



MS4 PROGRAM PLAN



James Madison University – Harrisonburg, Virginia
MS4 Program Plan

VSMP General Permit Registration Statement for Stormwater Discharges from Small Municipal Separate Storm
Sewer Systems (MS4)

Registration Number: VAR040112

In compliance with the Virginia Pollutant Discharge Elimination System (VPDES) Regulations

Last Updated June 2015

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Acronyms and Abbreviations

Bay	Chesapeake Bay	MCM	Minimum Control Measure
BMP	Best Management Practice	MS	Minimum Standard
CWA	Clean Water Act	MS4	Municipal Separate Storm Sewer System
CSS	Combined Sewer System		
DCR	Department of Conservation and Recreation	NPDES	National Pollution Discharge Elimination System
DEQ	Department of Environmental Quality	NOI	Notice of Intent
EPA	Environmental Protection Agency	NOV	Notice of Violation
ERP	Enforcement Response Plan	POC	Pollutants of Concern
ESC	Erosion & Sediment Control	RLD	Responsible Land Disturber
FM	Facilities Management	SOP	Standard Operating Procedures
GIS	Geographic Information Systems	TMDL	Total Maximum Daily Load
GPS	Global Positioning System	UA	Urbanized Area
HUC	Hydrologic Unit Code	VPDES	Virginia Pollution Discharge Elimination System
IDDE	Illicit Discharge Detection & Elimination	VSMP	Virginia Stormwater Management Program
JMU	James Madison University	WLA	Waste Load Allocation
MEP	Maximum Extent Practicable		

Introduction

This document represents James Madison University’s plan to meet the requirements of 9VAC25-890 General Virginia Stormwater Management Program (VSMP) Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems.

Registration Statement



VSMP GENERAL PERMIT REGISTRATION STATEMENT FOR STORMWATER DISCHARGES FROM SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS [VAR04]

(Please Type or Print All Information)

(The applicable fee specified in Form DCR 199-145 must additionally be submitted to the address given in that form to obtain coverage)

1. Regulated Small MS4

Name: James Madison University

Type: City County Incorporated Town Unincorporated Town College or University
 Local School Board Military Installation Transport System Federal or State Facility Other

Location (County or City): City of Harrisonburg

2. Regulated Small MS4 Operator

Name: James Madison University

Address: 181 Patterson St., MSC 7004

City: Harrisonburg State: VA Zip: 22807

3. Hydrologic Unit Code(s) as identified in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset currently receiving discharges or that have potential to receive discharges from the regulated small MS4:

020700050602 - PS22 - Blacks Run

4. Attach a description of the estimated drainage area, in acres, served by the regulated small MS4 discharging to any impaired receiving surface waters listed in the most recent Virginia 305(b)/303(d) Water Quality Assessment Integrated Report, and a description of the land use of each such drainage area.
See Section 1.3 Description of Drainage Areas of plan.

5. Any TMDL waste loads allocated to the regulated small MS4 (this information may be found at <http://www.deq.state.va.us/tmdl/develop.html>):

None

6. The name(s) of any regulated physically interconnected MS4s to which the regulated small MS4 discharges.

City of Harrisonburg, Virginia Department of Transportation (VDOT)

7. A copy of the MS4 Program Plan that includes:

a. A list of BMPs that the operator proposes to implement for each of the stormwater minimum control measures and their associated measurable goals pursuant to 4VAC50-60-1240, Section II B; that includes:

i. A list of the existing policies, ordinances, schedules, inspection forms, written procedures, and other documents necessary for BMP implementation; and

ii. The individual, department, division, or unit responsible for implementing the BMP;

b. The objective and expected results of each BMP in meeting the measurable goals of the stormwater minimum control measures;

c. The implementation schedule including any interim milestones for the implementation of a proposed new BMP; and

(DCR 199-148) (07/08)

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d. The method that will be utilized to determine the effectiveness of each BMP and the program as a whole.

8. List all existing signed agreements between the operator and any applicable third parties where the operator has entered into an agreement in order to implement minimum control measures or portions of minimum control measures.

JMU does not have any signed agreements with other parties.

9. The name, address, telephone number and e-mail address of either the principal executive officer or ranking elected official as defined in 4VAC50-60-370.

Charles W. King, Jr., Senior Vice President, 91 Alumnae Drive MSC 7606, Harrisonburg, VA 22807
(540) 568-3400, kingcw@jmu.edu

10. The name, position title, address, telephone number and e-mail address of any duly authorized representative as defined in 4VAC50-60-370.

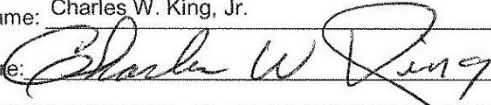
Dale Chestnut, Stormwater Coordinator, 181 Patterson St. MSC 7004, Harrisonburg, VA 22807, (540) 568-7606, chestndl@jmu.edu

11. **Certification:** "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate, and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

Print Name: Charles W. King, Jr.

Title: Senior Vice President

Signature:



Date: 2-11-13

For Department of Conservation and Recreation Use Only

Accepted/Not Accepted by: _____ Date: _____

Basin _____ Stream Class _____ Section _____ Special Standards _____

SECTION 1: MS4 OVERVIEW

1.1 Organizational Structure

The Department of Sustainability is responsible for coordinating James Madison University’s VSMP Phase II permit and for implementing a majority of the permit requirements. Additional information is gathered from several other departments including: Grounds/Landscaping, Operations, Power Plant, Recycling/Waste Management, Transportation, Risk Management, Integrated Science & Engineering and the Office of Environmental Stewardship & Sustainability.

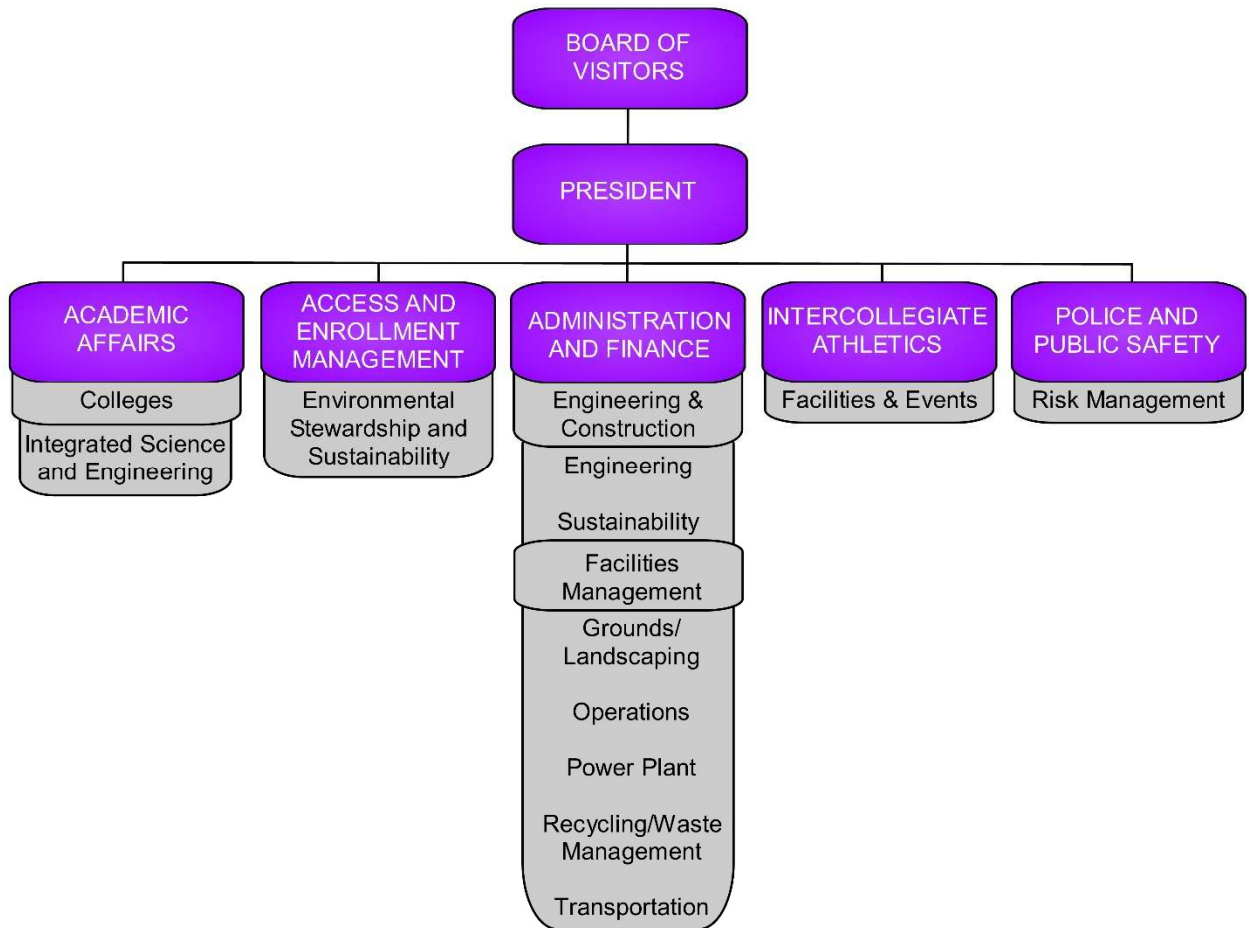


Figure 1. James Madison University Stormwater Management Organizational Structure

