics					TIME	CAPACITY
Catchment ID	**Total Area (ha.)**	**Captured By**	**Outlet to**	**R**	**A x R**	**ACC.**	**t_c (min)**	**Rainfall Intensity, I (mm/hr)**	**Peak Flow (m^3/sec)**	**STORM SEWER DESIGN INFORMATION**						
				Runoff Coeff.		A x R		I_{100}	$Q_{100\text{-}yrs}$	size (mm)	slope (%)	length (m)	Q full (m^3/s)	V full (m/s)	SECT. (min)	
ROOF (R1, R6, R8 , R9 and R10)	0.039	STM ROOF PLUG1	STM- CHAMBER	0.90	0.035	0.035	10.00	186.74	0.018	300	1.00	23.00	0.097	1.368	0.28	19%
A1	0.004	EB--CB1	EB-CBMH1	0.25	0.001	0.001	10.00	186.74	0.001	300	0.50	30.00	0.068	0.97	0.52	0.8%
A2	0.013	EB-CBMH1	STM CHAMBER	0.55	0.007	0.008	10.52	181.77	0.004	300	0.50	15.28	0.068	0.967	0.26	6%
CONVEYANCE		STM CHAMBER	MH1(CONTROL)			0.043	10.80	179.20	0.022	300	0.50	17.00	0.068	0.967	0.29	32%
CONVEYANCE		MH1(CONTROL)	MH2			0.043	11.09	176.59	0.021	300	0.50	3.50	0.068	0.967	0.06	31%
BUILDING ROOF (R2, R3,R4,R5, R7 and R11)	0.18	STM ROOF PLUG2	MH2	0.90	0.166	0.166	10.00	186.74	0.086	300	3.50	1.50	0.181	2.559	0.01	48%
CONVEYANCE		MH2	EX. 300MM STM			0.210	11.15	176.06	0.024	200	2.40	12.00	0.051	1.617	0.12	47%
Note : Service Connection is design based on controlled flow.																

Appendix D
Orifice Sizing, Onsite Detention Storage

n Engineering Inc

Table 1
Orifice Sizing Calculations

Project:	Mosque, Place of Worship
Address:	27 Winona Dr.
Town/Township/City	Whitcurch Stouffville, ON
Project No.	n2271
Proposed Development Area (m^2)	2408.74
Date:	12/11/2025

	Location	HWL (m)	Orifice Inv. (m)	Orifice Centrer Inv. (m)	C_d	A_o (m^2)	g	Orifice dia. (m)	H (m)	Q (m^3/sec)
	MH2(Contro	270.64	269.32	269.36	0.63	0.004415625	9.81	0.075	1.32	0.014

Orifice Flow Equation:

$Q = C_d A_o \sqrt{(2gH)}$

Where:

Q = Flow (m^3/sec)

A_o = Orifice area (m^2)

g = Gravitational Constant

H = Center line head (m)

C_d = coefficient of discharge, dimensionless, typically between 0.6 and 0.85, depending on the orifice geometry

Calculated Result:		
HWL:	270.64	m
Orifice Plate Size	75	mm
Pre-Development flow towards West (A2)-(2 year)	27.05	L/sec
Uncontrolled flow (100 years)	2.88	L/sec
100 years Roofs (R2, R3, R4, R5, R7 and R11) Controlled flow@1.625 l/sec /drain	9.75	L/sec
Allowable Flow from the Ground Surface	**14.41**	**L/sec**
Ground Surface Orfice Controlled Flow	**14.16**	**L/sec**
Required Storage	8.36	m^3
Available Storage	59.88	m^3

Note : The Allowable flow for Ground Surface and Roof (R1, R6, R8, R9 and R10) controlled flow

On-Site Storage Calculator

Whitcurch Stouffville, ON

Project: **Mosque, Place of Worship**

Project No.: **n2271**

Date: **11-Dec-25**

n Engineering Inc

Table 2A - 100 Years Storage- Ground Surface (A1, A2, R1, R6,R8, R9 and R10)

			Equation of IDF:		
R =	0.97		$i = \frac{A}{(t+B)^C}$	I = Rainfall Intensity (mm/hr)	
A =	0.0561	ha		T = Time of Concentration (hr)	
$Q_{release}$ =	0.014	m^3/s		A=	2051.707
				B=	6.23
Controlled Discharge=	14.16	L/s		C=	0.86
				Max Volume (m^3)	8.36

t_c (min)	i_{100} (mm/hr)	Q_{100} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
5	256.324	0.039	0.025	7.402	
6	238.193	0.036	0.022	7.790	
7	222.625	0.033	0.019	8.106	
8	209.102	0.031	0.017	8.289	
9	197.239	0.030	0.015	8.362	***
10	186.742	0.028	0.014	8.345	
11	177.382	0.027	0.013	8.251	
12	168.981	0.025	0.011	8.092	
13	161.396	0.024	0.010	7.877	
14	154.511	0.023	0.009	7.614	
15	148.231	0.022	0.008	7.308	
16	142.478	0.021	0.007	6.965	
17	137.187	0.021	0.006	6.590	
18	132.304	0.020	0.006	6.185	
19	127.781	0.019	0.005	5.753	
20	123.580	0.019	0.004	5.299	
21	119.667	0.018	0.004	4.822	
22	116.012	0.017	0.003	4.327	
23	112.591	0.017	0.003	3.814	
24	109.380	0.016	0.002	3.285	
25	106.361	0.016	0.002	2.741	
26	103.517	0.016	0.001	2.184	
27	100.832	0.015	0.001	1.615	
28	98.294	0.015	0.001	1.034	
29	95.889	0.014	0.000	0.442	

On-Site Storage Calculator

Whitcurch Stouffville, ON

Project: **Mosque, Place of Worship**

Project No.: **n2271**

Date: **11-Dec-25**

n Engineering Inc

Table 2B - 100 Years Storage (ROOF R2, R3, R4, R5, R7 AND R11)

		Equation of IDF:		
R =	0.90	$i = \frac{A}{(t+B)^C}$	I = Rainfall Intensity (mm/hr)	
A =	0.1849 ha		T = Time of Concentration (hr)	
$Q_{release}$ =	0.010 m^3/s		A=	2051.707
			B=	6.23
Controlled Discharge=	9.75 L/s		C=	0.86
	1.625l/s @ 6drains		Max Volume (m^3)	61.54

t_c (min)	i_{50} (mm/hr)	Q_{50} (m^3/s)	Q_{stored} (m^3/s)	Peak Volume (m^3)	
5	256.324	0.119	0.110	32.904	
6	238.193	0.111	0.101	36.444	
7	222.625	0.104	0.094	39.472	
8	209.102	0.097	0.088	42.086	
9	197.239	0.092	0.082	44.362	
10	186.742	0.087	0.077	46.356	
11	177.382	0.083	0.073	48.114	
12	168.981	0.079	0.069	49.669	
13	161.396	0.075	0.065	51.052	
14	154.511	0.072	0.062	52.284	
15	148.231	0.069	0.059	53.385	
16	142.478	0.066	0.057	54.371	
17	137.187	0.064	0.054	55.254	
18	132.304	0.062	0.052	56.047	
19	127.781	0.060	0.050	56.759	
20	123.580	0.058	0.048	57.397	
21	119.667	0.056	0.046	57.970	
22	116.012	0.054	0.044	58.482	
23	112.591	0.052	0.043	58.941	
24	109.380	0.051	0.041	59.349	
25	106.361	0.050	0.040	59.712	
26	103.517	0.048	0.038	60.033	
27	100.832	0.047	0.037	60.316	
28	98.294	0.046	0.036	60.562	
29	95.889	0.045	0.035	60.776	
30	93.609	0.044	0.034	60.959	
31	91.442	0.043	0.033	61.113	
32	89.382	0.042	0.032	61.241	
33	87.419	0.041	0.031	61.344	
34	85.547	0.040	0.030	61.424	
35	83.759	0.039	0.029	61.481	
36	82.050	0.038	0.028	61.518	
37	80.416	0.037	0.028	61.536	***
38	78.849	0.037	0.027	61.535	
39	77.348	0.036	0.026	61.517	
40	75.907	0.035	0.026	61.483	
41	74.523	0.035	0.025	61.434	
42	73.192	0.034	0.024	61.370	
43	71.911	0.034	0.024	61.292	
44	70.678	0.033	0.023	61.200	
45	69.490	0.032	0.023	61.097	
46	68.345	0.032	0.022	60.981	
47	67.239	0.031	0.022	60.854	
48	66.171	0.031	0.021	60.716	
49	65.140	0.030	0.021	60.567	
50	64.142	0.030	0.020	60.409	
51	63.177	0.029	0.020	60.241	
52	62.243	0.029	0.019	60.064	
53	61.338	0.029	0.019	59.879	
54	60.461	0.028	0.018	59.685	
55	59.611	0.028	0.018	59.483	
56	58.786	0.027	0.018	59.273	

On-Site Avaiable Storage Calculator

Whitcurch Stouffville, ON

Table 3- Proposed 100-yr Detention Storage

n Engineering Inc

Project:	**Mosque, Place of Worship**
Address:	**27 Winona Dr.**
Project No.:	**n2271**
Date:	**11-Dec-25**

HWL	**270.64**

MH/CATCH BASIN

Description	Length/Dia. (m)	Inlet Elevation (m)	Invert Elevation	Height of Water (m)	Volume (m^3)
ENVIROBASIN - CB1	0.6	270.48	269.69	0.79	0.28
ENVIROBASIN - CBMH1	1.2	270.44	269.52	0.92	1.04
MH1(CONTROL)	1.2	270.88	269.32	1.32	1.49
TOTAL					2.82

PIPE

FROM MH	TO MH	Length (m)		DIA (mm)	Volume (m^3)
EB--CB1	EB-CBMH1	30.00		300	2.19
STM CHAMBER	MH1(CONTROL)	17.00		300	1.24
EB-CBMH1	STM CHAMBER	15.28		300	1.12
TOTAL					4.55

SURFACE PONDING

PONDING LOCATION	Top Elevation	Ponding Depth(mm)	Area (m^2)	Volume (m^3)
EB-CB1	270.48	160	451.85	24.07
EB-CBMH1	270.44	200	279.2	18.59
TOTAL				42.67

STORMWATER CHAMBER

MODEL	Area (m^2)	Size (m)	Volume (m^3)
ADS- SC-310	39.79	27.01 X 1.48	9.84
TOTAL			9.84

TOTAL PROPOSED VOLUME:	**(m^3)**	**59.88**
REQUIRED VOLUME	**(m^3)**	**8.36**

Appendix E
Enviro Basin Details

ENVIROBASIN FLOW AND STORAGE SPECIFICATION
MODEL : EB6060 COMBINATION INLET

SCREEN AREA (cm^2)	6250	TRASH STORAGE (LITRES)	43
BYPASS CAPACITY (L / sec)	88	SEDIMENT STORAGE (m^3)	0.45

EnviroBasin™ BY ENVIROPOD CANADA LTD
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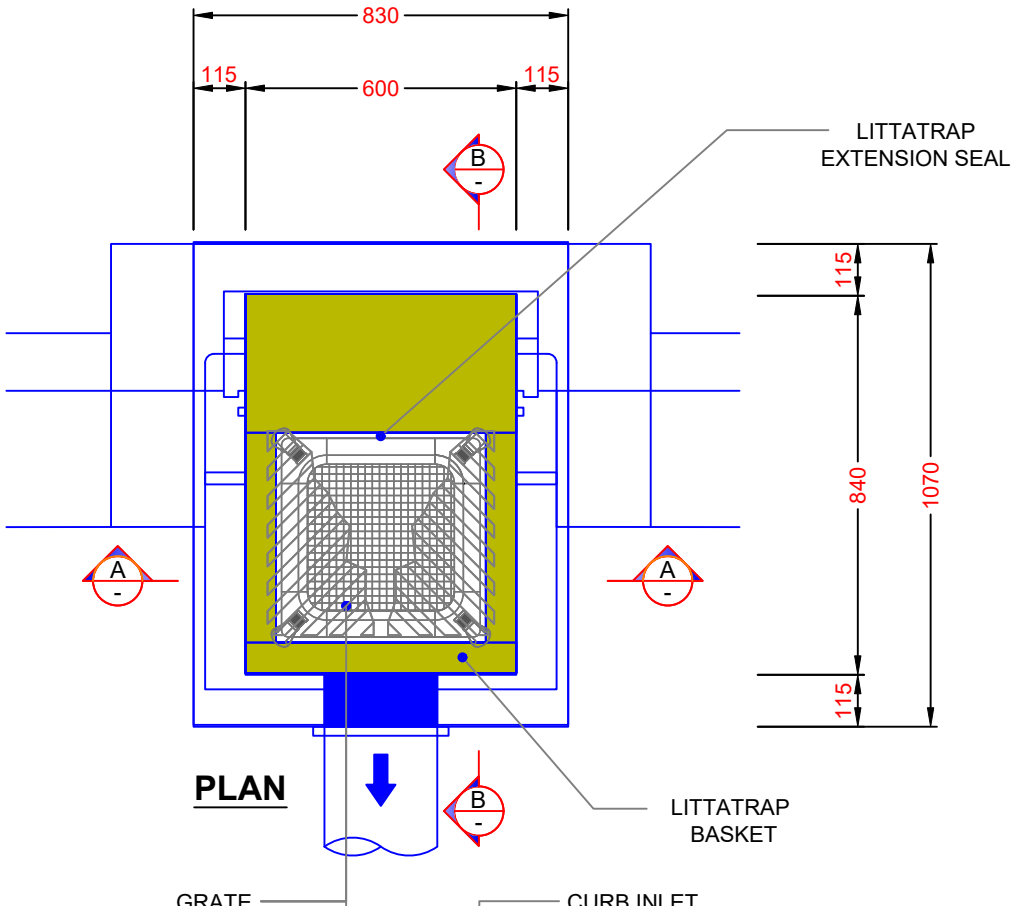
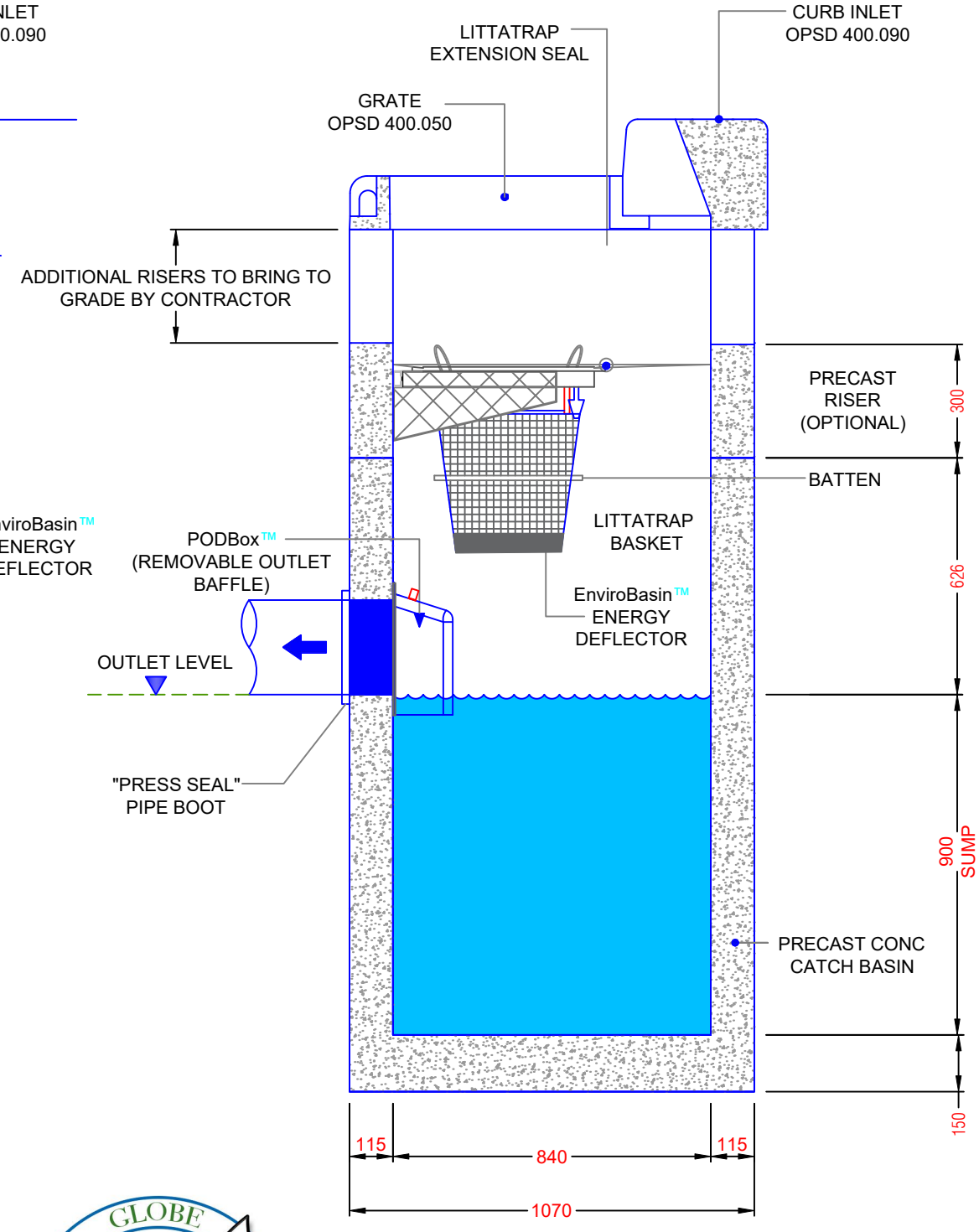


SECTION A-A



SECTION B-B

THE EnviroBasin® may be protected by one of the following Canadian, USA or International patent numbers and has other patents pending :
2,810,974, 13/824,376, 15/459,964, 2011302712, 588049

PATENT No.

PRE-INSTALLED BY ENVIROPOD

INSTALLED BY CONTRACTOR

ALL LITTATRAP COMPONENTS PREINSTALLED BY ENVIROPOD

ENVIROPOD™
A STORMWATER360™ COMPANY

EnviroBasin™
TRASH AND SEDIMENT CAPTURE
COMBINATION INLET SPECIFICATION DRAWING
ENVIROPOD CANADA

REV #	DATE	REVISION DESCRIPTION	BY
B	10/26/22	RISER NOTES	BVL
C	02/23/23	PLAN VIEW ADJUST	BVL
D	04/04/23	REMOVABLE BAFFLE	BVL
E	06/22/23	LARGER STRUCTURE	BVL

DATE :	09/23/22	DRG No. :	CAN-EB-8460CICB	DRAWN :	R.P.	CHECKED :	BVL	PROJECT No :	REV :	E

PRE-INSTALLED BY ENVIROPOD

INSTALLED BY CONTRACTOR

ALL LITTATRAP COMPONENTS PREINSTALLED BY ENVIROPOD

ENVIROBASIN FLOW AND STORAGE SPECIFICATION
MODEL : EB TWIN INLET

SCREEN AREA (cm^2)	6250	TRASH STORAGE (LITRES)	43
BYPASS CAPACITY (L / sec)	88	SEDIMENT STORAGE (m^3)	0.32

EnviroBasin™ BY ENVIROPOD CANADA LTD
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MOBILE : (437) 214-5419
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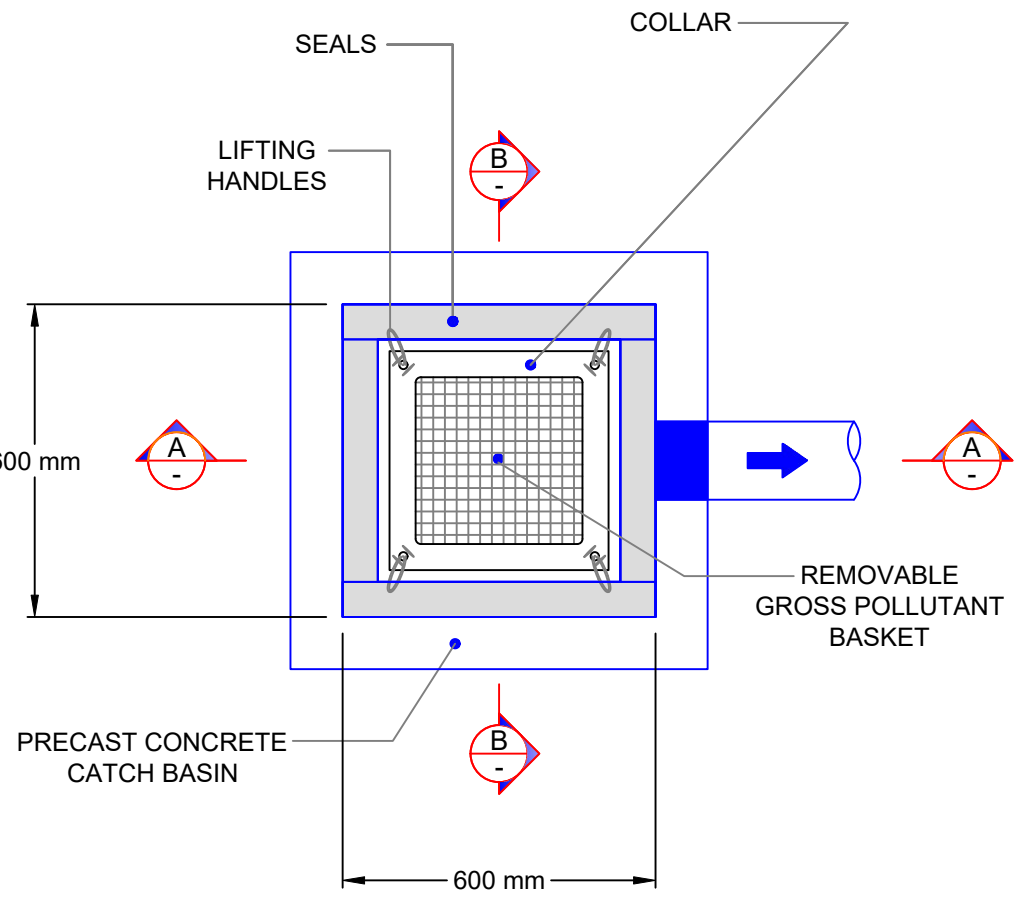
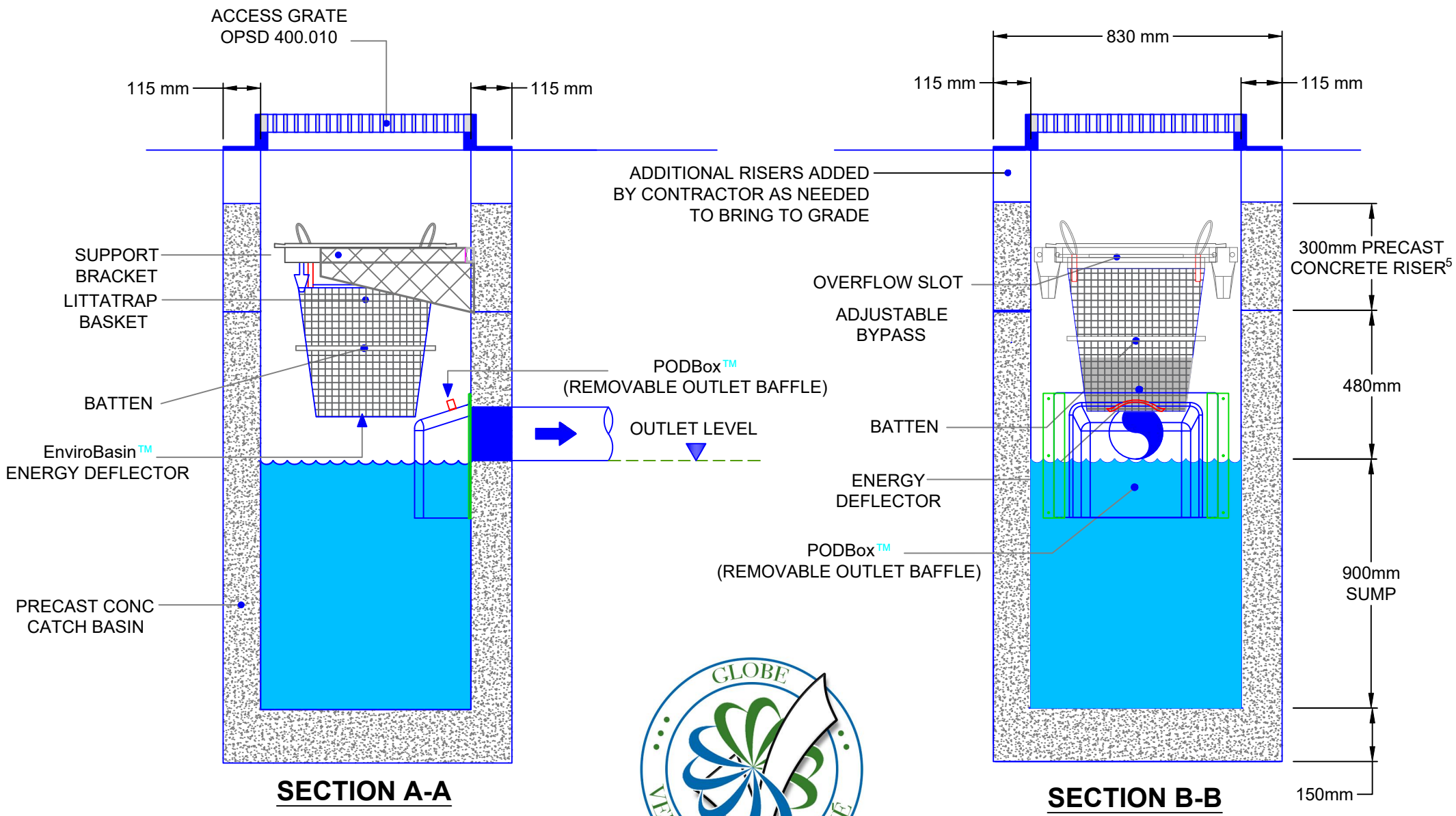


PLAN VIEW



SECTION A-A

SECTION B-B

THE Enviropod® may be protected by one of the following Canadian, USA or International patent numbers and has other patents pending :
2,810,974, 13/824,376, 15/459,964, 2011302712, 588049

PATENT No.

ENVIROPOD™
A STORMWATER360™ COMPANY

EnviroBasin™
TRASH AND SEDIMENT CAPTURE SPECIFICATION DRAWING
ENVIROPOD CANADA

REV #	DATE	REVISION DESCRIPTION	BY
E	04.04.22	REMOVABLE BAFFLE	B.V.

DATE :	13.05.22	DRG No. :	CAN-EB	DRAWN :	R.P.	CHECKED :	M.H.	PROJECT No :	REV :	E

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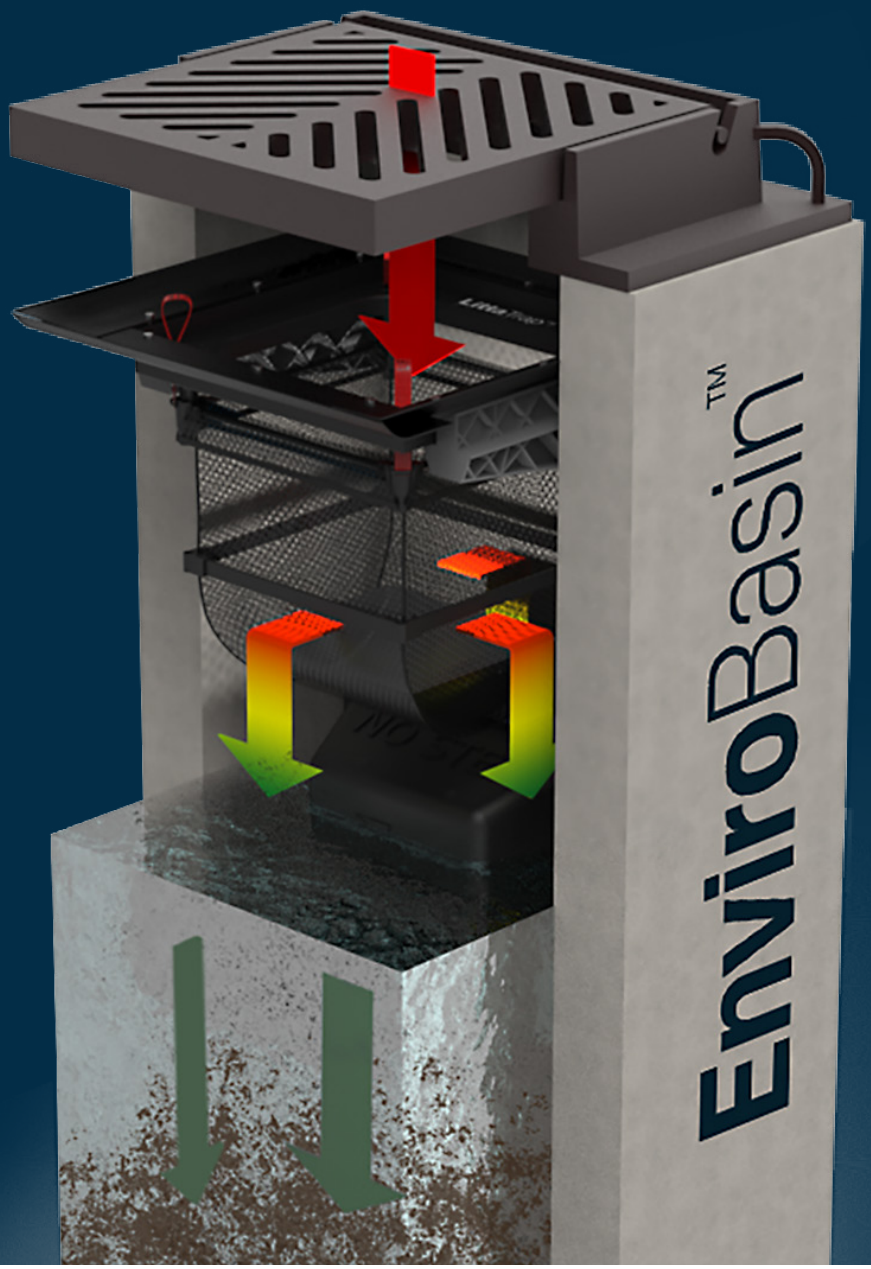
EnviroBasin™



Technical Guide

ENVIROPOD™
A STORMWATER360™ COMPANY

The EnviroBasin™

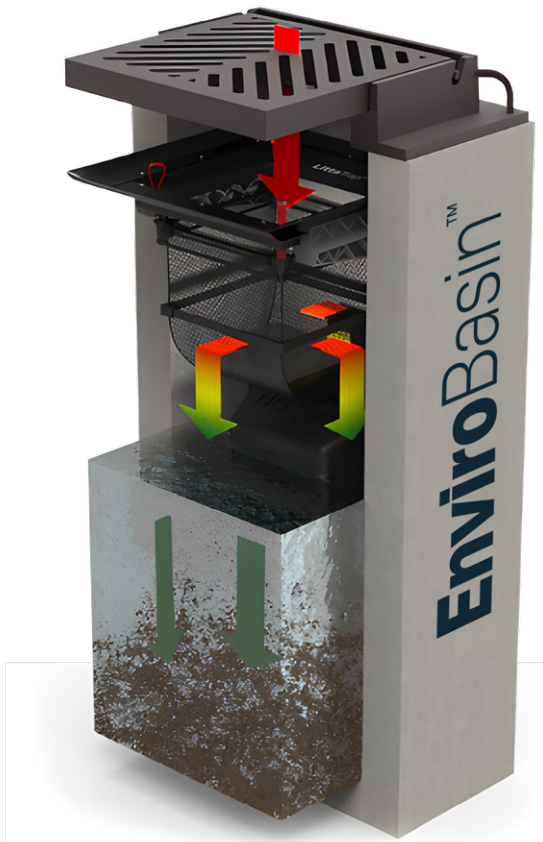
The EnviroBasin™ is an engineered water quality inlet offering two functions:

1. Conveyance of stormwater runoff from ground level into the reticulation system; and
2. Removal of pollutants and improvement of water quality.

The EnviroBasin™ consists of the LittaTrap™ catch basin insert installed into a pre-cast catch basin to dissipate energy, promote sedimentation and provide full capture of gross solids 5 mm in diameter and greater in stormwater runoff. This is done by the LittaTrap™ device in conjunction with an energy dissipator dish and submerged outlet baffle.

The system is easy and safe to maintain, with large storage capacity relative to its catchment area. Confined space entry is not required.

ISO 14034
ETV VERIFIED

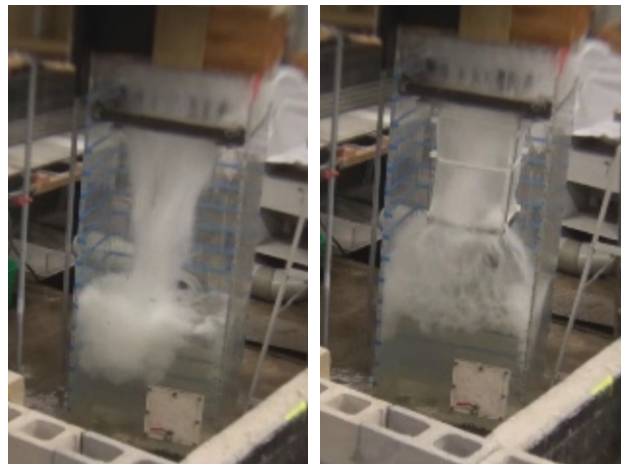


EnviroBasin™ Standard Grate Inlet

> **The EnviroBasin™ eliminates the need for downstream oil and grit separators, as it treats the stormwater at the source before it enters the stormwater system.**

FEATURES

- High flow, dry gross solid capture.
- Enhanced nutrient removal.
- Reduced contaminant release.
- Hand maintenance of gross pollutant basket; no vactor truck or confined space entry needed.
- Enhanced energy dissipation and flow distribution.
- >50% sediment removal (Good Harbour Labs, 2017).
- Reduced resuspension.
- Large sediment sump storage volume.
- No confined space entry. Vactor truck maintenance frequency of the sump is reduced.
- Lower carbon footprint.



Turbulence in sumped stormwater inlet (left) and EnviroBasin™ (Right)

TREATABLE CATCHMENT AREA

Each jurisdiction supplies guidance around the hydraulic design, location, and capture capacity of stormwater inlets. Catchment area, gradient, cross fall, configuration, dimensions, and grate all affect the inlet capacity of a catch basin and therefore, the spacing.

