

STORMWATER MANAGEMENT MEASURES OPERATION AND MAINTENANCE MANUAL

**For
Block 286, Lot 14.02
Franklin Township
Somerset County, New Jersey**

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PREPARED BY
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INTRODUCTION

The purpose of this manual is to provide guidelines for the operation and maintenance of the stormwater management measures that are utilized on this tract. This manual has been prepared for the use of the manager of the site to ensure that the stormwater management measures will be properly maintained in order to function as intended. The primary function of these stormwater management measures is to control the quantity and quality of runoff while providing groundwater recharge. The stormwater management measures on this property are listed below:

- Infiltration Basin

RESPONSIBLE PARTY

The maintenance of the stormwater management facilities on this property along with all of the associated logs and records, in accordance with this manual, is the responsibility of:

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Forefront Contracting
252 Melvin Avenue
Staten Island, NY 10314
646-420-9481
forefront15@yahoo.com**

This responsibility may be transferred to another party if the appropriate agencies are notified. Franklin Township and Somerset County shall be granted emergency access and maintenance rights – but are not obligated to handle all required responsibilities – in the circumstance where emergency maintenance must be performed to ensure public safety. The responsible party listed above shall cover the costs of any emergency maintenance and/or operation performed by Franklin Township or Somerset County.

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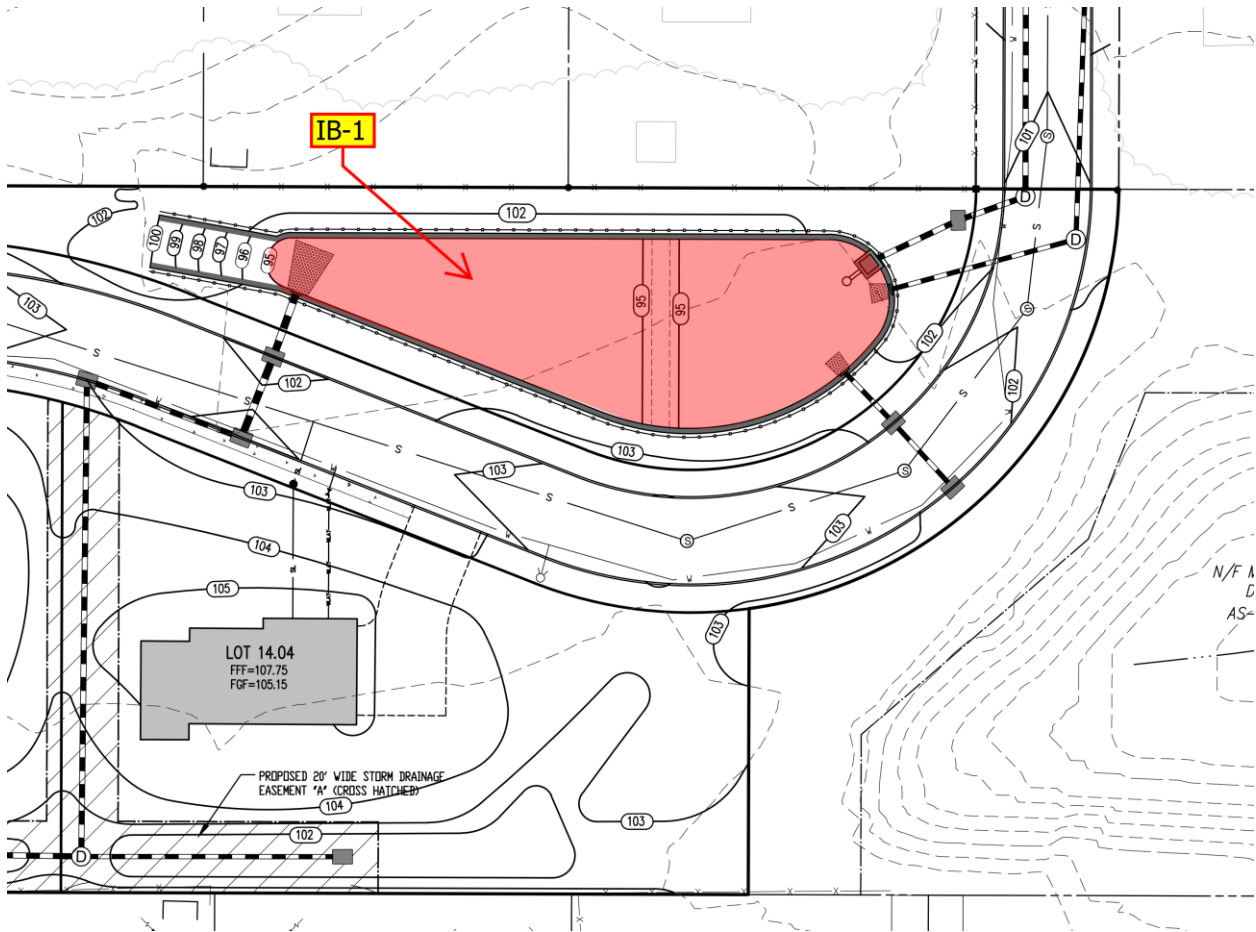
Inspection Checklist Log
Preventative Maintenance Log
Corrective Maintenance Log