1.2 Contact Information

<p>Principle Executive Officer: Title: Senior Vice President Name: Charles W. King, Jr. Address: 91 Alumnae Drive, MSC 7606 Harrisonburg, VA 22807 Phone: (540) 568-3400 Email: kingcw@jmu.edu</p>	<p>Duly Authorized Representative: Title: Stormwater Coordinator Name: Dale Chestnut Address: 181 Patterson St., MSC 7004 Harrisonburg, VA 22807 Phone: (540) 568-7606 Email: chestndl@jmu.edu</p>
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<p>Administration and Finance: Title: Senior Vice President Name: Charles W. King, Jr. Address: 91 Alumnae Drive, MSC 7606 Harrisonburg, VA 22807 Phone: (540) 568-3400 Email: kingcw@jmu.edu</p>	<p>Sustainability: Title: Stormwater Coordinator Name: Dale Chestnut Address: 181 Patterson St., MSC 7004 Harrisonburg, VA 22807 Phone: (540) 568-7606 Email: chestndl@jmu.edu</p>
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<p>Office of Environmental Stewardship & Sustainability: Title: Executive Director Name: C.J. Hartman Address: MSC 1106 Harrisonburg, VA 22807 Phone: (540) 568-3202 Email: brodicj@jmu.edu</p>	<p>FM – Grounds/Landscaping: Title: Manager Name: Frankie Lucas Address: MSC 7007 Harrisonburg, VA 22807 Phone: (540) 568-3411 Email: lucascf@jmu.edu</p>
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<p>Risk Management: Title: Environmental Health Coordinator Name: Marcella Mullenax Address: 131 W. Grace St., MSC 6703 Harrisonburg, VA 22807 Phone: (540) 568-4959 Email:</p>	<p>FM – Operations: Title: Administrative Analyst Name: Carlene Heatwole Address: MSC 7002 Harrisonburg, VA 22807 Phone: (540) 568-1773 Email: heatwocc@jmu.edu</p>
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<p>Integrated Science & Technology: Title: Professor Name: Thomas Benzing Address: MSC 4102 Harrisonburg, VA 22807 Phone: (540) 568-2794 Email: benzintr@jmu.edu</p>	<p>FM – Power Plant: Title: Manager Name: Dennis Hart Address: MSC 0501 Harrisonburg, VA 22807 Phone: (540) 568-6235 Email: hartdb@jmu.edu</p>
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<p>Integrated Science & Technology: Title: Associate Professor Name: Wayne Teel Address: MSC 4102 Harrisonburg, VA 22807 Phone: (540) 568-2798 Email: teelws@jmu.edu</p>	<p>FM – Recycling/Waste Management: Title: Manager Name: Tony Smith Address: MSC 7007 Harrisonburg, VA 22807 Phone: (540) 568-8144 Email: smith2tr@jmu.edu</p>
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<p><u>Integrated Science & Technology:</u> Title: Assistant Professor Name: Robert Brent Address: MSC 4102 Harrisonburg, VA 22807 Phone: (540) 568-2728 Email: bretrn@jmu.edu</p>	<p><u>FM – Transportation:</u> Title: Shop Supervisor Name: Terry Hemp Address: 181 Patterson St., MSC 7001 Harrisonburg, VA 22807 Phone: (540) 568-6364 Email: hemptl@jmu.edu</p>
<p><u>Facilities & Events:</u> Title: Assistant Athletics Director Name: Ty Phillips Address: MSC 4703 Harrisonburg, VA 22807 Phone: (540) 568-8810 Email: phillidt@jmu.edu</p>	<p><u>Sustainability:</u> Title: GIS Coordinator Name: Bradley Andrick Address: 181 Patterson St., MSC 7004 Harrisonburg, VA 22807 Phone: (540) 568-4029 Email: andricba@jmu.edu</p>

1.3 Description of Drainage Areas

James Madison University is located within the City of Harrisonburg and has approximately 20,000 students and 4,000 faculty and staff. The campus consists of nearly 686 acres of developed and undeveloped land comprising of academic buildings, student housing, recreation buildings, conference halls, parking areas, maintenance yards, athletic fields, a power plant and an arboretum.

Approximately 117 acres of the campus drain directly to Blacks Run while an additional 539 acres drain to either Sibert Creek or Newman Lake. Sibert Creek then flows into Blacks Run directly adjacent to the campus. The hydrologic unit code (HUC) from Virginia’s 6th Order National Watershed Boundary Dataset (NWBD) for this drainage area is PS-22. Blacks Run is included on the state’s Draft 2012 305(b)/303(d) Integrated Report as a Category 4A water body. Category 4A waters are those that are impaired and have been assigned a TMDL to address the impairments. Blacks Run has been deemed to be impaired due to elevated levels of fecal coliform and escherichia coli, as well as benthic-macroinvertebrate bioassessments.

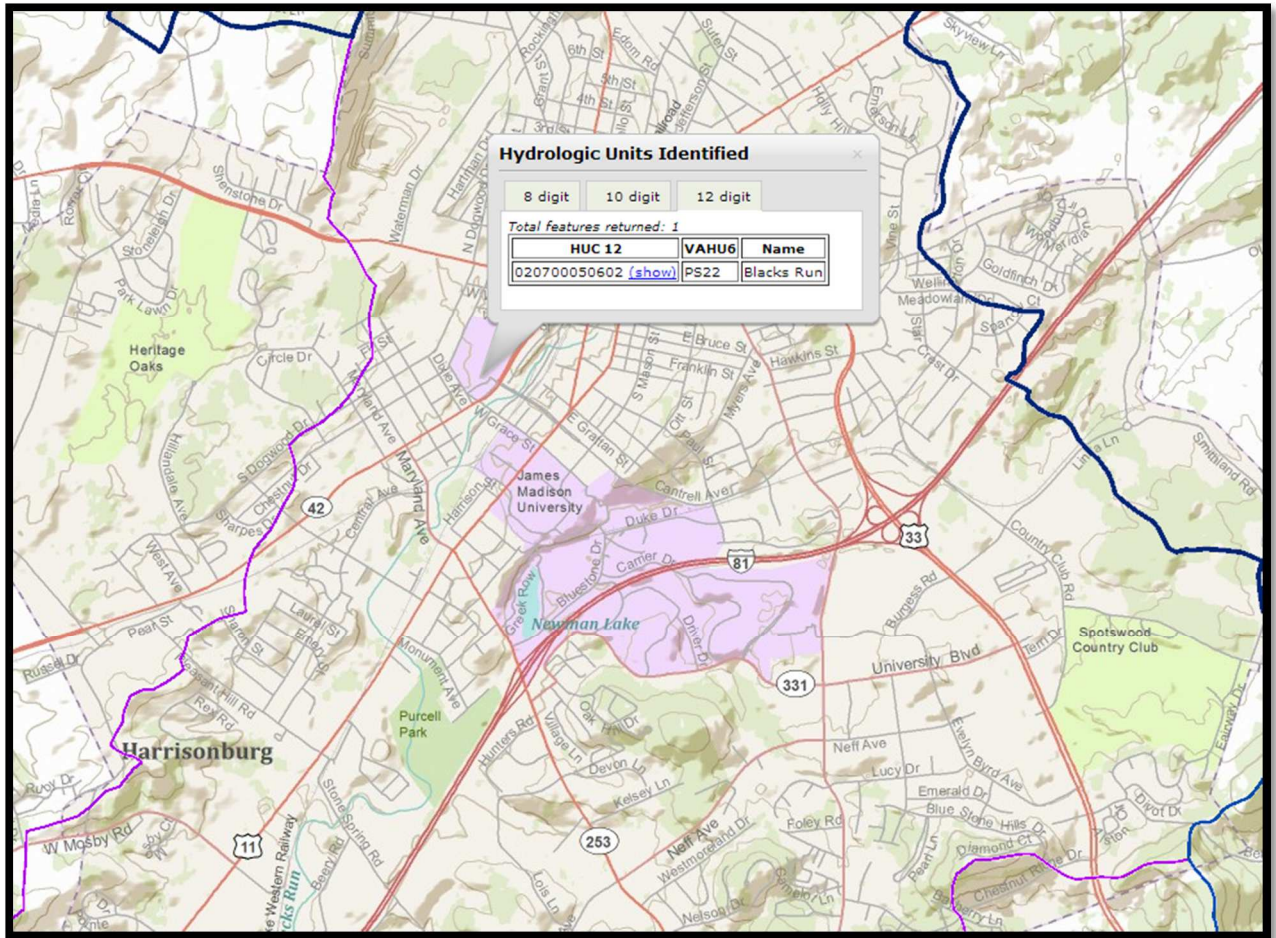


Figure 2. Hydrologic Unit Code (HUC), Source: Virginia Department of Conservation & Recreation

The University also owns a 30 acre tract of land located outside of the urbanized area, approximately 9 miles southeast of the main campus. This property consists primarily of wooded land and does not contain a storm sewer system.