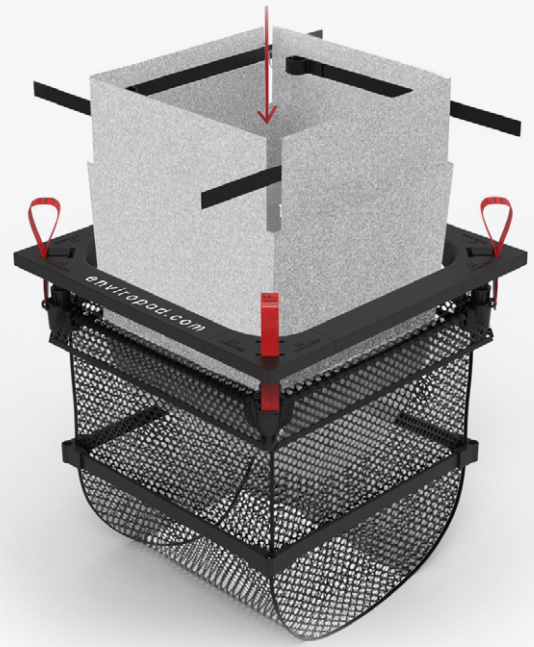
The maximum catchment area of the EnviroBasin™ is typically governed by the ability of the peak capture flow of the device, i.e. the inflow for a 5 or 10-year design storm.

EnviroPod in conjunction with AECOM Canada have developed a performance estimating tool to determine the Total Suspended Solids (TSS) removal of the EnviroBasin™ for a given catchment. The performance estimating tool uses third party performance data obtained from Canadian Environmental Technology Verification Program (CETV) procedure for Laboratory Testing of Oil-Grit Separators ISO14034 testing and historical rainfall data to estimate flow, determine surface loading rate and estimate performance for a catchment area.

Field Trials

EnviroBasin™ Components

EnviroPod Construction Liner



EnviroBasin™ installed with a EnviroPod Geotextile Constriction Liner protects the catch basin from construction to completion.

- **One product for two jobs** (Construction and post-construction trash control).
- **Easy maintenance.** The construction liner is supported by the LittaTrap™ basket allowing easy removal and replacement.
- **Hydraulically designed** not to cause flooding.
- **Cost savings.** Construction liners are a low cost addition to your site.
- **Readily available** online and through distributors.

✓ High hydraulic capacity
✓ Large sediment storage volume
✓ Structurally robust
✓ Easily maintained

× Blocks storm drain
× Can't be maintained
× Ineffective

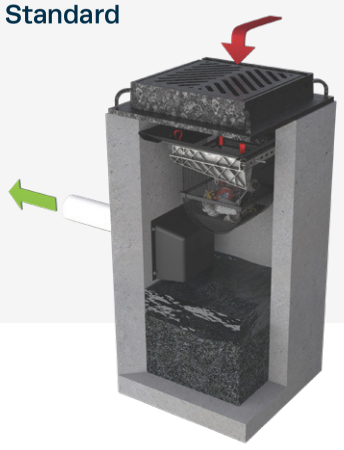
MODEL AND SIZE SPECIFICATION

The EnviroBasin™ has six standard models. Table 1 below details the standard models available.

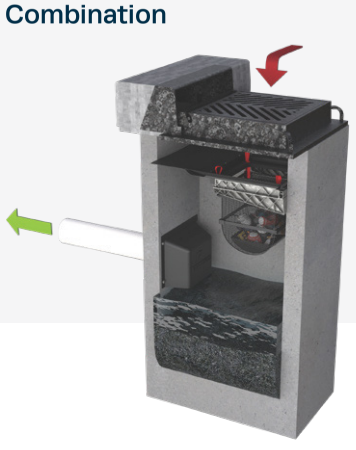
Model	LittaTrap™ Size	Impervious area for 60% TSS* (m_2)	Gross Solid Storage (L)	Sediment Storage (m_3)
Standard	LT6060	950	43	0.32
London Combination	LT6060 with seal kit	1330	43	0.45
Twin	2 x LT6060	2300	43	0.78
Ditch	LT6060	950	43	0.32
Junction	LT6060	950	43	0.32
Round	Specification dependant on the catch basins size. Contact EnviroPod for more info.			

*Estimated using ETV PSD modelled in a specification based on 6 hour 25mm storm depth. Note this is a guide only and site specific design may be required.

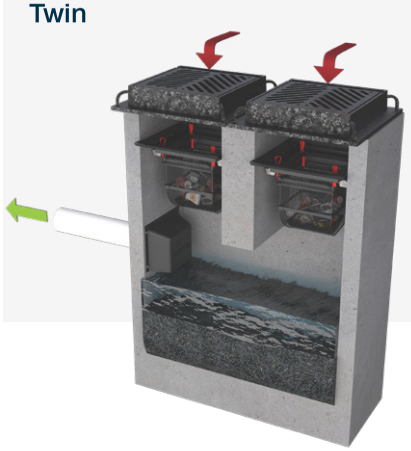
Standard



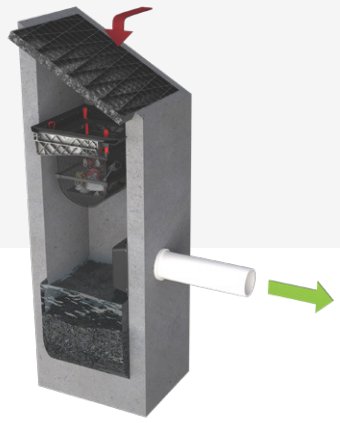
Combination



Twin

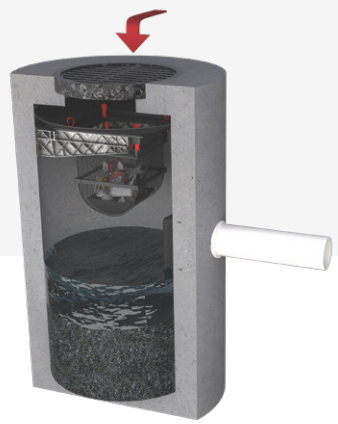


Ditch



Junction

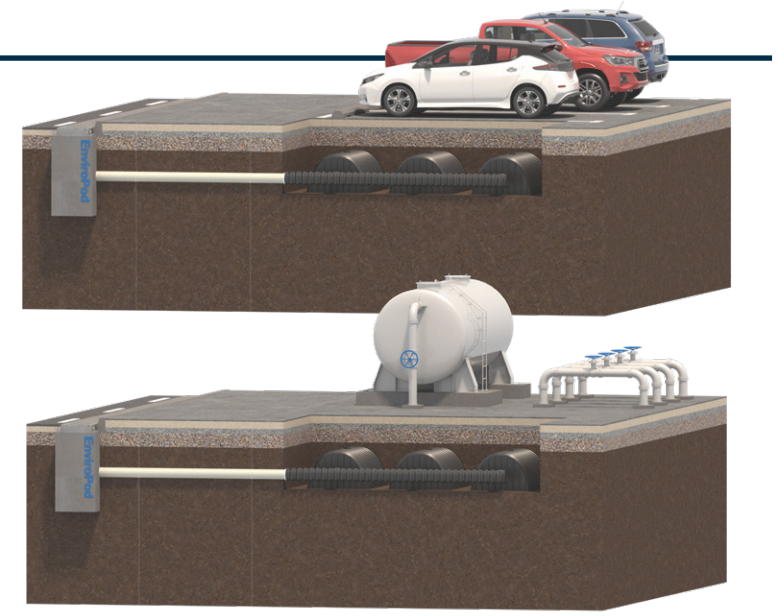
Round



Applications

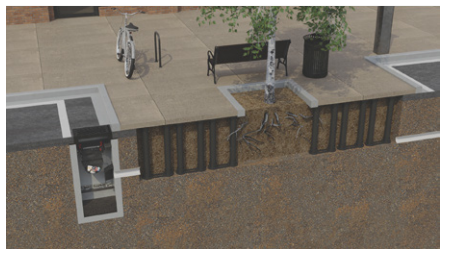
PRE-TREATMENT

Ideal pre-treatment to infiltration. As a pre-treatment device or as a stand-alone alternative to a catch basin, the EnviroBasin™ can be used in carpark roads, retail, industrial sites and other high contaminant generating areas.



LOW IMPACT DESIGN

Ideal for pre-treatment to Low Impact Design or infiltration. Using EnviroBasin™ allows a distributed entry into these drainage structures.



URBAN COASTAL AREAS

Ideal for urban coastal areas such as waterfronts, marinas and ports where catch basins often directly discharge into the ocean or lake.

What is ETV testing and why does it matter

In Canada and other jurisdictions, regulatory agencies and permitting authorities may have requirements and performance criteria to approve and accept various stormwater treatment devices for specific applications and operating conditions.

Regulatory agencies and authorities can benefit from scientifically defensible, verifiable performance data applicable to different end-use requirements and operating conditions.

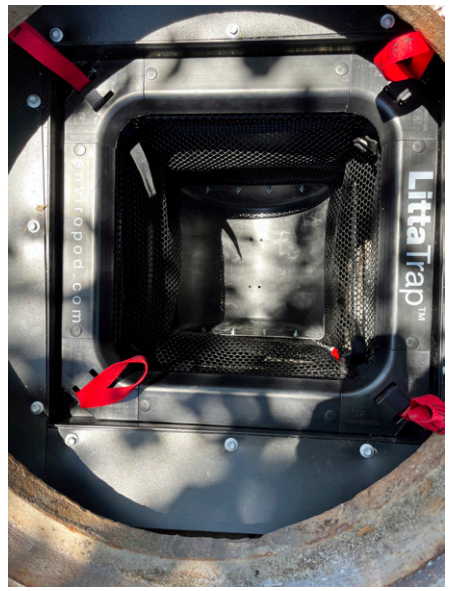
The "Procedure for Laboratory Testing of Oil-Grit Separators" was initially prepared in 2013 by TRCA for the Canadian Environmental Technology Verification (ETV) Program and subsequent verification following the International Organization for Standardization ISO requirements 14034:2016 ETV standard, published in November 2016.

The procedure intends to provide a standard procedure for testing and verifying the performance of OGS under controlled conditions independently and transparently. Independent verification of the performance data using the procedure as the basis for testing has assisted Canadian regulatory agencies, permitting authorities and other affected stakeholders in evaluating treatment technology options.

The ETV ISO 14034 testing standard represents a practical approach for testing to produce verifiable performance data on specific technologies under defined operating conditions. The procedure reduces uncertainties and improves the likelihood of market acceptance of the independently generated performance data, contributing to more informed technology decisions.

The EnviroBasin™ has been tested to the Procedure for Laboratory Testing of Oil-Grit Separators and has ETV-verified results.

Stormwater designers and municipalities can adopt the use of the EnviroBasin™ with confidence knowing it is verified and accepted across Canada.



Maintenance

The system is easy to maintain and the EnviroBasin's™ unique enhanced storage sump capacity extends vactor truck maintenance requirements to once every two-to-three years.

3–12 months	**Routine maintenance** of LittaTrap™ by hand or vactor truck (dependent on site specific loading).
2–3 years	**Periodic maintenance** by vactor truck maintenance of the EnviroBasin™ sump (depending on site specific loading).

LittaTrap™ Basket Hand Maintenance

It is recommended the LittaTrap™ basket be emptied when 75% full (generally every 3–12 months). To empty the basket, simply "Lift, Tip, Reuse". The following steps detail hand maintenance:

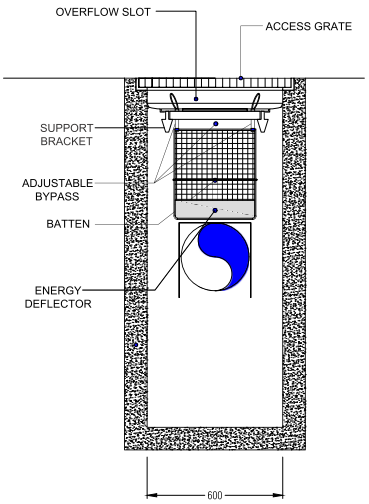
1. Establish a safe working area per typical catch basin service activity.
2. Remove grate/access cover.
3. Remove the basket with two lifting hooks or lift by hand through the loops on the top of the basket. Excess debris should be scooped out first if the basket is over half full.
4. Pour contents of the basket into a disposal container.
5. Replace grate.

EnviroBasin™ Sump Vactor Maintenance

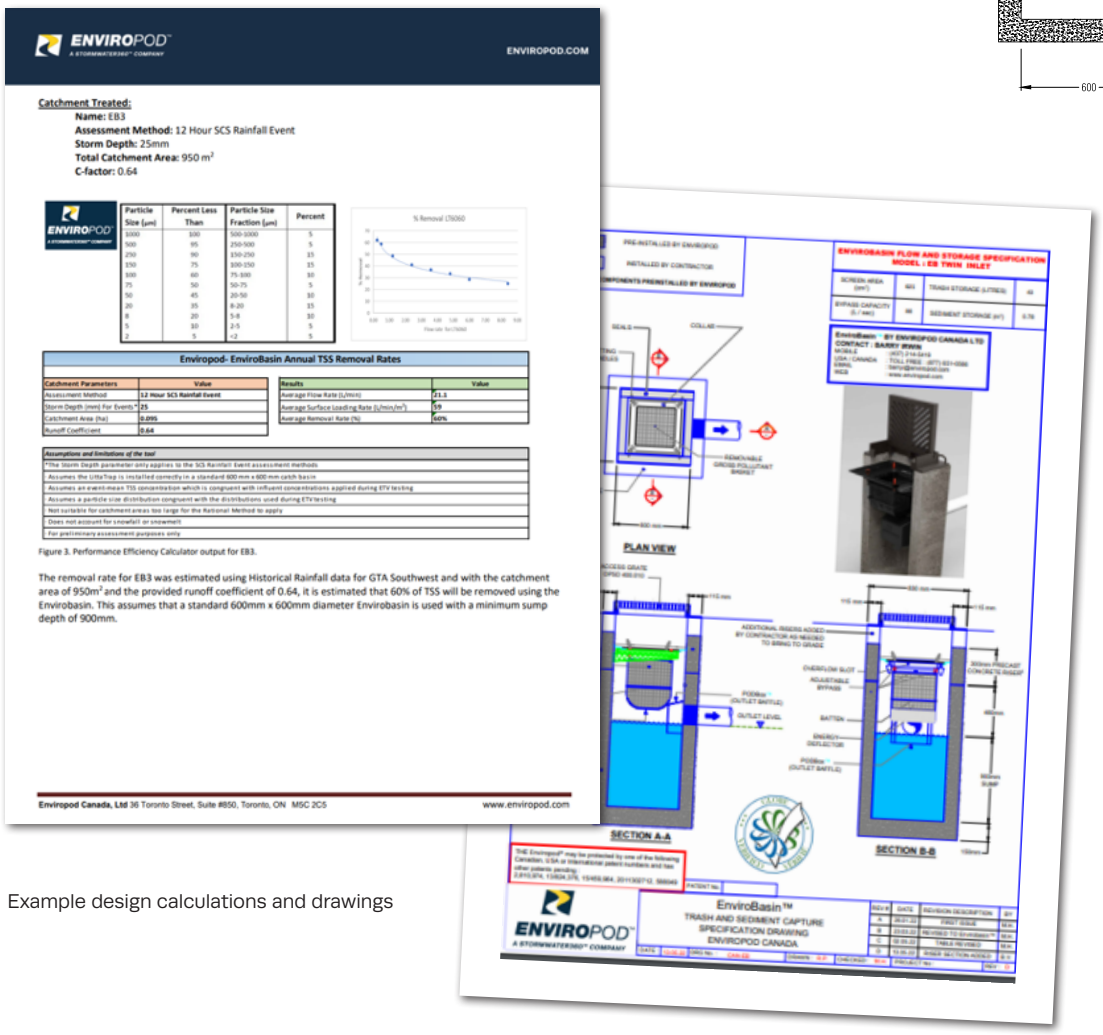
Steps for vactor maintenance are as detailed below:

1. Establish a safe working area per typical catch pit service activity.
2. Remove grate/access cover.
3. Vacuum accumulated debris from the basket.
4. Vactor the contents from the sump of the catch basin (if required).
5. Inspect the LittaTrap™ and EnviroBasin™ for any damage. Reinstall the LittaTrap™ basket.
6. Replace grate/access cover.

Free Design support & regulatory assistance



EnviroPod offers a free design service where the cumulative performance of several EnviroBasin's can be modelled for a specific project based on local rainfall and treatment needs. This service allows stormwater consultants to optimize the number and the location of EnviroBasin's for their projects.



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Catchment Treated:
Name: EB3
Assessment Method: 12 Hour SCS Rainfall Event
Storm Depth: 25mm
Total Catchment Area: 950 m²
C-factor: 0.64

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

Enviropod- EnviroBasin Annual TSS Removal Rates

Catchment Parameters	Value
Assessment Method	12 Hour SCS Rainfall Event
Storm Depth (mm) For Events	25
Catchment Area (ha)	0.095
Runoff Coefficient	0.64

Results	Value
Average Flow Rate (L/min)	21.1
Average Surface Loading Rate (L/min/m²)	59
Average Removal Rate (%)	60%

Assumptions and limitations of the tool
*The Storm Depth parameter only applies to the SCS Rainfall Event assessment methods
Assumes the LittaTrap is installed correctly in a standard 600 mm x 600 mm catch basin
Assumes an event-mean TSS concentration which is congruent with influent concentrations applied during ETV testing
Assumes a particle size distribution congruent with the distributions used during ETV testing
Not suitable for catchment areas too large for the Rational Method to apply
Does not account for snowfall or snowmelt
For preliminary assessment purposes only

Figure 3. Performance Efficiency Calculator output for EB3.

The removal rate for EB3 was estimated using Historical Rainfall data for GTA Southwest and with the catchment area of 950m² and the provided runoff coefficient of 0.64, it is estimated that 60% of TSS will be removed using the Envirobasin. This assumes that a standard 600mm x 600mm diameter Envirobasin is used with a minimum sump depth of 900mm.

Enviropod Canada, Ltd 36 Toronto Street, Suite #850, Toronto, ON M5C 2C5 www.enviropod.com

ENVIROBASIN FLOW AND STORAGE SPECIFICATION
MODEL : ES TWIN INLET

PLAN VIEW
SECTION A-A
SECTION B-B

EnviroBasin™
TRASH AND SEDIMENT CAPTURE
SPECIFICATION DRAWING
ENVIROPOD CANADA

Example design calculations and drawings

ABOUT ENVIROPOD

EnviroPod is the world's leading catch basin insert technology provider. The company has over 50,000 installations worldwide, including catchment wide retrofits. The EnviroBasin™ is a result of 26 years' of research, implementation and operation of source treatment solutions.

For further information please see www.enviropod.com

International patent numbers for: CA – 2,810,974 ; USA – 9,642,658 ; AU – 2011302712 ; NZ – 588049. Other patents pending.

ENVIROPOD™
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1960 05/23

LittaTrap™ BY ENVIROPOD CANADA LTD
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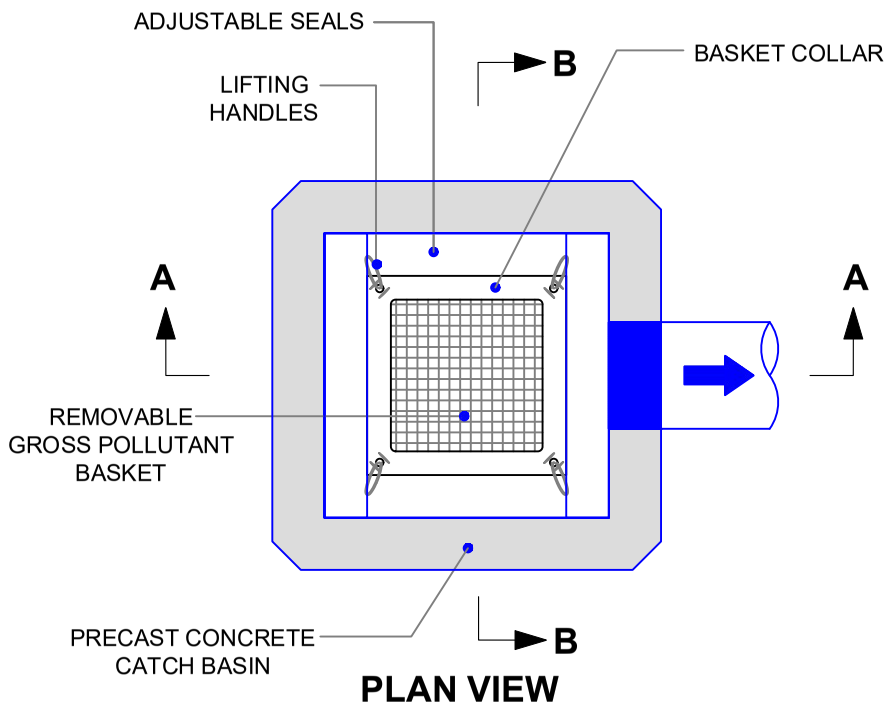
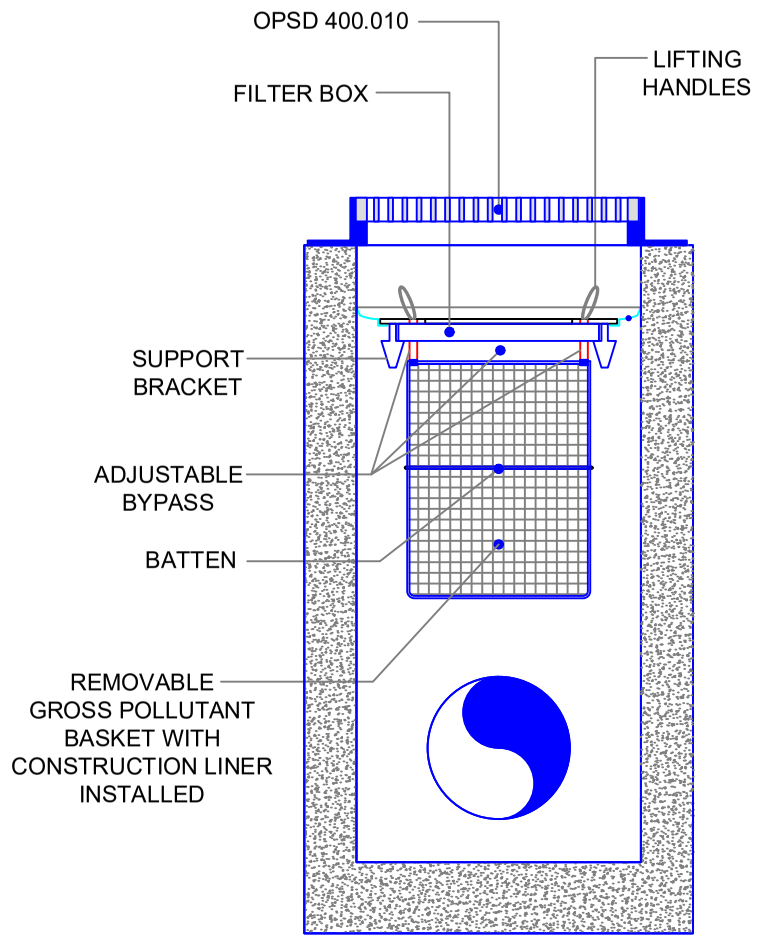
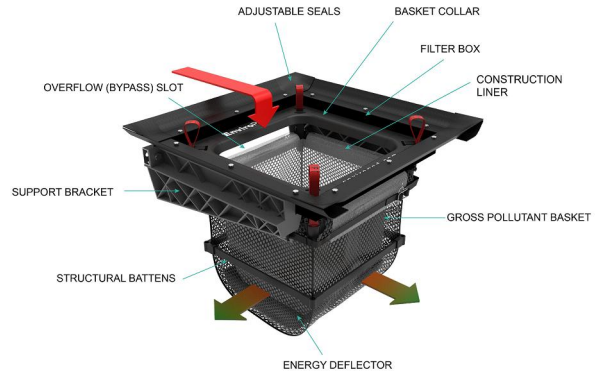


PLAN VIEW

COVER AND FRAME OMITTED FOR CLARITY



SECTION A-A



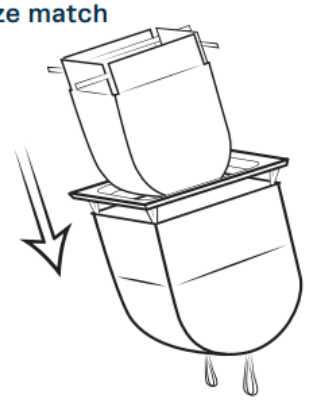
TO USE THE LITTATRAP AS A CONSTRUCTION BMP:

1. INSTALL LITTATRAP WITH CONSTRUCTION LINER DURING CONSTRUCTION.
2. CHECK REGULARLY AND REPLACE CONSTRUCTION LINER AS NEEDED
3. REMOVE CONSTRUCTION LINER WHEN CONSTRUCTION IS FINISHED FOR POST CONSTRUCTION USE.

INSTALLATION

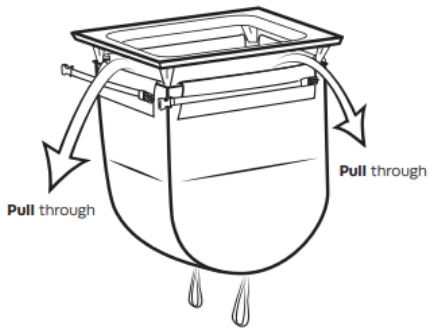
1 Insert LinerBag

Check LittaTrap & LinerBag size match



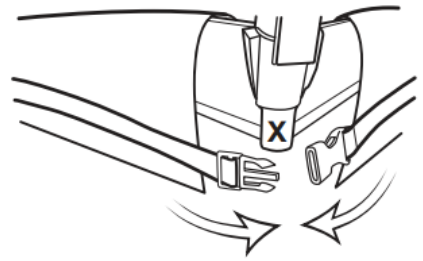
2 Pull LinerBag flaps through gap

Check LinerBag is **not stressed** in corners and no gaps



3 Clip corners

Position strap **below** corner posts (X). Clip all **four** corners



ENVIROPOD LittaTrap™ TRASH CAPTURE FLOW AND STORAGE SPECIFICATION

Catch Basin Nominal Dimensions (mm)	LittaTrap Model Size	Screen Area cm²	Maximum Trash Capture Volume (MCTV) (L)	Design Flow Rate 75% MCTV (L/s)	Standard Bypass Flow (L/s)
450 x 450	LT4545	3880	17	42	55
600 x 600	LT6060	6250	43	69	88
900 x 600	LT9060	9500	81	102	124

Notes:
Standard Bypass based on factory set bypass dimensions.
Other catch basin sizes are possible, please contact us for more detail.

THE Enviropod® may be protected by one of the following Canadian, USA or International patent numbers and has other patents pending : 2,810,974, 13/824,376, 15/459,964, 2011302712, 588049

PATENT No.

ENVIROPOD™
A STORMWATER360™ COMPANY

ENVIROPOD CANADA
600mmx600mm LITTATRAP WITH CONSTRUCTION LINER
GENERAL ARRANGEMENT

DRG No : CAN-LT-SPEC-CONST | REV : E | DATE : 05/31/23

JOB NO :			REV	REVISION DETAIL	DATE
PROJECT :			A	FIRST ISSUE	08/12/21
			B	IMAGE EDITS	07/03/22
			C	TABLE EDITS	10/18/22
DRN :	R.P.	08/12/21	D	CONSTRUCTION	02/14/23
CKD :	BVL	08/12/21	E	TITLE BLOCK	05/31/23

◆ Verification Statement ◆ Verification Statement ◆ Verification Statement ◆

VERIFICATION STATEMENT

GLOBE Performance Solutions

Verifies the performance of

LittaTrap™ Catch Basin System

Enviropod International Ltd.
North Harbour, Auckland, New Zealand

Registration: GPS-ETV_V2021-11-15

In accordance with

ISO 14034:2016

Environmental Management —
Environmental Technology Verification (ETV)

John D. Wiebe, PhD
Executive Chairman
GLOBE Performance Solutions

November 15, 2021
Vancouver, BC, Canada

GLOBE PERFORMANCE SOLUTIONS

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

Technology description and application

The LittaTrap™ Catch Basin System is a removable insert installed in a pre-cast sumped catch basin with a submerged outlet baffle designed to improve the capture of solids, trash and debris, and reduce resuspension of captured sediment particles in the sump (Figure 1). The system employs screening, energy dissipation, flow distribution and gravitational settling to remove pollutants from stormwater runoff.

The system functions by draining stormwater surface runoff through a grate, curb opening or both. Once the runoff drops below the surface it is diverted through the screened basket where it is intercepted by a patented energy dissipation mechanism. This mechanism reverses the direction of flow and distributes the sediment across the surface area of the sump. The process of intercepting and distributing the flow enhances settling in the catch basin sump and reduces the resuspension of TSS, while retaining and storing gross solids and debris (>5 mm) in a dewatered environment. Retention of organic gross pollutants and holding them in a dry environment prevents them from breaking down and releasing nutrients and other contaminants into the water.

The patented mesh batten basket is made of inert light weight plastic for easy removal and maintenance without the need for specialized equipment. An adjustable bypass at the top of the basket provides a secondary flow path into the catch basin should the basket become filled or temporarily clogged. The unit comes in different sizes to fit standard catch basins of variable dimensions.

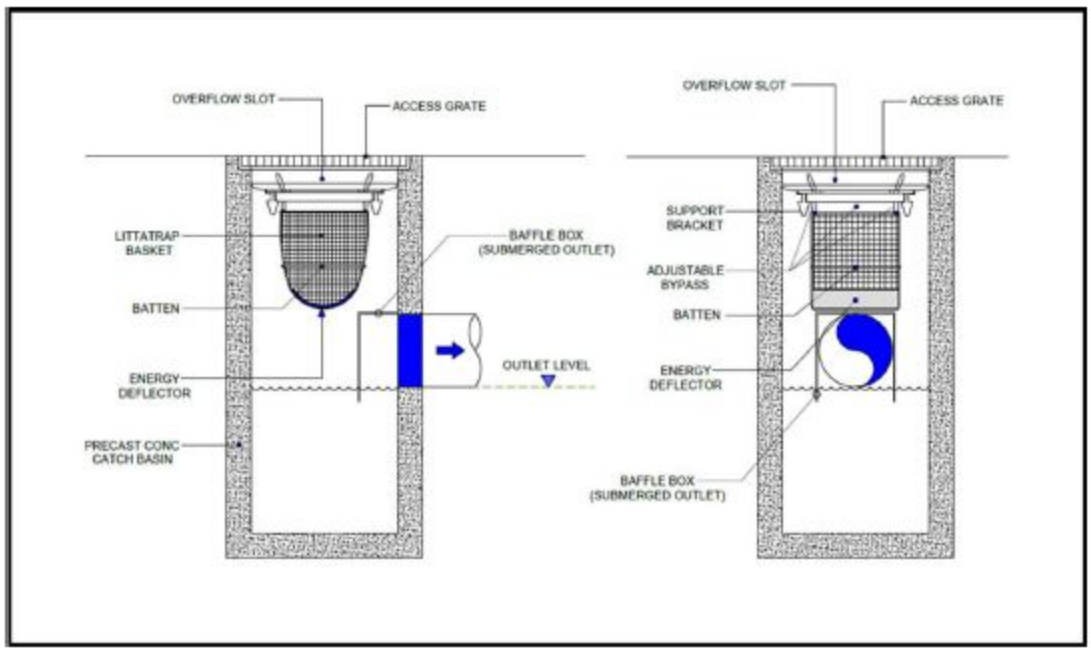


Figure 1: Enviropod® LittaTrap™ Catch Basin System

Performance conditions

The data and results published in this Technology Verification Statement were obtained from a testing program conducted on Enviropod International's LittaTrap™ Catch Basin System. The testing program was based on the *Procedure for Laboratory Testing of Oil-Grit Separators (Version 3.0, June 2014)*, and associated *Bulletins*, with modifications to accommodate the surface inlet and small storage capacity of the catch basin (see variance section below for details). These modifications to the *Procedure* were developed to comply with the ISO 14034 Environmental Technology Verification standard and were approved by the verifier in advance of the test. The *Procedure for Laboratory Testing of Oil-Grit Separators* was prepared by the Toronto and Region Conservation Authority (TRCA) for the Canadian Environmental Technology Verification Program. A copy of the Procedure may be accessed on the Canadian ETV website at www.etvcanada.ca.

Performance claim(s)

Capture test[1]:

During the capture test, the LittaTrap™ Catch Basin System device, with a false floor set at 50% of the maximum sediment storage depth and influent test sediment concentration of 200 mg/L, removes 62, 59, 49, 41, 37, 34, 28 and 25 percent of influent sediment by mass at surface loading rates of 40, 80, 200, 400, 600, 800, 1000, and 1400 L/min/m^2, respectively.

Scour test[1]:

During the scour test, the LittaTrap™ Catch Basin System, with 10.2 cm (4 inches) of test sediment pre-loaded onto a false floor reaching 50% of the maximum sediment storage depth, generates corrected effluent concentrations of 2.8, 2.3, 0.1, 0.5 and 0.7 mg/L at 5-minute duration surface loading rates of 200, 800, 1400, 2000, and 2600 L/min/m^2, respectively.

Performance results

The sediment used to test the technology consisted of ground silica (1 – 1000 micron) with a specific gravity of 2.65, uniformly mixed to meet the particle size distribution specified in the testing procedure. The *Procedure for Laboratory Testing of Oil Grit Separators* requires that the average (minimum 3 samples) of the test sediment particle size distribution (PSD) meet the specified PSD percent less than values within a boundary threshold of 6%, with a median no greater than 75 µm. Comparison of the average test sediment PSD to the CETV specified PSD in Figure 2 indicates that the test sediment used for the capture and scour tests met these conditions, with an average d50 particle size of 73 µm. The average was determined from three samples prepared for each of the tested surface loading rates. All three samples had a median particle size less than 75 µm.

