TECHNICAL REPORT

STORMWATER MANAGEMENT MAINTENANCE PLAN

WHITTIER FIELD
BLOCK 405, LOTS 1,7,8 & 11
CITY OF CAMDEN
CAMDEN COUNTY, NEW JERSEY

Prepared For:

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Proj. No. KCNAX23001

October 25, 2024

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APPENDICES

STORMWATER MANAGEMENT MEASURES

MAINTENANCE PLAN

Development Name: Whittier Field

Address: Kaighn Avenue (CR 607) and S. 7th Street

Block(s) / Lot(s): Block 405, Lots 1, 7, 8 & 11

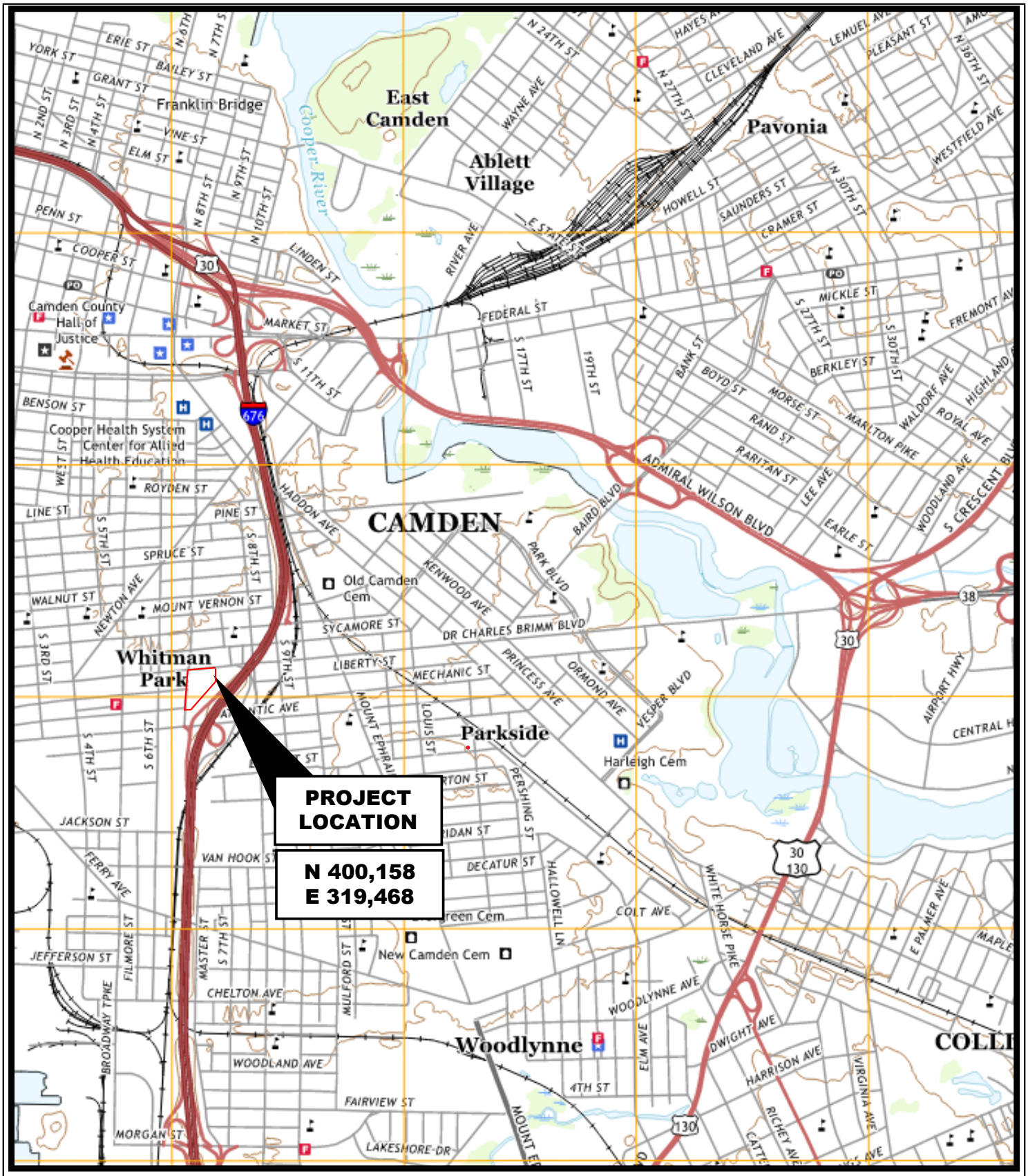
Township, County: City of Camden, Camden County, NJ

Party Responsible for Maintenance:

KIPP Team and Family Schools Inc.
60 Park Place, Suite 802, Newark, NJ 07102
Attn: Kelsey Waite
Phone: 732-673-7258

Prepared by: Pennoni Associates Date: 10/25/24

Last Revised on -- /-- / ----



USGS 7.5 Min. Camden Quadrangle, Camden County, New Jersey

Pennoni PENNONI ASSOCIATES INC. 2 AQUARIUM DRIVE, SUITE 320 CAMDEN, NEW JERSEY 08103		WHITTIER FIELD BLOCK 405, LOT 1, 7, 8 & 11 CITY OF CAMDEN, CAMDEN COUNTY NEW JERSEY
Job No. KCNAX23001	Scale: 1"=2,000'	Figure 1 –USGS Map

1.0 PROJECT OVERVIEW

This Operation and Maintenance Manual has been prepared in support of the proposed stormwater facilities for Whittier Field, located along Kaighn Avenue (CR 607) and S. 7th Street in the City of Camden, Camden County, NJ. The improvements include a multi-purpose synthetic turf field with bleacher area, restrooms, parking areas, stormwater collection / stormwater management, landscaping and lighting.

The responsibility for maintenance shall be dedicated to the property owner.