SECTION 2: PROGRAM OVERVIEW

2.1 Program History

The 1972 amendments to the Federal Water Pollution Control Act, also known as the Clean Water Act or CWA; provide the statutory basis for the National Pollution Discharge Elimination System (NPDES) permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States. Under Section 402 of the CWA the Environmental Protection Agency is the authorized agency to develop and implement the NPDES program. Therefore, Congress amended the Federal Water Pollution Control Act (CWA) to prohibit the discharge of any pollutant to waters of the United States from a point source unless the discharge is authorized by an NPDES permit. The NPDES program is designed to track point sources and require the implementation of the best management

practices or controls necessary to minimize the discharge of pollutants. Initial efforts to improve water quality under the NPDES program primarily focused on reducing pollutants in industrial process wastewater and municipal sewage. These discharge sources were easily identified as responsible for poor water quality.

As pollution control measures for industrial process wastewater and municipal sewage were implemented and refined, it became increasingly evident that stormwater runoff was found to be a major cause of water quality impairment. In response to the 1987 Amendments to the Clean Water Act (CWA), the U.S. Environmental Protection Agency (EPA) developed Phase I of the NPDES Stormwater Program in 1990. The Phase I program addressed sources of stormwater runoff that had the greatest potential to impact water quality. Under Phase I, EPA required NPDES permit coverage for stormwater discharges from Medium and Large Municipal Separate Storm Sewer Systems with populations of 100,000 or more people, industrial activities, and construction activities that disturbed 5 or more acres.

In 1999, the EPA developed the Stormwater Phase II Final Rule which tightened the regulations that requires operators of regulated small municipal separate storm sewer systems (MS4s) to obtain a NPDES permit and develop a stormwater management program designed to prevent pollutants from being washed into the MS4 system during a storm event (or from being discharged directly into the MS4) and then discharged from the MS4 into local water bodies.

James Madison University falls under the Phase II regulations as a small municipal storm sewer system operator. Based on 40 CFR 122.26(b)(8), the definition of a “municipal separate storm sewer” means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):

(i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law)...including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States. (ii) Designed or used for collecting or conveying stormwater; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.”

Also what defines James Madison University under the MS4 program is that the university is considered to be within an urbanized area. By definition, an urbanized area (UA) is a land area comprising one or more places – central place(s) – and the adjacent densely settled surrounding area – urban fringe – that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile. It is a calculation used by the Bureau of the Census to determine the geographic boundaries of the most heavily developed and dense urban areas.

2.2 Program Type

As a state university, JMU is considered to be a non-traditional MS4. Due to this unique structure, some of the traditional program elements will need to be modified or may not be entirely applicable. Concerning the interpretation of “public” as it relates to the university for education, outreach and involvement, JMU considers its employees as part of the “public” for the purposes of compliance with this permit. This is in line with EPA’s statement regarding “public” and its applicability to MS4 Programs administered by state entities as published in the Federal Register, Volume 64, No. 235 page 68,750 on December 8, 1999.

2.3 Program Evaluation

In accordance with the provisions of 9VAC25-890-40 Section II.E, James Madison University will annually evaluate the MS4 Plan for program compliance, the appropriateness of identified BMP's and the progress towards achieving the identified measurable goals. The information gathered for including in annual reports will determine if BMP's are effective as is, or if modifications are needed.

SECTION 3: MINIMUM CONTROL MEASURES

The Phase II MS4 Program requirement found in 9VAC25-890-40 Section II.A states:

"The operator of a small MS4 must develop, implement, and enforce a MS4 Program designed to reduce the discharge of pollutants from the small MS4 to the maximum extent practicable (MEP), to protect water quality, to ensure compliance by the operator with water quality standards, and to satisfy the appropriate water quality requirements of the Clean Water Act and its attendant regulations. The MS4 Program must include the minimum control measures described in paragraph B of this section. Implementation of best management practices consistent with the provisions of an iterative MS4 Program required pursuant to this section constitutes compliance with the standard of reducing pollutants to the "maximum extent practicable," protects water quality in the absence of a TMDL wasteload allocation, ensures compliance by the operator with water quality standards, and satisfies the appropriate water quality requirements of the Clean Water Act and regulations in the absence of a TMDL WLA."

The six minimum control measures described in 9VAC25-890-40 Section II.B are:

1. Public Education and Outreach on Stormwater Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination
4. Construction Site Runoff Control
5. Post-Construction Stormwater Management in New Development and Redevelopment
6. Pollution Prevention/Good Housekeeping for Municipal Operations

The following are James Madison University's best management practices (BMPs) that have been developed in order to meet the minimum control measures.

3.1 MCM 1: Public Education and Outreach on Stormwater Impacts

This section describes the best management practices that will be implemented in order to meet regulatory requirements for public education and outreach on stormwater impacts as set forth by Section II.B.1 of the General Permit found in 9VAC25-890-40.

3.1.1 BMP: Stormwater Management Website

Program Description: Provide information on the JMU website regarding the impacts of stormwater runoff and steps people can take to reduce stormwater pollution. The website will also have information

on the JMU MS4 plan and general information about illicit discharge detection and elimination. JMU's stormwater information can be found on the web at <http://www.jmu.edu/stormwater>.

Measurable Goals / Expected Results: Record the number of pageviews to the Stormwater Management Website. Increase the overall awareness of the impacts of stormwater and the measures that the University is undertaking to improve stormwater quality.

Schedule of Activities: Evaluate website annually and update as necessary.

Responsible Department: Engineering and Construction - Sustainability

3.1.2 BMP: Classroom Education on Stormwater Impacts

Program Description: A variety of classes are offered at the University that cover issues related to the impact of urban stormwater runoff on the environment.

Measurable Goals / Expected Results: Record the number of classes that are offered at the University that cover stormwater impacts. Increase the overall awareness of the impacts of stormwater among the students at the University.

Schedule of Activities: Courses will be taught as scheduled by the academic departments.

Responsible Department: Various Academic Departments – Integrated Science & Technology

3.1.3 BMP: Recycling & Trash Management

Program Description: Provide information on JMU's website regarding recycling & trash management and work with the Office of Environmental Stewardship & Sustainability to promote recycling activities. The mission statement of the Recycling Department is "to reduce the flow of waste and materials into the landfill, educate the JMU community on the proper disposal of waste items as well as the future impact of global waste stream issues".

Measurable Goals / Expected Results: Record the participation and amount of material that is recycled annually. JMU currently recycles more than 25% of its waste materials which exceeds the state guideline. Continue to meet or exceed the state guideline for recycling and "keep resources out of our waste stream".

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Recycling/Waste Management

3.1.4 BMP: Proper Disposal & Reduction of Hazardous Materials

Program Description: The University has hired an Environmental Health Coordinator who performs informal "area tours" to check for potential problems and assists in identifying hazardous materials which are no longer necessary and may be properly disposed of.

Measurable Goals / Expected Results: During area tours, ensure all safety and health issues, including improper storage and/or handling of hazardous materials, are noted and communicated to the responsible parties. Follow-up to verify that issues have been satisfactorily addressed and to facilitate on-going compliance and environmental stewardship. Assist all areas of the University in identifying, and determining proper disposal for unnecessary hazardous materials. Unnecessary hazardous materials will be identified and properly disposed of reducing their likelihood of polluting the environment. Report amount and type of hazardous materials disposed of during permit cycle.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Police & Public Safety - Risk Management

3.1.5 BMP: Office of Environmental Stewardship and Sustainability

Program Description: The Office of Environmental Stewardship and Sustainability (OESS) is responsible for facilitating implementation of JMU's 18th defining characteristic, "The University will be an environmentally literate community whose members think critically and act, individually and collectively, as model stewards of the natural world." OESS has a role in carrying out the mission and vision of the university with regard to environmental stewardship.

The OESS coordinates the Institute for Stewardship of the Natural World (ISNW). The ISNW is currently divided into four committees with over 100 stakeholders who advance environmental stewardship via annual recommendations and programs that advocate for best environmental practices.



Measurable Goals / Expected Results: Document the activities that the OESS is participating in that facilitate environmental stewardship as it relates to stormwater. Improved coordination and communication between various departments within the University regarding their efforts towards environmental sustainability.

Schedule of Activities: Activities will be coordinated by the OESS

Responsible Department: Access and Enrollment Management - Office of Environmental Stewardship and Sustainability

3.1.6 BMP: Distribute Educational Materials/Promote Education

Program Description: Seek innovative methods to distribute information related to stormwater impacts to students and staff. Three main issues have been identified as; (i) public awareness and reporting of water quality issues, (ii) litter prevention at outdoor athletic events, and (iii) pollution prevention related to facilities management operations. These three issues have been selected as they target audiences that are most likely to have significant impacts on stormwater quality. Possible methods of increasing public knowledge include; printed materials (newspaper advertisements, brochures, flyers, etc.), signage, websites, social media, training (seminars, presentations), and other activities deemed appropriate. As with most targeted audiences, there will be some overlap in promotion.