Part I - Maintenance

List of Stormwater Management Measures

Type of Stormwater Management Measure	Stormwater Management Measure No.	Location Description	State Plane Coordinates
Infiltration Basin	IB-1	Proposed Lot 14.03	X = 497581 Y = 606054

Location Map



Description of Stormwater Management Measures

Infiltration Basin

Design Storms:

- Water Quality Design Storm (1.25 inches in 2 hours)
- 2-Year Storm (3.34 inches)
- 10-Year Storm (5.01 inches)
- 100-Year Storm (8.21 inches)

Design Purpose:

- Runoff Quantity
- Groundwater Recharge
- Runoff Quality

Total Sand Bed Surface Area: 5,941 ft²

Drainage Area: 3.00 Acres

Sand Bed Depth: 6"

Preventative and Corrective Maintenance Action Plan

Preventative Maintenance Actions

Preventative Maintenance		
Frequency	Action	Stormwater Management Measure
Quarterly	<ul style="list-style-type: none"> • Perform Quarterly Inspection • Remove Trash or Debris from Basin Embankment • Remove Trash or Debris from Emergency Spillway • Remove Trash or Debris from Outlet Structure • Remove Trash or Debris from Sand Bed • Mow/Trim Vegetation 	Infiltration Basin
Semiannual	<ul style="list-style-type: none"> • Remove Sediment Buildup • Pump Out Standing Water in Outlet Structure 	Infiltration Basin
Annual	<ul style="list-style-type: none"> • Perform Structural Inspection • Replace Sand Layer • Revegetate 	Infiltration Basin
Biennial	<ul style="list-style-type: none"> • Replace Sand Layer 	Infiltration Basin
Unscheduled	<ul style="list-style-type: none"> • Perform Quick Inspection Following Any Storm Event That Produces 1" of Rainfall or More • Monitor for Sinkhole Development 	Infiltration Basin

Corrective Maintenance Actions

Potential Corrective Maintenance Actions	Stormwater Management Measure
<ul style="list-style-type: none">• Repair/Replace Eroded or Damaged Riprap Apron• Repair/Replace Outlet Structure Components• Install New Bolts to Fix the Orifice Plate• Stabilize Side Slope• Repair/Replace Trash Rack• Repair Riprap Apron, Stabilize Side Slopes• Pest Control• Remove Invasive Plants• Resurface Bed	Infiltration Basin