Owner: KIPP Team and Family Schools Inc. c/o Kelsey Waite
Address: 60 Park Place, Suite 802, Newark, NJ 07102
Phone: 732-673-7258

Block 405, Lots 1, 7, 8 & 11

NJ State Plane Coordinates of each facility is indicated below:

Small Scale Bioretention Basin #1	-	N 399,960	E 319,345
Outlet Control Structure (OCS-1)	-	N 399,919	E 319,342
Small Scale Bioretention Basin #2	-	N 399,816	E 319,363
Outlet Control Structure (OCS-2)	-	N 399,802	E 319,343
Subsurface Basin (UGB)	-	N 400,084	E 319,491
Outlet Control Structure (UGB)	-	N 400,045	E 319,380

Each facility location relative to the site has been indicated on the Facility Location Map on pages 3 and 4.

The inspection, maintenance and repair report shall be updated and kept on file at the maintenance office.

The person responsible for maintenance shall evaluate the effectiveness of the maintenance plan at least once per year and adjust the plan and deed as needed.

The person responsible for maintenance shall retain and make available, upon request by any public entity with administrative, health, environmental or safety authority over the site, the maintenance plan and the documentation required.

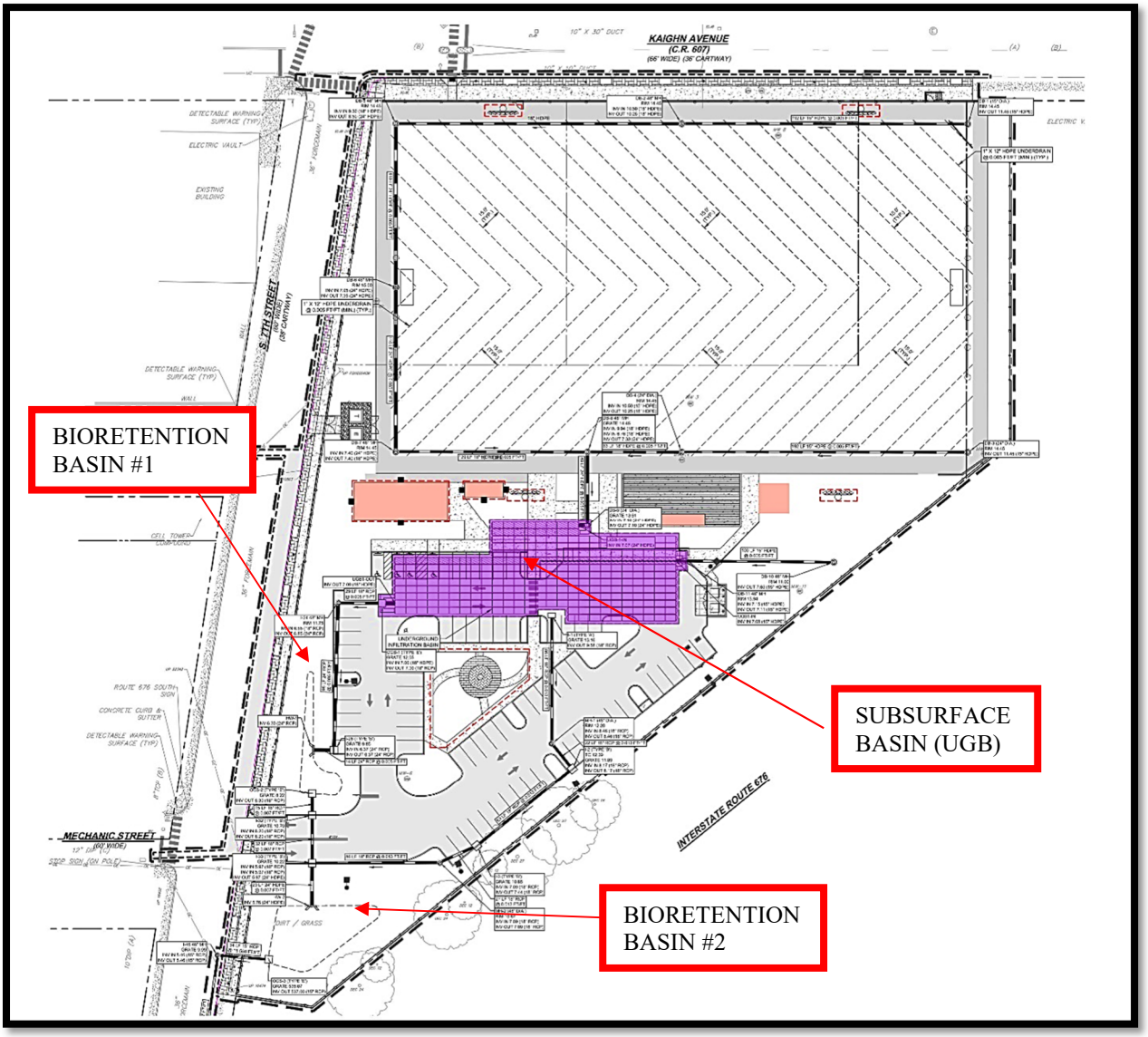
To the extent permitted by law, the City will at all reasonable times have a right of ingress and egress over the Easement Area and the right to enter the Easement Area via any road or parking lot located within any common area owned by the Grantor to inspect the System located in the Easement Area.

Except in the case of an emergency, the City will provide not less than seven (7) days prior notice to the performing any inspection or monitor of the System in accordance with approved plan. The applicant agrees that the failure to timely object after receiving notice from the City constitutes consent to inspection of the property within the timeframe specified in the notice.

If, after reasonable notice by the City, the applicant fails to maintain the System in accordance with the approved Manual and the Maintenance Plan, the City may perform any maintenance needed to correct a condition that impacts the effectiveness of routine maintenance and operations of the system and collect any costs incurred as a result from each owner of the System and in the same manner as real property taxes are collected. In addition, the City may seek reimbursement under any other method legally available to collect debts owed.

