

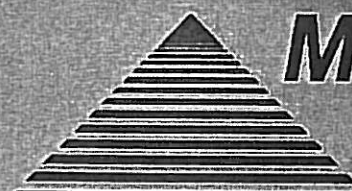
# **STORMWATER SYSTEMS MANAGEMENT PLAN**

REDEVELOPMENT AT 15 MABURY ROAD &  
8 MATHES TERRACE  
DURHAM, NH 03824  
TAX MAP 2, LOTS 12-5 & 12-6

PREPARED FOR:

Island Diversified, LLC

PREPARED BY:



**MJS  
ENGINEERING, PC**

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December 18, 2013

# 1.0 TABLE OF CONTENTS

1.0	TABLE OF CONTENTS .....	2
2.0	EXECUTIVE SUMMARY .....	4
3.0	TEMPORARY BEST MANAGEMENT PRACTICES .....	4
3.1	ORANGE CONSTRUCTION FENCING (PERIMETER CONTROL CONSTRUCTION) .....	4
3.2	SILT SOXX™ (PERIMETER CONTROL) .....	4
3.3	STABILIZED CONSTRUCTION ENTRANCE .....	4
3.4	SWEEPING OF PUBLIC WAY .....	5
3.5	SILTATION POND .....	5
3.6	INLET PROTECTION .....	5
3.7	MULCHING, TACKIFIER, GEOTEXTILE MATTING, CRUSHED GRAVEL .....	5
3.8	SITE DEWATERING .....	5
3.9	WASHOUT AREA/BOOM .....	6
3.10	SITE WATERING .....	6
4.0	PERMANENT BEST MANAGEMENT PRACTICES .....	6
4.1	ROOF DRAINAGE COLLECTION .....	6
4.2	CLOSED DRAINAGE SYSTEM .....	6
4.3	RAIN GARDEN .....	7
4.4	PERMEABLE PAVERS .....	7
5.0	INITIAL STABILIZATION AND MAINTENANCE OF PERMANENT BMPS .....	7
5.1	ROOF DRAINAGE COLLECTION .....	7
5.2	CLOSED DRAINAGE SYSTEM .....	7
5.3	RAIN GARDEN .....	8
5.4	PERMEABLE PAVERS .....	8
6.0	LONG TERM MAINTENANCE OF PERMANENT BMPS .....	8
6.1	ROOF DRAINAGE COLLECTION .....	8
6.2	CLOSED DRAINAGE SYSTEM .....	8
6.3	RAIN GARDEN .....	8
6.4	PERMEABLE PAVERS .....	9
7.0	REFERENCES .....	9

LIST OF APPENDICES

APPENDIX

STORM WATER SYSTEMS OVERVIEW PLAN.....	A
MAINTENANCE MATRIX.....	B
MAINTENANCE REPORTS.....	C
MANUFACTURERS DATA SHEETS.....	D

## 2.0 EXECUTIVE SUMMARY

The Storm Water Systems Management Plan (SWSMP) provides a complete reference guide for use by the property owner and their chosen maintenance subcontractor for the inspection and maintenance of the storm water best management practices (BMPs) at 15 Madbury Road and 8 Mathes Terrace in Durham, NH. While the primary purpose of the SWSMP is to establish inspection and maintenance requirements, the plan also summarizes the purpose and function of each practice. The SWSMP, in conjunction with the construction plans and details found in the Site Plan Package, describe the construction requirements of each BMP and standards for their protection and initial stabilization during the construction phase of the development and therefore should be incorporated into the construction bid documents. Compliance with the recommendations in the SWSMP will assure expected operation, performance, and life cycle of the BMPs which have a common purpose of collecting and treating storm water runoff in an effort to protect the quality of public waters.

## 3.0 TEMPORARY BEST MANAGEMENT PRACTICES

This section describes the temporary best management practices to be employed during construction whose purposes are to protect downstream water quality from sediment/contaminants carried in storm water surface run off during the site construction phase of the development. The temporary BMPs are summarized below.

### 3.1 ORANGE CONSTRUCTION FENCING (PERIMETER CONTROL CONSTRUCTION)

For this project, a formal positive limit of work barrier is needed adjacent to the wetlands which is accomplished by the installation of orange construction fencing as shown on the construction plans. This fence shall be installed prior to site demolition. Fencing shall be maintained in place throughout construction and permitted to be removed once the site earthwork and landscaping is completed. Temporary removal of the fencing is permitted to accommodate the full scope of construction. Fencing shall be replaced following the completion of the construction activity.

### 3.2 SILT SOXX™ (PERIMETER CONTROL)

Silt Soxx is a 12 to 18 inch diameter tube of geotextile fabric filled on site with bark mulch/compost. This is used along the down gradient side of disturbed site areas where surface runoff is non-concentrated sheet flow or minimal shallow concentrated flow. The material in the tubes filters the runoff and allows sediment to settle out by temporarily ponding runoff on the up gradient side.

These tubes are placed as shown in the construction plans prior to any soil disturbance on the site and maintained in accordance with the manufacturers requirements throughout construction. The tubes are removed once the development site has achieved greater than 75% stabilization. Bare soil areas resulting from the removal of the tubes are revegetated. Alternatively, the tubes can be slit along the top and the mulch/compost distributed to either side. The tube material then gets removed and disposed of in a normal trash container used by the contractor.

### 3.3 STABILIZED CONSTRUCTION ENTRANCE

The stabilized construction entrance created from placement of 2-1/2 inch or smaller crushed stone as detailed in the construction plans provides a firm supportive means of entering and exiting the property from/to the public way. The friction of the tires on construction vehicles

against the stone acts as a tire scrubber which releases soil bound to the tires. This minimizes the amount of soil and fines deposited on public roadways. Stabilized Construction Entrances shall be used wherever there is major traffic between the construction site and public way. Construction traffic shall be encouraged to the extent practicable to access the site via the stabilized construction entrance.

#### 3.4 SWEEPING OF PUBLIC WAY

Sweeping is accomplished by power broom or hand broom as needed whenever soil or debris from site construction activities are deposited on the public way. At a minimum, sweeping shall take place at the end of each work day during the site work and landscaping phase of construction.

#### 3.5 SILTATION POND

Storm water runoff from disturbed areas associated with site construction tends to concentrate more easily than on naturally vegetated soils. The velocity of the runoff becomes erosive as it concentrates in the resulting conveyance of sediment. Properly placed siltation ponds allow temporary ponding of this runoff which allows much of the sediment to settle out. The siltation pond is provided with a stable overflow channel such as a rip rap spillway underlain with a geotextile fabric or sand filter to allow runoff to exit the pond during more intense rain events.