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

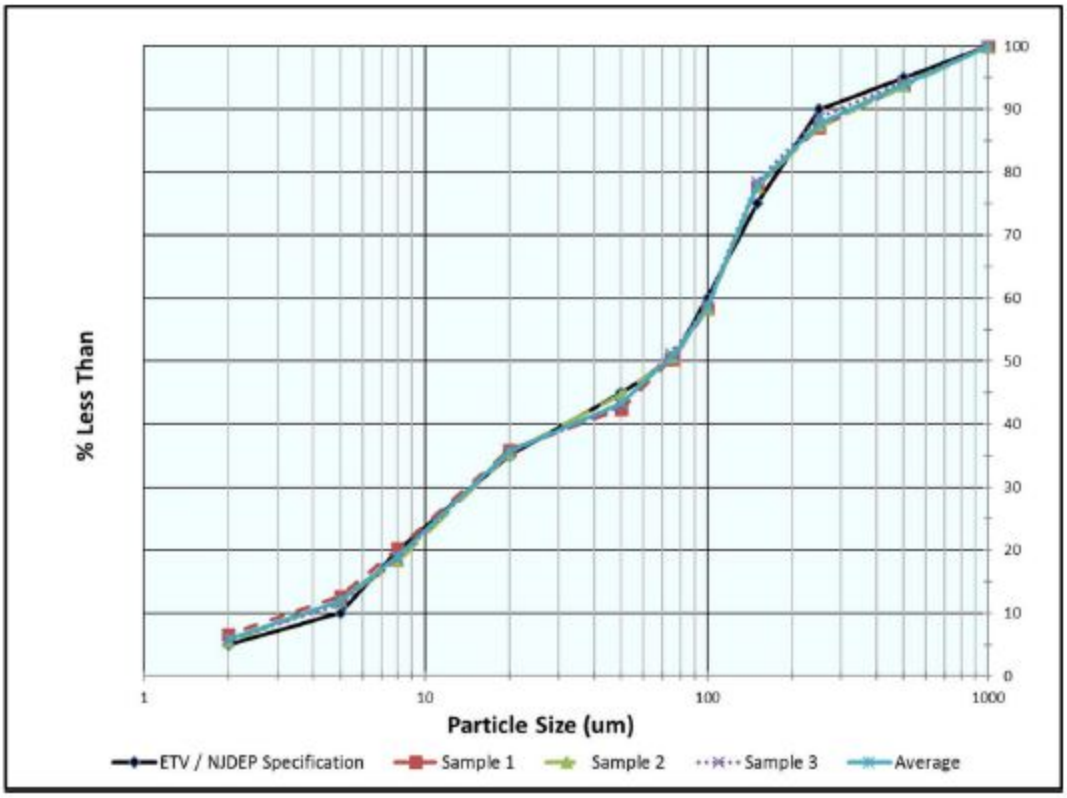


Figure 2: Average particle size distribution of test sediment relative to the ETV specification

Calibration samples of the test sediment were taken for each of the 8 runs. This includes one additional run (800 L/min/m²) not specified in the *Procedure* that was undertaken at the request of the vendor. The results presented in Figure 2 show that the PSD met the specification for all runs, with median PSDs less than or equal to 75 µm. An anomaly occurred on the feed sediment for the 1000 L/min/m² which the test laboratory attributed to a sediment sieving error that was not expected to affect the capture test results.

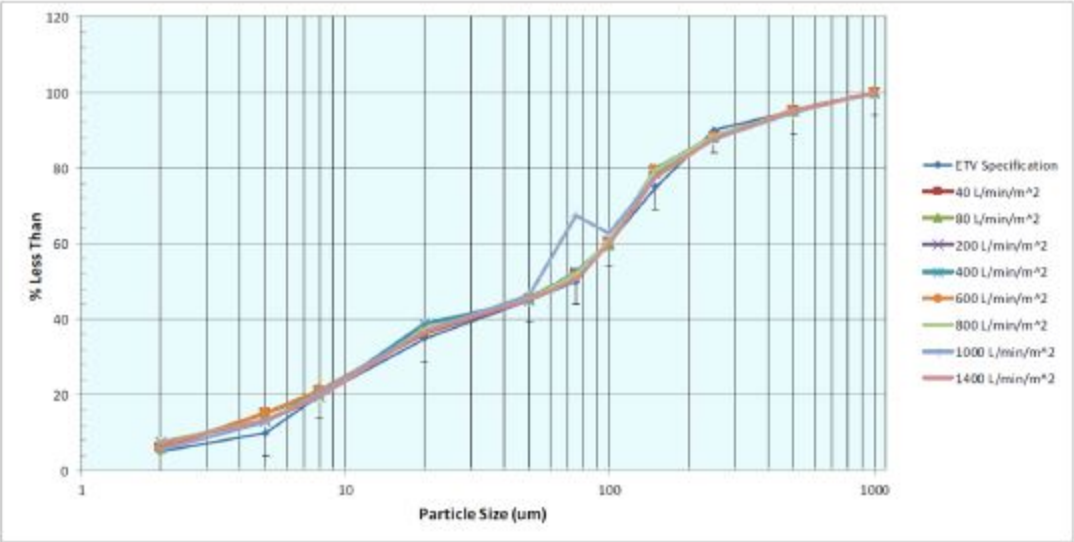


Figure 3: Particle size distribution of individual feed sediment calibration samples compared to the ETV specification

The LittaTrap technology was installed into a simulated 600 x 600 mm catch basin based on the design specified by the City of Toronto in the drawing *T-705.010, Pre-cast Catch Basin with Sump, Rev1; Apr2013.* Since runoff flows into catch basins through a surface grate, a simulated streetscape was used to test the capacity of the unit to capture sediment and prevent re-entrainment of captured sediment. The streetscape was graded at a 2% slope and a 2% cross slope with baffles to concentrate flow and direct it towards the sediment injection point 0.7 m upstream of the catch basin grate. Slopes and surface coatings were used to minimize build-up of sediment on the surface. The mass of feed sediment injected, averaging 4.2 kg, was less than the 11.3 kg min prescribed in the *Procedure* because of the much smaller storage capacity of a catch basin sump relative to an Oil Grit Separator. Test durations remained the same as specified in the *Procedure*.

The capacity of the LittaTrap™ Catch Basin system to retain sediment was determined at eight surface loading rates using the modified mass balance method. This method involved measuring the mass and particle size distribution of the injected and retained sediment for each test run. Performance was evaluated with a false floor at 45 cm from the bottom, simulating the technology filled to 50% of the sediment storage depth (as measured between the outlet invert and catch basin bottom). The test was carried out with clean water that maintained a sediment concentration below 20 mg/L.

Table 1 shows the location of sediment deposition in the unit during the capture test. No sediment was retained on the streetscape surface and an insignificant amount was retained on the grate. During the two lowest surface loading rates, between 32 and 37% of the retained sediment was captured in the basket on the flow deflection device. Subsequent PSD analysis of this sediment showed that the sediment retained in the basket was coarser than the sediment in the sump. Approximately 10% of retained sediment was captured in the basket at the 200 L/min/m^2 surface loading rate.

Table 1: Location of sediment deposition during the capture test. No sediment was retained on the streetscape during any of the tested surface loading rates.

Surface Loading Rate ($L/min/m^2$)	40	80	200	400	600	800	1000	1400
Total Mass Injected (kg)	4.011	3.974	4.313	4.302	4.058	4.257	4.056	4.533
Sediment Captured in sump (kg)	1.6487	1.4553	1.8777	1.7114	1.4983	1.4284	1.1547	1.1435
Sediment Captured in basket (kg)	0.7976	0.8526	0.2162	0.0581	-	-	-	-
Sediment Captured on the catch basin grate (kg)	0.0525	0.0233	0.0028	-	-	-	-	-
Total Mass Retained (kg)	2.4989	2.3312	2.0967	1.7695	1.4983	1.4284	1.1547	1.1435

Removal efficiency results for individual particle size classes and for the test sediment as a whole are presented in Table 2. In some instances, the removal efficiencies were above 100% for certain particle size fractions. These discrepancies are not unique to any one test laboratory and are attributed to challenges relating to the blending of sediment and the collection of representative samples for laboratory submission. Due to these errors, caution should be exercised in applying the removal efficiencies by particle size fraction for the purposes of sizing the tested device (see Bulletin # CETV 2016-11-0001). The results for "removal efficiency based on mass balance" (see Table 2) are based on measurements of the total mass of injected and retained sediment, and are therefore not subject to blending, sub-sampling or PSD analysis errors or anomalies.

Table 2. Removal efficiency summary at each surface loading rate by particle size and total mass.

Particle Size Fraction (µm)	Removal Efficiency (%)							
	40 ($L/min/m^2$)	80 ($L/min/m^2$)	200 ($L/min/m^2$)	400 ($L/min/m^2$)	600 ($L/min/m^2$)	800 ($L/min/m^2$)	1000 ($L/min/m^2$)	1400 ($L/min/m^2$)
> 500	100*	100*	95	100*	100*	99	68	100*
250 - 500	100*	100*	99	100*	100*	96	67	99
150 - 250	93	100	78	82	64	71	51	48
100 - 150	98	94	97	66	49	54	63	31
75 - 100	81	77	56	49	32	36	-66**	10
50 - 75	100*	55	85	25	18	24	9	2
20 - 50	41	25	11	12	4	4	0	0
8 - 20	25	11	2	1	0	0	0	0
5 - 8	0	0	0	0	0	0	0	0
< 5	10	9	9	7	6	6	6	4
Removal Efficiency based on mass balance (%)	62.31	58.65	48.61	41.13	36.92	33.56	28.47	25.23

* Removal efficiencies were calculated to be above 100%. Calculated values ranged between 106 and 158%

** An outlier in the retained sediment sample sieve data resulted in negative removal for this size fraction

Figure 4 compares the particle size distribution (PSD) specification of the test sediment to the PSD of the sediment retained in the catch basin at each of the tested surface loading rates. As expected, the capture efficiency for fine particles in the unit was generally found to decrease as surface loading rates increased although retained sediment at the 600 L/min/m² surface loading rate was unexpectedly coarse.

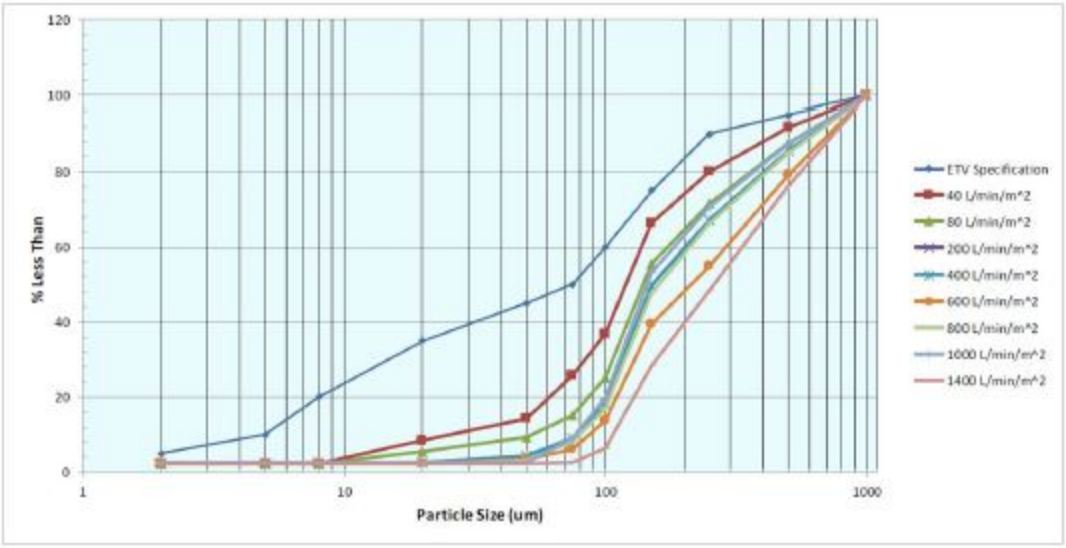


Figure 4: Particle size distribution of retained sediment compared to the ETV specified test sediment.

Table 3 shows the results of the sediment scour and re-suspension test for the LittaTrap™ Catch Basin system. The scour test involved preloading 10.2 cm of fresh test sediment into the sedimentation sump of the catch basin. The sediment was placed on a false floor to mimic a device filled to 50% of the maximum sediment storage depth. Clean water was run through the device at five surface loading rates over a 30 minute period. Each flow rate was maintained for 5 minutes with a one minute transition time between flow rates. Effluent samples were collected at one minute sampling intervals and analyzed for Suspended Sediment Concentration (SSC) and PSD by recognized methods. The effluent samples were subsequently adjusted based on the background concentration of the influent water. The smallest 5% of particles captured during the 40 L/min/m² surface loading rate are also commonly used to adjust the concentration, as per the method described in Bulletin # CETV 2016-09-0001. However, the sediment concentration was too low to conduct aqueous sample PSD tests, hence the results are adjusted based on background concentration of influent water alone. Results showed average adjusted effluent sediment concentrations below 3 mg/L at all tested surface loading rates.

Table 3: Sediment effluent concentration from the scour test, adjusted by the background concentration.

Run	SLR (L/min/m^2)	Run Time	SSC $_{Initial}$ (mg/L)	SSC $_{Adjusted}$ (mg/L)	Average Adjusted (mg/L)
1	200	1:00	9.6	4.9	2.8
		2:00	10	5.3	
		3:00	7.1	2.5	
		4:00	6.4	1.8	
		5:00	5.5	0.9	
		6:00	6.1	1.6	
2	800	7:00	7.1	2.6	2.3
		8:00	11	6.3	
		9:00	8.9	4.0	
		10:00	5.9	0.8	
		11:00	4.2	0	
		12:00	4.2	0	
3	1400	13:00	5.9	0.1	0.1
		14:00	6.9	0.4	
		15:00	4.1	0	
		16:00	4.7	0	
		17:00	2.9	0	
		18:00	1.8	0	
4	2000	19:00	13	3.0	0.5
		20:00	8.2	0	
		21:00	3.0	0	
		22:00	3.2	0	
		23:00	1.9	0	
		24:00	3.0	0	
5	2600	25:00	4.2	2.2	0.7
		26:00	2.6	0.8	
		27:00	2.1	0.5	
		28:00	1.0	0	
		29:00	1.4	0.2	
		30:00	1.7	0.7	

Variances from testing Procedure

The *Procedure for Laboratory Testing of Oil Grit Separators* was used as the basis for testing with the following modifications to accommodate the surface inlet and small size of the catch basin sump:

1. A simulated streetscape (2.4 m long x 0.61 m wide) was used to direct flows into the catch basin through a surface grate. The streetscape had a 2% slope to the catchbasin (CB) and a 2% cross slope to the outlet side of the CB. Baffles were used to direct water towards the sediment injection point 0.7 m upslope of the surface grate to promote thorough mixing of sediment and avoid accumulation of sediment on the streetscape surface.
2. The sump area of a catchbasin is approximately one third that of a typical 1.2 m diameter Oil Grit Separator. To ensure test durations similar to those normally completed for OGS, the mass of sediment injected per run was reduced to an average of 4.2 kg (see Table1 above).
3. The two lowest surface loading rates of 40 and 80 L/min/m2 had flow rates of only 0.24 and 0.48 L/s. These low flow rates required that: (i) sediment calibration samples be taken over 2 minutes rather than one to capture the minimum quantity of sediment for weighing, and (ii) higher tolerance for flow meter error (0.9% rather than 0.2%) as the lowest flow rate (0.24 L/s) lies outside of the flow meter calibration range. Although greater tolerances were suggested for sediment concentrations in the test plan, the test was within the 200±25 mg/L specified in the *Procedure*.
4. The highest flow rate during the scour test (15.6 L/s) requires switching of pumps which meant that flow rates were recorded manually ever 30 seconds for the 5 minute duration of this flow rate.

Verification

The verification was completed by the Verification Expert, Toronto and Region Conservation Authority, contracted by GLOBE Performance Solutions, using the International Standard ***ISO 14034:2016 Environmental management – Environmental technology verification (ETV)***. Data and information provided by Enviropod International Inc. to support the performance claim included the Performance Test Report prepared by Good Harbour Laboratories, Inc , and dated June 8, 2021. This report is based on testing completed in accordance with the *Procedure for Laboratory Testing of Oil-Grit Separators* (Version 3.0, June 2014) and associated Bulletins, with some modifications required to accommodate the application of the *Procedure* to a catch basin treatment unit.

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

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

For more information on the LittaTrap™ Catch Basin System please contact:

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

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

Limitation of verification - Registration: GPS-ETV_ V2021-11-15
GLOBE Performance Solutions and the Verification Expert provide the verification services solely on the basis of the information supplied by the applicant or vendor and assume no liability thereafter. The responsibility for the information supplied remains solely with the applicant or vendor and the liability for the purchase, installation, and operation (whether consequential or otherwise) is not transferred to any other party as a result of the verification.

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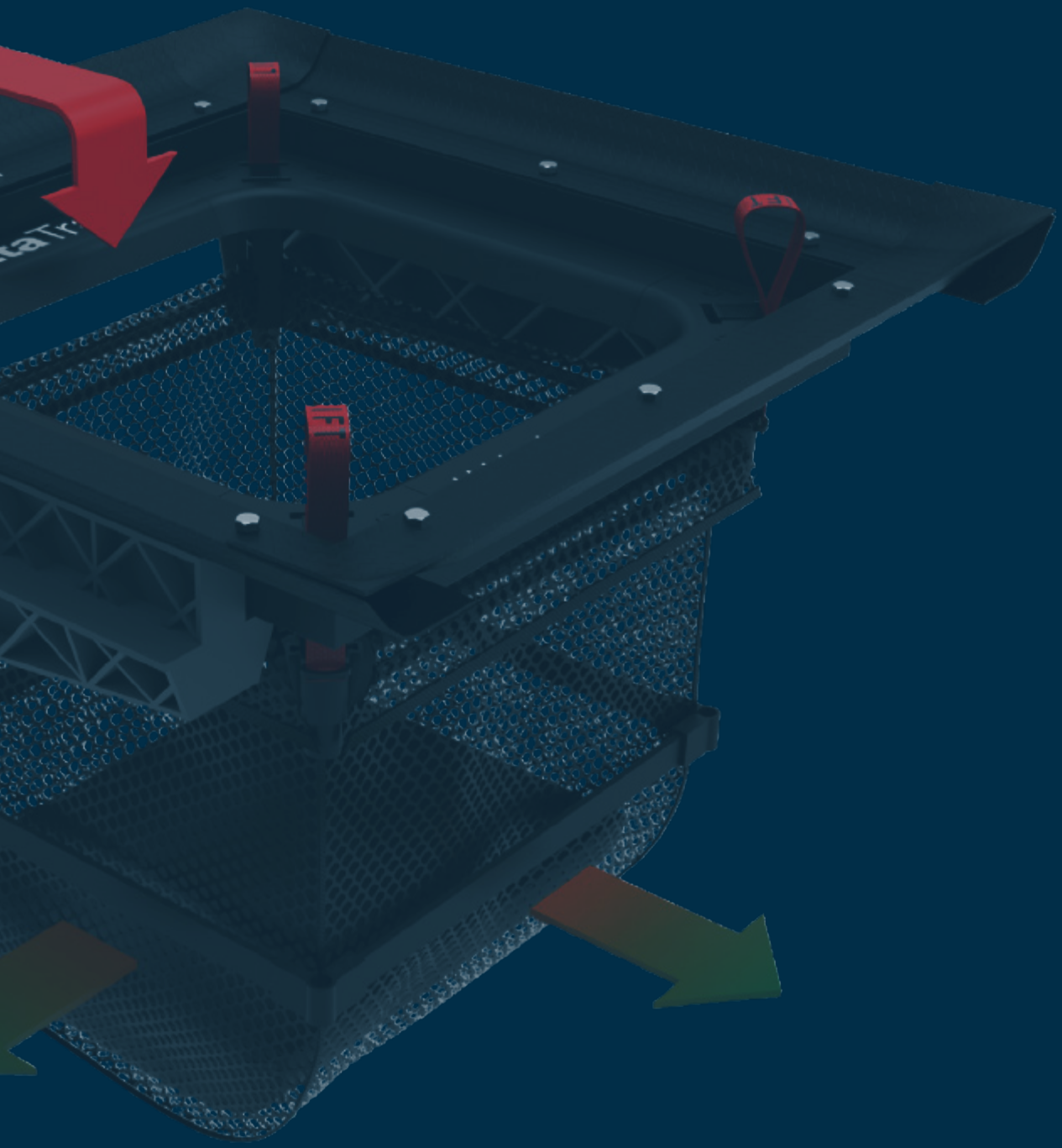


LittaTrap™ – Operations and Maintenance Guide

ENVIROPOD™
A STORMWATER360™ COMPANY

The EnviroPod® LittaTrap™

The EnviroPod® LittaTrap™ is an innovative catch basin inlet filter (insert) device designed to be easily installed into new and existing stormwater catch basins of any size or configuration. The EnviroPod® LittaTrap™ can be installed in grate (drop) inlets, curb inlets, combination grate/ curb inlets, or round manhole catch basins. Figure 1: EnviroPod® LittaTrap™ example catch basin applications shows these types of installations.

The EnviroPod® LittaTrap™ is an effective stormwater treatment technology that is designed to capture and remove a variety of stormwater pollutants conveyed in runoff, such as trash, debris, sediment, macro or micro plastic debris and other pollutants of concern. In addition, the EnviroPod® LittaTrap™ maintains catch basin hydraulic capacity and allows for easy maintenance when completely full of trash and debris. The EnviroPod® LittaTrap™ is available in a range of standard model sizes and configurations.

The EnviroPod® LittaTrap™ FC model is also approved for use by numerous State and local agencies throughout the USA as well as certified by the California State Water Resources Control Board, Trash Implementation Program.

The EnviroPod® LittaTrap™ FC model is fitted with a "full capture" liner that insures 100% of particles 5mm and over are captured in the trap.

The EnviroPod® LittaTrap™ FC also includes an optional hinged vector port seal (HVPS) when installed in a grated inlet or combination inlet catch basin, if required. The HVPS allows visual inspection under the basket for access by local or State Vector Control field personnel. In addition, the design of the HPVS has been approved by the Mosquito Vector Control Association of California (MVCAC) for California certified full trash capture applications.

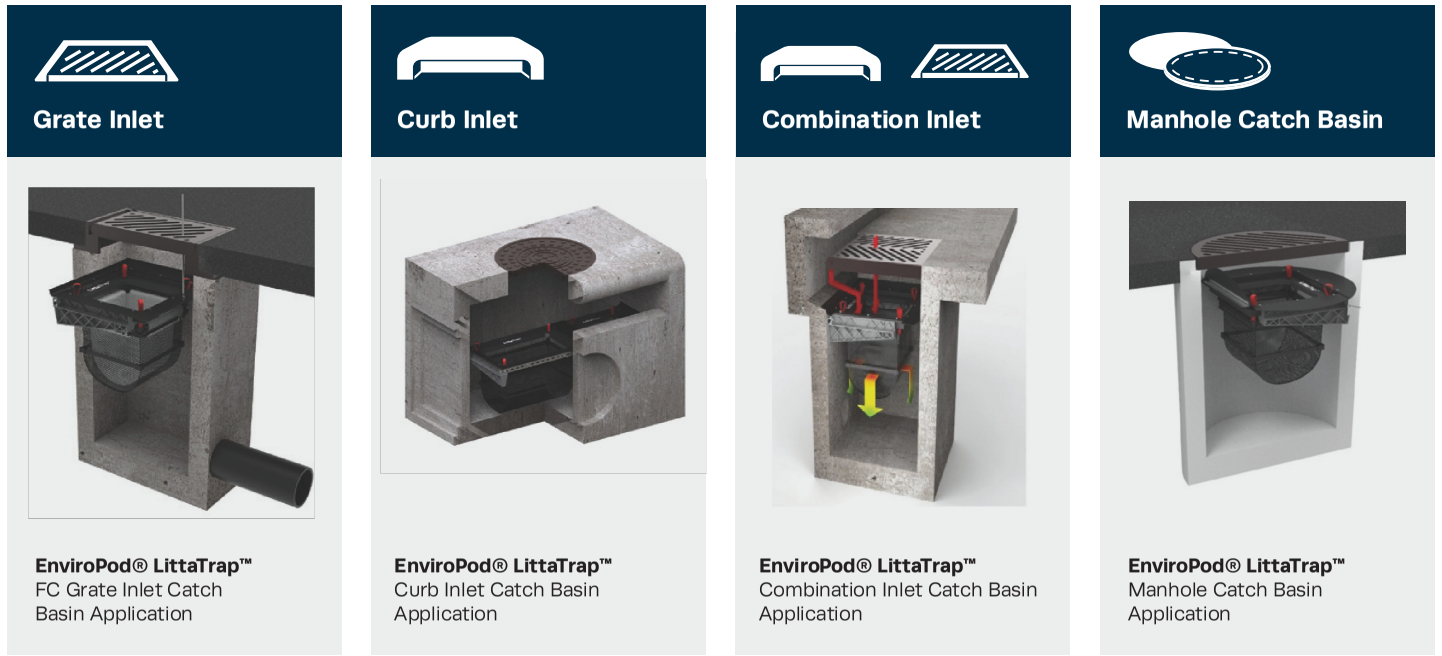


Figure 1: EnviroPod® LittaTrap™ example catch basin applications

Components and Operation

During a storm event, stormwater runoff flows enter a catch basin through a grate (drop) inlet, curb inlet, combination inlet or manhole type structure. The downward flow is intercepted and captured by the EnviroPod® LittaTrap™ device that is placed inside the entry portion of these catch basin types. Once flow enters the EnviroPod® LittaTrap™, the EnviroPod® LittaTrap™ seals and basket collar direct the flow over the bypass slots and into the basket and optional liner (as applicable). The LittaTrap™ seals are adjustable to ensure all particles diverted into the basket and liner will not cause "short-circuiting" or create early bypass of the design volume of runoff or treatment flows.

The LittaTrap™ filter box sits on a support bracket that cantilevers off a single wall of the catch basin. The support bracket is located approximately 8 inches below the surface level creating a driving head to increase the maximum bypass flow rate without causing surface ponding. The support bracket has been structurally designed to take the load of the basket that is filled with sediment, while the peak bypass flow is conveyed into the catch basin.

The patented EnviroPod® LittaTrap™ gross pollutant basket incorporates a structural batten that has three functions:

1. Constrains the basket preventing the expansion or "bulging" so the basket can be easily removed when full of material.
2. Maintains a secondary flow path around the basket for bypass flows; and
3. Maximizes the screen area and material storage volume of the basket.

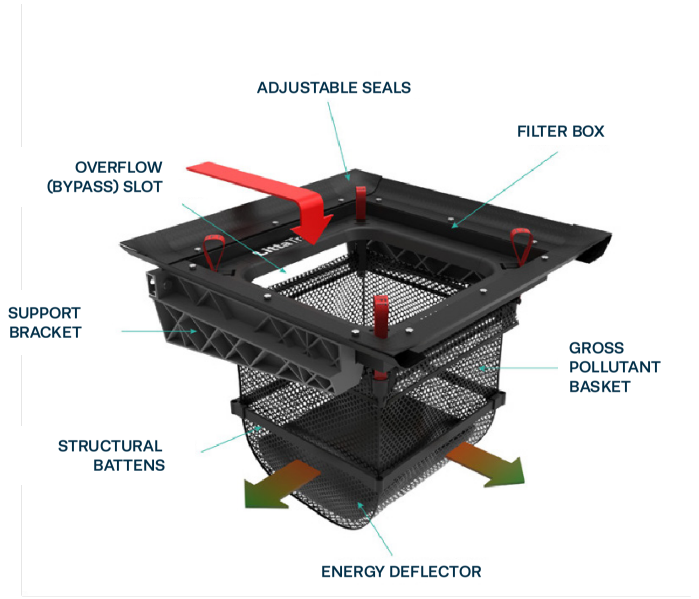


Figure 2: EnviroPod® LittaTrap™ FC Operation

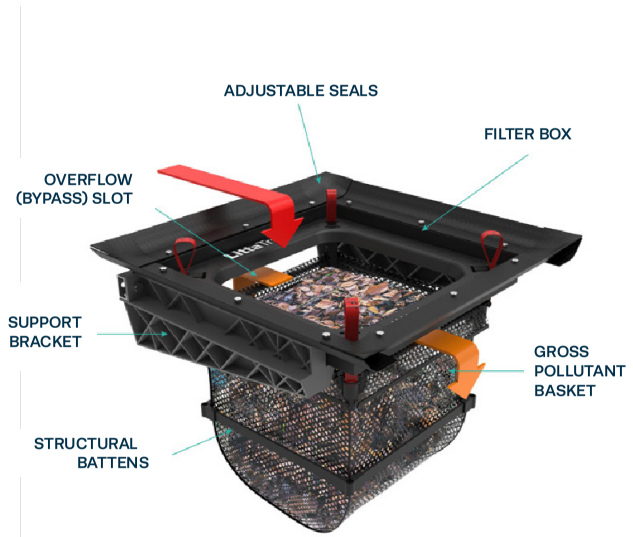


Figure 3: EnviroPod® LittaTrap™ FC Bypass Operation

Inspection and Maintenance Procedures

HEALTH AND SAFETY:

EnviroPod® recommends that owners check and utilize any applicable State and local regulatory requirements for applying a Site-Specific Safety Plan before undertaking any installation, inspection, or maintenance service. Personal Protection Equipment (PPE) is required when installing, inspecting, or maintaining a EnviroPod® LittaTrap™. Field personnel shall utilize personal protection equipment (PPE) as required, including gloves, long sleeve shirts or outwear, long pants, Hi-Viz clothing as well as steel toe shoes. For additional advice on the relevant health and safety requirements, we recommend that you consult the local health and safety regulator.

INSPECTIONS:

All stormwater inlet filter devices require routine inspection and maintenance service to ensure continued functionality of the device as well as identify and remove trapped contaminants and to minimize bypass. Due to the variable nature of stormwater pollution, annual rainfall characteristics and localized site pollutant loadings, maintenance service frequencies can vary for any catch basin location.

Figure 4: LittaTrap™ seen with 1mm liner installed to target micro-plastics such as plastic pellets. Hand maintenance shown.

It is recommended to inspect the LittaTrap™ EnviroPod® LittaTrap™ at least four times per year during the first year of operation to determine seasonal and annual maintenance requirements. First year inspection service frequency is recommended by conducting one inspection visit for every three months after a LittaTrap™ Inlet Filter device is installed and is placed in operation. However, if there is a presence of a high potential loading activity within the drainage area, it's recommended that catch basin inspection frequency be revised. High loading activity in the upstream drainage area may include the following:

- A high number of trees or vegetation.
- Construction activity.
- Uncovered or unsealed roadways

Additional inspections are recommended after major storm events. The LittaTrap™ should be inspected after a major storm event to check for any unforeseen damage or to find evidence of illicit discharge.

MAINTENANCE FREQUENCY

Maintenance of the EnviroPod® LittaTrap™ is recommended when more than 75% of the maximum trash capture volume of the LittaTrap™ model size installed. Maintenance frequency is typically conducted 1 or 2 times per year, depending on pollutant load conditions within a particular drainage area. If applicable, maintenance frequency shall be conducted as per any local municipal or State stormwater permit requirements.

MAINTENANCE PROCEDURES

The EnviroPod® LittaTrap™ maintenance service involves two activities. These activities are as follows:

1. Routine removal and emptying of the gross pollutant basket and liner (if used); and
2. Inspection for any structural damage or flow impedance.

The recommended maintenance procedure for grate (drop) inlets or combination grate/curb inlet catch basins is for the end-user or maintenance service contractor to conduct maintenance service by "hand" to reduce operational cost. Each EnviroPod® LittaTrap™ basket is fitted with lifting handles on four sides of the basket, so that maintenance personnel will have no personal contact with the captured and retained pollutants.

EnviroPod® also recommends the use of a vacuum induction truck (ie; vactor truck or heavy industrial vacuum equipment) for the maintenance of curb entry catch basin LittaTrap™ inlet filter devices.

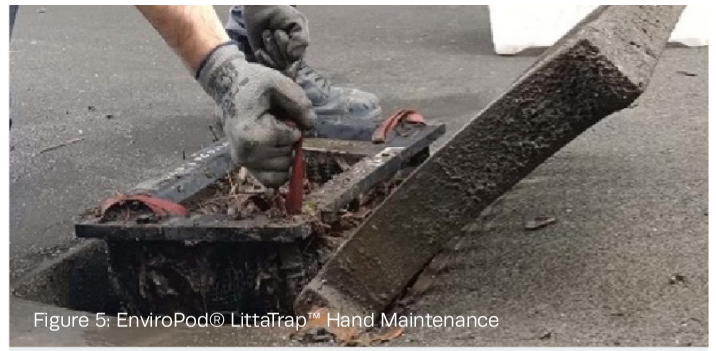


Figure 5: EnviroPod® LittaTrap™ Hand Maintenance

EnviroPod® LittaTrap™ FC Hand Maintenance

It is recommended that the EnviroPod® LittaTrap™ FC basket and liner be emptied when 75% Full. To empty the EnviroPod® LittaTrap™ FC, it is a simple one-minute exercise "Lift, Tip, Replace". The following steps detail hand maintenance:

1. Establish a safe working area per typical catch basin service activity.
2. Remove grate/access cover.
3. Remove the basket and liner with two lifting hooks or lift by hand through the loops on the top of the basket. Excess debris should be scooped out first if the basket is over half full.
4. Pour contents of the basket and liner into a disposal container.
5. Replace grate.

Figure 6: LittaTrap™ Vactor Maintenance

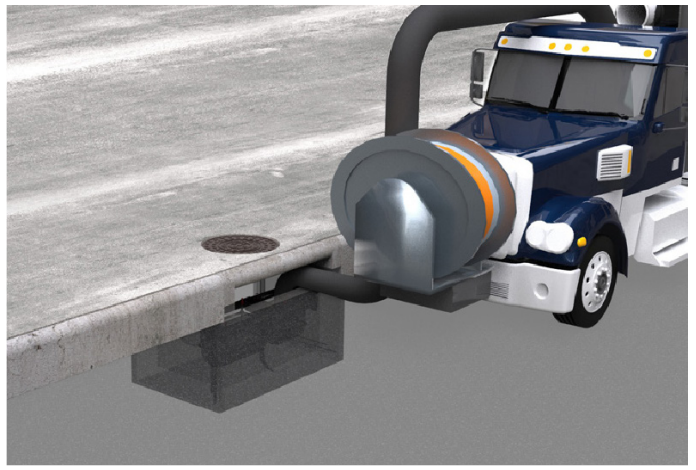
EnviroPod® LittaTrap™ FC Vactor Maintenance

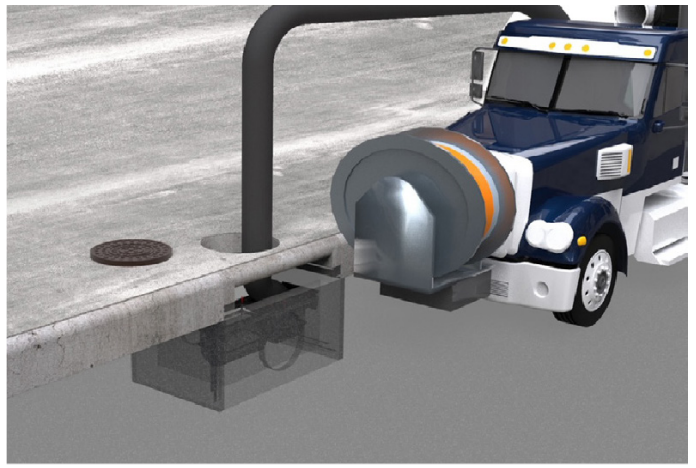
The steps for induction maintenance are detailed below:

1. Establish a safe working area per typical catch pit service activity.
2. Remove grate/access cover.
3. Vacuum accumulated debris from the basket.
4. Vacuum contents from the base of the catch basin (if required).
5. Inspect basket, filter box, and seals for any damage.
6. Replace grate/access cover.

CURB ENTRY CATCH BASIN MAINTENANCE

For curb entry catch basins, the geometry of the EnviroPod® LittaTrap™ basket allows a vactor hose to enter the basket through the curb opening, as shown in the figure below. Alternatively, baskets can be accessed through the catch basin access manhole.