The applicant agrees to indemnify and save the City harmless from any and all claims for direct damage to persons or property arising from inspections performed by the City.

Facility Location Map



2.0 STORMWATER SYSTEM OVERVIEW

Small Scale Bioretention Basin 1- Basin #1 consists of a small-scale bioretention basin. Runoff enters the basin through a 24" RCP pipe. An outflow structure provides slow release of the stormwater into bioretention basin #2. The outlet structure consists of a pre-cast concrete box with four (4) 6-inch orifices, a 3.5-foot rectangular weir (el. 8.00) and grate (el. 9.25) to regulate the discharge from the facility.

Small Scale Bioretention Basin 2- Basin #2 consists of a small-scale bioretention basin. Runoff enters the basin through 18" RCP pipes and the 24" RCP outflow pipe from bioretention basin #1. An outflow structure provides slow release of the stormwater into the existing sewer system located within S. 7th Street. The outlet structure consists of a pre-cast concrete box with three (3) 8" diameter orifices (el. 6.70), a 3.5-foot rectangular weir (el. 7.25) and grate (el. 8.50) to regulate the discharge from the facility.

Subsurface Infiltration Basin (UGB) – UGB is a subsurface infiltration basin consisting of StormTech SC-740 chambers. Runoff enters the basin through a 24" HDPE pipe from the synthetic turf athletic field and a 15" HDPE pipe from the building roof and grass area. An outflow structure provides slow release of the stormwater into bioretention basin #1. The outlet structure consists of a pre-cast concrete box with an 18" orifice (el. 7.00) and a 2.75-foot rectangular weir (el. 9.00) to regulate the discharge from the facility.

3.0 MAINTENANCE/INSPECTIONS

The following summarizes general maintenance items, which should be addressed on an annual basis:

1. Removal of debris and sediment;

2. General maintenance and repairs to the manufactured treatment devices;

An inspection, maintenance and repair report will be updated and submitted annually to the Township.

4.0 GENERAL MAINTENANCE

All facilities expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four (4) times annually as well as after every storm exceeding one (1) inch of rainfall. Such components may include bottoms, riprap aprons and inflow points.

5.0 REGULAR MAINTENANCE ITEMS

Regular maintenance items, as itemized in the checklist enclosed as Appendix B. includes the following items:

1. Removal and Disposal of Trash and Debris: Immediately following any significant rainfall event, and at least once every 3 months, all trash and debris should be removed from the impoundment area.

2. Sediment Removal and Disposal: Accumulated sediment should be removed before it threatens the operation of the facility. Sediment volume should be monitored on a quarterly basis to assure the outlets are not blocked.
   Disposal of sediment should be in accordance with current Township of West Deptford standards and regulations of the New Jersey Department of Environmental Protection.

Corrective Maintenance

Corrective maintenance should be provided as soon as practicable after a situation that requires attention is reported. Corrective maintenance includes repair of damage caused by vandalism, removal of debris and sediment that threatens the operational capacity of the facility, and corrections of any problems that jeopardize the safety or operation of the facility.

Maintenance Inspection

An inspection of the facility should be made a minimum of once every year in order to determine the effectiveness of the maintenance work and the condition of the facility. In addition, an inspection should be made whenever a severe storm warning is issued in order to determine the readiness of the facility.

Records

Included in this report as Appendix B, are checklists and logs for use by maintenance personnel and inspectors. These should be utilized every time maintenance or inspection is performed on the facility. The reports should be appropriately filed and used to determine effectiveness of the existing maintenance and inspection schedules and used as a guide to revise the schedules as necessary to effectively maintain the operational integrity of the facility.

6.0 BEST MANAGEMENT PRACTICES (BMPS)

The NJDEP Stormwater Management Regulations (N.J.A.C. 7:8) have been adopted to address the adverse impacts of land development. The stormwater management measures taken to meet these requirements are collectively known as Best Management Practices (BMPs). BMPs can be non-structural, as in the disconnect of stormwater runoff, or structural, as in the construction of manufactured treatment devices discussed in this manual.

6.1 BIORETENTION AREAS

The following is taken from the Rain Garden Manual of New Jersey by the Rutgers Cooperative Extension Water Resources Program:

Definition

A bioretention area is a landscaped/grassed depression that captures, filters and infiltrates stormwater runoff. The rain garden/bioretention area removes nonpoint source pollutants from stormwater runoff while recharging groundwater.

Purpose

A bioretention area has two main goals. The first goal is to serve as a functional system to capture, filter and infiltrate stormwater runoff at the source and the second goal is to be an aesthetically pleasing garden/grass area.

Maintenance

1. Vegetation

   Grasses within the bioretention area must be carefully maintained so as not to compact the soil, and through handheld equipment. The vegetative cover should be maintained at 85%.

2. Sediment/Debris Removal

   Occasionally use a flat shovel to remove any excess sediment, leaves, or debris that may accumulate.
   Grass clippings shall be collected and properly disposed of. Precautions must be taken to prevent planting bed soil compaction and sediment contamination by runoff.

Sediment removal should take place when the bioretention area is thoroughly dry. Disposal of debris, trash and sediment or other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste disposal regulations.

3. Structural Components

All structural components must be inspected for cracking, erosion and deterioration at least annually. The 4" perforated underdrains shall be inspected for clogging.

4. Other Maintenance criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the bottom of the basin. This normal drain or drawdown time should then be used to evaluate the infiltration area's actual performance.

If significant increases or decreases in the normal drain time are observed, the basin's bottom surface, subsoil and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the infiltration area.