Public Awareness of Pollution Prevention and Reporting of Water Quality Issues

Rationale: Illicit discharges to the MS4 can be acutely harmful to aquatic life, and pose a risk to health and safety on campus. These factors make it a critical issue of which the entire university community should be aware. The focus of this high priority issue is recognizing and reporting illicit discharges (water quality issues). While minimum control measure 3 requires JMU to “promote, publicize, and facilitate public reporting of illicit discharges into or from” the MS4, the general public doesn’t necessarily know how to identify or prevent such, or why. To maximize outreach effectiveness, this issue will combine education on general awareness with outreach on reporting water quality issues on campus.

Target Audience: Stormwater literacy and illicit discharges are general awareness issues, and thus affect everyone on campus. An illicit discharge could be noticed by anyone, at any time, necessitating

broad outreach to the campus community. The target audiences for these issues include the faculty (2,400), staff (1,530), and students (19,500). Faculty and staff are considered long-term members of the university community, and as such, will receive outreach on this topic cumulatively over the years. Students are short-term members of the campus community, but will carry these lessons with them when they move on. Together these groups are the eyes and ears of the stormwater management staff, and play a critical role in addressing illicit discharges on campus.

Litter Prevention at Outdoor Athletic Events

Rationale: JMU welcomes a large number of visitors, in addition to faculty, staff, and students to events that take place on campus. While JMU hosts other outdoor events, there are none that are as numerous and regularly scheduled as athletic events. Athletic events are more prone to create litter than normal campus activities and events, as attendees often participate in tailgating and other activities, involving eating, drinking, and vending in outdoor areas for extended periods of time, and the use of disposable items is the norm. Various promotional debris related to these events can also be left behind at the facilities, in the parking lots, and on the roads. Thus, targeting outdoor athletic events maximizes the opportunity to reduce litter on campus.

By rain and wind, litter can end up in drainage ways, storm sewers, stormwater controls, and ultimately Sibert Creek and Blacks Run. While JMU's Landscaping Department is tasked with cleaning up the debris created by athletic events, there is the opportunity to reduce litter before it is created. Preventing litter from entering stormwater infrastructure is a priority.

Target Audience: JMU will focus on football game attendees. Football games account for approximately 94% of outdoor athletic event activity, accounting for the audience that is most likely to create the largest amount of litter, and providing the best potential for litter prevention outreach. The population size of the target audience is approximately 22,000 people per game. All other outdoor athletic events combined attract only approximately 1,500 people per event. This includes seven additional sports team schedules. The level of effort required to reach these small audiences would be difficult to justify for this particular priority issue, especially since tailgating (the main litter producing activity) is not the norm for other athletic events.

Pollution Prevention Related to Facilities Management Operations

Rationale: JMU manages a wide variety of land and infrastructure that allows each student to be well prepared in the educational process. These facilities require operation and maintenance using materials and methods that can pose a risk to water quality. Examples include housekeeping, fueling stations, solid waste facilities, energy generation, landscaping, and snow removal. These operations are likely the biggest threat to water quality on campus, qualifying them as a high priority issue on which to focus outreach activities. Risks to water quality will be minimized by performing outreach on basic watershed and stormwater literacy, laws and regulations, and appropriate management techniques to minimize stormwater pollution.

Target Audience: As a nontraditional MS4, one segment of JMU's public is its staff (1,530 total people). Facilities management (FM) staff (580 people) is the segment of the staff that is most likely to have an effect on water quality, as it is responsible for the operations described above. FM staff is the target audience for this high priority issue.

Measurable Goals / Expected Results: Record the number of methods utilized to distribute information to the target audiences described above. Increase the overall awareness of the impacts of stormwater and the measures that the University is undertaking to improve stormwater quality.

Schedule of Activities: Utilize adequate and similar methods previously used aimed at reaching at least 20% of the estimated target audience for each priority issue annually.

Responsible Department: Engineering and Construction - Sustainability

3.1.7 BMP: Pollution Reporting Hotline

Program Description: Create and publicize a phone number and email that students and staff can call to report illicit discharges or other pollution issues. Use the creation of a pollution hotline to educate staff and students of the hazards of illicit discharges and improper waste disposal. The stormwater pollution hotline can be found on the main JMU stormwater web page and illicit discharge detection and elimination webpage.

Measurable Goals / Expected Results: Track the number of calls or emails received through the hotline. Increase the public knowledge of the implications of illicit discharges and improper waste disposal.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.1.8 BMP: Storm Drain Marking Campaign

Program Description: The University has purchased stainless steel storm drain markers which state "No Dumping - Drains to Stream". The markers will be installed on storm drain inlets across campus.

Measurable Goals / Expected Results: Document the number of inlets that are marked across campus on an annual basis. Increased public knowledge and awareness of the fact that stormwater drains to waterways and not a public treatment facility.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability



3.2 MCM 2: Public Involvement/Participation

This section describes the best management practices that will be implemented in order to meet regulatory requirements for public involvement/participation as set forth by Section II.B.2 of the General Permit found in 9VAC25-890-40.

3.2.1 BMP: Forming Partnerships

Program Description: James Madison University seeks to build active partnerships with local groups and government agencies in respect to stormwater concerns to share information and resources whenever possible.

Measurable Goals / Expected Results: Record the partnership activities that JMU is involved in over the course of annual reporting period. The formation of partnerships will help to pool resources to complete shared objectives and provide for a consistent message to nearby municipalities.

Schedule of Activities: Continue involvement with partnerships as opportunities become available.

Responsible Department: Engineering and Construction - Sustainability

3.2.2 BMP: Promote Availability of MS4 Program Plan & Reports

Program Description: Publish MS4 Program Plan and annual reports on Facilities Management website. Also provide printed copies of the MS4 Program Plan and annual reports to interested parties. Public comment on the MS4 Program Plan is always available through the Stormwater Coordinator. Contact information is provided on the stormwater and MS4 web pages at <http://www.jmu.edu/sustainability/Stormwater>

Measurable Goals / Expected Results: Keep website up to date with stormwater related material. Increase the accessibility of the information regarding the efforts JMU is taking to improve stormwater quality.

Schedule of Activities: Update website as necessary to include program plan modifications

Responsible Department: Engineering and Construction - Sustainability

3.2.3 BMP: Encourage Student Efforts to Improve Stormwater Quality

Program Description: Continue to support student efforts to improve stormwater quality by providing information and materials whenever possible.

Measurable Goals / Expected Results: Record the number of student activities that occur each semester which relate to stormwater quality. Increase the effectiveness of student activities by providing assistance whenever possible.

Schedule of Activities: Offer assistance to students when requested.

Responsible Department: Engineering and Construction - Sustainability, and Integrated Science & Technology

3.2.4 BMP: Student Water Quality Testing

Program Description: Students from the ISAT 320 class (Fundamentals of Environmental Science and Technology I) perform water quality sampling of tributaries within the North River watershed, including Blacks Run. Parameters measured include water clarity, specific conductivity, pH, dissolved oxygen and Fecal Coliform / E. Coli counts. In addition, students perform biological and physical habitat assessments of macro-invertebrates and fish communities.

Measurable Goals / Expected Results: Record the number of students and sections of this course that is offered each semester. Increase the awareness of local water quality issues within the student body.

Schedule of Activities: This course is scheduled to be offered in the fall semester.

Responsible Department: Academic Department – Integrated Science & Technology

3.2.5 BMP: Stream Clean-up Events

Program Description: Participate with the City of Harrisonburg in stream clean-up events.

Measurable Goals / Expected Results: Document the activities that JMU students or staff participate in related to stream clean-ups. Increase the awareness among students and staff of the opportunity to help improve the local water quality through these events.

Schedule of Activities: Blacks Run/Downtown Clean-Up Day occurs annually in April.

Responsible Department: Engineering and Construction - Sustainability

3.3 MCM 3: Illicit Discharge Detection and Elimination

This section describes the best management practices that will be implemented in order to meet regulatory requirements for illicit discharge detection and elimination as set forth by Section II.B.3 of the General Permit found in 9VAC25-890-40.

3.3.1 BMP: Storm Drain System Map

Program Description: The University currently has a storm sewer system GIS map and corresponding database. This map contains locations and attributes of the entire storm sewer system maintained by JMU and includes culverts, pipes, inlets, catch basins, trench drains, and outfalls. MS4 outfalls are further identified to include receiving waters, HUC, a unique identifier, estimated MS4 acreage served and any applicable TMDL's. This GIS data is used for illicit discharge tracking and recording maintenance activities.

Measurable Goals / Expected Results: Continue to update and maintain GIS map to ensure all known structures are located. An accurate and up-to-date storm sewer system map will aid in illicit discharge detection and elimination.

Schedule of Activities: Update map as new structures are completed. Report completed projects that are added to the storm sewer system.

Responsible Department: Engineering and Construction - Sustainability

3.3.2 BMP: Stormwater Outfall Inspections

Program Description: Conduct field investigations and inspections of MS4 stormwater outfalls. Monitor for dry weather discharges using visual observation, odor and other indicators to identify for possible illicit discharges.