In many instances, the pond areas used as a permanent BMP can temporarily be used as a siltation pond. In this case, it is recommended that the area of the rain garden not be used as the siltation pond to avoid degradation of the infiltration capacity of the surrounding soils. There shall be no discharge of sediment laden water into Pettee Brook. A pump truck may be necessary to remove such water from the site.

#### 3.6 INLET PROTECTION

The purpose of inlet protection is to collect and contain the majority of soil particles conveyed in storm water runoff prior to the runoff entering a drainage structure inlet (catchbasin, manhole opening, culvert, etc.). This project employs the Siltsack™ which is to be installed at all catch basin frame/grate openings receiving runoff from the site. The Siltsack™ is placed in the opening of the catch basin and functions as a filter. Maintenance of this shall be in compliance with the manufacturers requirements. The Siltsack™ shall be emptied once filled to 2/3 capacity, rinsed to release all fines, and reinstalled back in the catch basin. Care shall be taken to prevent puncture of the filter. A Siltsack™ showing signs of any tears, rips, or punctures shall be immediately repaired or replaced with a new Siltsack™.

#### 3.7 MULCHING, TACKIFIER, GEOTEXTILE MATTING, CRUSHED GRAVEL

These temporary practices are employed to improve the resistance of bare soil to erosion. Mulching with weed free straw/hay, sprayed on liquid tackifier, and placement of decomposable fabrics reduce and disperse the impact of falling rain drops, minimize the velocity of runoff, and help hold soil particles in place. Use of a temporary 4" thick layer of crushed gravel provides a necessary means of equipment travel through otherwise unstable material and helps minimize the release and conveyance of soil particles. Any single or combined form of these practices is highly encouraged during construction. Examples include disturbed areas excavated to subgrade and then left un-worked for more than 3 consecutive days and on temporary soil stockpiles. This shall continue until the final permanent site stabilization is in place and at least 75% of the vegetation is established.

#### 3.8 SITE DEWATERING

Efforts shall be made to eliminate excavating in extremely damp conditions. The use of

equipment in soils where free water is present tends to cause erosion and increased sedimentation. Dewatering requires removal of free groundwater to below the depth of excavation and can be accomplished by digging a temporary sump adjacent to the excavation site and filling this sump with clean crushed stone embedded with a perforated stand pipe. A pump is then placed in the standpipe to extract the water. With time, the free groundwater in the vicinity of the excavation is lowered and then site excavation can occur with minimal release of fines into storm water.

### 3.9 WASHOUT AREA/BOOM

A washout area/boom can take the form of either a naturally vegetated area or manufactured system where water from dewatering can be directed for treatment prior to release into public waters. A simple practice is to encircle an area with haybales overlaid with geotextile and direct the discharge onto a splash plate in the middle of this circle. The size of the area will depend on the amount of water to be discharged and therefore experimentation at the site is warranted. This area is often used to treat the discharge waters from the washout of concrete trucks. Maintenance is required as the area or system becomes 2/3 or more clogged with fines and fails to contain the majority of fines. Removal of the accumulated fines may be adequate, however, in many instances, full replacement of the practice may be necessary due to the difficulty of restoring the filtration of the practice.

### 3.10 SITE WATERING

Site watering is intended to dampen the surface of bare soils in order to reduce airborne dust associated with earth moving operations. It is important to establish an application rate suitable for each site that provides adequate dampening of the soils but does not generate runoff. The weather conditions will dictate the frequency of site watering needs.

## 4.0 PERMANENT BEST MANAGEMENT PRACTICES

The section identifies the BMPs employed on this development and provides a brief summary to establish their purpose in the collection and treatment train within the storm water system. See the included Storm Water Systems Overview Plan for the location(s) of each of the BMPs.

### 4.1 ROOF DRAINAGE COLLECTION

Portions of the buildings shall have a roof gutter system with down spouts and collector pipes that discharge to splash pads and the closed drainage system. Underground roof leaders shall be protected from receiving storm water during earth moving operations. Simple use of a cap or duct tape over the open ends of the roof leaders should be sufficient. When the building gutters are installed, care shall be taken to ensure that gutters and down spouts are protected from becoming clogged with construction material and accidentally misplaced/abandoned tools. A test flushing to ensure proper operation at completion of construction and prior to final sign-off is recommended.

### 4.2 CLOSED DRAINAGE SYSTEM

The closed drainage system is composed of collection and conduit systems as well as a chamber holding system. Two drip strips are located on the north side of the building, the drip strip to the east will be collecting the roof runoff from the north-east side of the building and convey it to the rain garden in which it will be treated. The west drip strip will collect the north-west roof runoff and convey it to Drain Manhole #1 (DMH #1) which will then outlet to Pettee Brook. The south side of the buildings roof runoff will be collected using a gutter system which conveys the runoff to a below grade stormwater chamber system. The chamber system outlets



to a Nyloplast weir structure. This outlet control structure drains to Drain Manhole (DMH #1). The trench drain which is located at the entrance of the parking garage will outlet to a 3-foot concrete drain manhole (DMH #2). This catch basin incorporates a hood (Snout™) at the outlet of the catch basin with an absorptive boom (Bioskirt™) which reduces harmful bacteria and retains oil and gas pollutants. This runoff then outlets to a Drain Manhole #1 (DMH #1).

#### 4.3 RAIN GARDEN

A rain garden or bioretention system is a landscaped depression that allows runoff to pond before it filters through an 12 inch deep soil mix, is collected by an under drain system. The rain garden incorporates a dense planting scheme specifically planned for the uptake of runoff.

The rain garden is designed to temporarily hold runoff like a detention pond and allow time for the vegetation to uptake the runoff, effectively reducing the pollutant load on Pettee Brook. The rain garden incorporates a 4" PVC under drain and Nyloplast drain basin which outlets to the existing Madbury Road closed drainage system.

#### 4.4 PERMEABLE PAVERS

This project utilizes permeable concrete paver blocks. The on-site soils are not suitable for infiltration of stormwater and therefore the purpose of the proposed permeable surface is to provide stormwater treatment. Runoff infiltrates through the subgrade of the permeable surface and collects in under drains. Cleanouts are proposed to provide system inspections.