The bottom of a bioretention area should be inspected at least monthly as well as after each storm event exceeding one inch of rainfall. The permeability rate of the soil below the infiltration area may also be retested periodically. The field infiltration rate for the small-scale infiltration basin is listed in the table below:

Table 1 – Permeability Test Results

Small Scale Infiltration Basin	Test Pit	Ground Elev.	GWT (ft)	SHWT Elev. (ft)	Soil Sample Collection Depth (ft)	Permeability Test Results (in/hr)
#1	TP-3	11.2	-1.8	NE	13.3	3.2
	TP-4	10.8	NE	2.8	12.5	1.51
#2	TP-5	10.0	NE	2.0	12.0	4.09
	TP-6	10.2	NE	2.2	12.0	2.94

For design purposes a safety factor of two (2) was applied. Table 2 below indicates approx. time the maximum design storm will take to infiltrate.

Table 2 – Maximum Design Storm Infiltration

Small Scale Infiltration Basin	Infiltration Time (hr)
#1	23.4
#2	5.24

If water fails to infiltrate 72 hours after the end of the storm, corrective measures must be taken.

6.2 UNDERGROUND INFILTRATION BASIN

The following is taken from the New Jersey Best Management Practices Manual and manufacturer's maintenance specifications:

Definition

The underground infiltration system is comprised of an arch shaped chamber system.

All underground infiltration systems must be cleaned and maintained. Underground systems may be maintained more cost effectively if these simple guidelines are followed. Inspection should be performed at a minimum of once per year. While maintenance can generally be performed year-round, it should be scheduled during a relatively dry season.

Maintenance

1. Removal and Disposal of Accumulated Debris and Trash

   All underground detention basin components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment at least four times annually as well as after every storm exceeding 1 inch of rainfall. All debris and trash should be removed from the underground basin.

2. Sediment Removal and Disposal

   Accumulated sediment should be removed before it threatens the operation or storage volume of the basin. Sediment volume should be monitored on a quarterly basis to assure that the storage capacity of the basin is not

adversely affected. If sediment is at, or above 3" depth clean out the isolator row using the JetVac process.

A JetVac truck utilizing a fixed floor cleaning nozzle with rear facing nozzle spread of 45 or more will be required. Insert the nozzle from the distribution manifold into the arch row through the opening. Turn the water feed hose on and feed the supply hose until the nozzle has reached the end of the arch row. Withdraw the nozzle slowly.

The tool will backflush the arch row forcing debris into the distribution manifold. Use the stringer vacuum hose to remove the sediments and debris from the distribution manifold. Multiple passes may be required to fully cleanout the arch row.

Use caution to minimize movement of stone bedding at the arch invert while performing this task; relevel stone as needed. Vacuum out the distribution manifold and remove all debris that may be clogging the outlet pipe.

Sediment removal should take place during the dry season. Disposal of debris, trash and sediment or other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste disposal regulations.

3. Structural Components

All structural components must be inspected for cracking, subsidence spalling, erosion and deterioration at least annually.

4. Inspection

The following is the recommended procedure to inspect system in service:

Inspection can be done through manhole access and visually inspecting the distribution manifold. When the depth of sediment accumulates over 4 inches, cleanout is recommended.

Refer to Appendix B for Manufacturers maintenance procedures.

5. Other Maintenance criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume. The normal drain or drawdown time should then be used to evaluate the infiltration area's actual performance.

If significant increases or decreases in the normal drain time are observed, the basin stone bed, subsoil and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the underground basin.

The field infiltration rate for the subsurface infiltration basin is listed in the table below:

Table 3 – Permeability Test Results

UGB	Test Pit	Ground Elev.	GWT (ft)	SHWT Elev. (ft)	Soil Sample Collection Depth (ft)	Permeability Test Results (in/hr)
	TP-1	12.5	NE	1.5	12.0	2.38
	TP-2	12.8	NE	1.8	13.0	1.90

For design purposes a safety factor of two (2) was applied. Table 2 below indicates approx. time the maximum design storm will take to infiltrate.

Table 4 – Maximum Design Storm Infiltration

Small Scale Infiltration Basin	Infiltration Time (hr)
#1	6.14

If water fails to infiltrate 72 hours after the end of the storm, corrective measures must be taken.

6.3 STORMWATER INLETS AND PIPES

Definition

Inlet structures are box structures with grate openings to receive surface water which is then conveyed through the underground stormwater pipe system.

Purpose

The primary function of an inlet structure is to allow water to enter the storm drainage system. Inlets also serve as access points for cleaning and inspection.

Maintenance

1. Sediment Removal and Disposal

   Inspect your structures every six months during the first year of operation to determine your site-specific rate of pollutant accumulation. Maintenance events may include inspection, floatables removal and sediment removal.

   Disposal of debris, trash and sediment or other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste disposal regulations.

2. Other Maintenance criteria

   Regular inspections of inlets and storm pipes should take place approximately three times per year, with additional inspections advised after major weather events. Inspection of the drainage flow paths should be performed to check for blockages. All drains must remain free of foreign objects.

   Pipes should be checked for settlement at the joints, which may cause leakage and undermining of the system. Inspections in locations that are not easily accessible may be performed by video inspection of the system.

7.0 SAFETY OF INSPECTION AND MAINTENANCE PERSONNEL

Maintenance personnel may require training in maintenance tasks. Inspectors are expected to be dressed in protective clothing and use the appropriate equipment and safety gear in accordance with OSHA regulations and procedures when performing their tasks. Equipment should always be operated safely and in accordance with manufacturers specifications. Call utility companies before initiating any maintenance activity involving any excavation.

8.0 MISCELLANEOUS ITEMS

1. Emergency Conditions

   Recommended corrective responses to various emergency conditions that may be encountered at the stormwater management measure are to be determined on an as-needed basis after each subsequent inspection.