ENVIROPOD® LITTATRAP™ BASKET AND FULL CAPTURE LINER CLEANING.

Material trapped in the EnviroPod® LittaTrap™ basket and or full capture liner is easily removed by shaking the basket or tapping the basket against a hard surface. If required a power washer can used to remove excess sediment or debris trapped in the screen

RECORD-KEEPING MAINTENANCE PROCEDURES

- Following maintenance and/or inspection, EnviroPod® recommends that the owner or maintenance service contractor prepare a maintenance/inspection record. The record shall include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
- The owner shall retain the maintenance/inspection records in accordance with local and/or state requirements.

REQUIRED EQUIPMENT AND MATERIALS FOR MAINTENANCE ACTIVITIES.

The following equipment is helpful when conducting EnviroPod® LittaTrap™ Grate Inlet and Curb Inlet inspections and maintenance:

- Recording device (pen and paper form, voice recorder, iPad, etc.)
- Personal protection equipment (protective footwear, gloves, hardhat, safety glasses, high visibility clothing, etc.)
- Traffic control equipment (cones, barricades, signage, flagging, etc.)
- Manhole hook or pry bar
- Flashlight
- Tape measure
- Vacuum truck (optional)
- Pressure washer (optional)
- Replacement oil absorbent pouches (Optional)

REPAIR OR REPLACEMENT PROCEDURES.

In the unlikely event of an EnviroPod® LittaTrap™ FC structural component requiring repair, the system can be easily uninstalled by reversing the installation procedure. Once uninstalled, any faulty part or component can be replaced.

Inspection and Maintenance Form

ADDRESS:

OWNER/LOCATION NAME:

DATE:

INSPECTOR NAME/COMPANY

Catch Basin Name/Number	Percentage Full of Trash/Debris (Mark X in appropriate box)				Condition of the LittaTrap™ Good/Poor (Requires Attached?)	Annual Weighting factor	Comments
	0–25%	25–50%	50–75%	75–100%			

COMMENTS:

Please include 3 photographs of each catch basin with the grate closed, grate open and upstream catchment.

Is the LittaTrap™ more than 75% full?

>75%: Proceed with maintenance.

If 50–75%: Maintenance recommended in the next 2 months.

QR CODE FOR THE ONLINE SURVEY

Download the ArcGIS Survey123 app on Android or Apple. No sign-in required, simply scan the QR code and complete. EnviroPod® will send you the Inspection or maintenance report.

ABOUT ENVIROPOD

EnviroPod® is Australasia's leading catch basin insert technology provider. The company has over 25,000 installs of its technology worldwide, including catchment wide retrofits. The LittaTrap™ is a result of 25 years' of research, implementation and operation of source treatment solutions.

For further information please see www.enviropod.com

International patent numbers for : CA– 2,810,974 ; USA – 9,642,658 ; AU – 2011302712 ;NZ – 588049 . Other patents pending.

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Appendix F
Stormwater Infiltration Chamber

User Inputs

Chamber Model:	SC-310
Outlet Control Structure:	No
Project Name:	n2271
Engineer:	N/A
Project Location:	Ontario
Measurement Type:	Metric
Required Storage Volume:	14.16 cubic meters.
Stone Porosity:	40%
Stone Foundation Depth:	153 mm.
Stone Above Chambers:	153 mm.
Design Constraint Dimensions:	(7.01 m. x 30.01 m.)

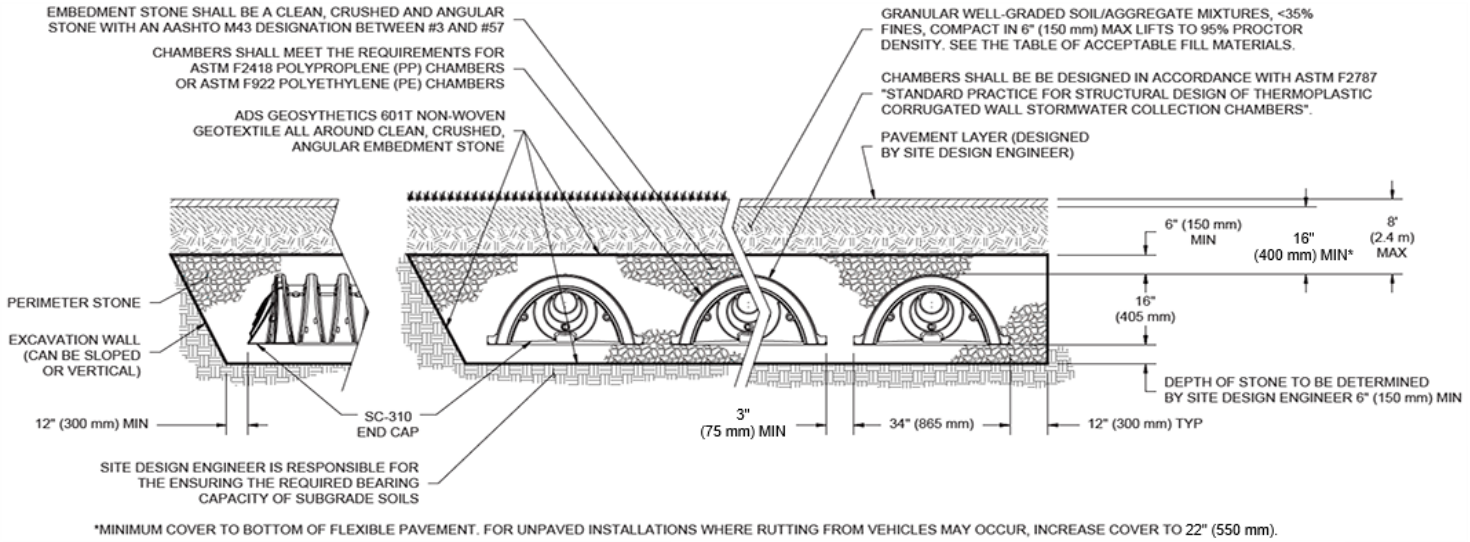
Results

System Volume and Bed Size

Installed Storage Volume:	14.33 cubic meters.
Storage Volume Per Chamber:	0.42 cubic meters.
Number Of Chambers Required:	12
Number Of End Caps Required:	2
Chamber Rows:	1
Maximum Length:	27.01 m.
Maximum Width:	1.48 m.
Approx. Bed Size Required:	39.79 square meters.
Average Cover Over Chambers:	N/A .

System Components

Amount Of Stone Required	
(0% Overage):	24 cubic meters
(Cubic yard to ton factor:1.4):	42.67 tons
Volume Of Excavation (Not Including Fill):	29 cubic meters
Total Non-woven Geotextile Required:	145 square meters
Woven Geotextile Required (excluding Isolator Row):	0 square meters
Woven Geotextile Required (Isolator Row):	39 square meters
Total Woven Geotextile Required:	39 square meters
Impervious Liner Required:	0 square meters



Project:

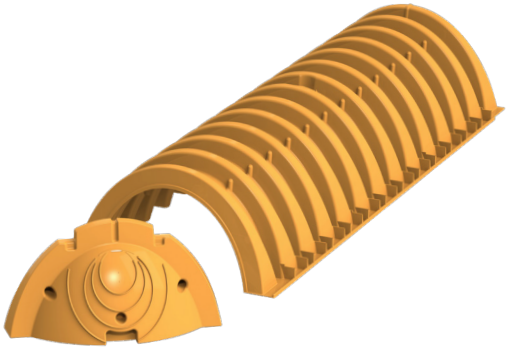
Chamber Model -	SC-310		
Units -	**Metric**	Click Here for Imperial	
Number of chambers -	12		
Voids in the stone (porosity) -	40	%	
Base of Stone Elevation -	269.20	m	☑ Include Perimeter Stone in Calculations
Amount of Stone Above Chambers -	153	mm	
Amount of Stone Below Chambers -	153	mm	
Area of system -	39.79	sq.meters	Min. Area - 26.457 sq.meters

StormTech SC-310 Cumulative Storage Volumes

Height of System *(mm)*	Incremental Single Chamber *(cubic meters)*	Incremental Total Chamber *(cubic meters)*	Incremental Stone *(cubic meters)*	Incremental Ch & St *(cubic meters)*	Cumulative Chamber *(cubic meters)*	Elevation *(meters)*
711	0.00	0.00	0.40	0.40	14.334	269.91
686	0.00	0.00	0.40	0.40	13.930	269.89
660	0.00	0.00	0.40	0.40	13.525	269.86
635	0.00	0.00	0.40	0.40	13.121	269.84
610	0.00	0.00	0.40	0.40	12.717	269.81
584	0.00	0.00	0.40	0.40	12.312	269.78
559	0.00	0.02	0.40	0.42	11.908	269.76
533	0.00	0.05	0.38	0.44	11.491	269.73
508	0.01	0.09	0.37	0.46	11.055	269.71
483	0.02	0.19	0.33	0.52	10.597	269.68
457	0.02	0.24	0.31	0.55	10.081	269.66
432	0.02	0.28	0.29	0.57	9.533	269.63
406	0.03	0.31	0.28	0.59	8.961	269.61
381	0.03	0.35	0.27	0.61	8.368	269.58
356	0.03	0.37	0.26	0.63	7.756	269.56
330	0.03	0.39	0.25	0.64	7.129	269.53
305	0.03	0.41	0.24	0.65	6.489	269.50
279	0.04	0.43	0.23	0.66	5.836	269.48
254	0.04	0.45	0.22	0.67	5.172	269.45
229	0.04	0.46	0.22	0.68	4.497	269.43
203	0.04	0.48	0.21	0.69	3.814	269.40
178	0.04	0.49	0.21	0.70	3.123	269.38
152	0.00	0.00	0.40	0.40	2.426	269.35
127	0.00	0.00	0.40	0.40	2.022	269.33
102	0.00	0.00	0.40	0.40	1.617	269.30
76	0.00	0.00	0.40	0.40	1.213	269.28
51	0.00	0.00	0.40	0.40	0.809	269.25
25	0.00	0.00	0.40	0.40	0.404	269.23

StormTech® SC-310 Chamber

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



Nominal Chamber Specifications
(not to scale)

Size (L x W x H)
85.4" x 34" x 16"
2170 mm x 864 mm x 406 mm

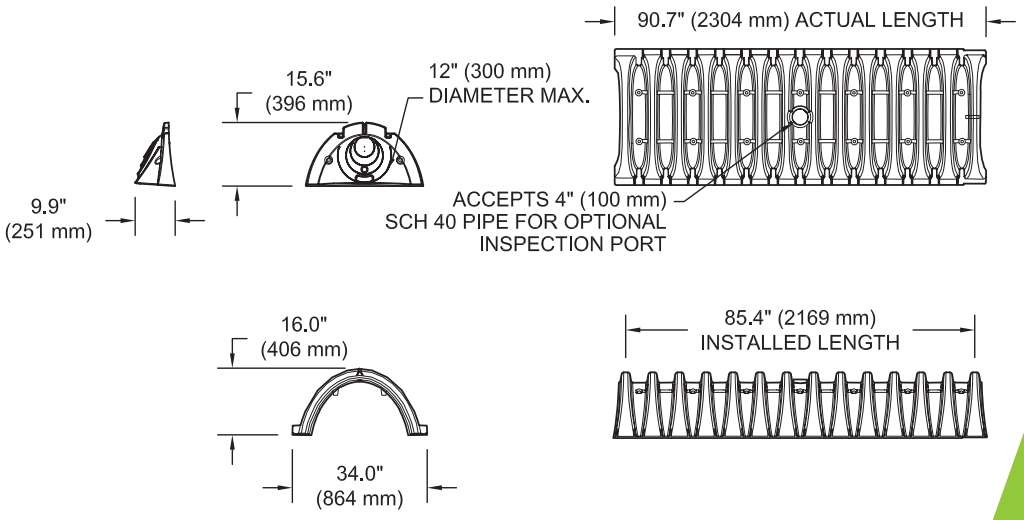
Chamber Storage
14.7 ft³ (0.42 m³)

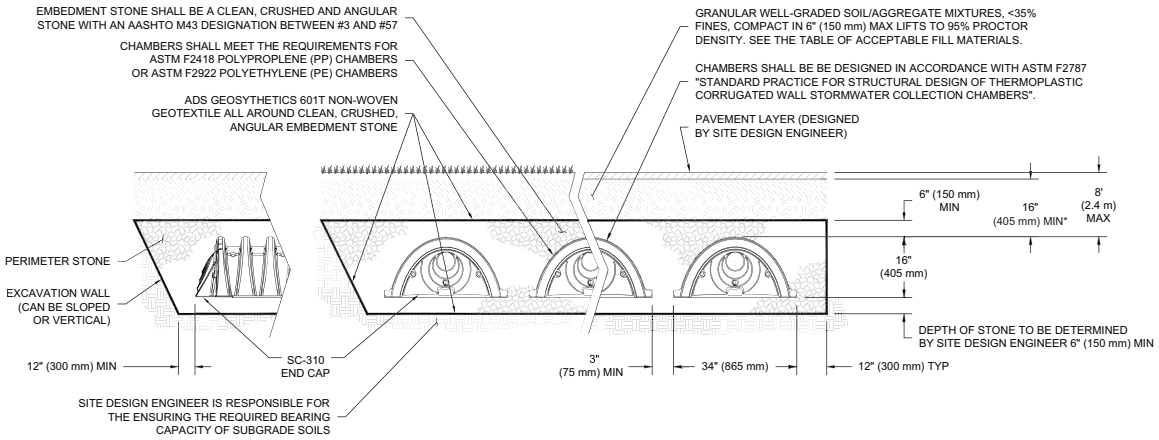
Min. Installed Storage*
29.3 ft³ (0.83 m³)

Weight
37.0 lbs (16.8 kg)

Shipping
55 chambers/pallet
108 end caps/pallet
18 pallets/truck

*Assumes 6" (150 mm) stone above and below chambers and 40% stone porosity.





ADS StormTech™

StormTech SC-310 Specifications

Cumulative Storage Volumes Per Chamber

Assumes 40% Stone Porosity. Calculations are Based Upon a 6” (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)	Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
28 (711)	14.70 (0.416)	29.34 (0.831)
27 (686)	14.70 (0.416)	28.60 (0.810)
26 (660)	Stone Cover 14.70 (0.416)	27.87 (0.789)
25 (635)	14.70 (0.416)	27.14 (0.769)
24 (610)	14.70 (0.416)	26.41 (0.748)
23 (584)	14.70 (0.416)	25.68 (0.727)
22 (559)	14.70 (0.416)	24.95 (0.707)
21 (533)	14.64 (0.415)	24.18 (0.685)
20 (508)	14.49 (0.410)	23.36 (0.661)
19 (483)	14.22 (0.403)	22.47 (0.636)
18 (457)	13.68 (0.387)	21.41 (0.606)
17 (432)	12.99 (0.368)	20.25 (0.573)
16 (406)	12.17 (0.345)	19.03 (0.539)
15 (381)	11.25 (0.319)	17.74 (0.502)
14 (356)	10.23 (0.290)	16.40 (0.464)
13 (330)	9.15 (0.260)	15.01 (0.425)
12 (305)	7.99 (0.227)	13.59 (0.385)
11 (279)	6.78 (0.192)	12.13 (0.343)
10 (254)	5.51 (0.156)	10.63 (0.301)
9 (229)	4.19 (0.119)	9.11 (0.258)
8 (203)	2.83 (0.081)	7.56 (0.214)
7 (178)	1.43 (0.041)	5.98 (0.169)
6 (152)	0	4.39 (0.124)
5 (127)	0	3.66 (0.104)
4 (102)	Stone Foundation 0	2.93 (0.083)
3 (76)	0	2.19 (0.062)
2 (51)	0	1.46 (0.041)
1 (25)	0	0.73 (0.021)

Note: Add 0.73 ft³ (0.021 m³) of storage for each additional inch (25 mm) of stone foundation.

Storage Volume Per Chamber ft³ (m³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-310 Chamber	14.7 (0.42)	29.30 (0.83)	33.7 (0.95)	38.1 (1.08)

Note: Assumes 6” (150 mm) stone above chambers, 3” (76 mm) row spacing and 40% stone porosity.

Amount of Stone Per Chamber

English Tons (yds³)	Stone Foundation Depth		
	6”	12”	18”
SC-310	1.9 (1.4)	2.5 (1.8)	3.1 (2.2)
Metric Kilograms (m³)	**150 mm**	**300 mm**	**450 mm**
SC-310	1724 (1.0)	2268 (1.3)	2812 (1.7)

Note: Assumes 6” (150 mm) of stone above and 3” (76 mm) between chambers.

Volume Excavation Per Chamber yd³ (m³)

	Stone Foundation Depth		
	6 (150)	12 (300)	18 (450)
SC-310	2.6 (2.0)	3.0 (2.3)	3.4 (2.6)

Note: Assumes 3” (76 mm) of row separation and 6” (150 mm) of stone above the chambers and 16” (400 mm) of cover. The volume of excavation will vary as depth of cover increases.

ADS StormTech products, manufactured in accordance with ASTM F2418 or ASTMF2922, comply with all requirements in the Build America, Buy America (BABA) Act.

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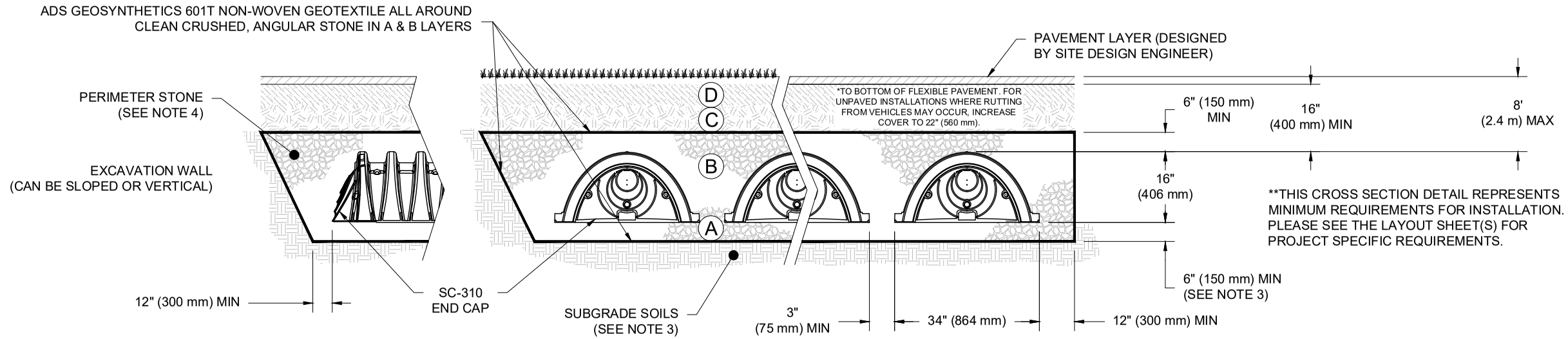
ACCEPTABLE FILL MATERIALS: STORMTECH SC-310 CHAMBER SYSTEMS

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.	3.25	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 16" (400 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 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	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 6" (150 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.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2922 (POLYETHYLENE) OR ASTM F2418 (POLYPROPYLENE), "STANDARD SPECIFICATION FOR CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-310 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. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
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 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2922 SHALL BE GREATER THAN OR EQUAL TO 325 LBS/FT/%. 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.

STANDARD CROSS SECTION
SC-310 CHAMBER
STORMTECH

DATE: 02/17/2025 | DRAWN: SMW | CHECKED: JLM
DRAWING #: 721-320

DATE	DRWN	CHKD	DESCRIPTION

StormTech® Chamber System
1-800-821-6710 | WWW.STORMTECH.COM

4640 TRUEMAN BLVD
HILLIARD, OH 43026

ADS

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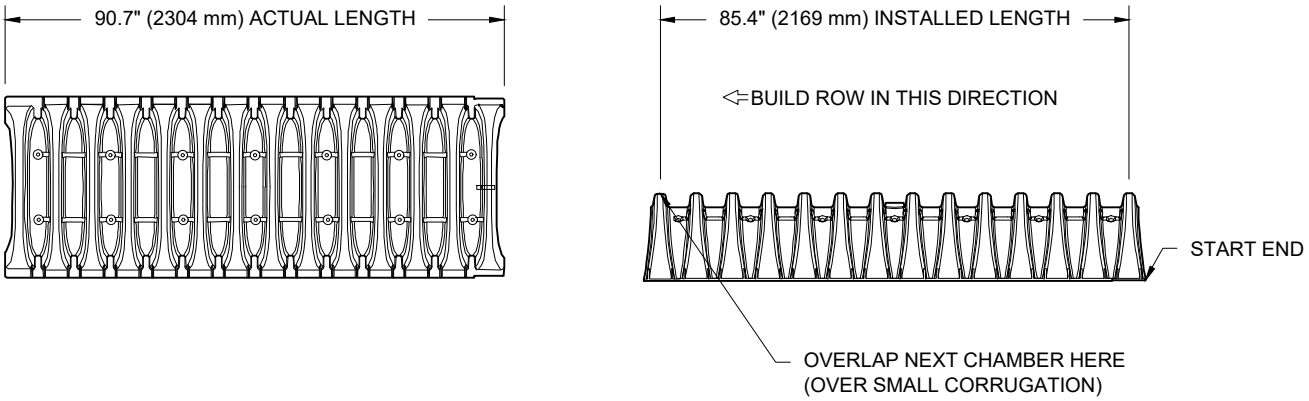
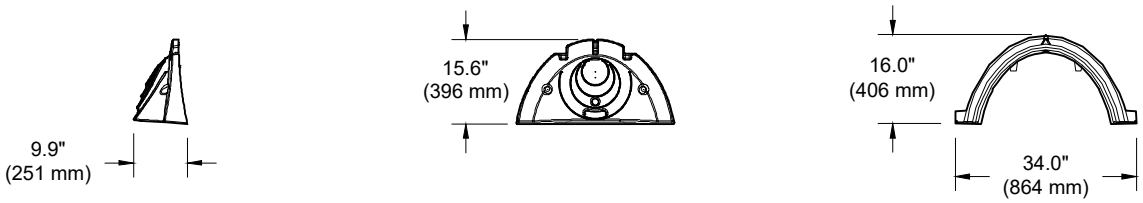
SC-310 TECHNICAL SPECIFICATION

NTS



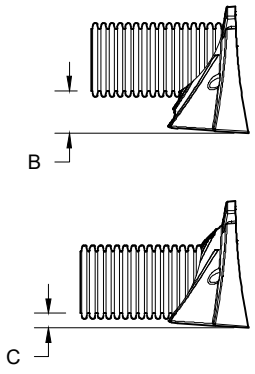


NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	34.0" X 16.0" X 85.4"	(864 mm X 406 mm X 2169 mm)
CHAMBER STORAGE	14.7 CUBIC FEET	(0.42 m³)
MINIMUM INSTALLED STORAGE*	29.34 CUBIC FEET	(0.83 m³)
WEIGHT	35.0 lbs.	(16.8 kg)

*ASSUMES 6" (150 mm) ABOVE AND BELOW CHAMBER; 3" (75 mm) BETWEEN CHAMBERS

PART #	STUB	B	C
SC310EPE06TPC	6" (150 mm)	5.8" (147 mm)	---
SC310EPE06BPC		---	0.5" (13 mm)
SC310EPE08TPC	8" (200 mm)	3.5" (89 mm)	---
SC310EPE08BPC		---	0.6" (15 mm)
SC310EPE10TPC	10" (250 mm)	1.4" (36 mm)	---
SC310EPE10BPC		---	0.7" (18 mm)
SC310ECEZ*	12" (300 mm)	---	0.9" (23 mm)



ALL STUBS, EXCEPT FOR THE SC310ECEZ ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC310ECEZ THE 12" (300 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 0.25" (6 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL; PRE-CORED END CAPS END WITH "PC"

TECHNICAL SPECIFICATIONS
SC-310 CHAMBER

DRAWN: SMW
CHECKED: JLM
DATE: 01/15/25
DRAWING #: 721-310

StormTech® Chamber System
1-800-821-6710
WWW.STORMTECH.COM

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HILLIARD, OH 43026

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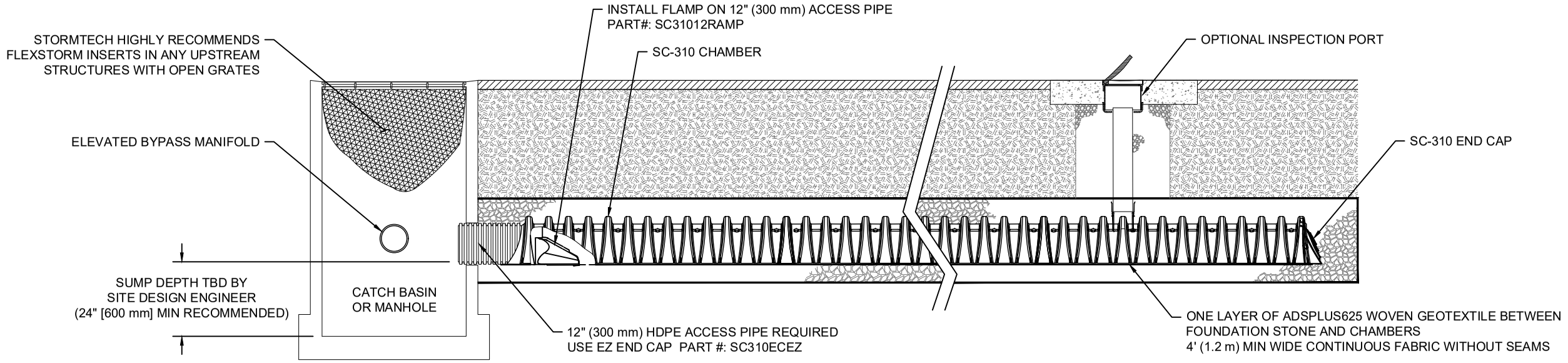


SC-310 ISOLATOR ROW PLUS DETAIL
NTS

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

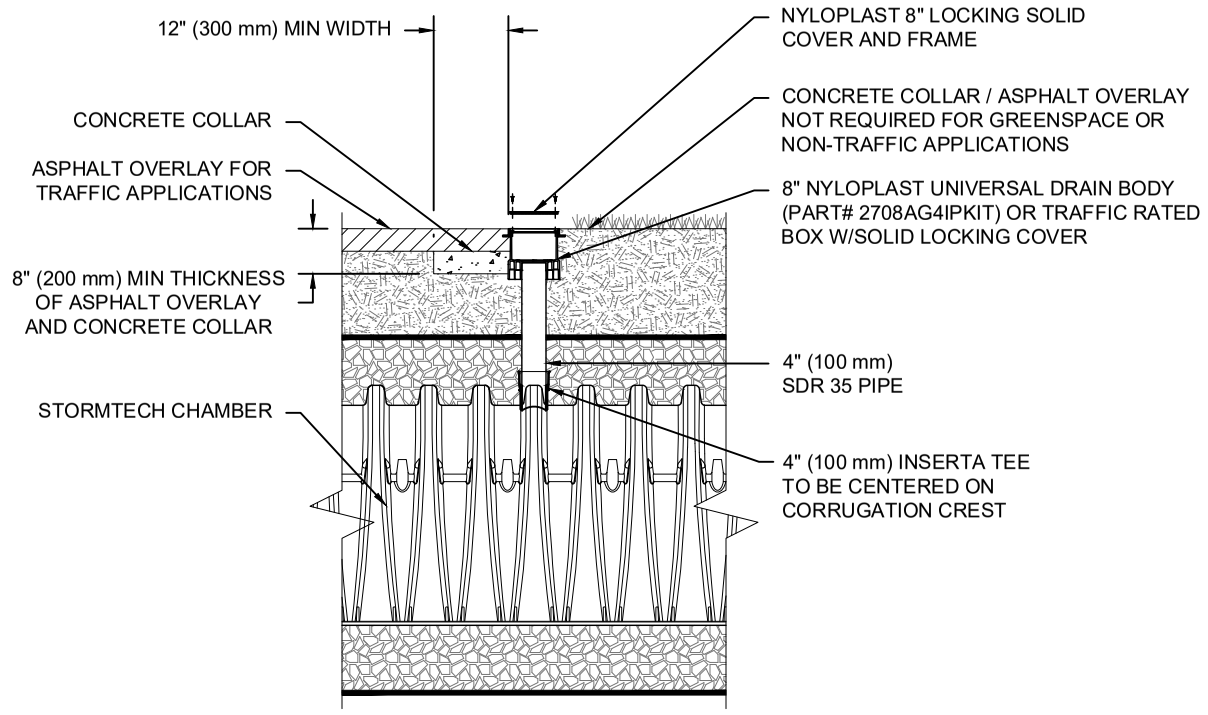
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

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.



NOTE:
INSPECTION PORTS MAY BE CONNECTED THROUGH ANY CHAMBER CORRUGATION CREST.

4" PVC INSPECTION PORT DETAIL
(SC SERIES CHAMBER)
NTS

SC-310
ISOLATOR ROW PLUS DETAILS
DATE: 10/29/20 DRAWN: ALI
PROJECT #: CHECKED: ALI

DATE	DRWN	CHKD	DESCRIPTION
12/15/23	AYT		

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

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

Isolator® Row Plus
O&M Manual

ADS StormTech™

The Isolator® Row Plus

Introduction

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row Plus is a technique to inexpensively enhance Total Suspended Solids (TSS), Total Phosphorus (TP), Total Petroluem Hydrocarbons (TPH) and Total Nitrogen (TN) removal with easy access for inspection and maintenance.

The Isolator Row Plus

The Isolator Row Plus is a row of StormTech chambers, either SC-160, SC-310, DC-780, SC-800, MC-3500, MC-4500 or MC-7200 models, are lined with filter fabric and connected to a closely located manhole for easy access. The fabric lined chambers provide for sediment settling and filtration as stormwater rises in the Isolator Row Plus and passes through the filter fabric. The open bottom chambers allow stormwater to flow vertically out of the chambers. Sediments are captured in the Isolator Row Plus protecting the adjacent stone and chambers storage areas from sediment accumulation.

ADS Isolator Row and Plus fabric are placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting.

The Isolator Row Plus is designed to capture the “first flush” runoff and offers the versatility to be sized on a volume basis or a flow-rate basis. An upstream manhole provides access to the Isolator Row Plus and includes a high/low concept such that stormwater flow rates or volumes that exceed the capacity of the Isolator Row Plus bypass through a manifold to the other chambers. This is achieved with an elevated bypass manifold or a high-flow weir. This creates a differential between the Isolator Row Plus row of chambers and the manifold to the rest of the system, thus allowing for settlement time in the Isolator Row Plus. After Stormwater flows through the Isolator Row Plus and into the rest of the chamber system it is either exfiltrated into the soils below or passed at a controlled rate through an outlet manifold and outlet control structure.

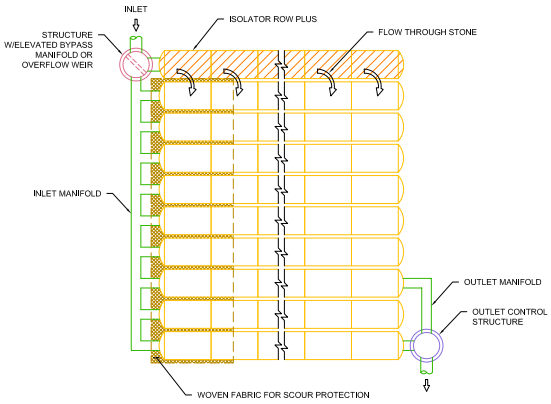
The Isolator Row Plus Flamp™ is a flared end ramp apparatus attached to the inlet pipe on the inside of the chamber end cap. The FLAMP provides a smooth transition from pipe invert to fabric bottom. It is configured to improve chamber function performance by enhancing outflow of solid debris that would otherwise collect at the chamber's end, or more difficult to remove and require confined space entry into the chamber area. It also serves to improve the fluid and solid flow into the access pipe during maintenance and cleaning and to guide cleaning and inspection equipment back into the inlet pipe when complete.

The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements and maintenance costs.

Note: *See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row Plus.*

Looking down the Isolator Row Plus from the manhole opening, ADS Plus Fabric is shown between the chamber and stone base.

StormTech Isolator Row Plus with Overflow Structure (not to scale)



Isolator Row Plus Inspection/Maintenance

Inspection

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row Plus should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

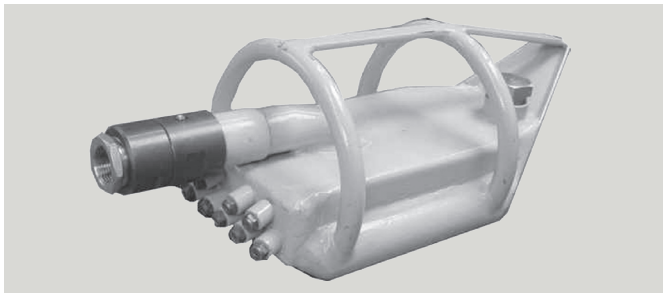
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3" (75 mm) throughout the length of the Isolator Row Plus, clean-out should be performed.

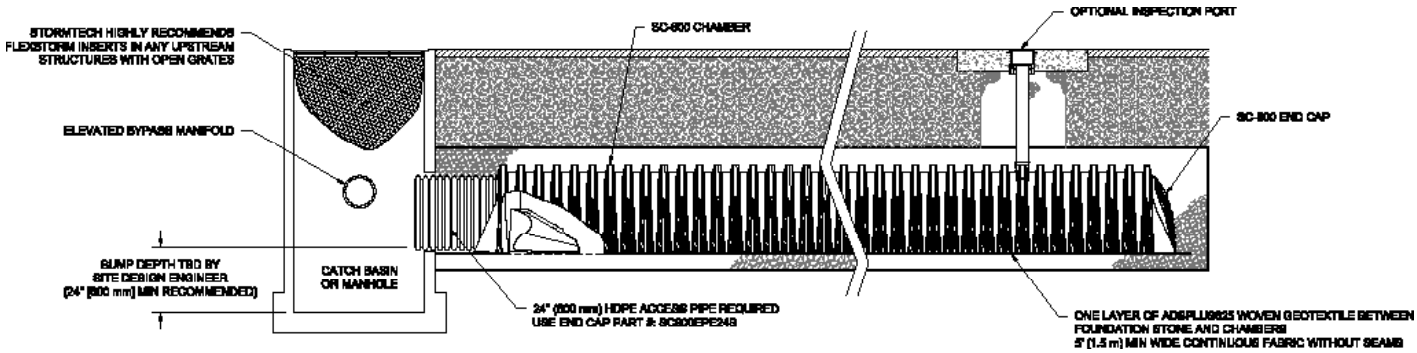
Maintenance

The Isolator Row Plus was designed to reduce the cost of periodic maintenance. By “isolating” sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entry.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row Plus while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45” are best. StormTech recommends a maximum nozzle pressure of 2000 psi be utilized during cleaning. JetVac reels can vary in length. For ease of maintenance, ADS recommends Isolator Row Plus lengths up to 200' (61 m). **The JetVac process shall only be performed on StormTech Isolator Row Plus that have ADS Plus Fabric (as specified by StormTech) over their angular base stone.**



StormTech Isolator Row Plus (*not to scale*)



Isolator Row Plus Step By Step Maintenance Procedures

Step 1

Inspect Isolator Row Plus for sediment.