### 5.0 INITIAL STABILIZATION AND MAINTENANCE OF PERMANENT BMPS

The maintenance requirements of Best Management Practices will vary through their life span. It is critically important to establish the required maintenance needs during the initial stabilization period as well as those long term maintenance needs during the course of their useful life. This section addresses the maintenance requirements for the initial stabilization period. Long term maintenance, repair, and potential replacement needs are discussed in Section 6.0. Note that any accumulated sediments to be removed shall be removed off site or, if approved by the owner, can be incorporated in the soils used during final site stabilization. However, none shall be incorporated into the soils within the rain garden.

#### 5.1 ROOF DRAINAGE COLLECTION

Underground roof leaders, if utilized on the project, shall be protected from receiving storm water during earth moving operations. Simple use of a cap or duct tape over the open ends of the roof leaders should be sufficient. When the building gutters are installed, care shall be taken to ensure that gutters and down spouts are protected from becoming clogged with construction material and accidentally misplaced/abandoned tools. A test flushing to ensure proper operation at completion of construction and prior to final sign-off is recommended.

#### 5.2 CLOSED DRAINAGE SYSTEM

Implementation of the Temporary BMPs, particularly the Siltsack™ will protect the closed drainage system from siltation. A riprap apron is provided at culvert outlets. Outlet protection reduces the velocity of runoff exiting a pipe thereby preventing scour and downstream erosion. Inspect rip rap for damage and deterioration and repair as necessary. Ensure outlet is free of debris.

### 5.3 RAIN GARDEN

The site work contractor is encouraged to refrain from final landscape installation in the rain garden until the contributing disturbed areas are stabilized and all plant materials are immediately on hand prior to preparing the bedding material. However, it is not possible, especially when the unknown of weather patterns are considered, to time all site construction activities to eliminate accumulation of fines in the final stabilized rain garden. The fines that do accumulate within the basin portion of the rain garden during the final phase of construction shall be removed prior to placement of the reservoir course and soil mix.

The establishment of the vegetation shall be a priority including adequate watering and pruning as prescribed by the supplier. It is recommended that the owner hold a contingency/guarantee of growth on the landscape contractor for period of 6 months to one year depending on the timing of the installation.

### 5.4 PERMEABLE PAVERS

Do not discharge sediment-laden waters from construction activities (runoff, water from excavations) into areas designated for porous pavement to prevent clogging of the voids in the pavers and the subgrade. Do not allow stormwater from other areas of the site to flow onto the completed porous pavement until those areas have been fully stabilized.

## 6.0 LONG TERM MAINTENANCE OF PERMANENT BMPS

This section will be useful to the property owner and their maintenance subcontractor to establish a systematic approach for the inspection and maintenance of the on-site storm water system components. Included in Appendix B is an Inspection Matrix which summarizes the inspection needs described below. An Inspection Report is provided in Appendix C. It is recommended that completed Inspection Reports be filed with this manual for future reference.

### 6.1 ROOF DRAINAGE COLLECTION

As needed, but at a minimum of once per year after leaf fall, the gutters and downspouts shall be flushed clear of debris to ensure proper flow of roof runoff. The splash pads at the down spouts shall be swept clear of leaves and debris and replaced if necessary. The roof drainage system shall be observed during a rain event to ensure proper performance. Any leaks from the gutters shall be addressed.

### 6.2 CLOSED DRAINAGE SYSTEM

The sumps of all drainage structures shall be inspected to determine the extent of sediment accumulation. The sump shall be cleaned when sediments exceed 2/3 total depth from outlet invert to basin bottom. The parking area trench drain shall be inspected for accumulate trash, debris, and sediment. It shall be cleaned out or the obstruction removed if there is an impediment to flow. The parking area drain manhole (DNH #2) shall be pumped dry to remove accumulated oils that are sitting on top of the stored water. The Snout™ and BioSkirt™ shall be maintained in accordance with the manufacturers' requirements which include annual inspections and servicing. Inspect rip rap for damage and deterioration and repair as necessary. Ensure pipe outlets are free of debris.

### 6.3 RAIN GARDEN

Rain garden should be inspected at least twice annually and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection. At least once annually the rain garden should be inspected for



drawdown time. If rain garden does not drain within 72 hours following a rainfall event, then a qualified professional should assess the system, to determine required measures to restore infiltration and filtration capacity which may include removal of sediment or reconstruction of filter media.

The landscaping material and riverstone mulch will be the major visible features of this BMP. Pruning of the trees and shrubs and cutting back of the groundcover to the extent necessary and practical to prevent overgrowth of the vegetation. Augmentation of the riverstone mulch may be needed every two or three years. Any fallen leaves, branches, and other detritus material should be removed each fall prior to the winter season with a final clean-up in the spring. Watering may be necessary during extended periods of extremely hot and/or dry weather.

#### 6.4 PERMEABLE PAVERS

The permeable pavers shall be monitored twice annually to ensure that the paver surface drains effectively after storms. No winter sanding of the surface is permitted. Minimize application of salt for ice control. Inspect annually for deterioration. Clean periodically (2 times per year) using a vacuum sweeper. Power washing may be required prior to vacuum sweeping, to dislodge trapped particles. Major clogging may necessitate replacement of paver surface, and possibly filter course and sub-base course. Inspect and clean underdrain pipes using inspection ports.