2. Specialized Stormwater Management Measures

   Maintenance, repair, and replacement instructions for specialized, proprietary, and non-standard measure components, in addition to manufacturer's product installation guides and user manuals, have been included and referenced, if applicable, on the design plans for the project. Refer to specific product guides and user manuals for specific detail regarding the respective item.

3. Disposal and Recycling Sites

   Approved disposal and recycling sites and procedures for sediment, trash, debris, and other material removed from the stormwater management measures during maintenance operations shall be utilized and have been referenced herein and on the design plans for the project.

4. As-Built Construction Plans

   As-built construction plans of the stormwater management measures and copies of pertinent construction documents, such as laboratory test results, permits, and completion certificates are required for verification for the associated measures to function properly and in accordance with the approved design. As-built construction plans will be available through the responsible party denoted in the report.

5. Permits for Maintenance Activities

Permits may be required from the New Jersey Department of Environmental Protection for the maintenance activities associated with the proposed drainage system discharging to Cabin Run. Compliance with all NJDEP regulations and requirements pertaining to the disposal of sediment, trash, debris and other removed material is required.

APPENDIX A

- **TOOLS AND EQUIPMENT**
- **MAINTENANCE CATEGORIES**

APPENDIX B

- **BASIN INSPECTION AND MAINTENANCE COSTS**
- **MAINTENANCE LOGS/CHECKLISTS**
- **CORRECTIVE MAINTENANCE RECORD**

Inspection Checklist / Maintenance Actions
Bioretention System #1

Checklist (circle one)**:** Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ **Inspection Date: _____**

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A1 Pretreatment (Forebay) (if installed)	1	Scouring or erosion is present at inlet structure and/or riprap apron	Y__ N__	Check the flow diversion device before the inlet pipe and whether the bypass flow channel is clogged Work Order # _____
	2	Clogged pipes or excessive sediment in the forebay	Y__ N__	Remove sediment or debris
	3	Damaged outlet structure (e.g., cracking, subsidence, spalling, erosion, or deterioration)	Y__ N__	Repair or replace the outlet structure Work Order # _____
A2 Pretreatment (MTD)	1	MTD inspection (if installed)	Y__ N__	(If a MTD is used for pretreatment, see Maintenance Manual Provided by the manufacturer)

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A3 Pretreatment (Structural BMP) (if installed)	1	BMP inspection	Y__ N__	(See BMP No. _____ Field Manual)
Note:				
B Basin Bed	1	Standing water is present after the design drain time	Y__ N__	Recheck to determine if there is standing water after 72 hours If standing water is present longer than 5 days, report to mosquito commission.

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
		The observed drain time is approximately _____ hours.		Remove any sediment buildup Check the soil permeability Till the soil bed with rotary tiller or disc harrow Replace the planting soil, if necessary Work Order # _____
	2	Excessive sediment, silt, or trash accumulation on basin bed	Y__ N__	Clean pretreatment system Remove silt, sediment, and trash
	3	Erosion or channelization is present	Y__ N__	Check whether the flow bypass or diversion device is clogged Re-grade the infiltration bed Work Order # _____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	4	Animal burrows/rodents are present	Y__ N__	Pest control Work Order # _____
Note:				
B Basin Bed	5	Uneven bed	Y__ N__	Use light equipment to resurface the bed Work Order # _____
	6	Evidence of sinkholes or subsidence	Y__ N__	Monitor for sinkhole development
C Vegetation	1	Large spot(s) showing bare soil	Y__ N__	Vegetative cover must be maintained at 85%. Revegetate the entire basin if 50% or more vegetation has been lost. Check Landscaping plan for guidance (if available) Work Order # _____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	2	Invasive plants are present	Y__ N__	Remove the invasive plants and restore the vegetation in accordance with the landscaping plan Work Order # _____
	3	The vegetation in the basin has been mowed or removed	Y__ N__	Revegetate the system in accordance with the vegetation plan Work Order # _____ Note: The vegetation in a bioretention system should **not** be mowed or removed
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
D Bioretention System Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__	Check for excessive overland runoff flow through the embankment. Check for any sink hole development Direct the overland runoff to the forebay or pretreatment area Restabilize the bank Work Order # _____
	2	Overgrown perimeter vegetation	Y__ N__	Mow the vegetation on the perimeter of the embankment Work Order # _____ Note: Mowing of vegetation should only take place in the area **outside** the basin. Dense vegetation must be maintained in the basin.
E Outlet	1	Trash or debris accumulation more than 20%	Y__ N__	Clean and remove Determine source of trash and address to reduce future maintenance costs or basin failure

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	2	Trash rack is damaged or rusted greater than 50% Trash rack is bent, loose, or missing parts	Y__ N__	Repair or replace trash rack Work Order #_____
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__	Repair or replace component Work Order #_____
	4	Discharge pipe apron is eroded or scoured	Y__ N__	Restabilize the discharge riprap apron Work Order #_____
Note:				
F Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__	Remove trees and roots, and restore berms if necessary Work Order #_____
	2	Damaged structure	Y__ N__	Repair Work Order #_____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
G Miscellaneous	1	Fence: broken or eroded parts	Y__ N__	Repair or replace Work Order #_____
	2	Gate: missing gate or lock	Y__ N__	Repair or replace Work Order #_____
	3	Sign/plate: tiled, missing, or faded	Y__ N__	Repair or replace Work Order #_____
	4	Excessive or overgrown vegetation blocking access to the basin	Y__ N__	Clear, trim, or prune the vegetation to allow access for inspection and maintenance Work Order #_____
Note:				

Follow Up Items (Component No. / Inspection Item No.):

_____

Associated Work Orders: # _____, # _____, # _____, # _____, # _____

_____	_____	_____
Inspector Name	Signature	Date

Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance

Inspection Checklist / Maintenance Actions
Bioretention System #2

Checklist (circle one)**:** Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ **Inspection Date: _____**