Measurable Goals / Expected Results: Maintain records of outfalls that were inspected and number of illicit discharges detected. Prompt detection and elimination of illicit discharges.

Schedule of Activities: Continue current program and evaluate annually. At a minimum, inspect at least 50 of outfalls per year.

Responsible Department: Engineering and Construction - Sustainability

3.3.3 BMP: IDDE Policy & Procedures

Program Description: Being a non-traditional MS4, JMU will implement a campus wide IDDE policy which will include procedures for the detection and elimination of illicit discharges. Refer to appendix B for a copy of JMU's IDDE policy.

Measurable Goals / Expected Results: Policy will be updated as needed to remain compliant with applicable regulations. Students, faculty, staff, contractors, affiliates and visitors of JMU will have access to IDDE policy and procedures via JMU's website.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.3.4 BMP: Spill Prevention Control & Countermeasure (SPCC) Plan

Program Description: A SPCC Plan was initially prepared for the University in 1975 to establish procedures to prevent discharges of oil from facilities and to contain such discharges should they occur. Continue to implement plan to reduce the risk of hazardous substances from entering the storm sewer system.

Measurable Goals / Expected Results: Maintain and update SPCC plan as needed. Reduce the risk of hazardous substances from entering the storm sewer system.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Power Plant

3.3.5 BMP: Trace and Remove Illicit Discharges

Program Description: Promptly address illicit discharges and utilize storm sewer system map to determine source of discharge. Determine best method of eliminating the discharge in a timely manner.

Measurable Goals / Expected Results: Track the number of illicit discharges detected and eliminated through a database. Timely removal of illicit discharge from storm sewer system.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction – Sustainability, FM - Operations

3.3.6 BMP: Illicit Discharge Detection & Elimination (IDDE) Education

Program Description: Refer to BMP 3.1.6, 3.1.7, 3.1.8 and 3.6.7. Establish pollution reporting hotline and storm drain marking campaign to increase awareness of what illicit discharges are.

Measurable Goals / Expected Results: Refer to BMP 3.1.6, 3.1.7, 3.1.8 and 3.6.7. Increase the awareness among students and staff that storm drains are only intended to receive stormwater.

Schedule of Activities: Refer to BMP's 3.1.6, 3.1.7, 3.1.8 and 3.6.7.

Responsible Department: Engineering and Construction - Sustainability

3.3.7 BMP: Notification of Downstream MS4 Interconnections

Program Description: Notify downstream MS4's of known physical interconnections.

Measurable Goals / Expected Results: Record when notification was given to the City of Harrisonburg. The City of Harrisonburg and VDOT has been made aware of JMU's physical interconnection with their system.

Schedule of Activities: Notification of MS4 interconnection has been sent to MS4's downstream.

Responsible Department: Engineering and Construction - Sustainability

3.4 MCM 4: Construction Site Stormwater Runoff Control

This section describes the best management practices that will be implemented in order to meet regulatory requirements for construction site stormwater runoff control as set forth by Section II.B.4 of the General Permit found in 9VAC25-890-40. Progressive compliance and enforcement shall be met through the use of the following BMP's.

3.4.1 BMP: ESC/SWM Annual Standards and Specifications

Program Description: JMU initially received approval from DCR to operate its own erosion and sediment control program under a set of annual standards and specifications on July 6, 2009. JMU continues to submit standards and specifications to DEQ on a regular basis to continue its program. JMU included stormwater management to its annual standards and specifications in response of amended stormwater regulations. Combined ESC/SWM Annual Standards and Specifications was originally approved by DEQ on May 28, 2014. Refer to Appendix A for a complete copy of the JMU Annual Standards & Specifications for ESC and SWM

Measurable Goals / Expected Results: JMU's Annual Standards and Specifications for ESC & SWM shall be kept current. With annual submissions, standards will keep up to date with any changes DEQ implements into the Virginia Erosion and Sediment Control Laws and Regulations and Virginia Stormwater Management Laws and Regulations.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.2 BMP: Requirement for ESC Plan and Review

Program Description: Site specific ESC plans shall be prepared for all JMU projects involving a regulated land-disturbing activity as defined in §62.1-44-15:51 of the Virginia Erosion and Sediment Control Law and submitted to JMU's Engineering and Construction department for review. Plans will be reviewed by a certified plan reviewer.

Measurable Goals / Expected Results: Plan review process will be able to be tracked through use of database and reports created as needed.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.3 BMP: Contract Language

Program Description: All contractors performing land disturbing activities on campus property are required through contract documents to follow existing ESC requirements and obtain all applicable permits before construction activity commences. The CO-7 General Conditions of the Construction Contract as issued by DGS is included in every contract and stipulates in Section 31(e) that:

"The Contractor shall have, On-Site, an employee certified by the Department as a Responsible Land Disturber who shall be responsible for the installation, inspection and maintenance of erosion control and stormwater management measures and devices. The Contractor shall prevent Site soil erosion, the runoff of silt and/or debris carrying water from the Site, and the blowing of debris off the Site in accordance with the applicable requirements and standards of the Contract and the Virginia Department of Conservation and Recreation's Erosion and Sediment Control Regulations and the Virginia Stormwater Management Regulations."

Measurable Goals / Expected Results: Ensure contractors comply with the Erosion and Sediment Control Law and attendant regulations and implement applicable ESC controls.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.4 BMP: Construction and Professional Services Manual

Program Description: In addition to contract language, all work performed on University property is required to comply with the Construction and Professional Services Manual (CPSM) published by the Bureau of Capital Outlay Management. Furthermore, language is included in construction specifications for each project as required by CPSM 902.2.4 stating that contractors are responsible for satisfying any and all erosion control and stormwater management requirements for any land disturbing activities.

Measurable Goals / Expected Results: Ensure contractors obtain the necessary approval and applicable permits before any land disturbing activities begin.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.5 BMP: Requirement for Pre-Construction Meeting with Contractors

Program Description: Prior to the commencement of regulated land-disturbance, a pre-construction meeting shall be held in order to clarify ESC/SWM roles, responsibilities and obligations of all parties involved with the land-disturbing activity. The meeting will be attended by the JMU Project Manager, JMU Construction Inspector, JMU Stormwater Coordinator, general construction permit operator (if applicable), and the project RLD. The DEQ's Valley Regional Office will be notified of land-disturbing activities as outlined in Annual Standards and Specifications.

Measurable Goals / Expected Results: Approved plans will be able to be tracked through a database and reports created as needed. Ensure contractors fully understand the ESC and SWM measures shown in plans before construction begins.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.6 BMP: Requirement for Construction Site Inspections

Program Description: Projects approved for land-disturbance shall be inspected for compliance with the approved plan and other requirements related to ESC and the VSMP, as applicable. A database shall be used to record inspections and violations for each project. Site inspections will be conducted by certified personnel. During site visits, applicable measures will be visually assessed to ensure continued performance of their intended function. Any comments and/or violations noted in an inspection report will be forwarded to the project manager, RLD, and/or any other persons of interest involved in the project.

Site inspections will be made during or immediately following initial installation of erosion and sediment controls, at least once in every two-week period, within 48 hours following any runoff producing storm event, and at the completion of the project.

Measurable Goals / Expected Results: Track the number of inspections and noted violations through the use of a database. Routine site inspections can help identify problems sooner to reduce ESC and SWM related problems.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.4.7 BMP: Pollution Reporting Hotline

Program Description: Establish a pollution reporting hotline and provide the public a method to share any information regarding stormwater runoff and construction activities. Any information submitted by the public concerning active construction projects will be reviewed by a JMU project manager.

Measurable Goals / Expected Results: Track the number of calls and emails received through the hotline number. Increase the public knowledge and awareness of issues regarding stormwater runoff from construction sites.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.5 MCM 5: Post-Construction Stormwater Management

This section describes the best management practices that will be implemented in order to meet regulatory requirements for post-construction stormwater management as set forth by Section II.B.5 of the General Permit found in 9VAC25-890-40.

Please note that as a non-traditional MS4, JMU has not created special criteria for stormwater facilities on individual residential lots as this is not applicable. All known structural BMPs are included in the University's stormwater facility database and will be inspected and maintained to meet compliance with the stormwater regulations.

3.5.1 BMP: Requirement for SWM Plan and Review

Program Description: Site specific SWM plans shall be prepared for all JMU projects involving regulated construction activity as defined in 9VAC25-870-10 of the Virginia Stormwater Management Program Regulations and submitted to JMU's Engineering and Construction department for review. Plans will be reviewed by a certified plan reviewer.

Measurable Goals / Expected Results: Track the number of regulated construction activities and report the total disturbed acreage. Ensure construction activity operators obtain the necessary approval from DEQ for land disturbing activities.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.5.2 BMP: Stormwater Management Facilities Policy

Program Description: Continue to implement the University's Stormwater Management Facilities Policy which sets forth requirements and procedures for stormwater BMP design, plan review, installation and approval, inspections, maintenance and reporting. Refer to appendix B for a copy of the policy.