Part II - Field Manuals

INFILTRATION BASIN IB-1 FIELD MANUAL

Block 286 Lot 14.02
Franklin Township
Somerset County

Location Map

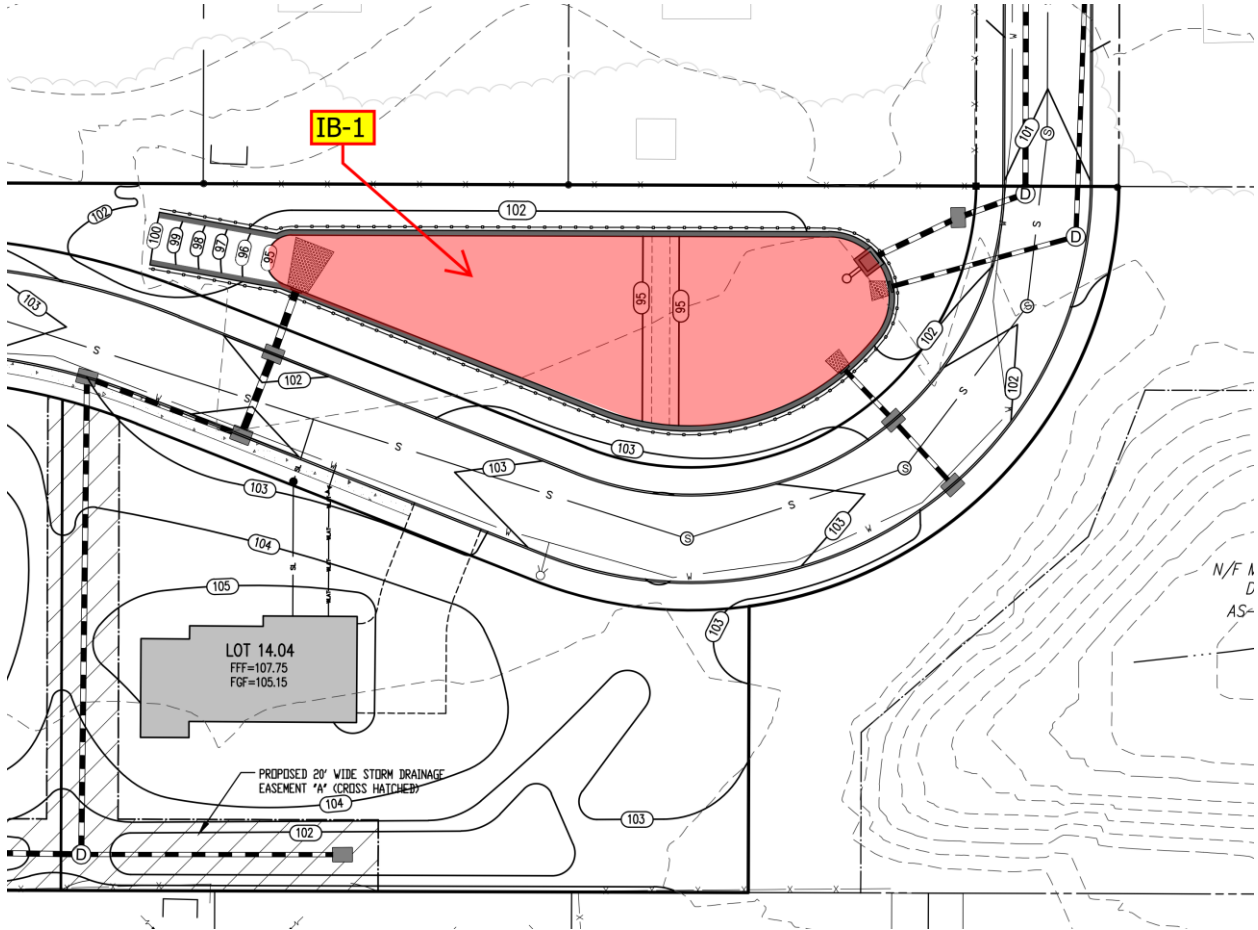


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Infiltration Basin Overview

An infiltration basin is a stormwater management facility constructed of highly permeable soils, which provides temporary storage of stormwater runoff. Infiltration basins are used to remove pollutants and to infiltrate stormwater. In addition to pollutant removal and groundwater recharge, infiltration may help to reduce increases in both the peak rate and total runoff volume caused by land development. Pollutant removal is achieved through filtration of the runoff through the soil, as well as biological and chemical activity within the soil. The total suspended solids (TSS) removal rate attributed to infiltration basins is 80%.

Proper care and attention in the long-term maintenance of the stormwater management measure is critically important to the safety and health of the public.

An infiltration basin is a type of dry basin. Dry basins must fully drain within 72 hours of the most recent rainfall. Standing water in excess of 72 hours is a sign of basin failure. It may also contribute to mosquito breeding and other health and safety issues. The design drain time shall be closely monitored to ensure that potential failure is recognized early.

This surface infiltration basin is designed as an on-line system.

Basic Design Information

Hydrology Design Targets

1. The infiltration basin is designed with a subsoil design permeability rate of 0.5 in/hour per the results of basin flooding tests.
2. The design drain time is 22.4 hours.
3. The outflow will be discharged to the municipal storm sewer system.

Hydraulic Design Targets (IB-1)

1. Design Parameters:

	Water Quality Design Storm	2-Year Storm	10-Year Storm	100-Year Storm
Rainfall Depth	1.25 inches in 2 hours	3.34 inches in 24 hours	5.01 inches in 24 hours	8.21 inches in 24 hours
Peak Flow Rate (CFS)	0.00	0.28	1.88	9.53
Water Surface Elevation (Feet)	95.86	97.40	98.38	99.49

2. This infiltration basin is designed to infiltrate the runoff generated by the WQDS.
3. The invert elevation of the 3" orifice is 95.86 feet. The invert elevation of the 6" weir is 97.40 feet. The invert elevation of the 15" weir is 98.35 feet.
4. The elevation of the emergency spillway is 99.95 feet.