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A1 Pretreatment (Forebay) (if installed)	1	Scouring or erosion is present at inlet structure and/or riprap apron	Y__ N__	Check the flow diversion device before the inlet pipe and whether the bypass flow channel is clogged Work Order # _____
	2	Clogged pipes or excessive sediment in the forebay	Y__ N__	Remove sediment or debris
	3	Damaged outlet structure (e.g., cracking, subsidence, spalling, erosion, or deterioration)	Y__ N__	Repair or replace the outlet structure Work Order # _____
A2 Pretreatment (MTD)	1	MTD inspection (if installed)	Y__ N__	(If a MTD is used for pretreatment, see Maintenance Manual Provided by the manufacturer)

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A3 Pretreatment (Structural BMP) (if installed)	1	BMP inspection	Y__ N__	(See BMP No. _____ Field Manual)
Note:				
B Basin Bed	1	Standing water is present after the design drain time	Y__ N__	Recheck to determine if there is standing water after 72 hours If standing water is present longer than 5 days, report to mosquito commission.

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
		The observed drain time is approximately _____ hours.		Remove any sediment buildup Check the soil permeability Till the soil bed with rotary tiller or disc harrow Replace the planting soil, if necessary Work Order # _____
	2	Excessive sediment, silt, or trash accumulation on basin bed	Y__ N__	Clean pretreatment system Remove silt, sediment, and trash
	3	Erosion or channelization is present	Y__ N__	Check whether the flow bypass or diversion device is clogged Re-grade the infiltration bed Work Order # _____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	4	Animal burrows/rodents are present	Y__ N__	Pest control Work Order # _____
Note:				
B Basin Bed	5	Uneven bed	Y__ N__	Use light equipment to resurface the bed Work Order # _____
	6	Evidence of sinkholes or subsidence	Y__ N__	Monitor for sinkhole development
C Vegetation	1	Large spot(s) showing bare soil	Y__ N__	Vegetative cover must be maintained at 85%. Revegetate the entire basin if 50% or more vegetation has been lost. Check Landscaping plan for guidance (if available) Work Order # _____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	2	Invasive plants are present	Y__ N__	Remove the invasive plants and restore the vegetation in accordance with the landscaping plan Work Order # _____
	3	The vegetation in the basin has been mowed or removed	Y__ N__	Revegetate the system in accordance with the vegetation plan Work Order # _____ Note: The vegetation in a bioretention system should **not** be mowed or removed
Note:				

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
D Bioretention System Embankment and Side Slopes	1	Signs of erosion, soil slide or bulges, seeps and wet spots, loss of vegetation, or erosion on the basin slope	Y__ N__	Check for excessive overland runoff flow through the embankment. Check for any sink hole development Direct the overland runoff to the forebay or pretreatment area Restabilize the bank Work Order # _____
	2	Overgrown perimeter vegetation	Y__ N__	Mow the vegetation on the perimeter of the embankment Work Order # _____ Note: Mowing of vegetation should only take place in the area **outside** the basin. Dense vegetation must be maintained in the basin.
E Outlet	1	Trash or debris accumulation more than 20%	Y__ N__	Clean and remove Determine source of trash and address to reduce future maintenance costs or basin failure

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	2	Trash rack is damaged or rusted greater than 50% Trash rack is bent, loose, or missing parts	Y__ N__	Repair or replace trash rack Work Order #_____
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__ N__	Repair or replace component Work Order #_____
	4	Discharge pipe apron is eroded or scoured	Y__ N__	Restabilize the discharge riprap apron Work Order #_____
Note:				
F Emergency Spillway	1	Trees or excessive vegetation present	Y__ N__	Remove trees and roots, and restore berms if necessary Work Order #_____
	2	Damaged structure	Y__ N__	Repair Work Order #_____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
G Miscellaneous	1	Fence: broken or eroded parts	Y__ N__	Repair or replace Work Order #_____
	2	Gate: missing gate or lock	Y__ N__	Repair or replace Work Order #_____
	3	Sign/plate: tiled, missing, or faded	Y__ N__	Repair or replace Work Order #_____
	4	Excessive or overgrown vegetation blocking access to the basin	Y__ N__	Clear, trim, or prune the vegetation to allow access for inspection and maintenance Work Order #_____
Note:				

Follow Up Items (Component No. / Inspection Item No.):

_____

Associated Work Orders: # _____, # _____, # _____, # _____, # _____

_____	_____	_____
Inspector Name	Signature	Date

Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance

Inspection Checklist / Maintenance Actions
Subsurface Basin

Checklist (circle one)**:** Quarterly / Annual / Monthly / Special Event Inspection

Checklist No. _____ **Inspection Date: _____**

Date of most recent rain event: _____

Rain Condition (circle one):
Drizzle / Shower / Downpour / Other _____

Ground Condition (circle one):
Dry / Moist / Ponding / Submerged / Snow accumulation

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
A Chambers	1	The cap of the inspection port is loose, damaged, or missing.	Y__ N__	Fix, repair, or replace the cap Work Order #_____
	2	Standing water is present after the design drain time The observed drain time is approximately _____ hours.	Y__ N__	Recheck to determine if there is standing water after 72 hours If standing water is present longer than 5 days, report to mosquito commission. Remove any sediment buildup and Check the chambers for clogging and clean it if necessary Check the chambers for damage and repair it if necessary Check subsoil permeability and replace subsoil if necessary Work Order #_____

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	3	Excessive sediment or debris present in the inspection port	Y__ N__	Clear and remove sediment or debris
Note:				
A Chambers	4	Little or no flow into the system	Y__ N__	Check whether the inlet pipe, or flow diverter is clogged Clear and remove debris
	5	Overflow pipe is clogged	Y__ N__	Clear the clog
	6	Odor present	Y__ N__	Clear and remove sediment and debris Investigate the pipes

