

SURFACE INFILTRATION BASIN FIELD MANUAL

Development Name: Clinton Moebus 34, LLC

Township, County: Town of Clinton, Hunterdon County, New Jersey

Location of Basin: E(X): 378,997; N(Y): 658,849

Location Description: Western Section of Site

Location Map





TABLE OF CONTENTS

1. Surface Infiltration Basin Overview.....	2
2. Basin Design Information	3
3. Visual Aid For Dry Type Stormwater Basin Inspection.....	5
4. Reference Documents.....	11
5. Inspection Checklist / Maintenance Actions For Surface Infiltration Basin	12
6. Preventative Maintenance Record	18
7. Corrective Maintenance Record	19



1. SURFACE INFILTRATION BASIN OVERVIEW

Functionality

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.

Type of BMP – Dry Basin / Infiltration Only

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 for **infiltration only** and is **not** designed for extended detention.



2. BASIN DESIGN INFORMATION

Hydrology Design Targets:

1. This basin is designed with a subsoil permeability rate of 2.74 inches/hour (pre-construction) and _____ inches/hour (post-construction)
2. The **design drain time** is 17.78 hours (Water Quality Storm)
3. The **design drain time** is 42.00 hours (100-Year Storm)
4. The elevation of the seasonal high-water table of this basin was observed on ___/___/___ and it was _____ feet below the basin bottom surface, at EL. _____ feet.
5. This basin will be discharged to a point in the Western section of the site to ex-stream, 360 feet away from the proposed infiltration basin.

Hydraulic Design Targets:

1. This basin is designed to infiltrate the runoff from the Water Quality Design storm, which generates 34,623 cubic feet of runoff.
2. The invert elevation of the outlet for the design storm is at EL. 225.80 feet. The water surface elevation is at EL. 225.72 feet.
3. The emergency spillway is at EL. 229.50 feet.

Basin Configuration Targets:

1. Pretreatment to the stormwater runoff is provided by overland flow through vegetated area.
2. The basin bottom is covered by a sand layer.
 - The depth of the sand layer is 6 inches, which requires a volume of 8,809 cubic feet of sand.
 - The invert elevation of the sand layer is EL. 224.00 feet
 - The sand layer is designed to be replaced every 24 months.
3. Vegetation
 - The top of sand bed has been designed to have no vegetation. The side slopes of the basin are to be seeded.
4. Outlet Structure Configuration

Outlet Description	Outlet Type	Orifice Size / Weir Length	Invert Elevation
Outlet #1	Orifice	14.0"	225.80
Outlet #2	Orifice	41.0"	226.90
Outlet #3	Spillway	50'	229.50
Outlet #4	Culvert / Discharge Pipe	30"	217.70





Critical Maintenance Features:

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

3. VISUAL AID FOR DRY TYPE STORMWATER BASIN INSPECTION



Issue:	The inlet is not properly drained, assuming it has not rained within 72 hours.
Corrective Action:	Clear and remove sediment. Check whether the water table is at or above the bottom of the forebay. Also check the permeability of the underlying soil, if necessary.
Preventative Action:	Routine inspections and removal of sediment from the forebay.



Courtesy of NJDOT

- Issue:** The Inflow pipe is clogged by sediment and vegetation.
- Corrective Action:** Clear and remove sediment and unwanted vegetation.
- Preventative Action:** Routine inspection and removal of sediment and unwanted vegetation.



Courtesy of NJDOT

- Issue:** The Inflow pipe is entirely clogged by sediment and trees.
- Corrective Action:** Clear and remove sediment and trees.
- Preventative Action:** Routine inspection & removal of sediment and unwanted vegetation.



Issue:

The excessive sediment in inflow pipe (shown above) might be caused by a blockage of flow to the basin due to excessive vegetation and overgrown trees.

Corrective Action:

Clear and remove trees and vegetation. If necessary, re-grade the bottom slope to ensure the flow properly spreads over the basin bottom.

Preventative Action:

Routine inspection and removal of sediment and unwanted vegetation.