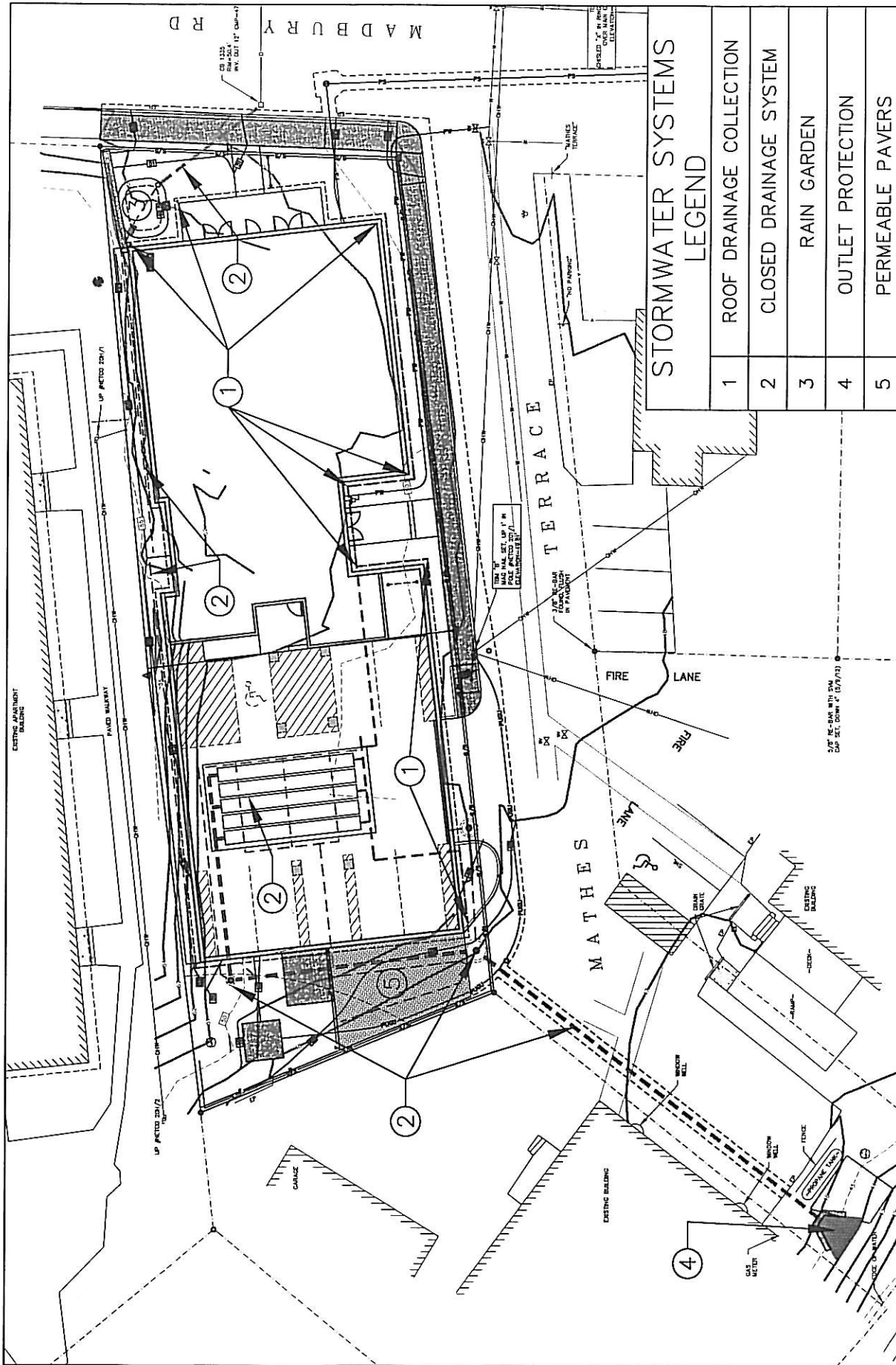
## 7.0 REFERENCES

The Storm Water Systems Management Plan incorporates many standard and accepted practices. Specifically the following references were utilized:

Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire. Rockingham County Conservation District, August 1992, or latest edition.

The New Hampshire Stormwater Manual, December 2008, Revision 1.0.

APPENDIX A:  
STORMWATER SYSTEMS OVERVIEW PLAN



### STORMWATER SYSTEMS LEGEND

1	ROOF DRAINAGE COLLECTION
2	CLOSED DRAINAGE SYSTEM
3	RAIN GARDEN
4	OUTLET PROTECTION
5	PERMEABLE PAVERS

DATE:	12/18/13	SEAL:
SCALE:	1"=30'	
DESIGNER:	MS	
DRAWN BY:	MS	
APPROVED BY:	MJS	
DWG FILE:		

### STORMWATER SYSTEMS OVERVIEW PLAN

prepared for  
**ISLAND DIVERSIFIED, LLC**  
 (TAX MAP 2, LOT 12-5 & 12-6)  
 MATHES TERRACE DURHAM, NH

**MJS  
ENGINEERING, PC**

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 ENVIRONMENTAL  
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APPENDIX B:  
MAINTENANCE MATRIX

# LONG TERM BMP INSPECTION / MAINTENANCE MATRIX

BMP	Major Inspection / Maintenance Criterion <sup>(1)</sup>	Inspection / Maintenance Interval				
		Spring <sup>(2)</sup>	Summer	Fall <sup>(3)</sup>	Winter	Other / Notes
Roof Drainage System	I - observation of system, check for leaks M - flushing clear of debris (leaves) M - splash pads swept clear of leaves and debris	I - RQ M - RQ	I - O	I - R M - R	I - O	
Closed Drainage System	I - check sump for accumulation of sediment M - Pump out basin to remove accumulated sediments and oils/gases. I - Inspect Bioskirt™ and Snout™	I - RQ M - R	I - O	I - RQ M - R	I - O	Pump basin when sediment is 6" or less from outlet pipe
Rain Garden	I - check for drawdown time I - check earthen dam for settlement, rodent damage, failures M - augment riverstone mulch as needed M - remove fallen leaves, branches, etc M - mow, head, prune to control overgrowth. Cut back ground cover if necessary. M - remove accumulated sediment	I - RQ M - R	I - O	I - RQ M - RQ	I - O	
Outlet Protection	I - check damage to rip rap apron M - remove debris including accumulated leaves and branches M - Repair rip rap apron	I - RQ M - RQ	I - O	I - R M - R	I - O	



# LONG TERM BMP INSPECTION / MAINTENANCE MATRIX

BMP	Major Inspection / Maintenance Criterion <sup>(1)</sup>	Inspection / Maintenance Interval			
		Spring <sup>(2)</sup>	Summer	Fall <sup>(3)</sup>	Winter
Permeable Pavers	I - check for concrete deterioration or spalling. M - power washing may be required prior to vacuum sweeping M - clean periodically (2 times per year) using a vacuum sweeper. M - Major clogging may necessitate replacement of concrete surface, and possibly filter course and sub-base course.	I - RQ M - RQ	I - O	I - RQ M - RQ	I - O

<u>Notes</u> (1) The BMP should be inspected as recommended and maintenance shall be performed as needed. Maintenance may be needed at shorter or longer intervals depending on weather conditions, and use of the property and contributing watershed (2) Early Spring as vegetation begins to blossom or earlier (3) Late Fall after majority of leaf fall, but prior to snow fall		<u>Abbreviations</u> I - Inspection M - Maintenance O - Optional R - Recommended RQ - Required
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APPENDIX C:  
MAINTENANCE REPORTS