	For Inspector			For Maintenance Crew
Component No. Component Name	**Inspection Item and Inspection Item No.**		**Result**	**Preventative / Corrective Maintenance Actions**
	7	Overflow from the top of the access manholes	Y__ N__	Clear and remove sediment and debris Check the bypass pipe if any clog Remove any sediment buildup and replace the stone fill if necessary Check the pipe for clogging and clean it if necessary Check the pipes for damage and repair it if necessary Check subsoil permeability and replace subsoil if necessary
Note:				

Follow Up Items: (Component No. / Inspection Item No.):

_____

Associated Work Orders: # _____, # _____, # _____, # _____, # _____

_____ _____ _____

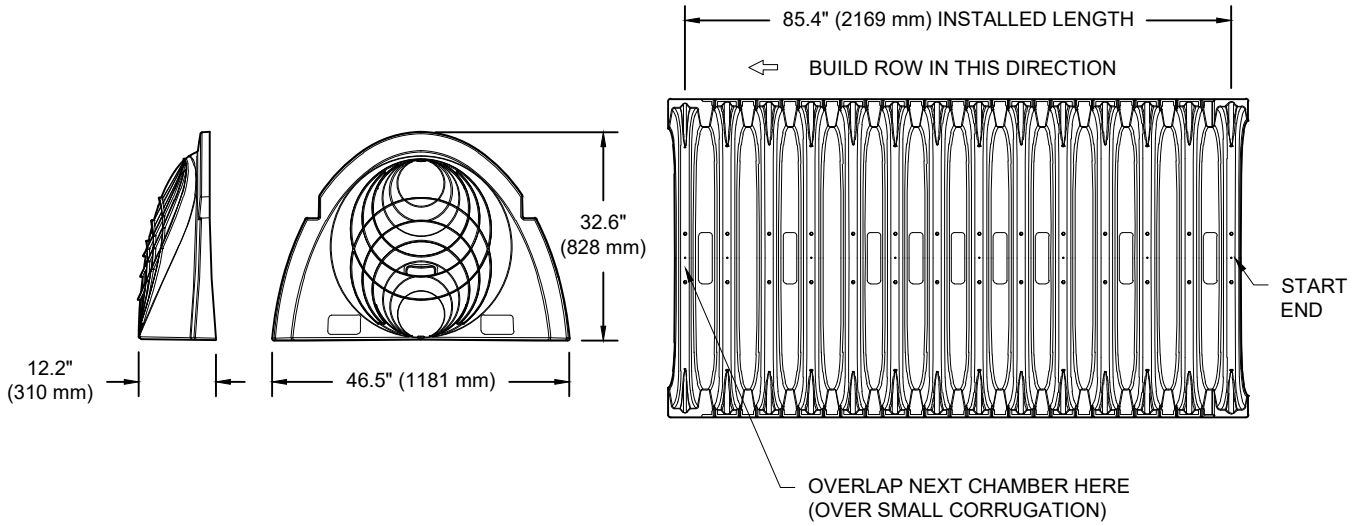
Inspector Name Signature Date

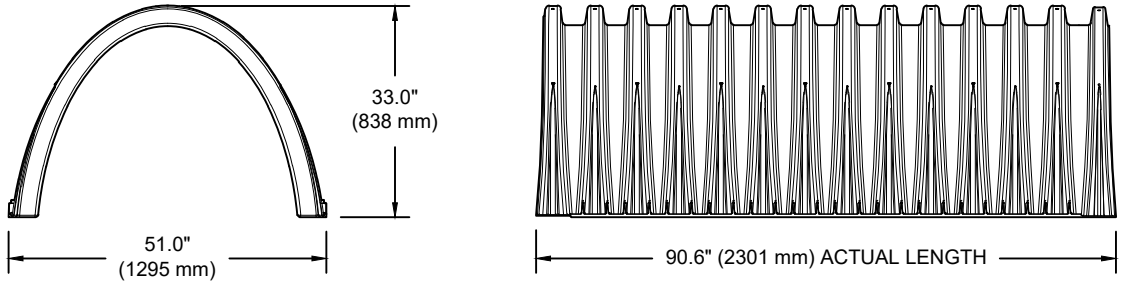
Report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.

File this checklist in the Maintenance Log after performing maintenance

SC-800 TECHNICAL SPECIFICATION

NTS





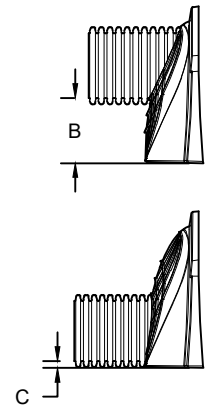
NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 33.0" X 85.4"	(1295 mm X 838 mm X 2169 mm)
CHAMBER STORAGE	50.6 CUBIC FEET	(1.43 m³)
MINIMUM INSTALLED STORAGE*	81.0 CUBIC FEET	(2.29 m³)
WEIGHT	81.8 lbs.	(37.1 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS

PRE-CORED HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
PRE-CORED HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	B	C
SC800EPE06TPC	6" (150 mm)	21.4" (544 mm)	---
SC800EPE06BPC		---	0.9" (23 mm)
SC800EPE08TPC	8" (200 mm)	19.2" (488 mm)	---
SC800EPE08BPC		---	1.0" (25 mm)
SC800EPE10TPC	10" (250 mm)	17.0" (432 mm)	---
SC800EPE10BPC		---	1.2" (30 mm)
SC800EPE12TPC	12" (300 mm)	14.4" (366 mm)	---
SC800EPE12BPC		---	1.6" (41 mm)
SC800EPE15TPC	15" (375 mm)	11.3" (287 mm)	---
SC800EPE15BPC		---	1.7" (43 mm)
SC800EPE18TPC	18" (450 mm)	8.0" (203 mm)	---
SC800EPE18BPC		---	2.0" (51 mm)
SC800EPE24BPC	24" (600 mm)	---	2.3" (58 mm)
SC800EPE	NONE	SOLID END CAP	



NOTE: ALL DIMENSIONS ARE NOMINAL

TECHNICAL SPECIFICATIONS
SC-800 CHAMBER

DRAWN: JLM
CHECKED: JLM
DATE: 01/12/24
PROJECT #:

StormTech®
Chamber System

888-892-2694
WWW.STORMTECH.COM

ADS
4640 TRUEMAN BLVD
HILLIARD, OH 43026

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, SC-310-3, SC-740, 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.