A) Inspection ports (if present)
   i. Remove lid from floor box frame
   ii. Remove cap from inspection riser
   iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
   iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.

B) All Isolator Row Plus
   i. Remove cover from manhole at upstream end of Isolator Row Plus
   ii. Using a flashlight, inspect down Isolator Row Plus through outlet pipe
      1. Mirrors on poles or cameras may be used to avoid a confined space entry
      2. Follow OSHA regulations for confined space entry if entering manhole
   iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2.
   If not, proceed to Step 3.

Step 2

Clean out Isolator Row Plus using the JetVac process.

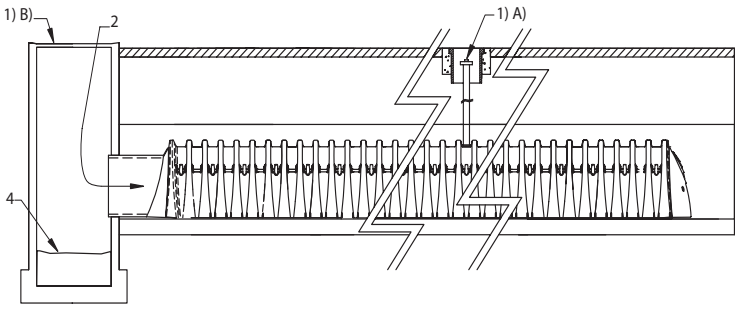
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

Step 3

Replace all caps, lids and covers, record observations and actions.

Step 4

Inspect & clean catch basins and manholes upstream of the StormTech system.



Sample Maintenance Log

Date	Stadia Rod Readings		Sedi-ment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row Plus, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

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StormTech® Installation Guide

SC-310/DC-780/SC-800

StormTech Installation Video

Required Materials and Equipment List

- Acceptable fill materials per Table 1
- ADS Plus and non-woven geotextile fabrics
- StormTech solid end caps and pre-cored end caps
- StormTech chambers
- StormTech manifolds and fittings

Important Notes:

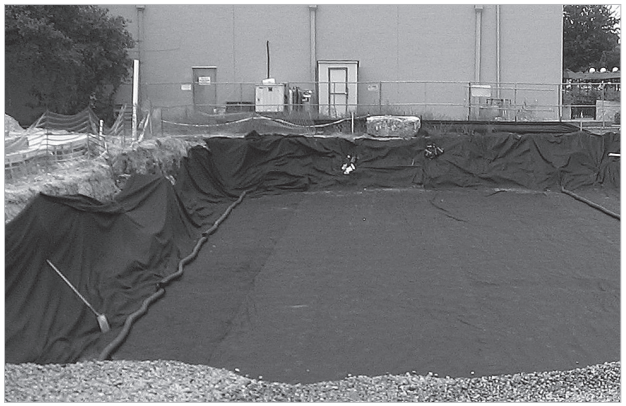
A. This installation guide provides the minimum requirements for proper installation of chambers. Non-adherence to this guide may result in damage to chambers during installation. Replacement of damaged chambers during or after backfilling is costly and very time consuming. It is recommended that all installers are familiar with this guide, and that the contractor inspects the chambers for distortion, damage and joint integrity as work progresses.

B. 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.

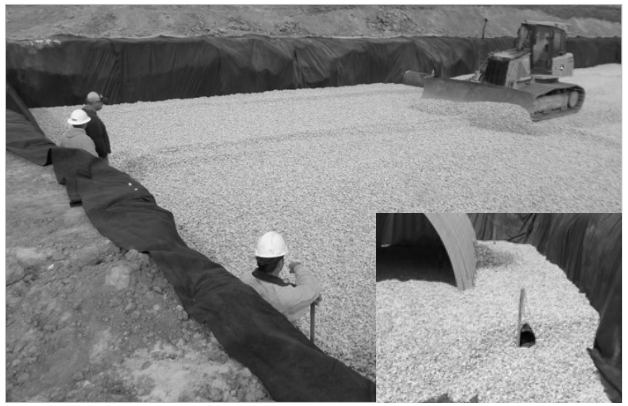
C. Care should be taken in the handling of chambers and end caps. Avoid dropping, prying or excessive force on chambers during removal from pallet and initial placement.

Requirements for System Installation

Excavate bed and prepare subgrade per engineer's plans.



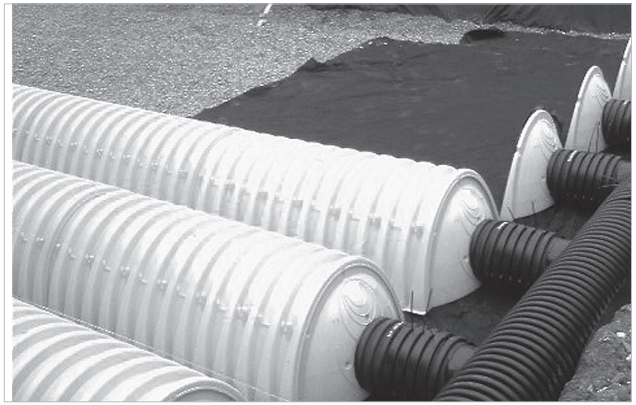
Place non-woven geotextile over prepared soils and up excavation walls. Install underdrains if required.



Place clean, crushed, angular stone foundation 6" (150 mm) min. Compact to achieve a flat surface.

Manifold, Scour Fabric and Chamber Assembly

Install manifolds and lay out ADS Plus Fabric at inlet rows. Place ADS Plus Fabric at each inlet end cap parallel to the row (min. 12.5 ft (3.8 m)). Place a continuous piece entire length of Isolator® Plus Row(s).



Align the first chamber and end cap of each row with inlet pipes. Contractor may choose to postpone stone placement around end chambers and leave ends of rows open for easy inspection of chambers during the backfill process.

Continue installing chambers by overlapping chamber end corrugations. Chamber joints are labeled "Lower Joint – Overlap Here" and "Build this direction – Upper Joint" Be sure that the chamber placement does not exceed the reach of the construction equipment used to place the stone. Maintain minimum 3" (75 mm) spacing between rows for SC-310 and SC-800, and 6" (150 mm) spacing for DC-780.

Attaching the End Caps

Lift the end of the chamber a few inches off the ground. With the curved face of the end cap facing outward, place the end cap into the chamber's end corrugation.

Prefabricated End Caps

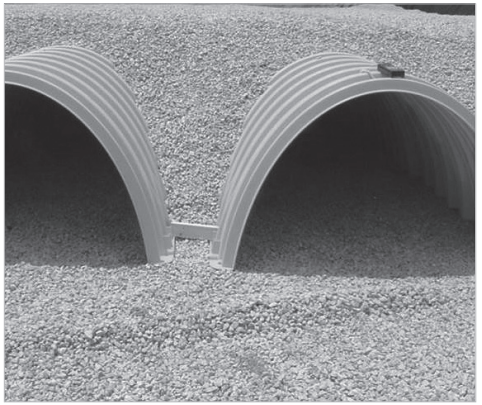
24" (600 mm) inlets are the maximum size that can fit into a DC-780 or SC-800 end cap and must be prefabricated with a 24" (600 mm) pipe stub. SC-310 chambers with a 12" (300 mm) inlet pipe must use a prefabricated end cap with a 12" (300 mm) pipe stub. When used on an Isolator Row Plus, these end caps will contain a welded FLAMP (flared end ramp) that will lay on top of the ADS Plus fabric (shown above)

Isolator Row Plus

Place a continuous layer of ADS Plus fabric between the foundation stone and the Isolator Row Plus chambers, making sure the fabric lays flat and extends the entire width of the chamber feet.

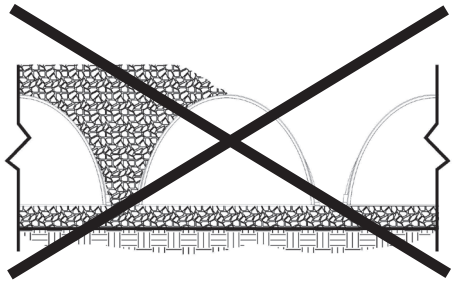
Initial Anchoring of Chambers – Embedment Stone

Initial embedment shall be spotted along the center line of the chamber evenly anchoring the lower portion of the chamber. This is best accomplished with a stone conveyor or excavator reaching along the row.

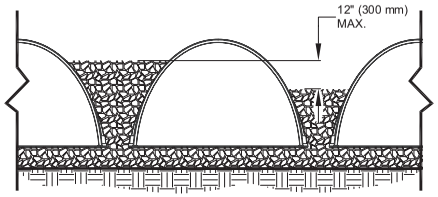


No equipment shall be operated on the bed at this stage of the installation. Excavators must be located off the bed. Dump trucks shall not dump stone directly on to the bed. Dozers or loaders are not allowed on the bed at this time.

Backfill of Chambers – Embedment Stone

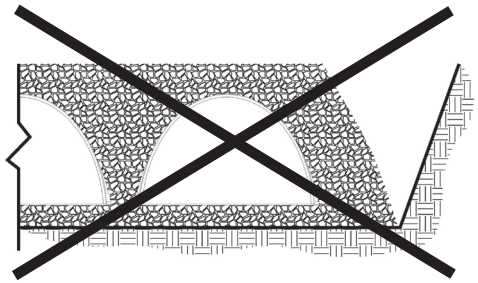


Uneven Backfill

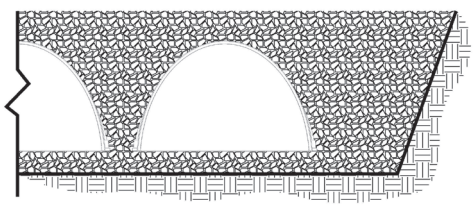


Even Backfill

Backfill chambers evenly. Stone column height should never differ by more than 12" (300 mm) between adjacent chamber rows or between chamber rows and perimeter.



Perimeter Not Backfilled



Perimeter Fully Backfilled

Perimeter stone must be brought up evenly with chamber rows. Perimeter must be fully backfilled, with stone extended horizontally to the excavation wall.

Backfill - Embedment Stone & Cover Stone

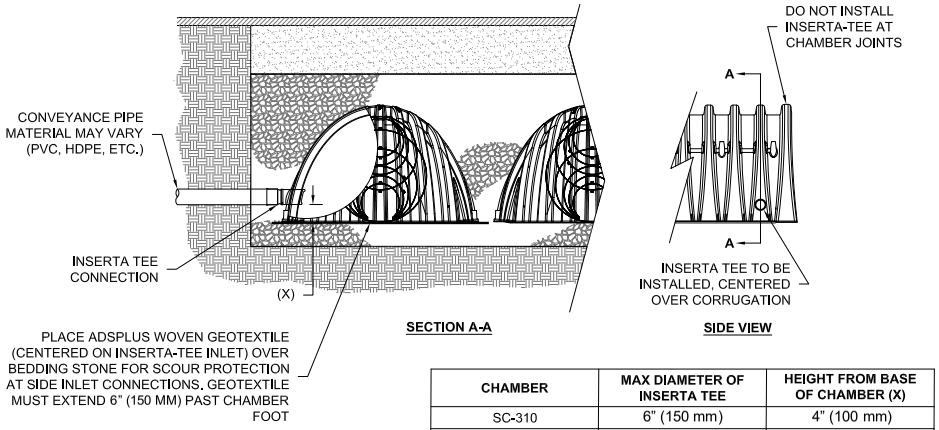
Continue evenly backfilling between rows and around perimeter until embedment stone reaches tops of chambers. Perimeter stone must extend horizontally to the excavation wall for both straight or sloped sidewalls. **Only after chambers have been backfilled to top of chamber and with a minimum 6" (150 mm) of cover stone on top of chambers can small dozers be used over the chambers for backfilling remaining cover stone.**

Small dozers and skid loaders may be used to finish grading stone backfill in accordance with ground pressure limits in Table 2. They must push material parallel to rows only. Never push perpendicular to rows. StormTech recommends that the contractor inspect chambers before placing final backfill. Any chambers damaged by construction shall be removed and replaced.

Final Backfill of Chambers – Fill Material

Install non-woven geotextile over stone. Geotextile must overlap 24" (600 mm) min. where edges meet. Compact each lift of backfill as specified in the site design engineer's drawings. Roller travel parallel with rows.

Inserta Tee Detail



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-800	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTES:

- PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.
- CONTACT ADS ENGINEERING SERVICES IF INSERTA TEE INLET MUST BE RAISED AS NOT ALL INVERTS ARE POSSIBLE.

StormTech Isolator Row Plus Detail

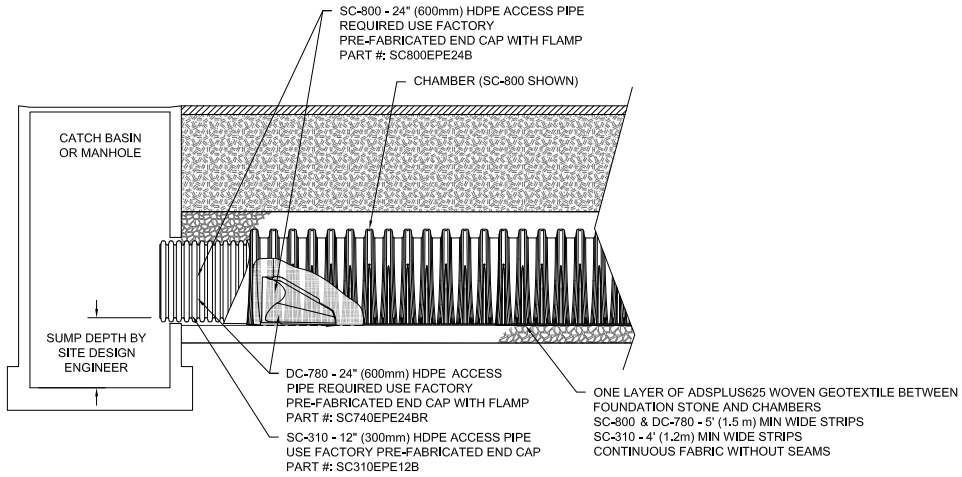


Table 1- Acceptable Fill Materials

Material Location	Description	AASHTO M43 Designation[1]	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 the 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 18" (450 mm) above the top of the chamber. Note that pavement subbase may be 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 M45 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 compaction after min. 12" (300 mm) of material over the chambers is reached. Compact additional layers in 6" (150 mm) max. lifts to a min. 95% Proctor density for well-graded material and 95% relative density for processed aggregate materials. Roller gross vehicle weight not to exceed 12,000 lbs (53 kN). Dynamic force not to exceed 20,000 lbs (89 kN)
(B) **Embedment Stone:** Embedment Stone surrounding chambers from the foundation stone to the 'C' layer above.	Clean, crushed, angular stone or Recycled Concrete[4]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	No compaction required.
(A) **Foundation Stone:** Foundation Stone below the chambers from the subgrade up to the foot (bottom) of the chamber.	Clean, crushed, angular stone or Recycled Concrete[4]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	Place and compact in 6" (6") lifts using two full coverages with a vibratory compactor. [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 6" (150 mm) (max) lifts using two full coverages with a vibratory compactor.
3. Where infiltration surfaces may be comprised by compaction, for standard installations and 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. Where recycled concrete aggregate is used in layers 'A' or 'B' the material should also meet the acceptable criteria outlined in ADS Technical Note 6.20 "Recycled Concrete Structural Backfill".

Figure 1- Inspection Port Detail

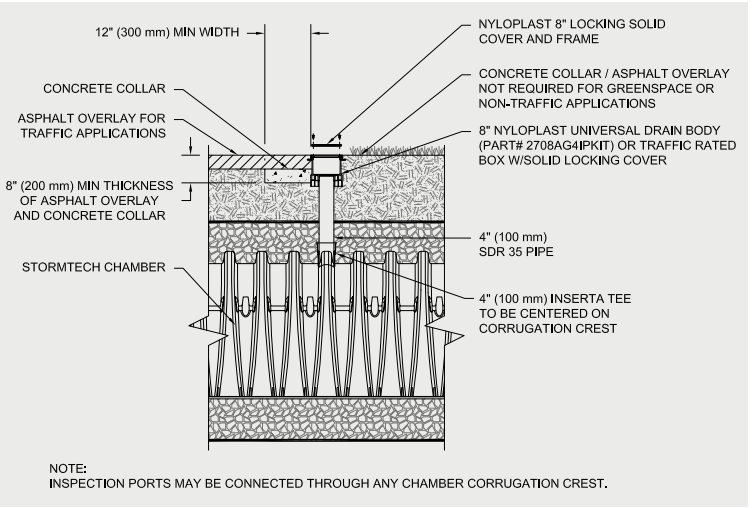
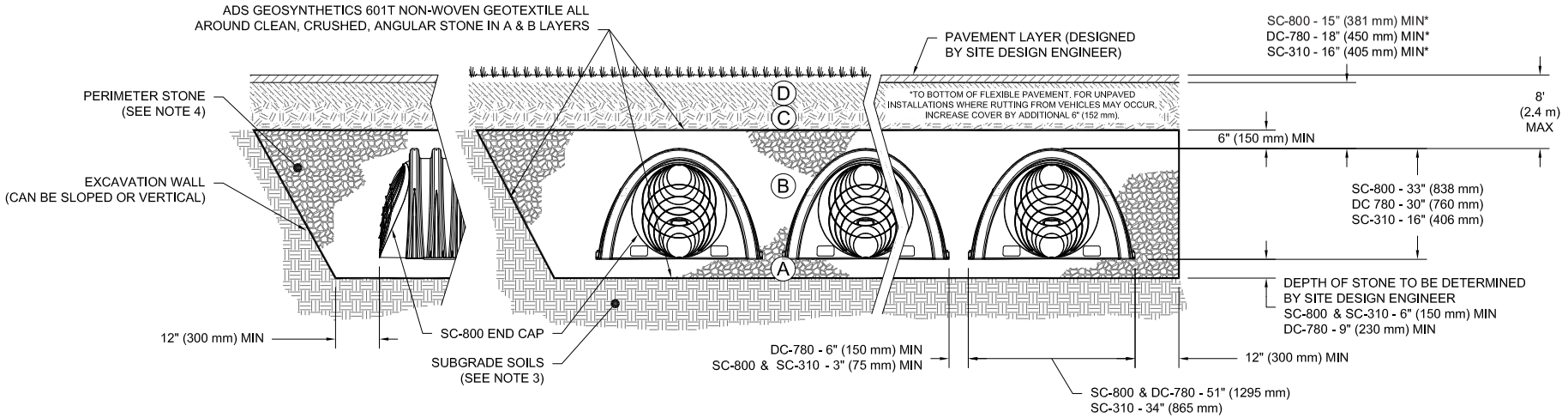


Figure 2 - Fill Material Locations



Notes:

1. 36" (900 mm) of stabilized cover materials over the chambers is recommended during the construction phase if general construction activities, such as full dump truck travel and dumping, are to occur over the bed.
2. During paving operations, dump truck axle loads on 18" (450 mm) of cover may be necessary. Precautions should be taken to avoid rutting of the road base layer, to ensure that compaction requirements have been met, and that a minimum of 18" (450 mm) of cover exists over the chambers. Contact StormTech for additional guidance on allowable axle loads during paving.
3. Ground pressure for track dozers is the vehicle operating weight divided by total ground contact area for both tracks. Excavators will exert higher ground pressures based on loaded bucket weight and boom extension.
4. Mini-excavators (< 8,000lbs/3,628 kg) can be used with at least 12" (300 mm) of stone over the chambers and are limited by the maximum ground pressures in Table 2 based on a full bucket at maximum boom extension.
5. Storage of materials such as construction materials, equipment, spoils, etc. should not be located over the StormTech system. The use of equipment over the StormTech system not covered in Table 2 (ex. soil mixing equipment, cranes, etc) is limited. Please contact StormTech for more information.
6. Allowable track loads based on vehicle travel only. Excavators shall not operate on chamber beds until the total backfill reaches 3 feet (900 mm) over the entire bed.

Table 2 - Maximum Allowable Construction Vehicle Loads[6]

Material Location	Fill Depth over Chambers in. (mm)	Maximum Allowable Wheel Loads		Maximum Allowable Track Loads[6]		Maximum Allowable Roller Loads
		Max Axle Load for Trucks lbs (kN)	Max Wheel Load for Loaders lbs (kN)	Track Width in. (mm)	Max Ground Pressure psf (kPa)	Max Drum Weight or Dynamic Force lbs (kN)
Ⓓ Final Fill Material	36" (900) Compacted	32,000 (142)	16,000 (71)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	3880 (186) 2640 (126) 2040 (97) 1690 (81) 1470 (70)	38,000 (169)
Ⓒ Initial Fill Material	24" (600) Compacted	32,000 (142)	16,000 (71)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	2690 (128) 1880 (90) 1490 (71) 1280 (61) 1150 (55)	20,000 (89)
	24" (600) Loose/ Dumped	32,000 (142)	16,000 (71)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	2390 (114) 1700 (81) 1370 (65) 1190 (57) 1080 (51)	20,000 (89) Roller gross vehicle weight not toexceed 12,000 lbs. (53 kN)
	18" (450)	32,000 (142)	16,000 (71)	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	2110 (101) 1510 (72) 1250 (59) 1100 (52) 1020 (48)	20,000 (89) Roller gross vehicle weight not to exceed 12,000 lbs. (53 kN)
Ⓑ Embedment Stone	12" (300)	16,000 (71)	NOT ALLOWED	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	1540 (74) 1190 (57) 1010 (48) 910 (43) 840 (40)	20,000 (89) Roller gross vehicle weight not to exceed 12,000 lbs. (53 kN)
	6" (150)	8,000 (35)	NOT ALLOWED	12" (305) 18" (457) 24" (610) 30" (762) 36" (914)	1070 (51) 900 (43) 800 (38) 760 (36) 720 (34)	NOT ALLOWED

Table 3 - Placement Methods and Descriptions

Material Location	Placement Methods/ Restrictions	Wheel Load Restrictions	Track Load Restrictions	Roller Load Restrictions
		See Table 2 for Maximum Construction Loads		
Ⓓ Final Fill Material	A variety of placement methods may be used. All construction loads must not exceed the maximum limits in Table 2.	36" (900 mm) minimum cover required for dump trucks to dump over chambers.	Dozers to push parallel to rows until 36" (900mm) compaced cover is reached.[4]	Roller travel parallel to rows only until 36" (900 mm) compacted cover is reached.
Ⓒ Initial Fill Material	Excavator positioned off bed recommended. Small excavator allowed over chambers. Small dozer allowed.	Asphalt can be dumped into paver when compacted pavement subbase reaches 18" (450 mm) above top of chambers.	Small LGP track dozers & skid loaders allowed to grade cover stone with at least 6" (150 mm) stone under tracks at all times. Equipment must push parallel to rows at all times.	Use dynamic force of roller only after compacted fill depth reaches 12" (300 mm) over chambers. Roller travel parallel to chamber rows only.
Ⓑ Embedment Stone	No equipment allowed on bare chambers. Use excavator or stone conveyor positioned off bed or on foundation stone to evenly fill around all chambers to at least the top of chambers.	No wheel loads allowed. Material must be placed outside the limits of the chamber bed.	No tracked equipment is allowed on chambers until a min. 6" (150 mm) cover stone is in place.	No rollers allowed.
Ⓐ Foundation Stone	No StormTech restrictions. Contractor responsible for any conditions or requirements by others relative to subgrade bearing capacity, dewatering or protection of subgrade.			

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StormTech® Standard Limited Warranty

STANDARD LIMITED WARRANTY OF STORMTECH LLC ("STORMTECH"): PRODUCTS

(A) This Limited Warranty applies solely to the StormTech chambers and end plates manufactured by StormTech and sold to the original purchaser (the "Purchaser"). The chambers and end plates are collectively referred to as the "Products."

(B) The structural integrity of the Products, when installed strictly in accordance with StormTech's written installation instructions at the time of installation, are warranted to the Purchaser against defective materials and workmanship for one (1) year from the date of purchase. Should a defect appear in the Limited Warranty period, the Purchaser shall provide StormTech with written notice of the alleged defect at StormTech's corporate headquarters within ten (10) days of the discovery of the defect. The notice shall describe the alleged defect in reasonable detail. StormTech agrees to supply replacements for those Products determined by StormTech to be defective and covered by this Limited Warranty. The supply of replacement products is the sole remedy of the Purchaser for breaches of this Limited Warranty. StormTech's liability specifically excludes the cost of removal and/or installation of the Products.

(C) THIS LIMITED WARRANTY IS EXCLUSIVE. THERE ARE NO OTHER WARRANTIES WITH RESPECT TO THE PRODUCTS, INCLUDING NO IMPLIED WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE.

(D) This Limited Warranty only applies to the Products when the Products are installed in a single layer. UNDER NO CIRCUMSTANCES, SHALL THE PRODUCTS BE INSTALLED IN A MULTI-LAYER CONFIGURATION.

(E) No representative of StormTech has the authority to change this Limited Warranty in any manner or to extend this Limited Warranty. This Limited Warranty does not apply to any person other than to the Purchaser.

(F) Under no circumstances shall StormTech be liable to the Purchaser or to any third party for product liability claims; claims arising from the design, shipment, or installation of the Products, or the cost of other goods or services related to the purchase and installation of the Products. For this Limited Warranty to apply, the Products must be installed in accordance with all site conditions required by state and local codes; all other applicable laws; and StormTech's written installation instructions.

(G) THE LIMITED WARRANTY DOES NOT EXTEND TO INCIDENTAL, CONSEQUENTIAL, SPECIAL OR INDIRECT DAMAGES. STORMTECH SHALL NOT BE LIABLE FOR PENALTIES OR LIQUIDATED DAMAGES, INCLUDING LOSS OF PRODUCTION AND PROFITS; LABOR AND MATERIALS; OVERHEAD COSTS; OR OTHER LOSS OR EXPENSE INCURRED BY THE PURCHASER OR ANY THIRD PARTY. SPECIFICALLY EXCLUDED FROM LIMITED WARRANTY COVERAGE ARE DAMAGE TO THE PRODUCTS ARISING FROM ORDINARY WEAR AND TEAR; ALTERATION, ACCIDENT, MISUSE, ABUSE OR NEGLECT; THE PRODUCTS BEING SUBJECTED TO VEHICLE TRAFFIC OR OTHER CONDITIONS WHICH ARE NOT PERMITTED BY STORMTECH'S WRITTEN SPECIFICATIONS OR INSTALLATION INSTRUCTIONS; FAILURE TO MAINTAIN THE MINIMUM GROUND COVERS SET FORTH IN THE INSTALLATION INSTRUCTIONS; THE PLACEMENT OF IMPROPER MATERIALS INTO THE PRODUCTS; FAILURE OF THE PRODUCTS DUE TO IMPROPER SITING OR IMPROPER SIZING; OR ANY OTHER EVENT NOT CAUSED BY STORMTECH. A PRODUCT ALSO IS EXCLUDED FROM LIMITED WARRANTY COVERAGE IF SUCH PRODUCT IS USED IN A PROJECT OR SYSTEM IN WHICH ANY GEOTEXTILE PRODUCTS OTHER THAN THOSE PROVIDED BY ADVANCED DRAINAGE SYSTEMS ARE USED. THIS LIMITED WARRANTY REPRESENTS STORMTECH'S SOLE LIABILITY TO THE PURCHASER FOR CLAIMS RELATED TO THE PRODUCTS, WHETHER THE CLAIM IS BASED UPON CONTRACT, TORT, OR OTHER LEGAL THEORY.

ADS StormTech™

adspipe.com
800-821-6710

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ADS PLUS WOVEN GEOTEXTILE SPECIFICATION

For use with StormTech® Isolator® Row Plus

Scope

This specification describes ADS Plus woven geotextile.

ADS Plus woven geotextile fabrics are woven polypropylene materials offering optimum performance when used in stabilization applications. Produced from first quality raw materials, they provide the perfect balance of strength and separation in styles capable of functioning exceptionally well in a wide range of performance requirements.

Filter Fabric Properties

Property[1]	Test Method	Unit	M.A.R.V. (Minimum Average Roll Value)[2]
Weight	ASTM D5261	oz/yd^2 (g/m^2)	8.0 (271.25)
Grab Tensile Strength	ASTM D4632	lbs (kN)	325 (1.45)
Grab Elongation	ASTM D4632	%	15
Trapezoidal Tear Strength	ASTM D4533	lbs (kN)	125 (0.89)
CBR Puncture Resistance	ASTM D6241	lbs (kN)	1,124 (5.0)

1. The property values listed above are subject to change without notice.
2. Minimum Average Roll Values (MARV) is calculated as the average minus two standard deviations. Statistically, it yields approximately 97.5% degree of confidence that any samples taken from quality assurance testing will meet or exceed the values described above.

Dimensions

ADS Plus shall be delivered to the jobsite in roll form with each roll individually identified and nominally measuring 12.5’ (3.8 m) width x 360’ (110 m) length for Plus125 and 6.25’ (1.9 m) width x 360’ (110 m) length for Plus625.

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ADS 0601T NONWOVEN GEOTEXTILE SPECIFICATION

Scope

This specification describes ADS 0601T (6.0 oz) nonwoven geotextile.

Filter Fabric Requirements

ADS 0601T (6.0 oz) is a needle-punched nonwoven geotextile made of 100% polypropylene staple fibers, which are formed into a random network for dimensional stability. ADS 0601T (6.0 oz) resists ultraviolet deterioration, rotting, biological degradation, naturally encountered basics and acids. Polypropylene is stable within a pH range of 2 to 13. ADS 0601T (6.0 oz) conforms to the physical property values listed below:

Filter Fabric Properties

Property	Test Method	Unit	M.A.R.V. (Minimum Average Roll Value)
Grab Tensile	ASTM D4632	lbs (kN)	160 (0.711)
Grab Elongation	ASTM D4632	%	50
Trapezoid Tear Strength	ASTM D4533	lbs (kN)	60 (0.267)
CBR Puncture Resistance	ASTM D6241	lbs (kN)	410 (1.82)
Permittivity*	ASTM D4491	sec^{-1}	1.5
Water Flow*	ASTM D4491	gpm/ft^2 ($l/min/m^2$)	110 (4480)
AOS*	ASTM D4751	US Sieve (mm)	70 (0.212)
Melting Point	ASTM D276	Fahrenheit (Celsius)	320 (160)
UV Resistance	ASTM D4355	%/hrs	70/500

Packaging

Roll Dimensions (W x L) - ft. (m)	3.0/5.0/6.25/7.5/9.0/12.5 x 360 -15 x 300 (0.9/1.5/1.9/2.3/2.7/3.8 x 110 - 4.5 x 91)
Roll Square Yards (Square Meters)	120/200/250/300/360/500 - 500 (100/167/209/251/301/418 - 418)
Estimated Roll Weight - lbs (kg)	44/65/97.5/102/141/195 - 195 (20/29/44/46/64/88 - 88)

* At the time of manufacturing. Handling may change these properties.

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Appendix G
Hydrant Test Report

HYDRATEST

JOB NO. _____ DATE: September 19, 2024

LOCATION 27 Winona Rd. Stoufville, ON

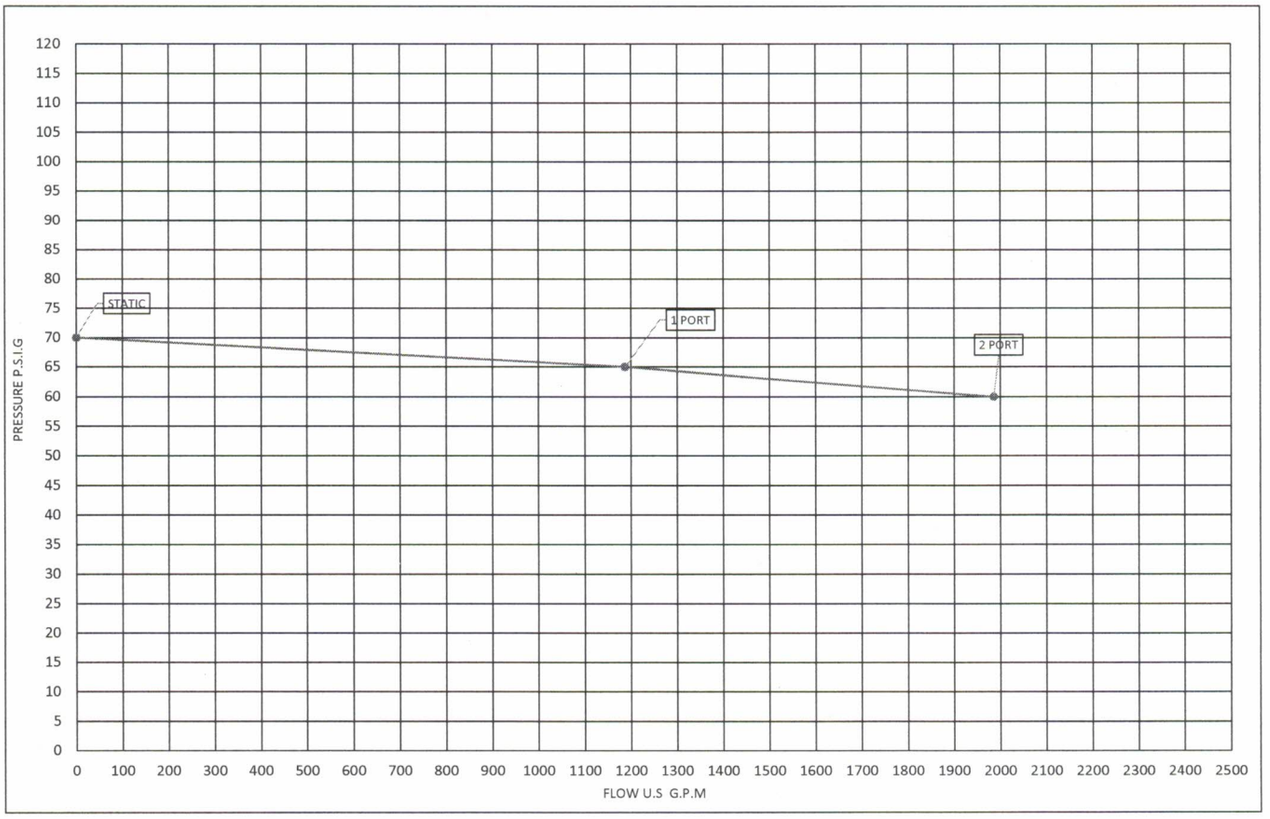
TIME OF TEST 8:30 AM

LOCATION OF TEST (FLOW) NW Corner of Main St. and Winona Dr.