# MJS ENGINEERING, PC

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## BMP Maintenance Report

Site Name:	Island Diversified (15 Madbury Road & 8 Mathes Terrace)
Site Location:	15 Madbury Road & 8 Mathes Terrace Durham, NH 03824
Installation Date:	Spring 2014

Owner:	Island Diversified, LLC	Contractor:	N/A
		Contact Name:	N/A
Company Name:		Company Name:	N/A
Telephone:		Telephone:	N/A
Fax:		Fax:	N/A
Address:		Address:	N/A

## Maintenance Log

Items Inspected	Checked		Maintenance Needed		Comments
	Yes	No	Yes	No	
Roof Drainage System					
Closed Drainage System					
Rain Garden					
Outlet Protection					
Permeable Pavers					

APPENDIX D:  
MANUFACTURERS DATA SHEETS



## SWPPP Cut Sheet

Last Updated: 1-1-08

### Section 1: Erosion and Sediment Control – Construction Activities

#### 1.1 Filtrex SiltSoxx™

##### *Sediment & Perimeter Control Technology*

#### PURPOSE & DESCRIPTION

Filtrex SiltSoxx™ are a three-dimensional tubular sediment control and storm water runoff filtration device typically used for perimeter control of sediment and other soluble pollutants (such as phosphorus and petroleum hydrocarbons), on and around construction activities.

#### APPLICATION

Filtrex SiltSoxx™ are to be installed down slope of any disturbed area requiring erosion and sediment control and filtration of soluble pollutants from runoff. SiltSoxx™ are effective when installed perpendicular to sheet or low concentrated flow. Acceptable applications include:

- Site perimeters
- Above and below disturbed areas subject to sheet runoff, interrill and rill erosion
- Above and below exposed and erodible slopes
- Around area drains or inlets located in a 'sump'
- On compacted soils where trenching of silt fence is difficult or impossible
- Around sensitive trees where trenching of silt fence is not beneficial for tree survival or may unnecessarily disturb established vegetation.
- On frozen ground where trenching of silt fence is impossible.
- On paved surfaces where trenching of silt fence is impossible.

#### INSTALLATION

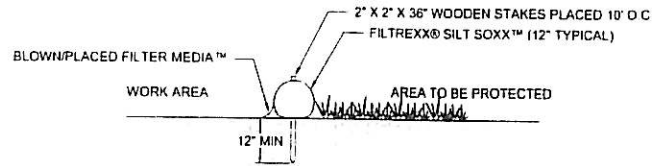
1. SiltSoxx™ used for perimeter control of sediment and soluble pollutants in storm runoff shall meet Filtrex Soxx™ Material Specifications and use Certified Filtrex FilterMedia™.
  2. Contractor is required to be Filtrex Certified™ as determined by Filtrex International, LLC (440-926-2607 or visit website at [www.filtrex.com](http://www.filtrex.com)). Certification shall be considered current if appropriate identification is shown during time of bid or at time of application (current listing can be found at [www.filtrex.com](http://www.filtrex.com)). Look for the Filtrex Certified™ Seal.
  3. SiltSoxx™ will be placed at locations indicated on plans as directed by the Engineer.
  4. SiltSoxx™ should be installed parallel to the base of the slope or other disturbed area. In extreme conditions (i.e., 2:1 slopes), a second SiltSoxx™ shall be constructed at the top of the slope.
  5. Stakes shall be installed through the middle of the SiltSoxx™ on 10 ft (3m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) wooden stakes. In the event staking is not possible, i.e., when SiltSoxx™ are used on pavement, heavy concrete blocks shall be used behind the SiltSoxx™ to help stabilize during rainfall/runoff events.
  6. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.
  7. Loose compost may be backfilled along the upslope side of the SiltSoxx™, filling the seam between the soil surface and the device, improving filtration and sediment retention.
  8. If the SiltSoxx™ is to be left as a permanent filter or part of the natural landscape, it may be seeded at time of installation for establishment of permanent vegetation. The Engineer will specify seed requirements.
  9. Filtrex SiltSoxx™ are not to be used in perennial, ephemeral, or intermittent streams.
- See design drawing schematic for correct Filtrex SiltSoxx™ installation (Figure 1.1).

#### INSPECTION and MAINTENANCE

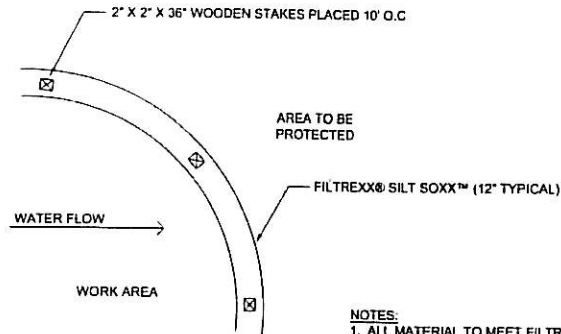
Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. SiltSoxx™ should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through. If ponding becomes excessive, additional SiltSoxx™ may be required to reduce effective slope length or sediment removal may be necessary. SiltSoxx™ shall be inspected until area above has been permanently stabilized and construction activity has ceased.

1. The Contractor shall maintain the SiltSoxx™ in a functional condition at all times and it shall be routinely inspected.
2. If the SiltSoxx™ has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the SiltSoxx™ when accumulation has reached 1/2 of the effective height of the SiltSoxx™, or as directed by the Engineer. Alternatively, a new SiltSoxx™ can be placed on top of and slightly behind the original one creating more sediment storage capacity without soil disturbance.
4. SiltSoxx™ shall be maintained until disturbed area above the device has been permanently stabilized and construction activity has ceased.
5. The FilterMedia™ will be dispersed on site once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.
6. For long-term sediment and pollution control applications, SiltSoxx™ can be seeded at the time of installation to create a vegetative filtering system for prolonged and increased filtration of sediment and soluble pollutants (contained vegetative filter strip). The appropriate seed mix shall be determined by the Engineer.





SECTION NTS



PLAN NTS

- NOTES:
1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
  2. SILT SOXX™ FILL TO MEET APPLICATION REQUIREMENTS.
  3. COMPOST MATERIAL TO BE DISPERSED ON SITE, AS DETERMINED BY ENGINEER.