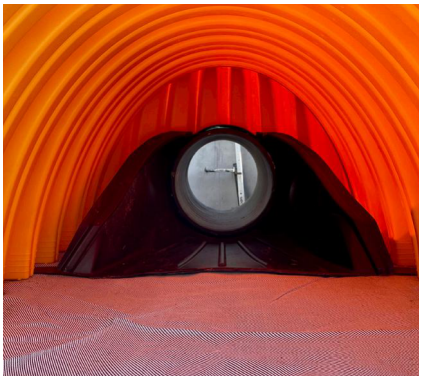
ADS Isolator Row and Plus fabric are placed between the stone and the Isolator Row Plus chambers. The woven geotextile provides a media for stormwater filtration, a durable surface for maintenance, prevents scour of the underlying stone and remains intact during high pressure jetting.

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.

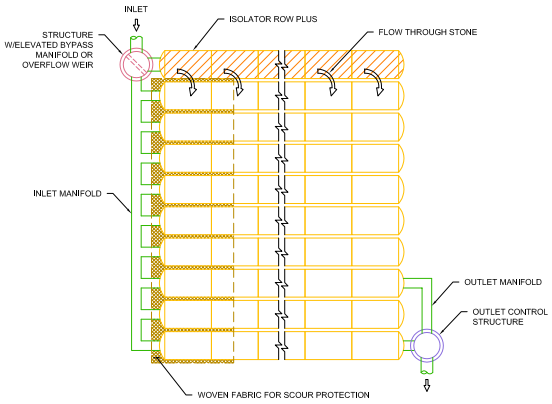
The Isolator Row Plus may be part of a treatment train system. The treatment train design and pretreatment device selection by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, StormTech recommend using the Isolator Row Plus to minimize maintenance requirements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

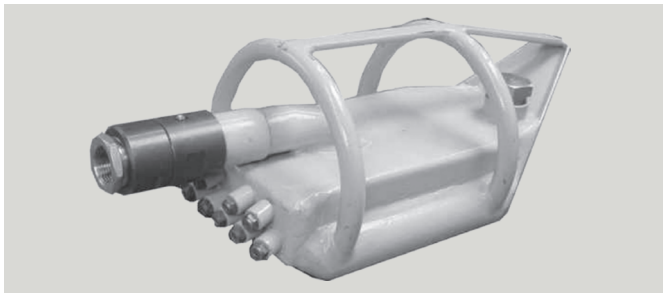
The Isolator Row Plus incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

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.

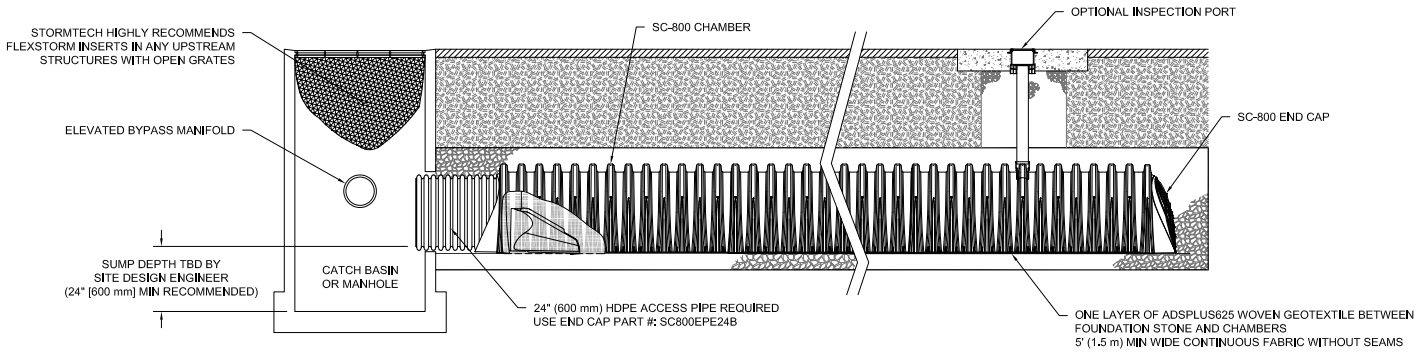
Maintenance

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.

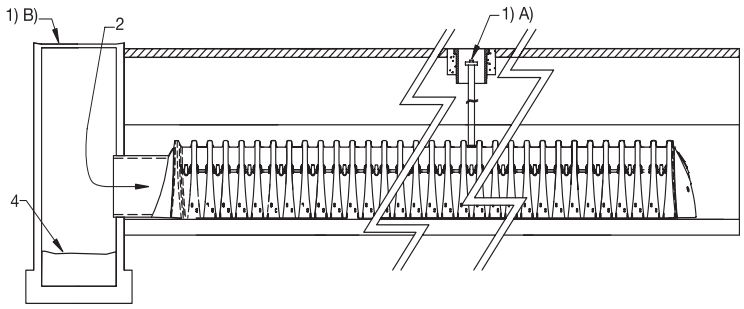
A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
B) Apply multiple passes of JetVac until backflush water is clean
C) Vacuum manhole sump as required

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		Sediment 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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