Measurable Goals / Expected Results: Record the number of structural management facilities that are added to the University's BMP inventory and the number of inspections performed each year. Ensure structural stormwater management facilities are maintained and operating properly.

Schedule of Activities: Each stormwater management facility shall be inspected at least annually. Any required maintenance shall be documented and information forwarded for remedial work.

Responsible Department: Engineering and Construction - Sustainability

3.5.3 BMP: Map Structural BMP's

Program Description: Track all known permanent stormwater management facilities that discharge to the regulated small MS4.

Measurable Goals / Expected Results: Maintain list of facilities and other required information about facility. Report number of structural BMPs added to system. Comply with conditions of MS4 General Permit.

Schedule of Activities: Map new structures as projects are completed.

Responsible Department: Engineering and Construction - Sustainability

3.6 MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations

This section describes the best management practices that will be implemented in order to meet regulatory requirements for pollution prevention/good housekeeping for municipal operations as set forth by Section II.B.6 of the General Permit found in 9VAC25-890-40.

3.6.1 BMP: Spill Prevention Control and Countermeasure (SPCC) Plan

Program Description: A SPCC Plan was initially prepared for the University in 1975 to establish procedures to prevent discharges of oil from facilities and to contain such discharges should they occur. Continue to implement plan to reduce the risk of hazardous substances from entering the storm sewer system.

Measurable Goals / Expected Results: Maintain and update SPCC plan as needed. Reduce the risk of hazardous substances from entering the storm sewer system.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Power Plant

3.6.2 BMP: Hazardous Materials and Chemical Storage

Program Description: Inspect and evaluate storage locations and method of storing hazardous materials and chemicals to ensure compliance with State and EPA regulations and ensure proper

disposal of these materials. Continue to phase out the use of hazardous materials and chemicals whenever possible.

Measurable Goals / Expected Results: Perform periodic audits to verify accuracy of the records and monitor overall inventory for opportunities to reuse, recycle, or reduce the amount of hazardous materials at JMU. Ensure hazardous materials are properly stored. Report the number of spills. Reduction in the overall presence of hazardous materials on Campus.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Police and Public Safety - Risk Management

3.6.3 BMP: Oil & Antifreeze Recycling

Program Description: Continue to collect and recycle used oil and antifreeze.

Measurable Goals / Expected Results: Monitor the locations where vehicle maintenance operations take place. Document any incidents where waste materials were improperly disposed of. Ensure waste materials are properly disposed of.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Recycling/Waste Management

3.6.4 BMP: Storage of Erodible Materials

Program Description: Evaluate the storage of all soil, sand and other erodible materials on campus to ensure proper techniques are being utilized to minimize stormwater pollution.

Measurable Goals / Expected Results: Monitor the locations where erodible materials are being stored to check for the possibility of stormwater pollution. Prevent the storage of erodible materials on campus from causing stormwater pollution.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.6.5 BMP: Salt Storage, Application and Snow Removal

Program Description: Salt is currently stored in a shed on an impervious surface to minimize the amount of infiltration and runoff that leaves the site. The minimum amount of salt necessary is being used for deicing and more environmentally friendly alternatives are currently being evaluated by the Landscaping Department. Following a storm event where salt or other materials are applied, regularly scheduled street sweeping will occur to remove the materials from roadways and parking lots to

prevent it from entering the storm sewer system. Also, whenever possible, snow stockpiles will be stored in a way that they do not block stormwater inlets and away from environmentally sensitive areas such as streams, lakes and swales.

Measurable Goals / Expected Results: Document the estimated amount of salt applied each winter and the other types of materials applied to aid in ice and snow removal. Ensure snow and ice removal on campus is done in a manner that minimizes stormwater pollution.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.6 BMP: Vehicle and Equipment Washing

Program Description: The University has a contract with a car wash vendor where the majority of vehicles are washed. Equipment is washed at the Sports Park facility or the Main Street Landscaping facility or as outlined in JMU's Daily Operational Procedures (Appendix B). Continue to work with the Landscaping Department to determine suitable locations to wash their equipment.

Measurable Goals / Expected Results: Monitor the locations where vehicles or equipment are washed and seek alternative washing practices to reduce stormwater pollution. Reduction in illicit discharges from vehicle and equipment washing operations.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.7 BMP: Employee Training

Program Description: A "Stormwater Pollution Prevention/IDDE" presentation and guidebook has been developed for use with employee training. Training is offered once a year for Facilities Management (FM) staff and during FM new employee orientations. Material in these presentations teach basic stormwater information, stormwater pollution prevention, good housekeeping measures, and how to recognize and report illicit discharges.

Appropriate emergency response employees shall have training in spill response.

Measurable Goals / Expected Results: Document the number of individuals which receive training when it is offered. Increase the overall awareness of the impacts of stormwater and the measures that the University is undertaking to improve stormwater quality.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

3.6.8 BMP: Parking Lot and Street Sweeping

Program Description: The University owns and regularly operates a street sweeper to pick up litter and debris from parking lots and streets on campus. All campus parking lots and streets are scheduled to be swept three times each month, or on an as needed basis, with additional measures taken to address the cleanup of parking lots that are used during football games.

Measurable Goals / Expected Results: Record the number of times the street sweeper cleans campus streets and parking lots and/or hours spent street sweeping. Reduce the amount of sediment and debris that enters the storm sewer system from streets and parking lots.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.9 BMP: Storm Structure Maintenance and Cleaning

Program Description: Storm structures are inspected and cleaned by Facilities Management staff to ensure they remain free of obstructions and to prevent sediment and other pollutants from entering the storm sewer system.

Measurable Goals / Expected Results: Record the number of structures cleaned and/or man-hours spent performing maintenance on storm structures. Reduce the amount of sediment and debris that enters the storm sewer system.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Landscaping

3.6.10 BMP: Outdoor Trash, Ground Litter and Landscaping Debris Collection

Program Description: The Recycling Department oversees the collection of outdoor trash and ground litter. The mission statement of the Recycling Department is "to reduce the flow of waste and materials into the landfill, educate the JMU community on the proper disposal of waste items as well as the future impact of global waste stream issues. The Grounds Department is responsible for the collection of landscaping debris and performs this activity on a regular basis. During the fall there are up to 20 people performing leaf collection daily.

Measurable Goals / Expected Results: Record the activities that the Recycling and Landscaping Department undertakes regarding outdoor trash, litter and landscaping debris collection. Reduce the amount of trash, ground litter, and landscaping debris that enters the storm sewer system.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: FM – Landscaping, and FM – Recycling/Waste Management

3.6.11 BMP: Fertilizer & Pesticide Application

Program Description: The application of all fertilizers and pesticides will be conducted in accordance with the Virginia Department of Agriculture and Consumer Services (VDACS) rules and regulations for agricultural chemical operations. The University currently has an Integrated Pest Management (IPM) program which seeks to control pests with a minimum of pesticide use while maximizing effectiveness and cost efficiency. The University also has a Nutrient Management Plan which outlines the proper application of fertilizer. Only property trained and/or certified employees or contractors will apply fertilizer or pesticides on campus.

Measurable Goals / Expected Results: Record the number of certified applicators for fertilizer and pesticides. Ensure the proper application of fertilizer and pesticides.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Facilities Management – Operations

3.6.12 BMP: Nutrient Management Plan

Program Description: The University is currently implementing a Nutrient Management Plan. The Nutrient Management Plan covers all lawn and landscaped areas of the University that receive nutrients and outlines the rates and frequencies that nutrients may be applied. The plan also covers best practices to follow regarding the application of these nutrients. A copy of this plan can be located in the office of the Landscape Manager and the Stormwater Coordinator.

Measurable Goals / Expected Results: Maintain records of nutrient applications per requirements outlined in Nutrient Management Plan. Ensure nutrients are applied in a manner that will minimize their impact on stormwater quality.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability, and FM – Operations

3.6.13 BMP: SWPPPs for High-Priority Facilities

Program Description: SWPPP's shall be developed and implemented (as scheduled in state permit) for all high-priority facilities identified as (i) composting facilities, (ii) equipment storage and maintenance facilities, (iii) materials storage yards, (iv) pesticide storage facilities, (v) public works yards, (vi) recycling facilities, (vii) salt storage facilities, (viii) solid waste handling and transfer facilities, and (ix) vehicle storage and maintenance yards.

Measurable Goals / Expected Results: List the number of facilities/groups of facilities that have SWPPP's or will require SWPPP's.

Schedule of Activities: Continue to identify high-priority facilities as new development is completed. Have SWPPP's implemented on identified facilities within 48 months of coverage under this state permit.

Responsible Department: Engineering and Construction – Sustainability

3.6.14 BMP: Daily Operational Procedures

Program Description: Implement a policy with procedures for daily operations and maintenance activities associated with facilities management. This policy shall include written procedures designed to minimize or prevent pollutant discharge from: (i) daily operations such as road, street and parking lot maintenance; (ii) equipment maintenance; and (iii) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers. These procedures will be utilized as part of new FM employee orientation training. Refer to appendix B for a copy of the policy.