(RESIDUAL) 341 Rupert Ave.

MAIN SIZE: 250mm/ 150mm STATIC PRESSURE: 70

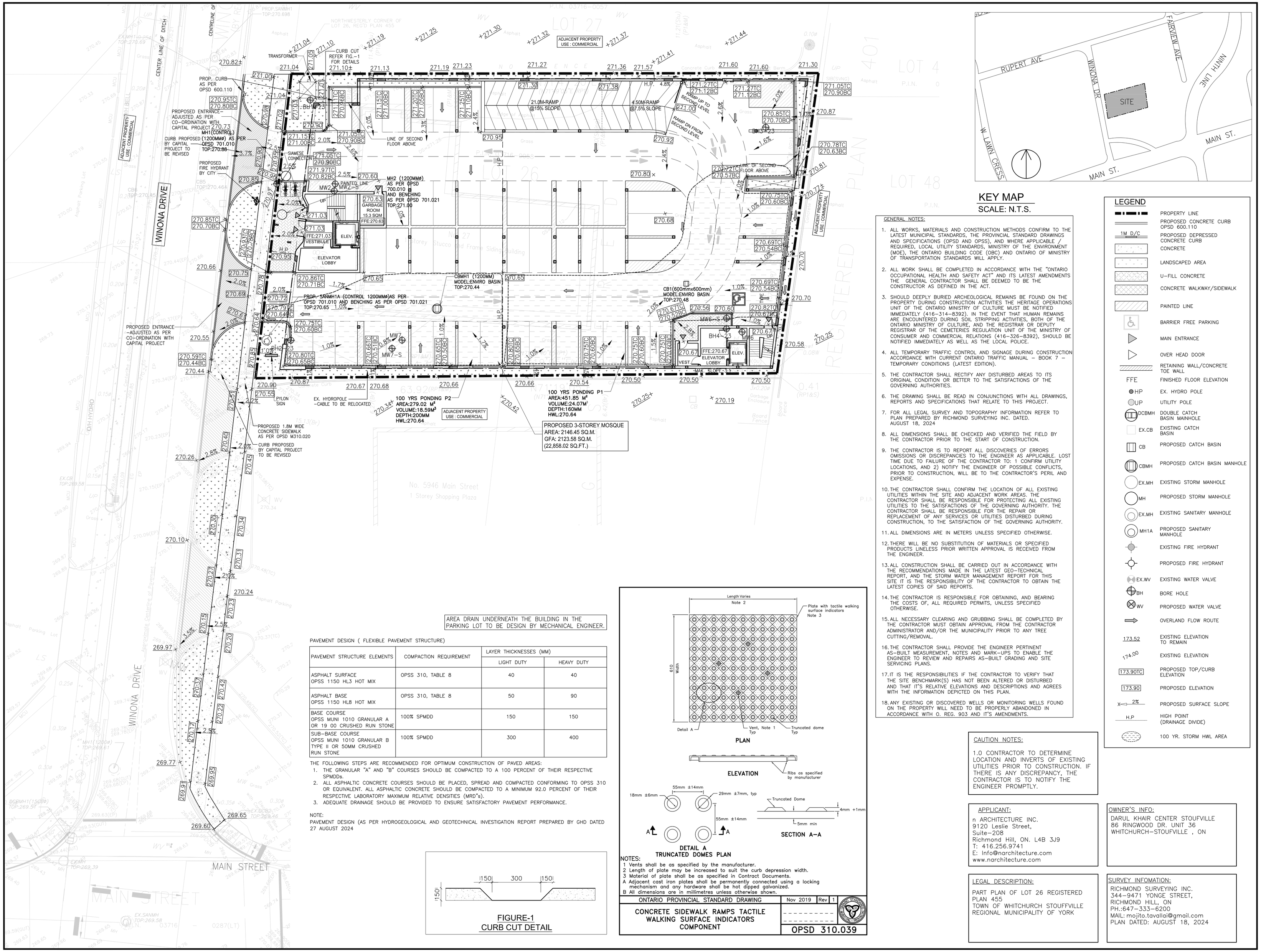
Number of Outlets & Orifice Size	Pitot Presure	Flow (USGPM)	Residual Pressure
1 X $2^{1/2"}$ PORT	50	1187	65
2 X $2^{1/2"}$ PORTS	35	1986	60

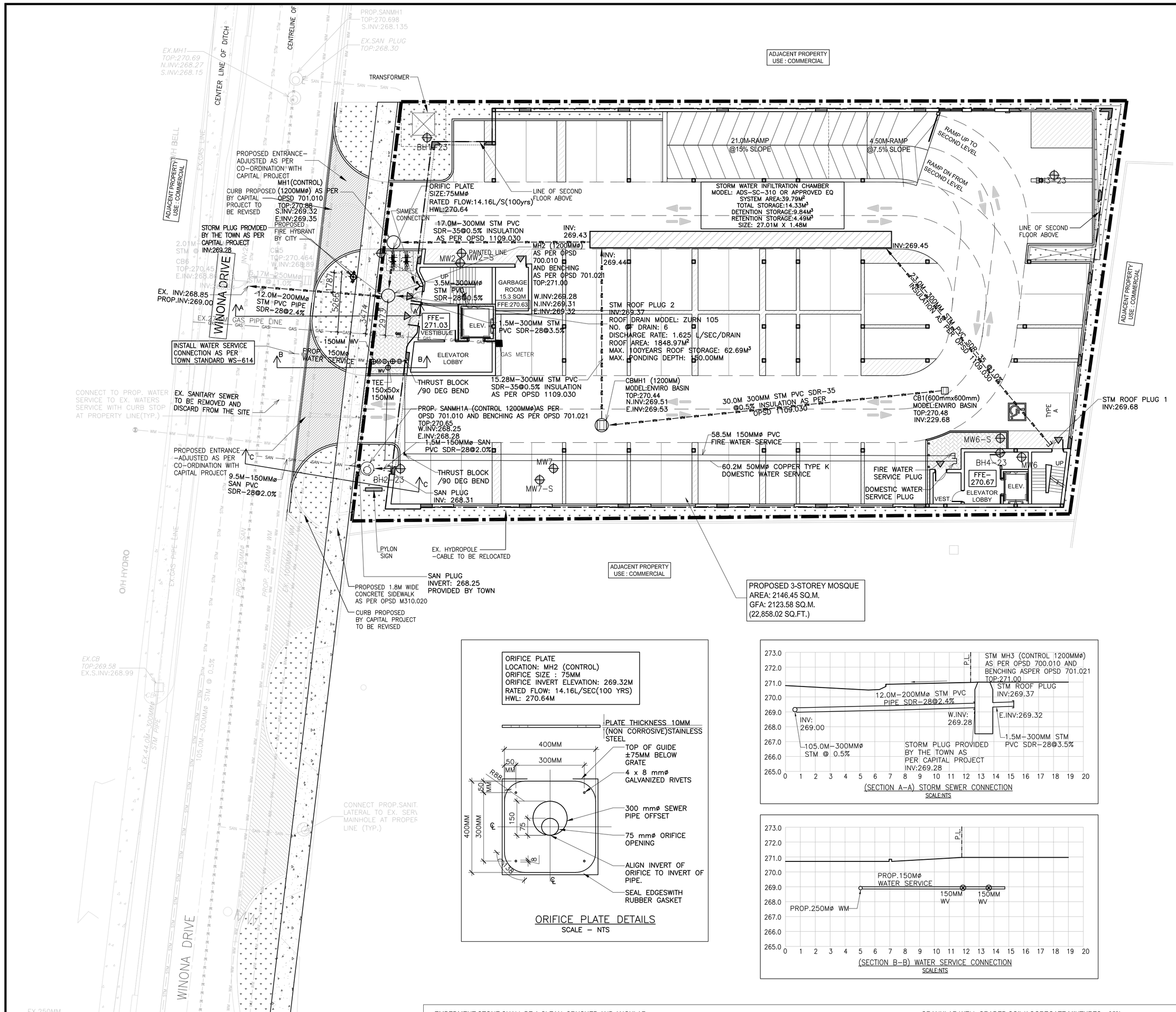


COMMENTS: Class "AA" Hydrant- Light Blue

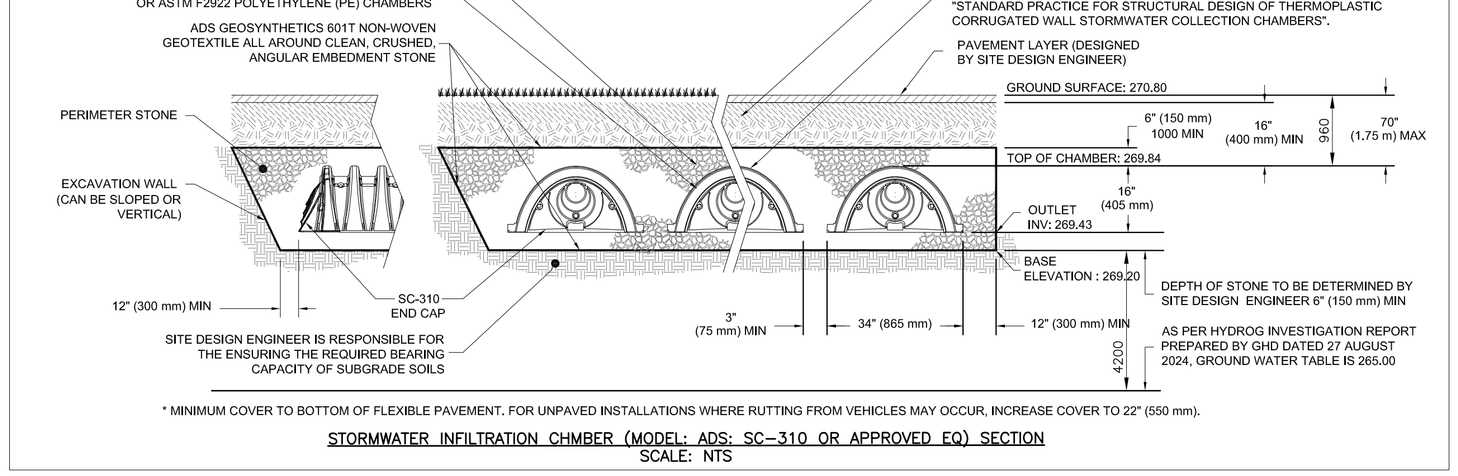
Authorized Signature: _____ Hydratest Signature: _____

Appendix H
Civil Plans


WINONA DRIVE
MAIN STREET
CENTERLINE OF DITCH
ADJACENT PROPERTY USE : COMMERCIAL
PROPOSED 3-STOREY MOSQUE
AREA: 2146.45 SQ.M.
GFA: 2123.58 SQ.M.
(22,858.02 SQ.FT.)
100 YRS PONDING P1
AREA:451.85 M²
VOLUME:24.07M³
DEPTH:160MM
HWL:270.64
100 YRS PONDING P2
AREA:279.02 M²
VOLUME:18.59M³
DEPTH:200MM
HWL:270.64
21.0M-RAMP @15% SLOPE
4.50M-RAMP @7.5% SLOPE
RAMP UP TO SECOND LEVEL
RAMP DN FROM SECOND LEVEL
LINE OF SECOND FLOOR ABOVE
ELEVATOR LOBBY
VESTIBULE
GARBAGE ROOM 15.3 SQM
PROP. SANMH1A (CONTROL 1200MM) AS PER OPSD 701.010 AND BENCHING AS PER OPSD 701.021
TOP:270.65
CBMH1 (1200MM) MODEL:ENVIRO BASIN TOP:270.44
CB1(600mmx600mm) MODEL:ENVIRO BASIN TOP:270.48
MH2 (1200MM) AS PER OPSD 700.010 AND BENCHNG AS PER OPSD 701.021 TOP:271.00
MH1(CONTROL) CURB PROPOSED (1200MM) AS PER OPSD 701.010 TOP:270.86
PROPOSED ENTRANCE –ADJUSTED AS PER CO–ORDINATION WITH CAPITAL PROJECT
PROPOSED FIRE HYDRANT BY CITY
PROP. CURB AS PER OPSD 600.110
CURB PROPOSED BY CAPITAL PROJECT TO BE REVISED
SIAMESE CONNECTION
TRANSFORMER
CURB CUT REFER FIG.–1 FOR DETAILS
PYLON SIGN
EX. HYDROPOLE –CABLE TO BE RELOCATED
PROPOSED 1.8M WIDE CONCRETE SIDEWALK AS PER OPSD M310.020
CURB PROPOSED BY CAPITAL PROJECT TO BE REVISED
PROP. SANMH1 TOP:270.698
EX.MH1 TOP:270.65
EX.CB TOP:269.58
EX.MH TOP:269.39
EX.SANMH TOP:269.58
MH1(1200dia) TOP:269.61
BCBMH1(1500dia) TOP:269.57
EX.DCB2 TOP:269.46
EX.SANMH TOP:269.58
No. 5946 Main Street 1 Storey Shopping Plaza
No. 5956 1 Storey Stucco and Frame Siding Building
No. 5938 2 Storey Brick Building
No. 5966 1 Storey Stucco and Frame Siding Building
LOT 27
LOT 26
LOT 48
LOT 4
REGISTERED PLAN 401
REGISTERED PLAN 455
P.I.N. 03716–0057
P.I.N. 03716–0287
P.I.N. 03716–0058
P.I.N. 03716–0059
P.I.N. 03716–0060
P.I.N. 03716–0061
P.I.N. 03716–0062
P.I.N. 03716–0063
P.I.N. 03716–0064
P.I.N. 03716–0065
P.I.N. 03716–0066
P.I.N. 03716–0067
P.I.N. 03716–0068
P.I.N. 03716–0069
P.I.N. 03716–0070
P.I.N. 03716–0071
P.I.N. 03716–0072
P.I.N. 03716–0073
P.I.N. 03716–0074
P.I.N. 03716–0075
P.I.N. 03716–0076
P.I.N. 03716–0077
P.I.N.

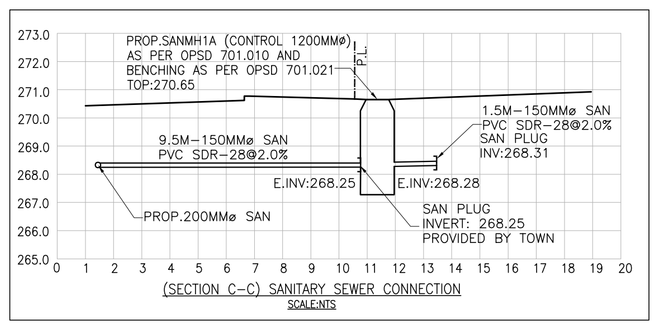


ORIFICE PLATE DETAILS
SCALE – NTS



* MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 22" (550 mm).

STORMWATER INFILTRATION CHMBER (MODEL: ADS: SC-310 OR APPROVED EQ) SECTION
SCALE: NTS

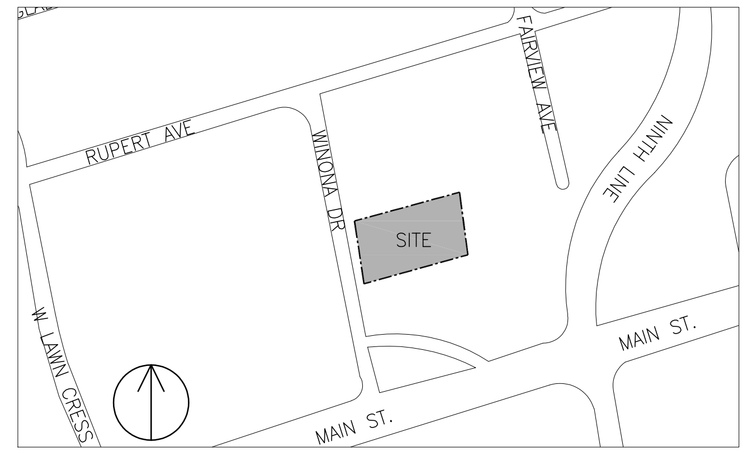


NOTES:

1. ALL EXISTING SANITARY AND STORM SEWER FROM THE SITE TO BE REMOVED AT THE PROPERTY LINE AND THE EXISTING WATER SERVICE TO BE REMOVED AT THE MAIN SOURCE AND DISCARD FROM THE SITE.
2. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE LOCATION AND INVERTS OF EXISTING UTILITIES PRIOR TO CONSTRUCTION,ANY DISCREPANCY MUST BE PROMPTLY REPORTED TO THE ENGINEER.

LEGAL DESCRIPTION:

PART PLAN OF LOT 26 REGISTERED PLAN 455 TOWN OF WHITCHURCH STOUFFVILLE REGIONAL MUNICIPALITY OF YORK



KEY MAP
SCALE: N.T.S.

GENERAL NOTES:

1. ALL WORKS, MATERIALS AND CONSTRUCTION METHODS CONFIRM TO THE LATEST MUNICIPAL STANDARDS, THE PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS (OPSD AND OPSS), AND WHERE APPLICABLE / REQUIRED, LOCAL UTILITY STANDARDS, MINISTRY OF THE ENVIRONMENT (MOE), THE ONTARIO BUILDING CODE (OBC) AND ONTARIO OF MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT" AND ITS LATEST AMENDMENTS THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. SHOULD DEEPLY BURIED ARCHEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATELY (416-314-8392). IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING SOIL STRIPPING ACTIVITIES, BOTH OF THE ONTARIO MINISTRY OF CULTURE, AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS (416-326-8392), SHOULD BE NOTIFIED IMMEDIATELY AS WELL AS THE LOCAL POLICE.
4. ALL TEMPORARY TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION ACCORDANCE WITH CURRENT ONTARIO TRAFFIC MANUAL – BOOK 7 – TEMPORARY CONDITIONS (LATEST EDITION).
5. THE CONTRACTOR SHALL RECTIFY ANY DISTURBED AREAS TO ITS ORIGINAL CONDITION OR BETTER TO THE SATISFACTIONS OF THE GOVERNING AUTHORITIES.
6. THE DRAWING SHALL BE READ IN CONJUNCTIONS WITH ALL DRAWINGS, REPORTS AND SPECIFICATIONS THAT RELATE TO THIS PROJECT.
7. FOR ALL LEGAL SURVEY AND TOPOGRAPHY INFORMATION REFER TO PLAN PREPARED BY RICHMOND SURVEYING INC. DATED. AUGUST 18, 2024
8. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
9. THE CONTRACTOR IS TO REPORT ALL DISCOVERIES OF ERRORS OMISSIONS OR DISCREPANCIES TO THE ENGINEER AS APPLICABLE. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO: 1 CONFIRM UTILITY LOCATIONS, AND 2) NOTIFY THE ENGINEER OF POSSIBLE CONFLICTS, PRIOR TO CONSTRUCTION, WILL BE TO THE CONTRACTOR'S PERIL AND EXPENSE.
10. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTIONS OF THE GOVERNING AUTHORITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE GOVERNING AUTHORITY.
11. ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED OTHERWISE.
12. THERE WILL BE NO SUBSTITUTION OF MATERIALS OR SPECIFIED PRODUCTS LINELESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE ENGINEER.
13. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE LATEST GEO-TECHNICAL REPORT, AND THE STORM WATER MANAGEMENT REPORT FOR THIS SITE IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN THE LATEST COPIES OF SAID REPORTS.
14. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING, AND BEARING THE COSTS OF, ALL REQUIRED PERMITS, UNLESS SPECIFIED OTHERWISE.
15. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR MUST OBTAIN APPROVAL FROM THE CONTRACTOR ADMINISTRATOR AND/OR THE MUNICIPALITY PRIOR TO ANY TREE CUTTING/REMOVAL.
16. THE CONTRACTOR SHALL PROVIDE THE ENGINEER PERTINENT AS-BUILT MEASUREMENT, NOTES AND MARK-UPS TO ENABLE THE ENGINEER TO REVIEW AND REPAIRS AS-BUILT GRADING AND SITE SERVICING PLANS.
17. IT IS THE RESPONSIBILITIES IF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATIONS AND DESCRIPTIONS AND AGREES WITH THE INFORMATION DEPICTED ON THIS PLAN.
18. ANY EXISTING OR DISCOVERED WELLS OR MONITORING WELLS FOUND ON THE PROPERTY WILL NEED TO BE PROPERLY ABANDONED IN ACCORDANCE WITH O. REG. 903 AND IT'S AMENDMENTS.

LEGEND

	PROPERTY LINE
	PROPOSED CONCRETE CURB OPSD 600.110
1M D/C	PROPOSED DEPRESSED CONCRETE CURB
	CONCRETE
	LANDSCAPED AREA
	U-FILL CONCRETE
	CONCRETE WALKWAY/SIDEWALK
	PAINTED LINE
	BARRIER FREE PARKING
	MAIN ENTRANCE
	OVER HEAD DOOR
	RETAINING WALL/CONCRETE TOE WALL
FFE	FINISHED FLOOR ELEVATION
HP	EX. HYDRO POLE
UP	UTILITY POLE
DCBMH	DOUBLE CATCH BASIN MAINHOLE
EX.CB	EXISTING CATCH BASIN
CB	PROPOSED CATCH BASIN
CBMH	PROPOSED CATCH BASIN MANHOLE
EX.MH	EXISTING STORM MANHOLE
MH	PROPOSED STORM MANHOLE
EX.MH	EXISTING SANITARY MANHOLE
MH1A	PROPOSED SANITARY MANHOLE
	EXISTING FIRE HYDRANT
	PROPOSED FIRE HYDRANT
EX.WV	EXISTING WATER VALVE
BH	BORE HOLE
WV	PROPOSED WATER VALVE
	OVERLAND FLOW ROUTE
DD	DOUBLE CHECK DETECTOR ASSEMBLY
M	WATER METER
B	BACK FLOW PREVENTER
D	DETECTOR ASSEMBLY IN CHAMBER
C/O	CLEAN OUT

APPLICANT:

, ARCHITECTURE INC.
)120 Leslie Street,
Suite-208
Richmond Hill, ON. L4B 3J9
': 416.256.9741
:: info@narchitecture.com
/ww.narchitecture.com

OWNER'S INFO:

DARUL KHAIR CENTER STOUFVILLE
86 RINGWOOD DR. UNIT 36
WHITCHURCH-STOUFVILLE , ON

SURVEY INFOMATION:

RICHMOND SURVEYING INC.
344-9471 YONGE STREET,
RICHMOND HILL, ON
PH.:647-333-6200
MAIL: mojito.tavalla@gmail.com
PLAN DATED: AUGUST 18, 2024

n Engineering Inc
9120 Leslie Street, Suite-208
Richmond Hill, Ontario. L4B 3J9
T : 4 1 6 . 2 5 6 . 9 7 4 1
E: info@nengineering.com
w w w . n e n g i n e e r i n g . c o m

LICENCED PROFESSIONAL ENGINEER
A.S.ZIAUDDIN
100233432
08DEC.2025
PROVINCE OF ONTARIO

N (GEOGRETIC NORTH)
PROJECT NORTH

NOT FOR CONSTRUCTION

No.	Date	Version	Dwn
8.	08 DEC. 2025	ISSUED FOR ZBA II (DA3)	LU
7.	21 NOV. 2025	ISSUED FOR COORDINATION	LU
6.	23 MAY. 2025	WATER SERVICE CONNECTION UPDATED AS PER CITY STANDARD	LU
5.	13 MAY. 2025	STORM SEWER CONNECTION UPDATED AS PER CITY STANDARD	LU
4.	19 MAR. 2025	ISSUED FOR ZBA (DA2)	LU
3.	10 FEB. 2025	RE-ISSUED FOR COORDINATION WITH CAPITAL PROJECT	LU
2.	06 FEB. 2025	ISSUED FOR COORDINATION WITH CAPITAL PROJECT	LU
1.	05 NOV. 2024	ISSUED FOR PRE-CON #3 (DA1)	SP

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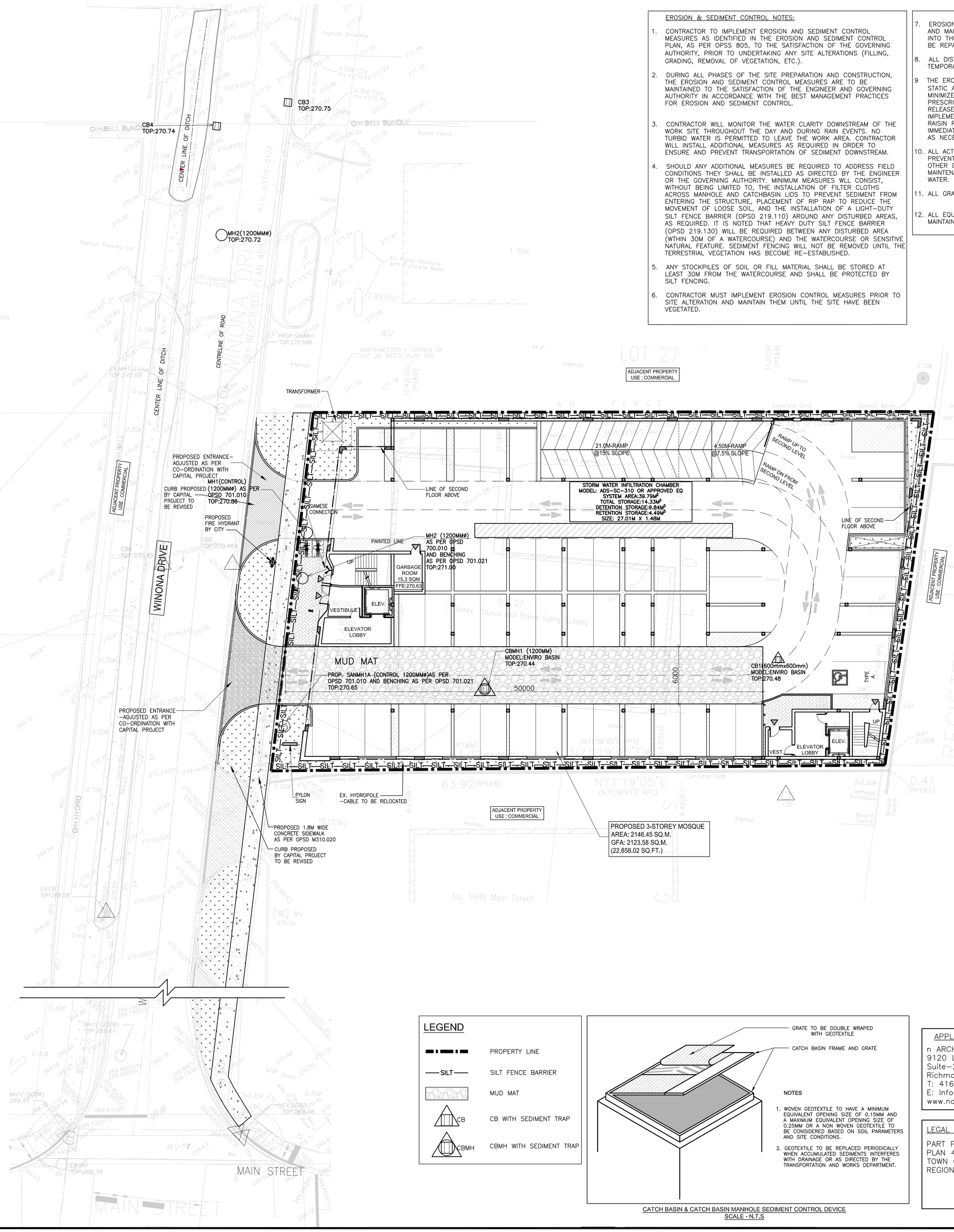
PROJECT:

27 WINONA DR, WHITCHURCH STOUFFVILLE, ON PLACE OF WORSHIP-MOSQUE

DRAWING TITLE:

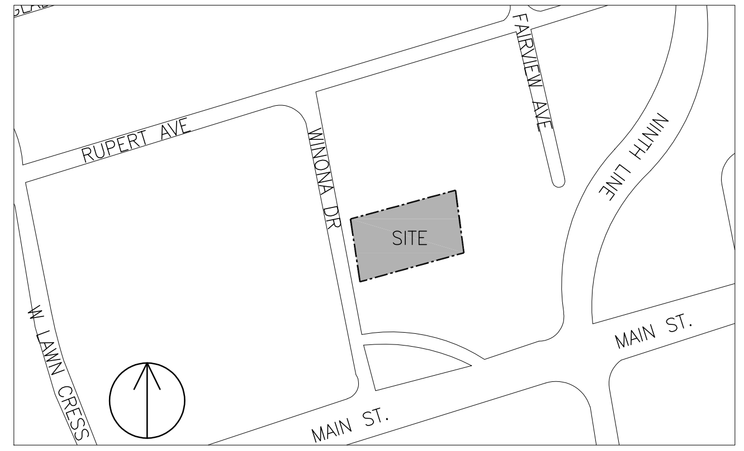
SITE SERVICING PLAN

DRAWN BY: SJ	DATE: 26 JUNE 2024
CHECKED BY: AZ	SCALE: 1:200
PROJECT NO.: 22-71	DRAWING NO.: C2



EROSION & SEDIMENT CONTROL NOTES:

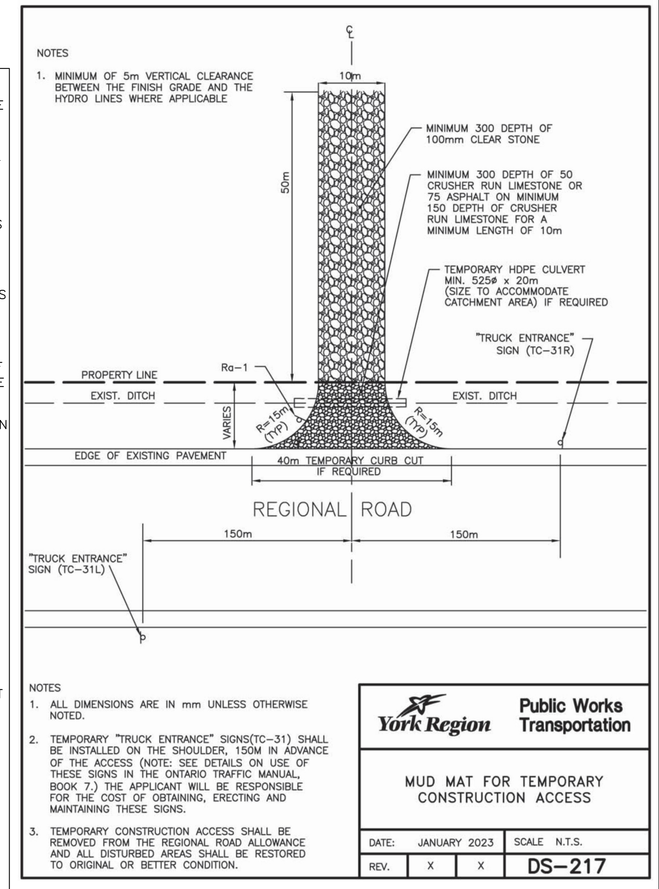
1. CONTRACTOR TO IMPLEMENT EROSION AND SEDIMENT CONTROL MEASURES AS IDENTIFIED IN THE EROSION AND SEDIMENT CONTROL PLAN, AS PER OPSS 805, TO THE SATISFACTION OF THE GOVERNING AUTHORITY, PRIOR TO UNDERTAKING ANY SITE ALTERATIONS (FILLING, GRADING, REMOVAL OF VEGETATION, ETC.).
2. DURING ALL PHASES OF THE SITE PREPARATION AND CONSTRUCTION, THE EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE MAINTAINED TO THE SATISFACTION OF THE ENGINEER AND GOVERNING AUTHORITY IN ACCORDANCE WITH THE BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL.
3. CONTRACTOR WILL MONITOR THE WATER CLARITY DOWNSTREAM OF THE WORK SITE THROUGHOUT THE DAY AND DURING RAIN EVENTS. NO TURBID WATER IS PERMITTED TO LEAVE THE WORK AREA. CONTRACTOR WILL INSTALL ADDITIONAL MEASURES AS REQUIRED IN ORDER TO ENSURE AND PREVENT TRANSPORTATION OF SEDIMENT DOWNSTREAM.
4. SHOULD ANY ADDITIONAL MEASURES BE REQUIRED TO ADDRESS FIELD CONDITIONS THEY SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER OR THE GOVERNING AUTHORITY. MINIMUM MEASURES WLL CONSIST, WITHOUT BEING LIMITED TO, THE INSTALLATION OF FILTER CLOTHS ACROSS MANHOLE AND CATCHBASIN LIDS TO PREVENT SEDIMENT FROM ENTERING THE STRUCTURE, PLACEMENT OF RIP RAP TO REDUCE THE MOVEMENT OF LOOSE SOIL AND THE INSTALLATION OF A LIGHT-DUTY SILT FENCE BARRIER (OPSD 219.110) AROUND ANY DISTURBED AREAS, AS REQUIRED. IT IS NOTED THAT HEAVY DUTY SILT FENCE BARRIER (OPSD 219.130) WILL BE REQUIRED BETWEEN ANY DISTURBED AREA (WTHIN 30M OF A WATERCOURSE) AND THE WATERCOURSE OR SENSITIVE NATURAL FEATURE. SEDIMENT FENCING WILL NOT BE REMOVED UNTIL THE TERRESTRIAL VEGETATION HAS BECOME RE-ESTABLISHED.
5. ANY STOCKPILES OF SOIL OR FILL MATERIAL SHALL BE STORED AT LEAST 30M FROM THE WATERCOURSE AND SHALL BE PROTECTED BY SILT FENCING.
6. CONTRACTOR MUST IMPLEMENT EROSION CONTROL MEASURES PRIOR TO SITE ALTERATION AND MAINTAIN THEM UNTIL THE SITE HAVE BEEN VEGETATED.
7. EROSION AND SEDIMENT CONTROL (ECS) MEASURES WILL BE IMPLEMENTED PRIOR TO, AND MAINTAINED DURING CONSTRUCTION PHASES TO PREVENT ENTRY OF SEDIMENT INTO THE WATER. ALL DAMAGED EROSION AND SEDIMENT CONTROL MEASURES SHOULD BE REPAIRED OR REPLACED WITHIN 48 HOURS OF INSPECTION OR BOTH.
8. ALL DISTURBED AREAS WILL BE MINIMIZED TO THE EXTENT POSSIBLE, AND TEMPORARILY OR PERMANENTLY STABILIZED OR RESTORED AS THE WORK PROGRESS.
9. THE EROSION AND SEDIMENT CONTROL STRATEGIES OUTLINED ON THE PLANS ARE NOT STATIC AND MAY NEED TO BE UPGRADED/AMENDED AS SITE CONDITION CHANGE TO MINIMIZE SEDIMENT LADEN RUNOFF FROM LEAVING THE WORK AREA. IF THE PRESCRIBED MEASURES ON THE PLANS ARE NOT EFFECTIVE IN PREVENTING THE RELEASE OF A DELETERIOUS SUBSTANCE, THEN ALTERNATIVE MEASURES MUST BE IMPLEMENTED IMMEDIATELY TO MINIMIZE THE POTENTIAL ECOLOGICAL IMPACTS AND A RAISIN REGION CONSERVATION AUTHORITY ENFORCEMENT OFFICE SHOULD BE IMMEDIATELY CONTACTED. ADDITIONAL ESC MEASURES TO BE KEPT ON SITE AND USED AS NECESSARY.
10. ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCE INTO THE WATER. VEHICULAR REFUELING AND MAINTENANCE AND REFUELING WILL BE CONDUCTED A MINIMUM OF 30M FROM THE WATER.
11. ALL GRADES WITHIN THE REGULATORY FLOOR PLAN WILL BE MAINTAINED OR MATCHED.
12. ALL EQUIPMENT WORKING WITHIN 30M OF THE WATERCOURSE SHALL BE WELL MAINTAINED, CLEAN AND FREE OF LEAKS.