Issue: Eroded inflow apron.

Corrective Action: Repair apron.

Preventative Action: Routine inspection and rehabilitation, if necessary.



Issue:

The vegetation loss and the blackish soil may indicate frequent inundation.

Corrective Action:

Check the permeability rate of the soil and the water table elevation.
Replace the soil if necessary.

Preventative Action:

Routine inspection and tilling/aeration, if necessary.



Issue:

The low flow channel has excessive accumulation of sediment and debris. The outflow orifice is clogged by a trash bag and debris. Note that there is no trash rack installed.

Corrective Action:

Check the permeability rate of the soil and the water table elevation.
Replace the soil if necessary.

Preventative Action:

Routine inspection and cleaning.



Issue:	Trash rack is damaged.
Corrective Action:	Repair the trash rack.
Preventative Action:	Routine inspection, especially after large storm events. Tighten any loose bolts and repair structural flaws.



A well-maintained detention basin

4. REFERENCE DOCUMENTS

Documents to be placed in this field manual should include the following:

- As-built Drawings with Drainage Plans
- Soil Boring Logs

5. INSPECTION CHECKLIST / MAINTENANCE ACTIONS FOR SURFACE INFILTRATION 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

The inspection items and preventative/corrective maintenance actions listed below represent general requirements. The design engineer and/or responsible party shall adjust the items and actions to better meet the conditions of the site, the specific design targets, and the requirements of regulatory authorities.



		For Inspector	For Maintenance Crew
A Infiltration Bed	1	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. Replace the sand layer. Work Order # _____
	2	Excessive sediment, silt, or trash accumulation on basin bed	Y__ N__ Clean pretreatment system. Remove silt, sediment, and trash. Work Order # _____
	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
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	
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__	Check for excessive overland runoff flow through the embankment.
			N__	Check for any sink hole development Direct the overland runoff to the forebay or pretreatment area Re-stabilize the bank Work Order # _____
D Outlet	1	Trash or debris accumulation more than 20%	Y__	Clean and remove
	2	Trash rack is damaged or rusted greater than 50%	Y__	Determine source of trash and address to reduce future maintenance costs or basin failure
		Trash rack is bent, loose, or missing parts	N__	Repair or replace trash rack Work Order # _____
	3	Outlet components (e.g., orifice plates or weir plate) skewed, misaligned, or missing	Y__	Repair or replace component
			N__	Work Order # _____
4	Discharge pipe apron is eroded or scoured	Y__	Re-stabilize the discharge riprap apron	
		N	Work Order # _____	
5	Standing water is present in the outlet structure longer than 72 hours	Y__	Pump out the standing water	
		N__	Work Order # _____	
Note:				



	For Inspector		For Maintenance Crew	
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 # _____
	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 # _____
F Miscellaneous	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 # _____



	For Inspector	For Maintenance Crew
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.



6. PREVENTATIVE MAINTENANCE RECORD

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

Work Logs

Activities	Components	Date Completed
Sediment/debris removal Sediment removal should be taken place when the basin is thoroughly dry	A – Basin Bed	
	C – Basin Embankment and Side Slopes	
	D – Outlet	
Vegetation removal	A – Basin Bed	
	C – Basin Embankment and Side Slopes	
	C – Outlet	
	E – Emergency Spillway	

Vegetation is removed by _____ 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 fertilizer applied is _____, and _____ is applied _____.

Debris, sediment, and trash are handled (onsite / by _____ (contractor name) to disposal site _____). (See Part I: Maintenance Plan – Disposal Plan Section)

Crew member: _____ / _____ Date: _____
 (name/ signature)

Supervisor: _____ / _____ Date: _____
 (name/ signature)

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



7. CORRECTIVE MAINTENANCE RECORD

1. **Work Order #** _____
Date Issued _____
2. **Issue to be resolved:**
3. The issue was from **Corresponding Checklist** ____, **Component No.** ____,
Inspection Item No. ____.

4. **Required Actions**

Actions	Planned Date	Date Completed

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.