Measurable Goals / Expected Results: Record the number of FM employees in attendance at FM new employee orientation and that receive annual stormwater training. FM employees will be made aware of proper procedures associated with daily operations and possible impacts on waterways. Policy will be updated as needed to remain compliant with applicable regulations.

Schedule of Activities: Continue current program and evaluate annually.

Responsible Department: Engineering and Construction - Sustainability

SECTION 4: TMDL ACTION PLANS

In order to meet pollutant reductions required for the Chesapeake Bay, an Action Plan has been developed using guidance materials from the DEQ to outline the means and methods to be implemented in order to meet the required goals.

Before action plan guidance was circulated, two studies were completed to assist in determining the best way to meet the Chesapeake Bay TMDL. One study, completed by Vanasse Hangen Brustlin, Inc. (VHB) looked at two options: (1) Constructing a series of stand-alone stormwater improvement projects; and (2) Requiring all Capital Improvement Projects to reduce post-construction pollutant loading by roughly 2.25 times the required amount. The second study, completed by the Center for Watershed Protection (CWP), looked at meeting the required reductions through stormwater retrofits.

A combination of methods may be used in JMU's action plans to meet reduction goals. Refer to Appendix C to view JMU's Chesapeake Bay TMDL Action Plan.

Locally, Blacks Run has been listed as an impaired waterway and while a TMDL has been developed, there are currently no associated WLA's. The impairments include bacteria (fecal coliform and e. coli) and aquatic life (benthic-macroinvertebrate bioassessments) due to excess sediments. Existing BMPs, such as construction site inspections, IDDE and stormwater facility maintenance, currently assist in efforts to clean up Blacks Run.

Appendix A

Annual Standards & Specifications for ESC & SWM

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LETTER OF ENDORSEMENT

Subject: James Madison University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management.

Dated: December 2nd, 2014

I certify under penalty of law that all documents and all attachments related to the submission and updating of the James Madison University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management have been prepared under my direction or supervision in a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of a fine and imprisonment for knowing violations.

Sincerely,



Dale Chestnut
James Madison University Stormwater Coordinator

INTRODUCTION

James Madison University (JMU) has incorporated Annual Standards and Specifications for Erosion and Sediment Control (ESC) and Stormwater Management (SWM) that are integral components of James Madison University's design, construction, maintenance, and management of the university's facilities and campuses. The James Madison University Annual Standards and Specifications for ESC and SWM submittal has been developed to provide information regarding JMU's implementation in accordance with the Virginia Erosion and Sediment Control Law (§62.1-44 et. seq.), the Virginia Erosion and Sediment Control Regulations (9VAC25-840 et. seq.), the Virginia Erosion and Sediment Control Certification Regulations (9VAC25-850 et. seq.), the Virginia Stormwater Management Act (§62.1-44 et. seq.), and the Virginia Stormwater Management Program (VSMP) Permit Regulations (9VAC25-870 et. seq.) as related to municipal separate storm sewer systems (MS4) and regulated construction activities.

James Madison University Annual Standards and Specifications for ESC and SWM shall be administered by Facilities Management Engineering Department and shall apply to all design, construction and maintenance activities undertaken by James Madison University, either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC Law and Regulations or the Virginia SWM Act and VSMP Permit Regulations. During any inspections of James Madison University's land disturbing activities by DEQ, EPA or other such environmental agencies, compliance with the approved James Madison University Annual Standards and Specifications for ESC and SWM (and all parts thereof), the Virginia ESC Law and Regulations, the Virginia SWM Act and the VSMP Permit Regulations will be expected.

James Madison University Annual Standards and Specifications for ESC and SWM are submitted to the Virginia Department of Environmental Quality (DEQ) for review and approval on an annual basis. James Madison University shall ensure that project specific plans are developed and implemented in accordance with these Annual Standards and Specifications. This submittal constitutes James Madison University's commitment to execute all provisions contained herein on our regulated land disturbing activities and land development projects. As such, this submittal will be made available and utilized as an

operational guidance by all appropriate James Madison University and DEQ personnel. This submittal and errata information are available for download as PDF files at: http://facmgt.jmu.edu/web/engineering/stormwater/index_html/.

ACRONYMS AND ABBREVIATIONS

Bay	Chesapeake Bay	MCM	Minimum Control Measure
BMP	Best Management Practice	MS	Minimum Standard
Board	Virginia Soil & Water Conservation Board	MS4	Municipal Separate Storm Sewer System
CWA	Clean Water Act	NPDES	National Pollution Discharge Elimination System
CSS	Combined Sewer System	NOI	Notice of Intent
DCR	Department of Conservation and Recreation	NOV	Notice of Violation
DEQ	Department of Environmental Quality	POC	Pollutants of Concern
EPA	Environmental Protection Agency	RLD	Responsible Land Disturber
ERP	Enforcement Response Plan	SOP	Standard Operating Procedures
ESC	Erosion & Sediment Control	SWM	Stormwater Management
FM	Facilities Management	SWPPP	Stormwater Pollution Protection Plan
GIS	Geographic Information Systems	TMDL	Total Maximum Daily Load
GPS	Global Positioning System	UA	Urbanized Area
HUC	Hydrologic Unit Code	VESCL&R	Virginia Erosion & Sediment Control Law & Regulations
IDDE	Illicit Discharge Detection & Elimination	VPDES	Virginia Pollution Discharge Elimination System
JMU	James Madison University	VRRM	Virginia Runoff Reduction Method
LID	Low Impact Development	VSMP	Virginia Stormwater Management Program
MEP	Maximum Extent Practicable	WLA	Waste Load Allocation

SECTION 1: ANNUAL STANDARDS AND SPECIFICATIONS ADMINISTRATION

- 1.1 James Madison University follows the policies and procedures described in *the Virginia Erosion and Sediment Control Handbook* and the *Virginia Stormwater Management Handbook*. James Madison University Annual Standards and Specifications for ESC & SWM approved by DEQ are composed of general specifications. The general specifications for erosion and sediment control and Stormwater management apply to the land-disturbing activities included by referencing the following.
- 1.1.1 *Virginia Erosion and Sediment Control Law* (§62.1-44 et seq. as amended);
 - 1.1.2 *Virginia Erosion and Sediment Control Regulations* (9VAC25-840 et seq. as amended);
 - 1.1.3 *Virginia Erosion and Sediment Control Certification Regulations* (9VAC25-850 et seq. as amended);
 - 1.1.4 *Virginia Erosion and Sediment Control Handbook*, 1992, as amended;
 - 1.1.5 *Virginia Stormwater Management Act* (§62.1-44 et seq. as amended);
 - 1.1.6 *Virginia Stormwater Management Permit Regulations* (9VAC25-870 et seq. as amended);
 - 1.1.7 *Virginia Stormwater Management Handbook*, 1999, as amended;
 - 1.1.8 Technical Bulletins, as amended, on the Virginia DEQ website at www.deq.virginia.gov; and
 - 1.1.9 Memos, as amended, on the Virginia DEQ website at www.deq.virginia.gov.
- 1.2 Any land-disturbing activity, as defined by James Madison University shall comply with the *James Madison University Annual Standards and Specifications for ESC & SWM*.
- 1.3 Any land-disturbing work, as defined by VESCL&R, must be vetted through FM Engineering. Prior to starting a land-disturbing project, the project must have plans stamped approved by FM Engineering.
- 1.4 Site specific ESC plans shall be prepared for all projects involving a regulated land-disturbing activity as defined in §62.1-44 or when deemed necessary by FM Engineering if development is outside the purview of the VESCL&R and poses potential environmental implications. Site specific ESC plans shall be submitted to FM Engineering for review. Prior to starting a land-disturbing project, the project must have plans stamped approved by FM Engineering. In addition, if the addition of impervious surfaces is part of the scope, a SWM narrative and/or schematic must be submitted concurrently to explain/show how the run-off will be treated.
- 1.5 Site specific SWM plans shall be prepared for all projects involving a regulated land—disturbing activity that requires:
- (a) A Virginia Stormwater Management Program General Permit for Discharges from Construction Activities (VSMPP)
 - (b) Land-disturbing activity contained within a watershed of a regional water quality Stormwater management facility
 - (c) Incorporates the use of an LID and/or BMP.
 - (d) Changes the University MS4.
- Site specific SWM plans shall be submitted to FM Engineering for review. Prior to starting a land-disturbing project requiring a SWM plan, the project must have an approval issued by FM Engineering.
- 1.6 FM Engineering may request DEQ to grant project specific variance or exception, in terms of ESC and SWM, respectively, to the approved James Madison University Annual Standards and Specifications for ESC and SWM. All requested variances and exceptions are to be considered unapproved until written approval from DEQ is received. Refer to Section 6 for more information on variances and exceptions.

SECTION 2: ANNUAL STANDARDS AND SPECIFICATIONS PERSONNEL

FM Engineering shall be the plan approving authority for James Madison University projects. The following is a breakdown in responsibilities and titles in regard to the James Madison University Annual Specifications for ESC and SWM.