## FILTREXX® SILT SOXX™

NTS

Slope Percent	Maximum Slope Length Above SiltSoxx™ in Feet (meters)*				
	8 in (200 mm) SiltSoxx™	12 in (300 mm) SiltSoxx™	18 in (450 mm) SiltSoxx™	24 in (600mm) SiltSoxx™	32 in (800mm) SiltSoxx™
	7 in (175 mm)**	10 in (250 mm) **	15 in (375 mm) **	20 in (500 mm) **	26 in (650 mm) **
2 (or less)	600 (180)	750 (225)	1000 (300)	1300 (400)	1650 (500)
5	400 (120)	500 (150)	550 (165)	650 (200)	750 (225)
10	200 (60)	250 (75)	300 (90)	400 (120)	500 (150)
15	140 (40)	170 (50)	200 (60)	325 (100)	450 (140)
20	100 (30)	125 (38)	140 (42)	260 (80)	400 (120)
25	80 (24)	100 (30)	110 (33)	200 (60)	275 (85)
30	60 (18)	75 (23)	90 (27)	130 (40)	200 (60)
35	60 (18)	75 (23)	80 (24)	115 (35)	150 (45)
40	60 (18)	75 (23)	80 (24)	100 (30)	125 (38)
45	40 (12)	50 (15)	60 (18)	80 (24)	100 (30)
50	40 (12)	50 (15)	55 (17)	65 (20)	75 (23)

\*Based on a failure point of 36 in (0.9 m) super silt fence (wire reinforced) at 1000 ft (303 m) of slope, watershed width equivalent to receiving length of sediment control device, 1 in/ 24 hr (25 mm/24 hr) rain event. \*\*Effective height of Silt Soxx™ after installation and with constant head from runoff as determined by Ohio State University.

# SILTSACK®

(U.S. Patent #5,575,925)

## Catch Basin Sediment Capture Device

*Keeping catch basins free of silt!*

### Versatile

Available in 2 styles to meet your needs:

- High flow
- Regular flow

### And It's Simple

- Remove drain grate
- Insert Siltsack
- Replace grate to hold Siltsack in position
- Siltsack traps silt
- Remove filled Siltsack easily
- Clean and reuse or simply discard and replace

Are you looking for a cost-effective, easy way to stop silt and sediment from entering catch basins on construction site? Siltsack is the simple and economical solution to prevent clogging of catch basins.

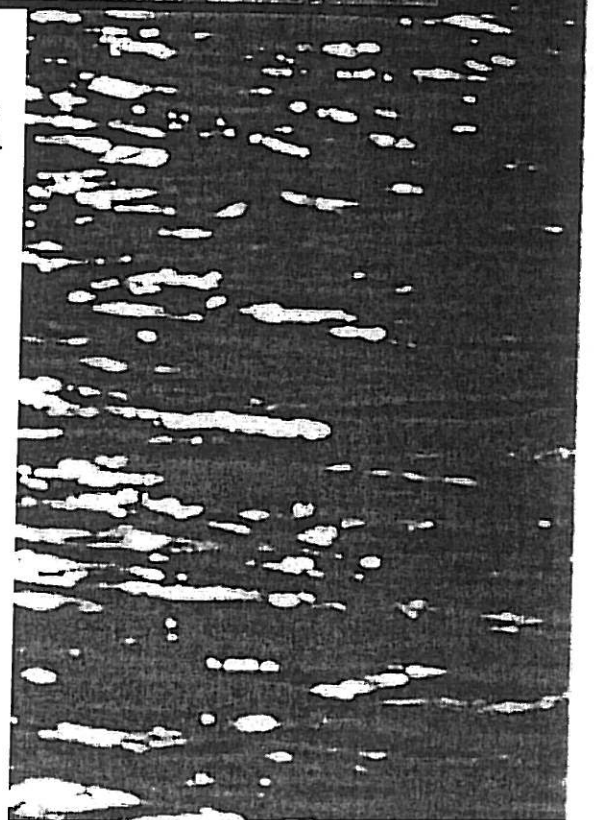
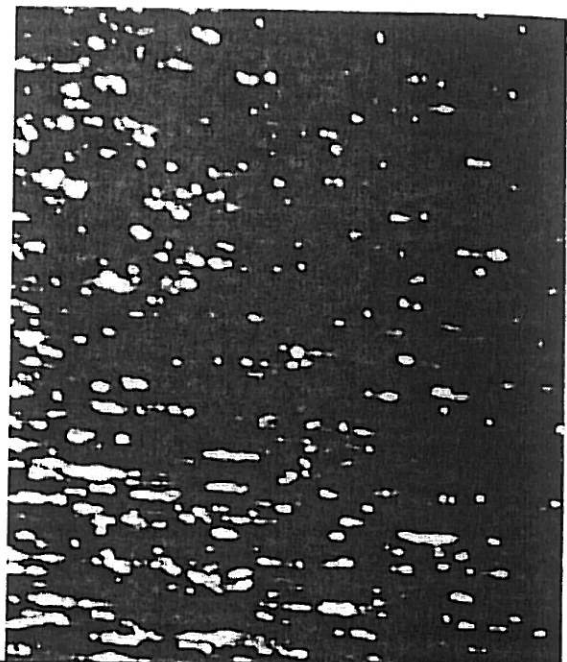
Siltsack is a sediment control device used to prevent silt and sediment from entering your drainage system by catching the silt and sediment while allowing water to pass through freely. Siltsack can be used as a primary or secondary sediment control device to prevent failure of your drainage system due to clogging. It must be maintained on a regular basis to function properly.

Siltsack is available in both high-flow or regular flow. A modified Siltsack is also available with a curb opening deflector attached to prevent sediment and debris from entering through curb openings. Constructed with properties shown on the Specifications page, Siltsack is a quality product designed to save time and money.

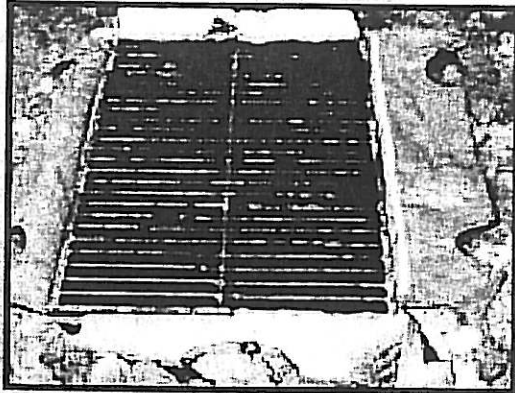


Routine inspection of a Siltsack's collected sediment level is important to prevent "ponding" around storm drains. We recommend the following maintenance schedule:

- Each Siltsack should be inspected after every major rain event.
- If there have been no major events, Siltsack should be inspected every 2-3 weeks.
- The yellow restraint cord should be visible at all times. If the cord is covered with sediment, the Siltsack should be emptied.