KEY MAP
SCALE: N.T.S.

GENERAL NOTES:

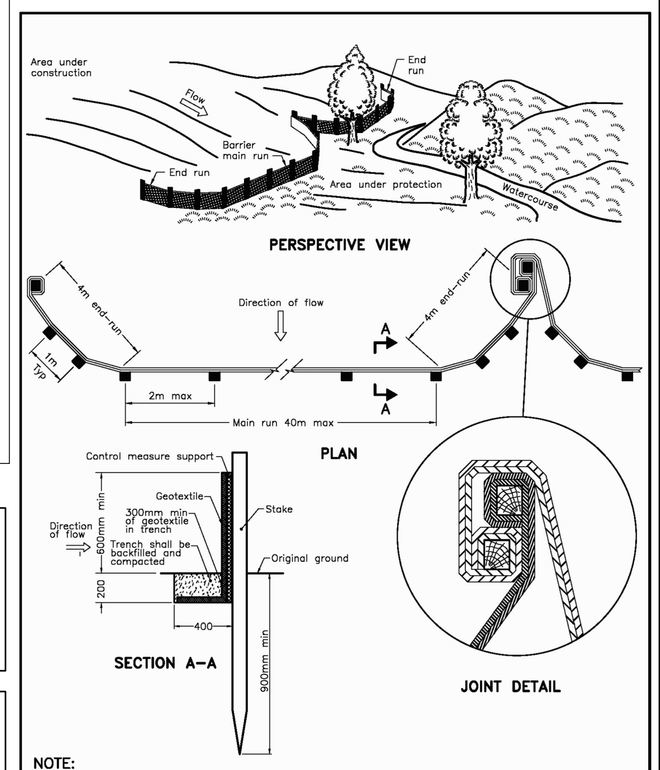
1. ALL WORKS, MATERIALS AND CONSTRUCTION METHODS CONFIRM TO THE LATEST MUNICIPAL STANDARDS, THE PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS (OPSD AND OPSS), AND WHERE APPLICABLE / REQUIRED, LOCAL UTILITY STANDARDS, MINISTRY OF THE ENVIRONMENT (MOE), THE ONTARIO BUILDING CODE (OBC) AND ONTARIO OF MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY.
2. ALL WORK SHALL BE COMPLETED IN ACCORDANCE WITH THE "ONTARIO OCCUPATIONAL HEALTH AND SAFETY ACT" AND ITS LATEST AMENDMENTS THE GENERAL CONTRACTOR SHALL BE DEEMED TO BE THE CONSTRUCTOR AS DEFINED IN THE ACT.
3. SHOULD DEEPLY BURIED ARCHEOLOGICAL REMAINS BE FOUND ON THE PROPERTY DURING CONSTRUCTION ACTIVITIES THE HERITAGE OPERATIONS UNIT OF THE ONTARIO MINISTRY OF CULTURE MUST BE NOTIFIED IMMEDIATELY (416-314-8392). IN THE EVENT THAT HUMAN REMAINS ARE ENCOUNTERED DURING SOIL STRIPPING ACTIVITIES, BOTH OF THE ONTARIO MINISTRY OF CULTURE, AND THE REGISTRAR OR DEPUTY REGISTRAR OF THE CEMETERIES REGULATION UNIT OF THE MINISTRY OF CONSUMER AND COMMERCIAL RELATIONS (416-326-8392), SHOULD BE NOTIFIED IMMEDIATELY AS WELL AS THE LOCAL POLICE.
4. ALL TEMPORARY TRAFFIC CONTROL AND SIGNAGE DURING CONSTRUCTION ACCORDANCE WITH CURRENT ONTARIO TRAFFIC MANUAL – BOOK 7 – TEMPORARY CONDITIONS (LATEST EDITION).
5. THE CONTRACTOR SHALL RECTIFY ANY DISTURBED AREAS TO ITS ORIGINAL CONDITION OR BETTER TO THE SATISFACTIONS OF THE GOVERNING AUTHORITIES.
6. THE DRAWING SHALL BE READ IN CONJUNCTIONS WITH ALL DRAWINGS, REPORTS AND SPECIFICATIONS THAT RELATE TO THIS PROJECT.
7. FOR ALL LEGAL SURVEY AND TOPOGRAPHY INFORMATION REFER TO PLAN PREPARED BY RICHMOND SURVEYING INC. DATED. AUGUST 18, 2024
8. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED THE FIELD BY THE CONTRACTOR PRIOR TO THE START OF CONSTRUCTION.
9. THE CONTRACTOR IS TO REPORT ALL DISCOVERIES OF ERRORS OMISSIONS OR DISCREPANCIES TO THE ENGINEER AS APPLICABLE. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO: 1 CONFIRM UTILITY LOCATIONS, AND 2) NOTIFY THE ENGINEER OF POSSIBLE CONFLICTS, PRIOR TO CONSTRUCTION, WILL BE TO THE CONTRACTOR'S PERIL AND EXPENSE.
10. THE CONTRACTOR SHALL CONFIRM THE LOCATION OF ALL EXISTING UTILITIES WITHIN THE SITE AND ADJACENT WORK AREAS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EXISTING UTILITIES TO THE SATISFACTIONS OF THE GOVERNING AUTHORITY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OR REPLACEMENT OF ANY SERVICES OR UTILITIES DISTURBED DURING CONSTRUCTION, TO THE SATISFACTION OF THE GOVERNING AUTHORITY.
11. ALL DIMENSIONS ARE IN METERS UNLESS SPECIFIED OTHERWISE.
12. THERE WILL BE NO SUBSTITUTION OF MATERIALS OR SPECIFIED PRODUCTS UNELESS PRIOR WRITTEN APPROVAL IS RECEIVED FROM THE ENGINEER.
13. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RECOMMENDATIONS MADE IN THE LATEST GEO-TECHNICAL REPORT, AND THE STORM WATER MANAGEMENT REPORT FOR THIS SITE IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN THE LATEST COPIES OF SAID REPORTS.
14. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING, AND BEARING THE COSTS OF, ALL REQUIRED PERMITS, UNLESS SPECIFIED OTHERWISE.
15. ALL NECESSARY CLEARING AND GRUBBING SHALL BE COMPLETED BY THE CONTRACTOR MUST OBTAIN APPROVAL FROM THE CONTRACTOR ADMINISTRATOR AND/OR THE MUNICIPALITY PRIOR TO ANY TREE CUTTING/REMOVAL.
16. THE CONTRACTOR SHALL PROVIDE THE ENGINEER PERTINENT AS-BUILT MEASUREMENT, NOTES AND MARK-UPS TO ENABLE THE ENGINEER TO REVIEW AND REPAIRS AS-BUILT GRADING AND SITE SERVICING PLANS.
17. IT IS THE RESPONSIBILITIES IF THE CONTRACTOR TO VERIFY THAT THE SITE BENCHMARK(S) HAS NOT BEEN ALTERED OR DISTURBED AND THAT IT'S RELATIVE ELEVATIONS AND DESCRIPTIONS AND AGREES WITH THE INFORMATION DEPICTED ON THIS PLAN.
18. ANY EXISTING OR DISCOVERED WELLS OR MONITORING WELLS FOUND ON THE PROPERTY WILL NEED TO BE PROPERLY ABANDONED IN ACCORDANCE WITH O. REG. 903 AND IT'S AMENDMENTS.



York Region — Public Works Transportation

MUD MAT FOR TEMPORARY CONSTRUCTION ACCESS

DATE:	JANUARY 2023	SCALE N.T.S.
REV.	X	X	DS-217



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING — Nov 2021 — Rev 3

HEAVY-DUTY SILT FENCE BARRIER

OPSD 219.130

LEGEND

- PROPERTY LINE
- SILT — SILT FENCE BARRIER
- MUD MAT
- CB — CB WITH SEDIMENT TRAP
- CBMH — CBMH WITH SEDIMENT TRAP

CATCH BASIN & CATCH BASIN MANHOLE SEDIMENT CONTROL DEVICE
SCALE - N.T.S

APPLICANT:
n ARCHITECTURE INC.
9120 Leslie Street,
Suite-208
Richmond Hill, ON. L4B 3J9
T: 416.256.9741
E: Info@narchitecture.com
www.narchitecture.com

OWNER'S INFO:
DARUL KHAIR CENTER STOUFVILLE
86 RINGWOOD DR. UNIT 36
WHITCHURCH-STOUFVILLE , ON

LEGAL DESCRIPTION:
PART PLAN OF LOT 26 REGISTERED PLAN 455
TOWN OF WHITCHURCH STOUFFVILLE
REGIONAL MUNICIPALITY OF YORK

SURVEY INFOMATION:
RICHMOND SURVEYING INC.
344-9471 YONGE STREET,
RICHMOND HILL, ON
PH.:647-333-6200
MAIL: mojito.tavalla@gmail.com
PLAN DATED: AUGUST 18, 2024

n Engineering Inc
9120 Leslie Street, Suite-208
Richmond Hill, Ontario. L4B 3J9
T: 416.256.9741
E: info@nengineering.com
www.nengineering.com

LICENCED PROFESSIONAL ENGINEER
A.S.ZIAUDDIN
100233432
08DEC.2025
PROVINCE OF ONTARIO

N (GEODETIC NORTH)
PROJECT NORTH

NOT FOR CONSTRUCTION

No.	Date	Version	Dwn
8.	08 DEC. 2025	ISSUED FOR ZBA II (DA3)	LU
7.	21 NOV. 2025	ISSUED FOR COORDINATION	LU
6.	23 MAY. 2025	WATER SERVICE CONNECTION UPDATED AS PER CITY STANDARD	LU
5.	13 MAY. 2025	STORM SEWER CONNECTION UPDATED AS PER CITY STANDARD	LU
4.	19 MAR. 2025	ISSUED FOR ZBA (DA2)	LU
3.	10 FEB. 2025	RE-ISSUED FOR COORDINATION WITH CAPITAL PROJECT	LU
2.	06 FEB. 2025	ISSUED FOR COORDINATION WITH CAPITAL PROJECT	LU
1.	05 NOV. 2024	ISSUED FOR PRE-CON #3 (DA1)	SP

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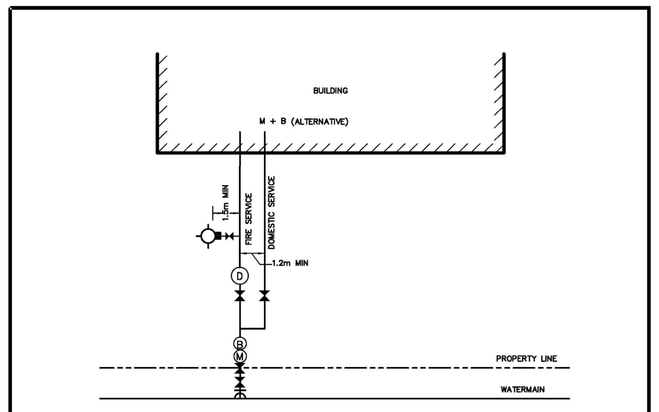
PROJECT:
27 WINONA DR, WHITCHURCH STOUFFVILLE, ON PLACE OF WORSHIP-MOSQUE

DRAWING TITLE:
EROSION & SEDIMENT CONTROL PLAN

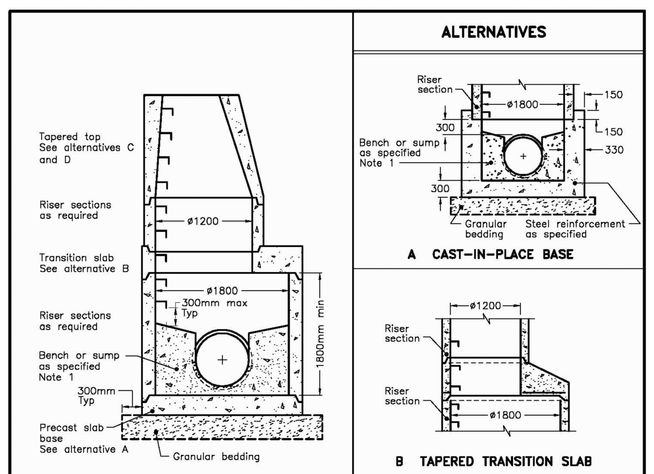
DRAWN BY: SJ	DATE: 26 JUNE 2024
CHECKED BY: AZ	SCALE: 1:200
PROJECT NO.: 22-71	DRAWING NO.: C3



NOTES:

1. THE REQUIRED DETECTOR ASSEMBLY AND/OR CHECK VALVE AND/OR BACKFLOW PREVENTOR ON THE FIRE SERVICE IS DETERMINED BASED ON THE FIRE SPRINKLER OR STANDPIPE CLASSIFICATION AS FOUND IN SECTION 7.8.2.4. BACKFLOW FROM FIRE PROTECTION SYSTEMS, OF THE CURRENT ONTARIO BUILDING CODE AND SECTION 5.5 OF THE CSA B64.10, SERIES STANDARD. IF THE BUILDING CODE AND CSA B64.10 REQUIRES A DOUBLE CHECK VALVE ASSEMBLY FOR THE FIRE SERVE THEN THE WATER SUPPLY BYLAW REQUIRES IT TO BE DOUBLE CHECK DETECTOR ASSEMBLY. THEN IT SHOULD BE A REDUCED PRESSURE DETECTOR ASSEMBLY. IT SHOULD BE NOTED THAT A REDUCED PRESSURE DETECTOR ASSEMBLY CAN NOT BE INSTALLED BELOW GRADE IN A VAULT OR CHAMBER.
2. WHEN A BUILDING REQUIRES A HYDRANT FOR FIRE PROTECTION MAKE ALL ATTEMPTS TO LOCATE PROPOSED HYDRANT ON PRIVATE PROPERTY.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE NOTED.
4. INDUSTRIAL OR INSTITUTIONAL PROPERTIES REQUIRING A 250L/S FIRE SERVICE SHALL INSTALL SERVICING CONNECTIONS IN ACCORDANCE WITH SECTION E8.03 OF THE TOWN OF WHITCHURCH–STOUFFVILLE DESIGN GUIDELINES AND STANDARDS.

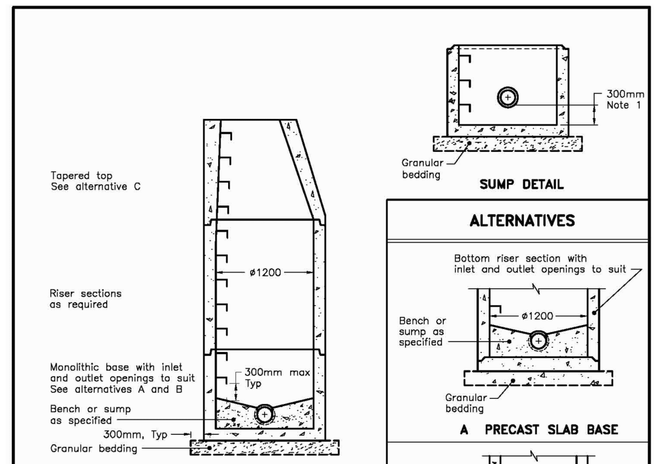
TOWN OF WHITCHURCH–STOUFFVILLE		APPROVED: DK
Stouffville	WATER SERVICING FOR SINGLE BUILDING WITH FRONTAGE ON MUNICIPAL ROAD ALLOWANCE - ONE LOT	DATE: AUG. 2023
	NON-RESIDENTIAL, COMMERCIAL AND INSTITUTIONAL LOTS OF BLOCKS (28.00)	ISSUE NO. 3
		SCALE: N.T.S.
		DWG. NO. WS-614



NOTES:

1 For sump detail, see OPSD 701.010.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, 701.050, 701.051, 703.012, 703.022, and 706.020.
C Structures exceeding 5.0m in depth shall include safety platform according to OPSD 404.020 or 404.022.
D Pipe support shall be according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

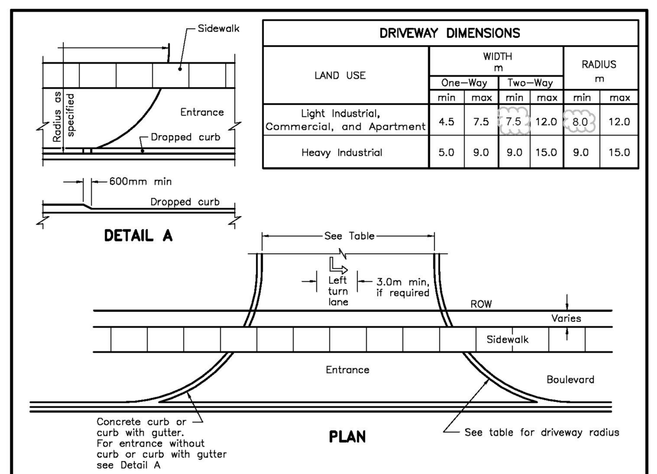
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1800mm DIAMETER		
		OPSD 701.012



NOTES:

1 The sump is measured from the lowest invert.
A Granular backfill shall be placed to a minimum thickness of 300mm all around the maintenance hole.
B Precast concrete components shall be according to OPSD 701.030, 701.031, or 701.032.
C Structure exceeding 5.0m in depth shall include safety platform according to OPSD 404.020.
D Pipe support according to OPSD 708.020.
E For benching and pipe opening details, see OPSD 701.021.
F For adjustment unit and frame installation, see OPSD 704.010.
G All dimensions are nominal.
H All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 5
PRECAST CONCRETE MAINTENANCE HOLE 1200mm DIAMETER		
		OPSD 701.010

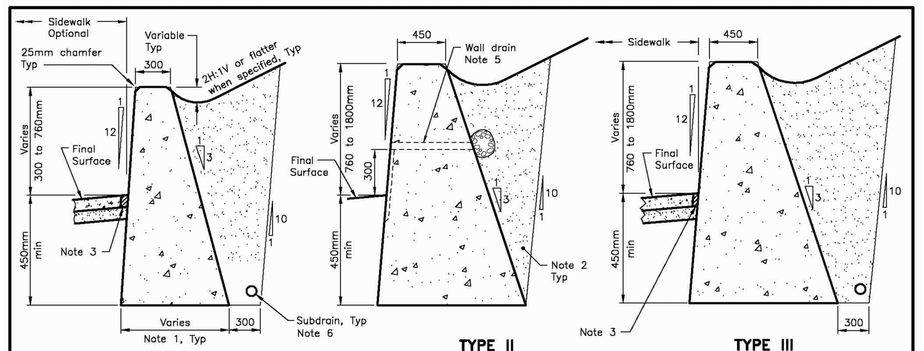


DRIVEWAY DIMENSIONS						
LAND USE	WIDTH m				RADIUS m	
	One–Way		Two–Way			
	min	max	min	max	min	max
Light Industrial, Commercial, and Apartment	4.5	7.5	7.5	12.0	8.0	12.0
Heavy Industrial	5.0	9.0	9.0	15.0	9.0	15.0

NOTES:

A All dimensions are in millimetres unless otherwise shown.

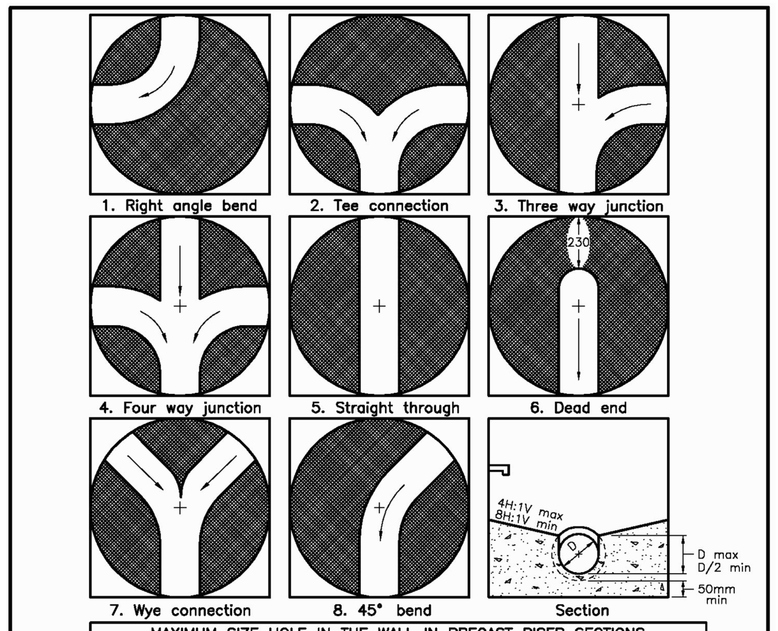
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2009	Rev 1
URBAN INDUSTRIAL, COMMERCIAL, AND APARTMENT ENTRANCES	DATE: NOV. 23, 2018	
	WS MODIFIED BY: DK	
	ISSUE No. 2	
		OPSD M350.010



NOTES:

1 Walls shall be founded on undisturbed soil having a minimum bearing capacity at ultimate limit states of 200kPa for Type I and 300kPa for Type II and Type III.
2 Excavation for toe walls shall be backfilled with free draining granular material.
3 10mm preformed joint filler, Type A, non–extruding and resilient bituminous type as specified.
4 Cold applied rubber asphalt joint sealing compound.
5 Where specified, wall drains shall be installed as per OPSD 3190.100.
6 150mm dia perforated pipe subdrain wrapped in geotextile.
A Maximum height of slope above top of wall is 4m.
B Concrete for toe walls shall be 30MPa.
C All dimensions are in millimetres unless otherwise shown.

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

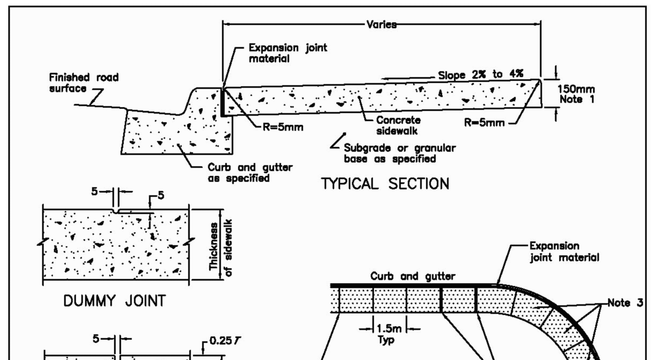


MAXIMUM SIZE HOLE IN THE WALL IN PRECAST RISER SECTIONS					
Maintenance Hole Diameter	No. 1–4	No. 5 and 6	No. 8	No.7	
				Inlet Hole	Outlet Hole
1200	700	860	780	700	860
1500	860	1220	960	860	1170
1800	1220	1485	1220	1220	1485
2400	1485	2020	1760	1485	2020
3000	1930	2450	2300	1930	2450
3600	2470	3085	2730	2470	3085

NOTES:

1 Slopes shall be maintained from the outlet hole opening for top of benching.
A Concrete for benching shall be 30MPa.
B When benching is hand–finished, it shall be given wood float finish, channel shall be given steel trowel finish.
C Benching slope and height shall be as specified.
D When specified, maintenance holes that are 1200mm in diameter with a uniform channel for 200 or 250mm pipe may be prebenched at the manufacturer with standardized benching slope and channel orientation.
E All dimensions are nominal.
F All dimensions are in millimetres unless otherwise shown.

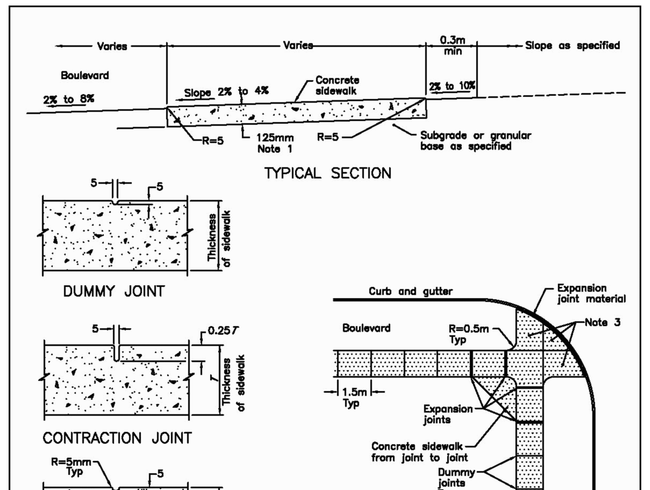
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2014	Rev 4
MAINTENANCE HOLE BENCHING AND PIPE OPENING ALTERNATIVES		
		OPSD 701.021



NOTES:

1 At commercial and industrial driveways, the thickness shall be 200mm.
2 Sidewalk width shall be wider when specified
3 This OPSD shall be read in conjunction with OPSSDM310.030, 310.031, 310.32, 310.033 and 310.039.
A All dimensions are in millimeters unless otherwise specified.
B Concrete to be 32MPa on 100mm of 19mm crusher run limestones or approved equivalent.
C Expansion joint spacing shall not be greater than 9 meters

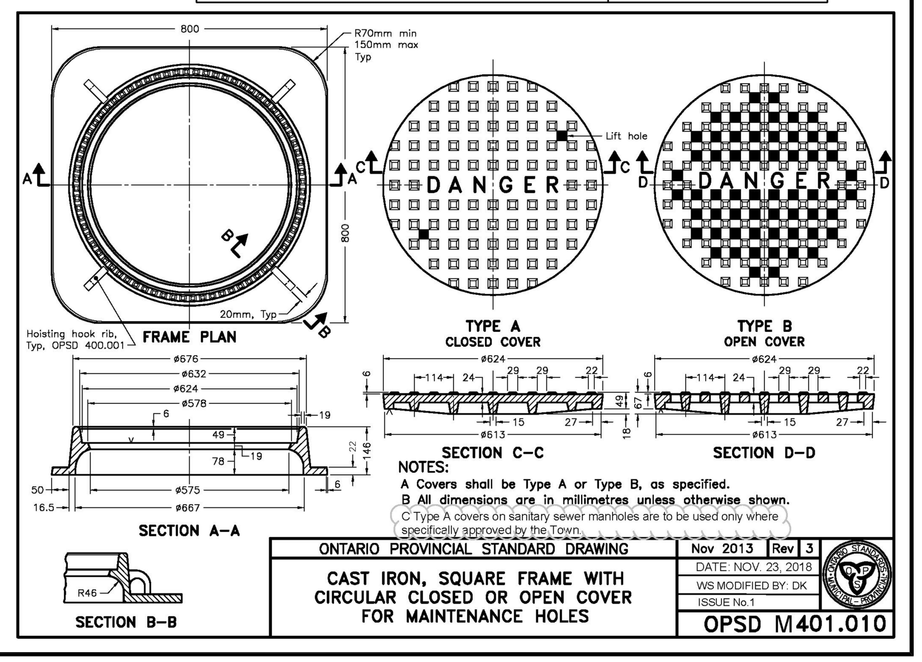
ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
CONCRETE SIDEWALK ADJACENT TO CURB AND GUTTER	DATE: JAN. 31, 2019	
	WS MODIFIED BY: PM	
	ISSUE NO. 4	
		OPSD – M310.020



NOTES:

1 Sidewalk thickness at residential driveways and adjacent to curb shall be 150mm. At commercial and industrial driveways, the thickness shall be 200mm
2 Sidewalk width shall be wider when specified
3 This OPSD shall be read in conjunction with OPSD M310.030, 310.031, 310.32, 310.033 and 310.039.
A All dimensions are in millimeters unless otherwise specified.
B Concrete to be 32MPa on 100mm of 19mm crusher run limestones or approved equivalent.
C Expansion joint spacing shall not be greater than 9 meters

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
CONCRETE SIDEWALK	DATE: JAN. 31, 2019	
	WS MODIFIED BY: PM	
	ISSUE NO. 3	
		OPSD–M310.010



NOTES:

A Covers shall be Type A or Type B, as specified.
B All dimensions are in millimetres unless otherwise shown.
C Type A covers on sanitary sewer manholes are to be used only where specifically approved by the Town.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2013	Rev 3
CAST IRON, SQUARE FRAME WITH CIRCULAR CLOSED OR OPEN COVER FOR MAINTENANCE HOLES	DATE: NOV. 23, 2018	
	WS MODIFIED BY: DK	
	ISSUE No.1	
		OPSD M401.010

NOT FOR CONSTRUCTION

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Richmond Hill, Ontario. L4B 3J9
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LICENCED PROFESSIONAL ENGINEER
A.S.ZIAUDDIN
100233432
08DEC.2025
PROVINCE OF ONTARIO

No.	Date	Version	Dwn
8.	08 DEC. 2025	ISSUED FOR ZBA II (DA3)	LU
7.	21 NOV. 2025	ISSUED FOR COORDINATION	LU
6.	23 MAY. 2025	WATER SERVICE CONNECTION UPDATED AS PER CITY STANDARD	LU
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4.	19 MAR. 2025	ISSUED FOR ZBA (DA2)	LU
3.	10 FEB. 2025	RE-ISSUED FOR COORDINATION WITH CAPITAL PROJECT	LU
2.	06 FEB. 2025	ISSUED FOR COORDINATION WITH CAPITAL PROJECT	LU
1.	05 NOV. 2024	ISSUED FOR PRE-CON #3 (DA1)	SP

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PROJECT:

27 WINONA DR, WHITCHURCH STOUFFVILLE, ON PLACE OF WORSHIP-MOSQUE

DRAWING TITLE:

STANDARD DRAWINGS

DRAWN BY: SJ	DATE: 26 JUNE 2024
CHECKED BY: AZ	SCALE: 1:200
PROJECT NO.: 22-71	DRAWING NO.: C4

GENERAL NOTES

1. THE NOTES ON THIS SHEET APPLY TO ALL WORKS UNDER THIS CONTRACT UNLESS OTHERWISE NOTED ON THE PLAN AND PROFILE DRAWINGS AND/OR SPECIFIC DETAIL DRAWINGS.
2. ALL MATERIALS ARE TO COMPLY WITH THE MANUFACTURER'S SPECIFICATIONS PER APPROVED PRODUCTS AS LISTED IN SCHEDULE 'C' OF THE TOWN'S GUIDELINES.
3. THE STANDARD DRAWINGS OF THE TOWN OF WHITCHURCH–STOUFFVILLE, ONTARIO PROVINCIAL STANDARDS AND SPECIFICATIONS (OPSS) AND THE ONTARIO PROVINCIAL STANDARD DRAWINGS (OPSD) CONSTITUTE PART OF THE PLANS OF THIS CONTRACT. ORDER OF PRECEDENCE OF STANDARD DRAWINGS IS FIRSTLY TOWN OF WHITCHURCH–STOUFFVILLE STANDARD DRAWINGS, AND SECONDLY ONTARIO PROVINCIAL STANDARD DRAWINGS.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ALL RELEVANT STANDARD DRAWINGS AND SPECIFICATIONS AS REQUIRED FOR THIS CONTRACT.
5. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS SHOWN ON THE ENGINEERING DRAWINGS ARE IN METRES OR MILLIMETERS.
6. ALL DIMENSIONS AND ELEVATIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND ANY DISCREPANCIES SHALL BE REPORTED IMMEDIATELY TO THE ENGINEER.
7. EXISTING SERVICES AND UTILITIES SHOWN ON THESE CONTRACT DRAWINGS ARE BASED ON THE BEST INFORMATION AVAILABLE AND THEIR LOCATIONS ARE NOT GUARANTEED. THE CONTRACTOR SHALL INTERPRET THIS INFORMATION AS HE WISHES WITH THE UNDERSTANDING THAT THE OWNER DISCLAIMS ALL RESPONSIBILITY FOR ITS ACCURACY AND/OR SUFFICIENCY.
8. THE CONTRACTOR IS RESPONSIBLE TO ARRANGE FOR AND MAINTAIN ALL UTILITY STAKE–OUTS AND LOCATES.
9. ALL PRIMARY HYDRO, STREET LIGHT CABLE, TELECOMMUNICATION CABLE, GAS LINES AND CABLE T.V. SHALL BE PLACED UNDERGROUND IN LOCATIONS SHOWN ON THE ROAD SECTIONS LISTED IN THE STANDARD DRAWINGS.
10. ALL SILT CONTROL AND EROSION PROTECTION DEVICES ARE TO BE IN PLACE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION AND SHALL REMAIN IN PLACE AND BE MAINTAINED BY THE CONTRACTOR UNTIL CONSTRUCTION IS COMPLETE AND THE GROUND COVER HAS ESTABLISHED GROWTH, SUBJECT TO APPROVAL BY THE TOWN.
11. NATIVE MATERIAL, SUITABLE FOR BACKFILL, SHALL BE COMPACTED TO 95% STANDARD PROCTOR MAXIMUM DRY DENSITY.
12. GRANULAR MATERIAL USED FOR BACKFILL, SHALL BE PLACED IN LAYERS 150mm IN DEPTH MAXIMUM AND COMPACTED TO 100% STANDARD PROCTOR MAXIMUM DRY DENSITY.
13. ALL DISTURBED AREAS ARE TO BE REINSTATED TO THEIR ORIGINAL CONDITION OR BETTER, AS DETERMINED BY THE ENGINEER. ALL GRASS AND VEGETATION COVERED AREAS SHALL BE RESTORED BY PLACING A MIMIMUM DEPTH OF 150mm AND A MAXIMUM DEPTH OF 250mm OF APPROVED TOPSOIL AND No. 1 NURSERY SOD.
14. ALL FENCING SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TOWN STANDARD DRAWINGS.
15. THE STREET LIGHTING SYSTEM SHALL BE DESIGNED BY A QUALIFIED CONSULTING ENGINEER IN ACCORDANCE WITH THE ILLUMINATION ENGINEERING SOCIETY OF NORTH AMERICA (IESNA) LATEST EDITION STANDARDS AND APPROVED BY THE TOWN. STREET LIGHTING SYSTEMS FOR ROADWAYS IN THE TOWN OF WHITCHURCH–STOUFFVILLE SHALL MEET THE REQUIREMENTS OF HYDRO ONE.
16. ALL DESIGNS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE REGION OF YORK STANDARDS WHICH MEET THE REQUIREMENTS OF THE ACCESSIBILITY FOR ONTARIANS WITH DISABILITIES ACT (AODA).