Configuration Targets

1. The bottom of the basin is covered by a sand bed that is 6" inches deep. The sand layer is designed to be replaced every 24 months. The volume of sand is 2,970.5 cubic feet. The elevation of the bottom of the sand bed is 94.50.
2. The top of the sand bed is designed to have vegetation.

Critical Maintenance Features

1. No heavy equipment shall be permitted on the basin surface or sand layer.
2. Trash racks and discharge outlet shall be cleaned frequently.
3. Grass clippings shall be collected from the basin and properly disposed.

**Inspection Checklist / Maintenance Actions
Infiltration Basin IB-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
A Infiltration Bed	1	<p>Standing water is present after the design drain time</p> <p>The observed drain time is approximately _____ hours.</p>	<p>Y__</p> <p>N__</p> <p>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 Replace the sand layer (volume of replacement sand is specified in the Basin Configuration Targets in the Basic Design Information Section of this Manual) Work Order # _____</p>
	2	Excessive sediment, silt, or trash accumulation on basin bed	<p>Y__</p> <p>N__</p> <p>Clean pretreatment system Remove silt, sediment, and trash Work Order # _____</p>
Note:			

	For Inspector		For Maintenance Crew	
Component No. Component Name	Inspection Item and Inspection Item No.		Result	
			Preventative / Corrective Maintenance Actions	
A Infiltration Bed	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 # _____
	4	Animal burrows/rodents are present	Y__ N__	Pest control Work Order # _____
	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

Note:

	For Inspector		For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
B 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 # _____
	2	Overgrown vegetation	Y__ N__ Mow/trim the vegetation Work Order # _____
	3	Tree growth in the basin	Y__ N__ Clear, trim, or prune the trees according to the original Landscaping Plan Inspect to determine if the tree roots caused any structural damage Work Order # _____

Note:

	For Inspector		For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.		Preventative / Corrective Maintenance Actions
C Basin 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 # _____

Note:

	For Inspector		For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
D 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
	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 # _____
	5	Standing water is present in the outlet structure longer than 72 hours	Y__ N__ Pump out the standing water Work Order # _____

Note:

	For Inspector		For Maintenance Crew
Component No. Component Name	Inspection Item and Inspection Item No.	Result	Preventative / Corrective Maintenance Actions
E 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 # _____
F 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:

Preventative Maintenance Record

Corresponding Checklist No. _____
 Component No. _____, Inspection Item No. _____

Work Logs

Activities	Components	Date Completed
Sediment/Debris Removal	B – Infiltration Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
Vegetation Removal	B – Infiltration Bed	
	D – Basin Embankment and Side Slopes	
	E – Outlet	
	F – Emergency Spillway	

Vegetation shall be removed with minimum disruption to the remaining vegetation.

All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the stormwater management measure.

The replacement of the sand layer will occur according to the scheduled frequency (see Basin Configuration Targets above).

Crew member: _____ / _____ **Date:** _____
(Name/Signature)

Supervisor: _____ / _____ **Date:** _____
(Name/Signature)

File this Preventative Maintenance Record in the Maintenance Log after performing maintenance.

Corrective Maintenance Record

1. **Work Order #** _____ **Date Issued** _____

2. **Issue to be resolved:**

3. The issue was from **Corresponding Checklist No.** _____,
Component No. _____, **Inspection Item No.** _____.

4. **Required Actions**

Actions	Planned Date	Date Completed
New bolts to fix the orifice plate		
Repair/replace the trash rack		
Restabilize side slope (indicate location)		
Repair riprap apron		
Revegetate		

5. **Responsible person(s):**

6. **Special requirements**

- Time of the season or weather condition: _____
- Tools/equipment: _____
- Subcontractor (name or specific type): _____

Approved by _____/_____ **Date** _____
(Name/Signature)

Verification of completion by _____/_____ **Date** _____
(Name/Signature)

File this Corrective Maintenance Record in the Maintenance Log after performing maintenance.

Part III - Maintenance and Inspection Logs

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Inspection Checklist Log

1. The responsible party shall report issues to the local authority and mosquito commission as required by local ordinances and regulatory authorities.
2. The maintenance crew should fill out the checklist in the field manual when performing each inspection/maintenance task.
3. After the maintenance task is performed, the checklist should be filed in the Maintenance Plan and recorded in the log below.

Cycle of Inspection	Stormwater Management Measure No.	Checklist No.	Date(s) of Inspection

Cycle of Inspection	Stormwater Management Measure No.	Checklist No.	Date(s) of Inspection

Continue the Table When Necessary

Preventative Maintenance Log

Maintenance Schedule	Stormwater Management Measure No.	Preventative Maintenance Record No.	Date(s) of Maintenance

Continue the Table When Necessary