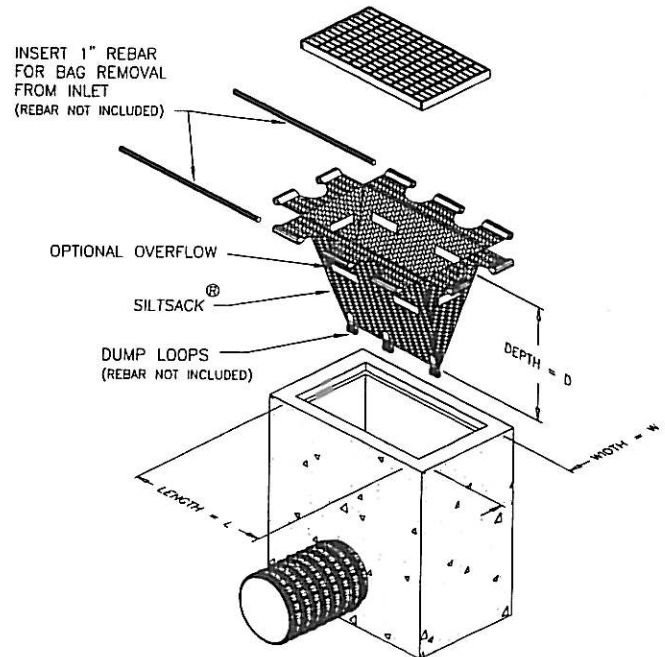


## Typical Siltsack® Construction

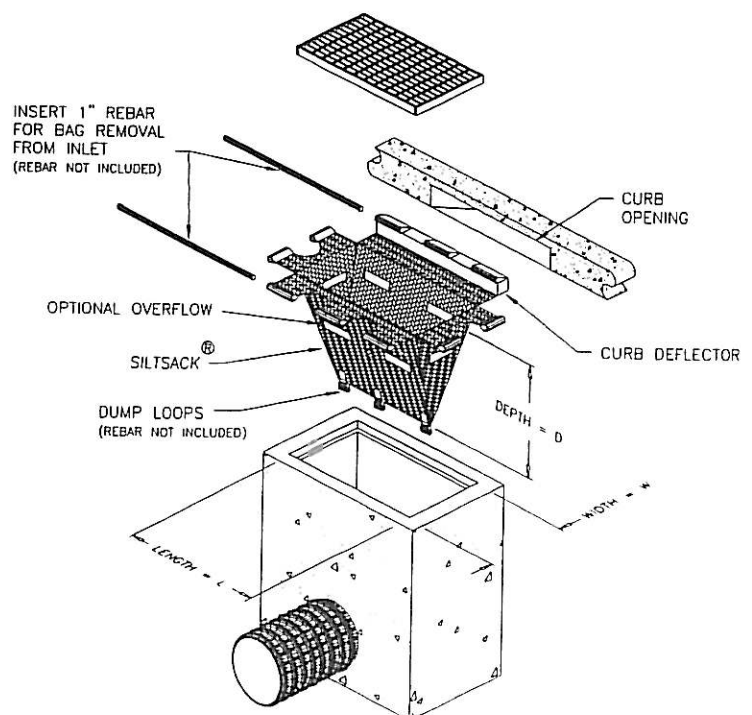


Installed Siltsack held in place by grate.

### Type A



### Type B



Sediment captured by Siltsack® can easily be removed from the site.

# Siltsack® Specification

## Control of Sediment Entering Catch Basins

(Storm Water Management)

### 1.0 Description

- 1.1 This work shall consist of furnishing, installing, maintaining, and removing Siltsack sediment control device as directed by the engineer or as shown on the contract drawings. Siltsack sediment control device is manufactured by:

*ACF Environmental, Inc.*  
 2831 Cardwell Road, Richmond, Virginia 23234  
 Phone: 800-448-3636 • Fax: 804-743-7779  
[www.acfenvironmental.com](http://www.acfenvironmental.com)

### 2.0 Materials

#### 2.1 Siltsack®

- 2.1.1 Siltsack shall be manufactured from a specially designed woven polypropylene geotextile manufactured by SI® Geosolutions and sewn by a double needle machine, using a high strength nylon thread.



*SI Geosolutions:*  
[www.sigeosolutions.com](http://www.sigeosolutions.com)  
 (800)621-0444



- 2.1.2 Siltsack will be manufactured to fit the opening of the catch basin or drop inlet. Siltsack will have the following features: two dump straps attached at the bottom to facilitate the emptying of Siltsack; Siltsack shall have lifting loops as an integral part of the system to be used to lift Siltsack from the basin; Siltsack shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this yellow cord is also a visual means of indicating when the sack should be emptied. Once the strap is covered with sediment, Siltsack should be emptied, cleaned and placed back into the basin.

- 2.1.3 Siltsack seams shall have a certified average wide width strength per ASTM D-4884 standards as follows:

Siltsack Style	Test Method	Test Method
Regular Flow	ASTM D-4884	165.0 lbs./in
Hi-Flow	ASTM D-4884	114.6 lbs./in

#### Siltsack Regular Flow

Property	Test Method	Units	Test Results
Grab Tensile	ASTM D-4632	lbs.	315x300
Grab Elongation	ASTM D-4632	%	15x15
Puncture	ASTM D-4833	lbs.	125
Mullen Burst	ASTM D-3786	P.S.I.	650
Trapezoid Tear	ASTM D-4533	lbs.	120x150
UV Resistance	ASTM D-4355	%	90
Apparent Opening	ASTM D-4751	US Sieve	40
Flow Rate	ASTM D-4491	Gal/Min/Ft <sup>2</sup>	40
Permittivity	ASTM D-4491	sec <sup>-1</sup>	0.55

#### or SILTSACK® High Flow

Property	Specification	Units	Test Results
Material	Polypropylene		
Weight	5.6 oz/sq yd		
Color	Black		
Grab Tensile Strength	390lbs (530N)	lbs.	255x275
Grab Elongation (Max %)	30%	%	20x15
Traezoid Tear	120 lbs (250N) Min	lbs.	40x50
Puncture	140 lbs (250N) Min	lbs.	135
Mullen Burst	600 psi	P.S.I.	420
Coefficient of Permeability	0.04 in/sec		
Permittivity	0.3 gal/min/sq ft	sec <sup>-1</sup>	1.5
Water Flow Rate	152 gal/min/sq ft	gal/min/ft <sup>2</sup>	200
AOS	0.212mm	US Sieve	40
UV Resistance Strength	90%		
Fabric Width	72"		

*All properties are Minimum Average Roll Values (MARV)*

### 3.0 Construction Sequence

#### 3.1 General

- 3.1.1 To install Siltsack in the catch basin, remove the grate and place the sack in the opening. Hold out approximately six inches of the sack outside the frame. This is the area of the lifting straps. Replace the grate to hold the sack in place.