GENERAL NOTES – ROADS

1. THE ROAD PAVEMENT MINIMUM STRUCTURE SHALL CONSIST OF THE FOLLOWING AND WILL BE CONFIRMED BY A SOILS CONSULTANT AND APPROVED BY THE TOWN:

LOCAL ROAD:	40mm HL3 SURFACE COURSE ASPHALT
	50mm HL8 BASE COURSE ASPHALT
	150mm 19mm CRUSHER RUN LIMESTONE *
	300mm 50mm CRUSHER RUN LIMESTONE **
COLLECTOR ROAD:	40mm HL3 SURFACE COURSE ASPHALT
	100mm HL8 BASE COURSE ASPHALT (2 LIFTS)
	150mm 19mm CRUSHER RUN LIMESTONE *
	450mm 50mm CRUSHER RUN LIMESTONE **

*EQUIVALENT DEPTH OF GRANULAR A FROM AN APPROVED SOURCE MAY BE SUBSTITUTED UPON OBTAINING WRITTEN APPROVAL FROM THE TOWN.

**EQUIVALENT DEPTH OF RECYCLED CONCRETE OR GRANULAR B FROM AN APPROVED SOURCE MAY BE SUBSTITUTED UPON OBTAINING WRITTEN APPROVAL FROM THE TOWN.

2. BOULEVARDS IN URBAN AREAS AND DITCHES IN RURAL AREAS ARE TO BE STABILIZED WITH No. 1 NURSERY SOD PLACED ON A MINIMUM 150mm AND MAXIMUM 250mm DEPTH OF TOPSOIL.
3. NATIVE SUBGRADE TO BE COMPACTED TO MINIMUM 98% STANDARD PROCTOR MAXIMUM DRY DENSITY AND SHALL BE PROOF ROLLED. NATIVE SUBGRADE SHALL HAVE A CROSS–FALL OF 3% AND THE MATERIAL SHALL BE APPROVED BY A SOILS CONSULTANT AND IS SUBJECT TO APPROVAL BY THE TOWN ENGINEER.
4. 150mm DIAMETER PERFORATED, FILTER CLOTH WRAPPED PLASTIC CORRUGATED SUB–DRAINS WILL BE REQUIRED TO RUN CONTINUOUS ALONG BOTH SIDES OF ALL ROADS WITH CURB AND GUTTER.
5. CONCRETE CURB AND GUTTER CONFORMING TO OPSD 600.040 OR 600.070 (TWO STAGE) SHALL BE USED. CONCRETE STRENGTH IS TO BE A MINIMUM OF 32MPa AT 28 DAYS WITH 7% ± 1.5% AIR ENTRAINMENT.
6. DRIVEWAY DEPRESSIONS SHALL BE FORMED IN THE CURB AS PER OPSD 351.010.
7. SIDEWALK CONSTRUCTION SHALL COMPLY WITH OPSD M310.010 (MODIFIED) AND SHALL BE CONSTRUCTED ON 100mm OF 19mm CRUSHER RUN LIMESTONE COMPACTED FOUNDATION. CONCRETE STRENGTH IS TO BE A MINIMUM OF 32MPa AT 28 DAYS WITH 7% ± 1.5% AIR ENTRAINMENT. SIDEWALK AT RESIDENTIAL DRIVEWAYS TO BE 150mm THICK, AND AT INDUSTRIAL/COMMERCIAL/INSTITUTIONAL/MULTIPLE RESIDENTIAL BLOCK DRIVEWAYS SHALL BE 200mm THICK..
8. PROVIDE FROST TAPERS FOR ROAD CROSSING CULVERTS AS PER OPSD 803.030.
9. RESIDENTIAL DRIVEWAYS TO BE CONSTRUCTED WITH A MINIMUM OF 150mm GRANULAR 'A', AND BE PAVED WITH A MINIMUM OF 50mm OF HL8 BASE AND 25mm HL3A TOP ASPHALT FROM STREET TO GARAGE/DWELLING, OR AS APPROVED BY THE TOWN.
10. ALL ACCESS DRIVEWAYS SHALL BE LOCATED A MINIMUM OF 1.2m FROM LIGHT POLES, HYDRO TRANSFORMERS, CATCHBASINS, HYDRANTS, WATERMAIN VALVES, BELL MANHOLES, BELL AND CABLE TV JUNCTION BOXES, UTILITY VAULTS, WATER SERVICE VALVE BOXES, SIDE LOT LINES AND OTHER DRIVEWAYS. WHERE FRONTAGE LIMITATIONS INTERFERE WITH STANDARD LOCATIONS, SITE SPECIFIC SOLUTIONS SHALL BE DETAILED IN THE PLAN AND PROFILE AND LOT GRADING PLANS.
11. MINIMUM SLOPES ON DRIVEWAYS SHALL BE 1.0% AND MAXIMUM SLOPES SHALL BE 6.0%.
12. ROAD OCCUPANCY PERMIT IS REQUIRED FROM THE TOWN PUBLIC WORKS DEPARTMENT PRIOR TO THE COMMENCEMENT OF ANY WORK ON ANY ROAD THAT IS EXTERNAL TO THE PLAN. A MINIMUM 48 HOUR NOTICE IS REQUIRED.

GENERAL NOTES – STORM SEWERS

1. STORM SEWER TO BE LOCATED TYPICALLY 1.5m TO THE WEST OR SOUTH OF CENTRELINE OF THE ROAD.
2. PIPE SHALL CONFORM TO THE REQUIREMENTS SHOWN BELOW:
   a. NON–REINFORCED CONCRETE PIPE, CSA STANDARD A257.1 CLASS 1,2,3.
   b. REINFORCED CONCRETE PIPE, CSA STANDARD A257,2 STRENGTH CLASS 50–D, 65–D, 100–D AND 140–D.
   c. PVC PIPE, CSA STANDARD B182.1 AND B182.2 (DR35).
3. ALL STORM SEWERS OVER 450mm DIAMETER SHALL BE CONSTRUCTED WITH REINFORCED CONCRETE PIPE.
4. THE MINIMUM COVER OVER STORM SEWERS SHALL BE 1.5m. THE MAXIMUM DEPTH TO THE OBVERT OF STORM SEWERS WITH DIRECT SERVICE CONNECTIONS SHALL BE 6.0m. WHERE DEEPER SEWERS ARE REQUIRED, LOCAL SEWERS SHALL BE CONSTRUCTED TO PROVIDE FOR DIRECT SERVICE CONNECTIONS.
5. SEWERS SHALL BE CONSTRUCTED WITH 19mm CRUSHER RUN LIMESTONE BEDDING AS PER OPSD 802.010, AND 802.030, UNLESS OTHERWISE SPECIFIED BY A GEOTECHNICAL CONSULTANT AND APPROVED BY THE TOWN.
6. TRENCH BACKFILL APPROVED BY THE GEOTECHNICAL ENGINEER SHALL BE PLACED IN 200mm LIFTS AND COMPACTED TO 95% SPMDD.
7. ALL STORM SEWER MANHOLES TO BE ACCORDING TO TOWN STANDARDS AND BE BENCHED TO OBVERT IN ACCORDANCE WITH OPSD 701.021.
8. DROP STRUCTURES SHALL CONFORM WITH OPSD 1003.010 AND 1003.020.
9. MANHOLE TOPS ARE TO BE SET TO BASE COURSE ASPHALT GRADE AND THEN ADJUSTED TO FINAL GRADE. FRAME AND COVER TO BE PER OPSD M401.010, TYPE 'B'. GRADE AND CROSSFALL ADJUSTMENT SHALL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. MODULAR ADJUSTMENT RINGS ARE TO BE USED TO ADJUST THE MANHOLE TO FINAL GRADE.
10. CATCHBASINS MUST BE OF THE PRECAST TYPE AS SHOWN ON THE OPSD DRAWINGS 705.010 OR 705.020. DOUBLE CATCHBASINS ARE REQUIRED IN VALLEYS.
11. SINGLE CATCHBASIN LEADS SHALL BE PVC DR35 PIPE WITH MINIMUM SLOPE OF 1% AND MINIMUM SIZES AS FOLLOWS:
    a. SINGLE CATCHBASIN 250mm DIAMETER
    b. DOUBLE CATCHBASIN 300mm DIAMETER
    c. REAR LOT CATCHBASIN 250mm DIAMETER
12. THE FRAME AND GRATE FOR CATCHBASINS SHALL BE OPSD 400.010. CATCHBASIN GRATES SHALL INITIALLY BE SET TO BASE ASPHALT AND ADJUSTED TO FINAL GRADE BEFORE PLACEMENT OF TOP ASPHALT..
13. REAR LOT CATCHBASIN LEADS TO BE CONCRETE ENCASED FROM THE STREET LINE TO THE CATCHBASIN, PER STANDARD DETAIL WS–401. FRAME AND GRATE TO BE OPSD 400.010.
14. WHERE CATCHBASINS ARE CONNECTED DIRECTLY TO SEWERS, PRE–MANUFACTURED TEES SHALL BE USED.
15. PARTIAL BULKHEADS ARE REQUIRED AT MANHOLE CONNECTIONS TO EXISTING SEWERS.
16. MANHOLE STEPS ARE TO BE SOLID, RECTANGULAR ALUMINUM PER OPSD 405.020.
17. ROOF LEADERS SHALL DISCHARGE TO GRASSED AREAS ONLY USING CONCRETE SPLASH PADS.
18. "TRENCH PLUGS" AS SPECIFIED BY THE GEOTECHNICAL ENGINEER SHALL BE USED IN THE TRENCH AND PLACED 2 TO 3 METERS UPSTREAM FROM ANY MANHOLE WHICH IS SUSPECTED OF BEING SUSCEPTIBLE TO HIGH WATER LEVELS OF INFLOW/INFILTRATION, SUBJECT TO VERIFICATION BY GEOTECHNICAL ENGINEER.

GENERAL NOTES – SANITARY SEWERS

1. SANITARY SEWERS SHALL GENERALLY BE LOCATED 1.5m NORTH OR EAST OF THE ROAD CENTER.
2. ALL POLYVINYL CHLORIDE (PVC) MAIN LINE SANITARY SEWER PIPE SHALL HAVE WATERTIGHT JOINTS AND MEET CSA STANDARD B182.2, DR35. ALL GASKETTED FITTINGS SHALL BE PVC DR26.
3. SEWERS SHALL BE CONSTRUCTED WITH 19mm CRUSHER RUN LIMESTONE BEDDING AS PER OPSD 802.010, AND 802.030, UNLESS OTHERWISE SPECIFIED BY A GEOTECHNICAL CONSULTANT AND APPROVED BY THE TOWN. IN WATER BEARING SAND, IF EXTENSIVE DEWATERING IS REQUIRED, A CLASS "A" BEDDING CONSISTING OF CONCRETE MAY BE REQUIRED.
4. TRENCH BACKFILL APPROVED BY THE GEOTECHNICAL ENGINEER SHALL BE PLACED IN 200mm LIFTS AND COMPACTED TO 95% SPMDD.
5. FRAMES AND COVERS SHALL BE WATERTIGHT IN ACCORDANCE WITH O.P.S.D. 401.030, EXCEPT WHERE ALTERNATIVES ARE SPECIFICALLY APPROVED BY THE TOWN.
6. THE MINIMUM DEPTH OF SANITARY SEWERS FROM THE CENTERLINE OF ROAD SHALL BE 2.8m. THE MAXIMUM DEPTH TO THE OBVERT OF SANITARY SEWERS WITH DIRECT SERVICE CONNECTIONS SHALL BE 6.0m. WHERE DEEPER SANITARY SEWERS ARE REQUIRED, LOCAL SEWERS SHALL BE CONSTRUCTED TO PROVIDE FOR DIRECT SERVICE CONNECTIONS.
7. INSTALL SEWER DROP CONNECTIONS TO MANHOLES AS PER OPSD 1003.010 AND 1003.020.
8. ALL MANHOLE ADJUSTMENT RINGS SHALL BE MADE WATERTIGHT BY PLACING SEALANT BETWEEN ADJUSTMENT RINGS AND WRAPPED ON THE OUTSIDE OF THE STRUCTURE WITH AN APPROVED COMPOSITE MEMBRANE PRIOR TO BACKFILLING.
9. MANHOLE JOINTS AND PIPE CONNECTIONS AT MANHOLES ARE TO BE MADE WATERTIGHT WITH AN APPROVED COMPOSITE MEMBRANE WRAP, OVERLAPING JOINTS AND CONNECTIONS BY 0.3m ON THE OUTSIDE OF THE STRUCTURE PRIOR TO BACKFILLING.
10. "TRENCH PLUGS" AS SPECIFIED BY THE GEOTECHNICAL ENGINEER SHALL BE USED IN THE TRENCH AND BE PLACED 2 TO 3 METERS UPSTREAM FROM ANY MANHOLE WHICH IS SUSPECTED OF BEING SUSCEPTIBLE TO HIGH WATER LEVELS OF INFLOW/INFILTRATION, SUBJECT TO VERIFICATION BY GEOTECHNICAL ENGINEER.
11. MAINTENANCE HOLE TOPS (FRAMES) ARE TO BE SET TO BASE COURSE ASPHALT GRADE, AND THEN ADJUSTED TO FINAL GRADE WHEN TOP LIFT OF ASPHALT IS PLACED. GRADE AND CROSSFALL ADJUSTMENT SHALL BE MADE USING PRODUCTS SPECIFICALLY MANUFACTURED FOR THAT PURPOSE. MODULAR ADJUSTMENT RINGS INCLUDING ADDITIONAL EXTERNAL COMPOSITE WATERPROOF MEMBRANE WRAP ARE TO BE USED TO ADJUST THE MANHOLE TO FINAL GRADE.
12. PRECAST CONCRETE MANHOLES SHALL CONFORM TO OPSD M701.010 (MODIFIED) FOR 1200mm DIAMETER.
    a. REINFORCED, POURED IN PLACE CONCRETE MANHOLES, ARE SUBJECT TO APPROVAL OF THE TOWN ENGINEER.
    b. SAFETY PLATFORMS ARE TO BE PROVIDED FOR MANHOLES IN ACCORDANCE WITH PROVINCIAL REGULATIONS.
    c. ALL SANITARY MANHOLES TO HAVE BENCHING TO OBVERT PER OPSD 701.021.
13. MINIMUM CLEARANCES BETWEEN SERVICES SHALL BE PROVIDED IN ACCORDANCE WITH M.E.C.P. GUIDELINES. MINIMUM CLEARANCE FOR SEWERS IN THE COMMON TRENCH SHALL BE 450mm BETWEEN THE OUTSIDE OF THE BELLS.
14. BULKHEADS OR PLUGS ARE REQUIRED IN DOWNSTREAM MANHOLE AT OUTLET FROM DEVELOPMENT, UNTIL THE FIRST OCCUPANCY.
15. ALL TESTING OF THE SANITARY SYSTEM IS TO BE COMPLETED IN ACCORDANCE WITH THE "SANITARY SEWER SYSTEM INSPECTION, TESTING AND ACCEPTANCE GUIDELINE"(OCT.2011) AS PREPARED BY THE REGION OF YORK, OR LATEST AMENDMENT THERETO, AND IN ACCORDANCE WITH THE TOWN'S DESIGN GUIDELINES.
16. MANHOLE STEPS ARE TO BE SOLID, RECTANGULAR ALUMINUM PER OPSD 405.020.

GENERAL NOTES – SEWER SERVICE LATERALS

1. SINGLE SANITARY SERVICE LATERAL PIPES SHALL BE 125mm DIAMETER PVC DR28, GREEN IN COLOR. THE SERVICE SHALL BE EXTENDED FROM THE TEST FITTING 1.5m INTO THE LOT WITH A 100mm DIAMETER PVC DR28 SERVICE PIPE.
2. DOUBLE STORM SERVICE LATERAL PIPES SHALL BE 150mm DIAMETER PVC DR 28, WHITE IN COLOR. SINGLE SERVICE PIPES SHALL BE EXTENDED FROM THE WYE TEST FITTING 1.5m INTO EACH LOT WITH 125mm DIAMETER PVC DR28 SERVICE PIPES.
3. ELEVATION OF SERVICE CONNECTIONS AT THE STREETLINE IS TO BE 2.5m MINIMUM BELOW FINISHED GRADE. EACH SERVICE PIPE EXTENDED 1.5m INTO EACH LOT SHALL BE TERMINATED WITH A WATERTIGHT PLUG.
4. THE LOCATION OF THE WATERTIGHT PLUG FOR EACH SERVICE PIPE SHALL BE STAKED WITH A 50mm x 100mm WOOD MARKER PAINTED GREEN FOR SANITARY AND RED FOR STORM.
5. LATERALS SELECTED BY THE TOWN ARE TO BE INSPECTED BY CCTV FROM THE MAINLINE TO THE DWELLING AND A REPORT SUBMITTED TO THE TOWN PRIOR TO OCCUPANCY OF THE DWELLING PER SECTION C6.03 OF THE DESIGN GUIDELINES.
6. TEST FITTINGS AT STREET–LINE TO BE WATERTIGHT PVC FITTING.
7. SERVICE RISERS SHALL BE PROVIDED WHERE THE DEPTH TO THE SEWER OBVERT EXCEEDS 4.5m. THE RISER SHALL RAISE THE SERVICE PIPE TO A DEPTH OF 3m BELOW CENTERLINE OF ROAD. THE MAXIMUM HEIGHT OF A SERVICE RISER SHALL BE 3m, UNLESS SPECIFICALLY APPROVED BY THE TOWN.
8. SERVICE RISERS SHALL CONSIST OF AN ELBOW CONNECTED TO THE MAIN SEWER TEE, OFFSET FROM THE MAIN SEWER SUCH THAT THE RISER AND ELBOW ARE SUPPORTED BY THE MAIN SEWER BEDDING. A CONTROLLED SETTLEMENT JOINT, APPROVED BY THE TOWN, IS REQUIRED ABOVE THE ELBOW CONNECTION TO THE MAIN SEWER TEE. SEE STANDARD DRAWING WS–301.
9. SERVICE CONNECTION BEDDING SHALL BE 19mm CRUSHER RUN LIMESTONE AND INSTALLED PER MODIFIED OPSD M1006.010.

GENERAL NOTES – WATERMAINS

1. WATERMAIN SHALL BE LOCATED AS SHOWN ON THE STANDARD TOWN ROADWAY CROSS SECTIONS. THIS LOCATION SHALL NORMALLY BE ON THE NORTH AND EAST SIDE OF THE STREET. WATERMAIN SHALL BE OFFSET FROM STREET LINE AS PER STANDARD ROAD CROSS SECTION.
2. ALL WATERMAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH OPSS 441. PIPE MATERIAL SHALL BE A MINIMUM CLASS 150 PVC (DR18) IN ACCORDANCE WITH AWWA C900 STANDARDS, LATEST REVISION.
3. WATERMAIN BEDDING SHALL BE GRANULAR A OR AN APPROVED EQUIVALENT AS PER OPSD 802.010 AND AS RECOMMENDED BY THE GEOTECHNICAL ENGINEER.
4. A MINIMUM CLEARANCE BETWEEN THE WATERMAIN AND ALL UTILITIES MUST BE KEPT, WHILE STILL MAINTAINING A MINIMUM DEPTH OF COVER AT ALL TIMES.
5. WATERMAIN SHALL BE INSTALLED WITH A MINIMUM COVER OF 1.8m BELOW THE CENTERLINE OF ROAD.
6. TEMPORARY DEAD–ENDS OF WATERMAINS SHALL BE EQUIPPED WITH A TEMPORARY FIRE HYDRANT.
7. PVC WATERMAIN SHALL INCLUDE TRACER WIRE. A TRACER WIRE SHALL BE PROVIDED ALONG THE TOP OF ALL WATERMAINS. THE WIRE IS TO BE SECURED AT EVERY FITTING AND VALVE AND AT INTERVALS NOT TO EXCEED 3m. ALL TRACING WIRES SHALL BE 12 GAUGE, STRANDED COPPER WIRE WITH OUTER PLASTIC COATING.
8. CONCRETE THRUST BLOCKS ARE NOT PERMITTED. MECHANICAL JOINT RESTRAINTS ARE TO BE INSTALLED AT ALL TEES, HORIZONTAL AND VERTICAL BENDS, HYDRANTS, END OF MAINS AND VALVES, AND IN AREAS OF ENGINEERED FILL INCLUDING SEWER TRENCH BACKFILL. MECHANICAL JOINT RESTRAINTS ARE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ARE TO INCLUDE CATHODIC PROTECTION. HYDRANT TEES TO BE ANCHOR STYLE.
9. EACH FITTING, WATER SERVICE CONNECTION, HYDRANT AND VALVE SHALL BE INSTALLED WITH A 5kg ZINC ANODE OR AN APPROVED EQUIVALENT FOR CATHODIC PROTECTION. PROPOSED ALTERNATIVE CATHODIC PROTECTION MEASURES SHALL BE RECOMMENDED BY A GEOTECHNICAL ENGINEER AND ARE SUBJECT TO APPROVAL OF THE TOWN.
10. CAST IRON MECHANICAL JOINT FITTINGS MEETING AWWA SPECIFICATIONS C–110 AND C.S.A. B137.2 SHALL BE USED ON PVC WATERMAIN 150mm TO 300mm IN DIAMETER.
11. ALL VALVES SHALL BE RESILIENT WEDGE GATE VALVES WITH VALVE BOX UNLESS OTHERWISE APPROVED BY THE TOWN. VALVES SHALL HAVE A NON–RISING STEM AND A 50mm SQUARE OPERATING NUT, OPENING COUNTER–CLOCKWISE.
12. VALVES IN EXCESS OF 1.8m IN DEPTH SHALL REQUIRE A VALVE STEM EXTENSION.
13. VALVE CHAMBERS PER TOWN STANDARD OPSD M1101.010 RATHER THAN BOXES SHALL BE PROVIDED ON WATERMAINS 300mm DIAMETER AND ABOVE.
14. HYDRANT FLANGE ELEVATIONS SHALL BE SET AT A GRADE THAT WILL GIVE A FLANGE ELEVATION OF 75mm TO 100mm ABOVE THE FINAL GRADE.
15. HYDRANTS SHALL BE LOCATED A MINIMUM OF 1.2m FROM THE EDGE OF DRIVEWAYS, OR HOUSE SERVICE LOCATION. OTHER ABOVE GROUND UTILITIES SUCH AS LIGHT STANDARDS, TRANSFORMER OR STREET SIGNS SHALL NOT BE LOCATED ANY CLOSER THAN 3m TO A HYDRANT. HYDRANTS SHALL BE LOCATED IN CLOSE PROXIMITY TO A LOT LINE AND OFFSET FROM THE STREET LINE IN ACCORDANCE WITH THE STANDARD CROSS–SECTION.
16. HYDRANTS SHALL BE INSTALLED IN ACCORDANCE WITH TOWN MODIFIED OPSD M1105.010, WITH STORZ TYPE PUMPER NOZZLE AND PAINTED RED. ALL HYDRANT DRAIN HOLES ARE TO BE PLUGGED UNLESS SPECIFICALLY DIRECTED BY THE TOWN. LOCK–OUT DEVICES ARE REQUIRED ON ALL HYDRANTS. THE FOLLOWING IS A LIST OF HYDRANTS APPROVED BY THE TOWN OF WHITCHURCH–STOUFFVILLE:
    a. DARLING B–50–B–24
    b. CENTURY
    c. MCAVITY M67
17. A MINIMUM HORIZONTAL SEPARATION OF 2.5m SHALL BE MAINTAINED BETWEEN THE WATERMAIN AND ANY SEWER.
18. PIPE DEFLECTION SHOULD BE USED WHEREVER POSSIBLE TO MINIMIZE THE USE OF BENDS. WHEREVER IT IS NECESSARY TO DEFLECT FROM A STRAIGHT LINE, EITHER IN THE VERTICAL OR HORIZONTAL PLANE, THE AMOUNT OF DEFLECTION SHALL NOT EXCEED THE RECOMMENDATIONS OF THE MANUFACTURER.
19. THE MAXIMUM SIZE OF CONNECTION THAT CAN BE TAPPED INTO A 150mm DIAMETER WATERMAIN IS 50mm IN DIAMETER. WATER SERVICE CONNECTIONS 75mm IN DIAMETER AND LARGER SHALL BE MADE BY INSTALLING A TEE ON THE SUPPLY MAIN.
20. THE TOWN ENGINEER MUST BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE OF ANY PRESSURE AND LEAKAGE TESTING, CHLORINATION OR FLUSHING WHICH MUST BE CARRIED OUT IN ACCORDANCE WITH TOWN SPECIFICATIONS AND OPSS 441.

GENERAL NOTES – WATER SERVICES

1. RESIDENTIAL LOTS SHALL HAVE A SINGLE 25mm MINIMUM DIAMETER, TYPE K COPPER WATER SERVICE FROM THE WATERMAIN TO THE CURB STOP. FOR DEVELOPMENTS WERE THE ONTARIO BUILDING CODE REQUIRES A GREATER DIAMETER CONNECTION THE SERVICE SHALL BE INCREASED FROM THE WATERMAIN TO THE BUILDING INCLUDING THE CURB STOP ASSEMBLY AS DIRECTED BY THE TOWN.
2. SERVICES SHALL BE INSTALLED ACCORDING TO OPSD 1104.010 AND 1104.020.
3. WATER SERVICES SHALL BE LOCATED 3.0m FROM THE LOT LINE OPPOSITE THE DRIVEWAY WITH A CURB STOP AT THE STREET LINE AND THE SERVICE SHALL BE EXTENDED 1.5m INTO THE LOT. THE LOCATION OF THE EXTENDED SERVICE INTO THE LOT IS TO BE STAKED WITH 50mm x 100mm WOOD MARKER PAINTED BLUE.
4. THE MINIMUM DEPTH OF COVER IS 1.8m.
5. WATER SERVICES SHALL BE INSTALLED WITH 1.2m CLEARANCE TO DRIVEWAYS.
6. NO COUPLINGS WILL BE ALLOWED BETWEEN THE CURB STOP AND MAIN STOP.
7. STAINLESS STEEL SERVICE SADDLES SHALL BE USED WHEN TAPPING INTO THE PVC WATERMAIN.
8. A REMOTE READOUT WATER METER WILL BE REQUIRED ON EACH RESIDENCE. MAKE AND MODEL IS TO BE PER TOWN REQUIREMENTS COMPLETE WITH A REMOTE READER LOCATED ON AN OUTSIDE WALL, ADJACENT TO THE HYDRO METER.

GENERAL NOTES – LOT GRADING

1. LOTS ARE TO BE RESTORED AND STABILIZED WITH A MINIMUM DEPTH OF 150mm AND A MAXIMUM DEPTH OF 250mm OF TOPSOIL AND No. 1 NURSERY SOD.
2. DRAINAGE SWALES ON RESIDENTIAL LOTS ARE TO OFFSET 0.3m FROM THE PROPERTY LINE. SIDEYARD SWALES ARE TO BE LOCATED ON THE LOW SIDE OF THE LOT AND ONLY ONE SWALE SHALL BE SITED PER LOT.
3. ALL ROOF LEADERS AND DOWNSPOUTS ARE TO BE DIRECTED TO GRASSED AREAS AND SHALL NOT DISCHARGE TO PAVED OR CONCRETE SURFACES.

GENERAL NOTES FOR CONSTRUCTION AND INSPECTION

1. READ THIS DRAWING IN CONJUNCTION WITH ARCHITECTURAL, MECHANICAL AND LANDSCAPING PLANS.
2. ALL WORK SHALL BE CARRIED OUT IN COMPLIANCE WITH THE APPLICABLE HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.
3. ALL WORK, MATERIALS AND CONSTRUCTION METHODS TO CONFORM WITH THE LATEST STANDARDS, SPECIFICATIONS, POLICIES, REGULATIONS, GUIDELINES AND LAWS FOR THE TOWN, THE ONTARIO BUILDING CODE (OBC), MINISTRY OF THE ENVIRONMENT (MOE), ONTARIO PROVINCIAL STANDARD DRAWINGS AND SPECIFICATIONS (OPSD AND OPSS), THE ENVIRONMENTAL PROTECTION ACT AND THE WATER RESOURCES ACT. THE MINISTRY OF TRANSPORTATION STANDARDS WILL APPLY WHERE REQUIRED.
4. THE INFORMATION SHOWN FOR EXISTING UTILITIES WAS COMPILED FROM LOCATES INFORMATION AND RECORD DRAWINGS FROM THE TOWN. THE INFORMATION IS SHOWN FOR GENERAL INFORMATION ONLY AND THE ACCURACY OR COMPLETENESS OF THE PROVIDED INFORMATION HAS NOT BEEN CONFIRMED. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING AND PROTECTING ALL UTILITIES DURING CONSTRUCTION. ALL EXISTING UTILITIES MUST BE LOCATED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORK. ANY VARIANCE IS TO BE IMMEDIATELY REPORTED TO THE ENGINEER. LOST TIME DUE TO FAILURE OF THE CONTRACTOR TO CONFIRM UTILITY LOCATIONS AND NOTIFY THE ENGINEER OF POSSIBLE CONFLICTS PRIOR TO CONSTRUCTION WILL BE AT THE CONTRACTOR'S EXPENSE.
5. THIS PLAN SHOULD BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS' PLANS. ANY DISCREPANCIES SHALL BE CLARIFIED PRIOR TO CONSTRUCTION. INFORMATION RELATED TO DIMENSIONS FOR PRIVATE ROADS, PARKING, CURBING, BUILDING LOCATION AND SETBACKS SHALL BE TAKEN FROM THE SITE PLAN PREPARED BY THE ARCHITECT.
6. ALL DIMENSIONS AND ELEVATIONS TO BE VERIFIED PRIOR TO CONSTRUCTION AND ANY DISCREPANCIES FOUND PRIOR TO OR DURING CONSTRUCTION SHALL BE CLARIFIED WITH THE ENGINEER.

INSPECTIONS:

7. ALL WORK IN THE TOWN'S RIGHT OF WAY AND EASEMENTS IS TO BE INSPECTED BY THE TOWN PRIOR TO BACKFILLING. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY THE TOWN AS PER THE SITE PLAN AGREEMENT.
8. ALL DISTURBED GRASSED AREAS TO BE RESTORED WITH MINIMUM 200MM TOPSOIL AND NO. 1 NURSERY SOD.
9. THE CONTRACTOR AGREES NOT TO MAKE A MATERIAL CHANGE OR CAUSE A MATERIAL CHANGE TO BE MADE TO A PLAN, SPECIFICATION, DOCUMENT OR OTHER INFORMATION, ON THE BASIS OF WHICH THIS DRAWING WAS APPROVED BY THE TOWN, WITHOUT NOTIFYING, FILING DETAILS WITH AND OBTAINING WRITTEN AUTHORIZATION OF THE MUNICIPAL AND PROJECT ENGINEER.
10. SITE SPECIFIC DETAILED DESIGN AND PLAN PREPARED BY TEAM OF EXPERT ARCHITECTS AND ENGINEERS FROM N ARCHITECTURE INC. BASED ON THROUGH CONSULTATION WITH ALL AUTHORITIES OF JURISDICTION. IT IS MANDATORY THE PROJECT CONSTRUCTION BE SUPERVISED BY N ARCHITECTURE INC TO ENSURE THE ACCURACY, QUALITY OF EXECUTION OF THE PLAN AND ENSURE THE COMPLETION OF THE PROJECT
11. THE DEVELOPER/OWNER AGREES ALL STORMWATER MANAGEMENT WORK, WATER SERVICING WORK AND SANITARY SEWER WORK INSIDE THE BOUNDARY OF THE SITE IS TO BE INSPECTED BY N ENGINEERING INC. PRIOR BACKFILLING.
12. ALL WORK RELATING TO WATERMAINS AND SEWERS TO BE INSPECTED BY N ENGINEERING AS PER APPROVED PLANS BY THE TOWN.

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PROVINCE OF ONTARIO

NOT FOR CONSTRUCTION

No.	Date	Version	Dwn
8.	08 DEC. 2025	ISSUED FOR ZBA II (DA3)	LU
7.	21 NOV. 2025	ISSUED FOR COORDINATION	LU
6.	23 MAY. 2025	WATER SERVICE CONNECTION UPDATED AS PER CITY STANDARD	LU
5.	13 MAY. 2025	STORM SEWER CONNECTION UPDATED AS PER CITY ST

Appendix I
Statement of Limiting Conditions and Assumptions

Statement of Limiting Conditions and Assumptions

1. This Report/Study (the "Work") has been prepared at the request of, and for the exclusive use of, the Owner, and its affiliates (the "Intended Users"). No one other then the intended users has the right to use and rely on the work without first obtaining the written authorization of n Engineering and its Owners.
2. The comments, recommendations and material in this report reflect n Engineering best judgment in light of the information available to it at the time of preparation of this report. It is not qualified to and is not providing legal or planning advice in this work.
3. n Engineering expressly excludes liability to any third party except the Intended Users for any use of, and/or reliance upon, the work.
4. n Engineering notes that the following assumptions were made in completing the work
   a) The land use description(s) supplied n Engineer Inc. is correct;
   b) The surveys and other data supplied to n Engineering by the Owner are accurate;
   c) Market timing, approval delivery and secondary information are within the control of parties other then n Engineering;
   d) There are no encroachments, leases, covenants, binding agreements, restrictions, pledges, charges, liens or special assessments outstanding, or encumbrances, which would significantly affect the use or servicing;
   Investigations have not carried out to verify these assumptions. n Engineering deems the sources of data and statistical information contained herein to be reliable, but we extend no guarantee of accuracy in these respect.
5. All the plans, photographs, and sketches prepared and presented in this report/study are included solely to aid the visualizing the location of the property, the boundaries of the site, and the relative position of the improvements on the said lands are based on information provided by Owner
6. n Engineering accepts no responsibility for legal interpretations, questions of survey, opinion of title, hidden or inconspicuous conditions of the property, toxic wastes or contaminated materials, soil or sub soil conditions, environmental, Engineering or other factual and technical matters disclosed by the owner, the clients, or any public agency, which by their nature, may change the outcome of the work.
7. In the preparation of this report, n Engineering have made investigations from secondary sources as documented in the work, but did not checked compliance with by laws, codes, agency and government regulations, etc., unless specifically noted in the work.
8. The value of proposed improvements should apply only with regard to the purpose and function of the work, as outlined in the body of this work. Any cost estimated set out in the work based on construction averages and subject to change.
9. Neither possession of Work, nor a copy of it, carries the right of publication. All copyright in the work reserved to n Engineering and considered confidential by n Engineering. The Work shall not be disclosed, reproduced, quoted from, or referred to, in whole or in part, or published in any manner, without the express written consent of n Engineering and the Owner.
10. The work is only valid if it bears the Professional Engineer's seal and original signature of author, and if considered in its entity. Responsibility for unauthorized alteration to the Work is denied.

End of the Statement

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