- 3.1.2 When the restraint cord is no longer visible, Siltsack is full and should be emptied.

- 3.1.3 To remove Siltsack, take two pieces of 1" diameter rebar and place through the lifting loops on each side of the sack to facilitate the lifting of Siltsack.

- 3.1.4 To empty Siltsack, place it where the contents will be collected. Place the rebar through the lift straps (connected to the bottom of the sack) and lift. This will turn Siltsack inside out and empty the contents. Clean out and rinse. Return Siltsack to its original shape and place back in the basin.

- 3.1.5 Siltsack is reusable. Once the construction cycle is complete, remove Siltsack from the basin and clean. Siltsack should be stored out of the sunlight until needed on another project.

### 4.0 Basis of Payment

- 4.1 Payment for all Siltsack used during the construction is to be included in the bid price for the overall erosion and sediment control plan unless unit price is requested. Maintenance of Siltsack also to be included in this price.

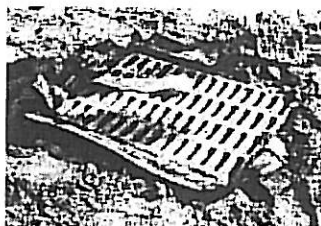
*\*Silt sack is covered by U.S. Patent No. 5,575,925.*



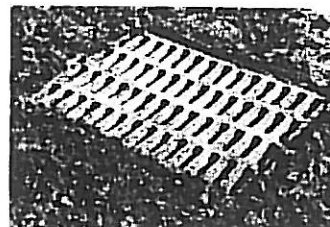
## Installation Made Easy



Install SiltSack® in catch basin, making sure emptying straps are laid flat outside the basin and held in place by drain grate.



Hold down removal flap pockets and emptying straps by covering with soil.



Properly installed, SiltSack® is out of sight and catches silt without the worry of silt fences or straw dams failing.

## Emptying Even Easier



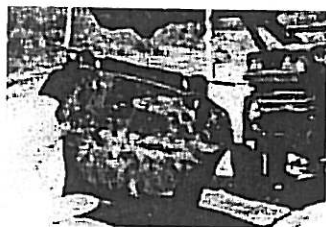
To prepare for emptying SiltSack®, remove soil covering removal flap pockets and rebar through pockets.



Remove catch basin cover grate.



Remove SiltSack® from catch basin by attaching to both bars and lifting with available equipment.



Move filled SiltSack® to dumping area and set on ground.



Insert a lifting bar through both emptying straps.



Lift SiltSack® by emptying straps, which are attached to the bottom of bag. When raised by straps, the bag will turn inside-out, empty and be ready for reuse or disposal.

## ACF Environmental

"Complete Source for Storm Water Solutions"



(800) 644-9223  
www.thebmpstore.com

Distributed by:



2831 Cardwell Road  
Richmond, Virginia 23234  
(800) 448-3636 • FAX (804) 743-7779  
www.acfenvironmental.com



# The Bio-Skirt®

Anti-Microbial and  
Hydrocarbon Adsorbent

## Introducing the Bio-Skirt®

Cost-Effective Bacteria and  
Oil Control for Stormwater Inlets

Easy  
retrofit for  
35,000+  
SNOUTs in  
service!

Anti-siphon device

SNOUT®  
traps oils  
and  
floatables  
on surface

Fabric made from  
100% Recycled Materials!

Cleaner Water Exiting

Sediment and Grit

Bio-Skirt®  
tendrils  
reduce  
bacteria, boom  
adsorbs  
hydrocarbons

- Bio-Skirt® material has been proven to significantly reduce harmful bacteria and polluting hydrocarbons typically retained in stormwater structures— which can help keep beaches, bays, rivers, and lakes safer.
- The Bio-Skirt® is constructed of a non-leaching antimicrobial which kills by physical contact as opposed to chemical means— no toxic chemicals leach into the environment— and the antimicrobial remains active indefinitely.
- The combination of the SNOUT® and the Bio-Skirt® is an extremely robust delivery method to reduce many significant pollutants of concern including TSS, Gross Particles, Floatable Trash and Debris, Hydrocarbons, and Bacteria.
- The Bio-Skirt® can significantly reduce single cell organisms such as bacteria, fungi, yeast, and algae.
  - Using Fecal Coliform as an indicator organism, within 30 minutes, Bio-Skirt® media was shown to reduce this organism by 95%, and by 100% within 2 hours in standing water. Test tank contained 10.6 US Gallons of contaminated water at 70° F with a ratio of Bio-Skirt® fabric to water of 1:322 (Analysis by Test Method SM9222D for Fecal Coliform MF).
- The media used to construct the Bio-Skirt® has been shown to significantly reduce hydrocarbons including Motor Oil/Diesel, Vegetable Oils, Emulsified Oils, and Polynuclear Aromatic Hydrocarbons (PAHs).
  - 0.5 grams of Bio-Skirt® material has been shown to remove more than 96% of a diesel/motor oil mixture (9.6g out of 10g) in a sample tank. Emulsified oils have been reduced by 95% (from 140 ppm to 7 ppm) at a flow rate of 100 gal./min. per 1 sq. ft section of Bio-Skirt® fabric. Per ASTM Method F726-81, "Sorber Performance of Adsorbents", Bio-Skirt® media has been shown to adsorb more than 10 times its own weight of 50W motor oil.

PRODUCTS FOR A BETTER ENVIRONMENT

BMP

BEST MANAGEMENT PRODUCTS, Inc.  
53 Mt. Archer Rd. Lyme, CT  
800-504-8008 fax 877-434-3197  
www.bio-skirt.com