Responsibilities may be combined in terms of staffing resources only if the person responsible for the task(s) is qualified per Section 1.1.3. The following titles are designated to ensure compliance with erosion and sediment control and stormwater management regulations on all James Madison University projects.

- 2.1 “Certified inspector for ESC” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the area of project inspection; or, (ii) is enrolled in the Board’s training program for project inspection and successfully completes such program within one year after enrollment; and (iii) shall be responsible to inspect as mandated by the VESCL&R erosion and sediment control measures to ensure proper installation in accordance with the approved plan and record the state and effectiveness of such measures in an effort to minimize site erosion and sediment control.
- 2.2 “Certified inspector for SWM” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the classification of project inspector in the area of SWM; or, (ii) is enrolled in the Board’s training program for project inspector and successfully completes such program within one year after enrollment; and, (iii) shall be responsible to inspect the construction of permanent stormwater management controls.
- 2.3 “Certified plan reviewer for ESC” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the area of plan review; or, (ii) is enrolled in the Board’s training program for plan review and successfully completes such program within one year after enrollment.
- 2.4 “Certified plan reviewer for SWM” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the classification of plan reviewer in the area of SWM; or, (ii) is enrolled in the Board’s training program for plan reviewer and successfully completes such program within one year after enrollment.
- 2.5 “Certified program administrator for ESC” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the area of program administration; or, (ii) is enrolled in the Board’s training program for program administration and successfully completes such program within one year after enrollment.
- 2.6 “Certified program administrator for SWM” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the classification of program administration in the area of SWM; or, (ii) is enrolled in the Board’s training program for program administration and successfully completes such program within one year after enrollment.
- 2.7 “Certified combined administrator for ESC” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the area of program administration, plan review and project inspection; or, (ii) is enrolled in the Board’s training program for program administration, plan review and project inspection and successfully completes such program within one year after enrollment.
- 2.8 “Certified combined administrator for SWM” means an employee or agent of James Madison University who: (i) holds a certificate of competence from the Board in the classification of program administration, plan reviewer and project inspector in the area of SWM; or, (ii) is enrolled in the Board’s training program for program administration, plan reviewer, and project inspector and successfully completes such program within one year after enrollment.

SECTION 3: ANNUAL STANDARDS AND SPECIFICATIONS IMPLEMENTATION

ESC and SWM plans shall comply with James Madison University Annual Standards and Specifications for Erosion and Sediment Control and Stormwater Management, the Virginia Erosion and Sediment Control Law (62.1-44 et. seq.), the Virginia Stormwater Management Act (62.1-44 et. Seq.), associated ESC and SWM regulations, and the Virginia Stormwater Management Program Permit regulations (9VAC25-870 et. Seq.). Refer to Section 1.1 for more information on general specifications.

- 3.1 Submittals: Two complete sets of ESC/SWM plans, narratives and necessary attachments shall be submitted to the JMU FM-Engineering Department for review and approval prior to any land-disturbing activities. JMU FM-Engineering shall have 30 days to review the plan and provide written comments. Re-submittals shall include revision notes referenced to written comments. Prior to commencement of any land-disturbing activities, the project must have received plan approval from FM-Engineering.
- 3.2 Plan Reviews: Plan reviews shall be conducted by qualified personnel as defined in section 2. When approved, at least five complete sets must be submitted to be stamped approved by JMU for ESC/SWM. These plan sets will be allocated as follows: (1) Project Manager, (1) Design Engineer, (2) Contractor, (1) Stormwater Coordinator.
- 3.3 Pre-Construction Conference: Prior to commencement of a land disturbance, a pre-construction conference shall be held in order to clarify ESC/SWM roles, responsibilities and obligations of all parties involved with the land-disturbing activity. At a minimum, the pre-construction conference will be attended by the JMU Project Manager, JMU Construction Inspector, JMU Stormwater Coordinator, general construction permit operator and the project RLD.
- 3.4 Inspections: Site inspections shall be conducted by qualified personnel as defined in section 2.
- 3.5 Enforcement: The JMU Project Manager shall be responsible for ensuring that corrective action is taken in response to comments and violations listed on inspection reports.
- 3.6 Changes and Amendments to Approved Plans: Amendments to approved plans must be reviewed and approved by FM-Engineering. Revisions shall not be considered approved until written notice is provided.

SECTION 4: PLAN REQUIREMENTS

Detailed requirements of specific items to be included in the ESC and SWM plans are located in the ESC/SWM Plan Preparer/Reviewer Checklist (Appendix A) and General Erosion and Sediment Control Notes (Appendix B).

- 4.1 Construction Plans
 - a.) Complete ESC and SWM plans shall be provided in the construction plans.
 - b.) Plans shall include the amount of disturbed area listed per phase and proposed net increase in impervious area.
 - c.) Minimum Standards 1 through 19 (9VAC25-840-40) shall be listed in the construction plans.
 - d.) Construction sequence of operations shall be provided on the construction plans with staged implementation of erosion and sediment control measures for each phase. The area which may be disturbed in each phase shall be set forth in the construction plans.
 - e.) Plans shall provide information on the maintenance of BMPs or reference the narrative section that contains the information.
 - f.) Profiles shall be included for all closed and open storm systems. The profile shall include the existing surface, final surface, proposed water elevations, pipes, pipe crossings, and hydraulic grade line. Surcharges shall be clearly indicated on the profile.
 - g.) SWM calculations include but are not limited to: ditch computations, stormwater routing, storm inlet computations, pipe capacity computations, BMP computations, pond routings and computations, etc.
 - h.) Proof of adequate outfall and adequacy of the receiving channel to the SWM treatment facility needs to be provided.

- i.) Plans shall comply, to the maximum extent practicable, with any locality's VSMP ESC and SWM technical requirements or demonstrate that the locality's VSMP ESC and SWM technical requirements are not practicable for the project.
- j.) Plans should also include a detailed landscape plan with a planting schedule.
- k.) Stockpile/lay-down areas and trailer locations shall be provided on the erosion and sediment control plans for all phases.
- l.) Any on-site changes shall be documented on the approved site plan and within the SWPPP.

SECTION 5: INSPECTIONS

Periodic inspections shall be conducted as required by state law for ESC and SWM. Inspectors shall be notified 24 hours prior to installation of BMPs and shall be present for installation of BMPs. In addition, inspections shall be made during or immediately following initial installation of erosion and sediment controls and at the completion of the project. Completion of the project will only be considered after establishment of permanent stabilization, not completion of construction.

- 5.1 Erosion and Sediment Control Inspections: Construction sites shall be inspected by qualified personnel during or immediately following initial installation of erosion and sediment controls, at least once in every two-week period and within 48 hours following any runoff producing storm event until the completion of the project. The ESC/SWM Inspection Report form provided in Appendix C shall be used on each site inspection visit. All control measures shown on the plan shall be inspected. Any issues and violations shall be photographed and documented in the report. Critical areas that require continuous inspections shall also be identified on the site plan. The inspection report shall specify the required corrective action for each issue or violation noted and a date by which all corrective actions must be completed. A copy of the ESC/SWM Inspection Report will be emailed to the project manager and any other persons identified during the pre-construction meeting.
- 5.2 Stormwater Management Inspections: Construction sites shall be inspected by qualified personnel along with ESC inspections. The ESC/SWM Inspection Report form provided in Appendix C will also be used to record SWM inspections and any construction general permit deficiencies will be noted. The projects SWPPP will be reviewed for compliance at the beginning of the project and periodically after that as needed. All stormwater BMPs must be identified on the site plan. All control measures shown on the plan shall be inspected. All issues and violations shall be photographed and documented in the report. Critical areas that require continuous inspections shall also be identified on the site plan. The inspection report shall specify the required corrective action for each issue or violation noted and a date by which all corrective actions must be completed. A copy of the ESC/SWM Inspection Report will be emailed to the project manager and any other persons identified during the pre-construction meeting.
- 5.3 Project Close-Out: As previously stated, project completion is defined as the achievement of permanent stabilization, verification of final product according to approved plans, completion of TV inspection of the installed storm sewer system and receipt of as-built certification of SWM BMPs (if applicable). Project completion, concerning ESC and SWM, will be noted using the ESC/SWM Inspection Report form.
- 5.4 Post-Construction Inspections: Post-construction (maintenance) inspections for permanent SWM BMPs shall be made in accordance with the manufacturer's recommendations, engineer's recommendations and/or stormwater regulation requirements. The BMP Field Assessment Worksheet provided in Appendix D shall be used during inspections. In the case where maintenance or repair is required, fund requests and/or work orders shall be made in order to have items corrected.
- 5.5 Violations and Documentation: Violations shall be documented in the ESC/SWM Inspection Report, including photographs, descriptions, and necessary corrective actions. If a violation continues to be repeated, then a Notice to Comply will be issued and DEQ notified. At the discretion of JMU FM, the land disturbance approval may be suspended and/or revoked; at which time all land disturbing activity must cease until corrective actions have been completed. Alternatively, JMU FM has the option to contract with a 3rd party to install and maintain ESC and/or

SWM measures in accordance with the approved plan, complete any necessary corrective actions, and/or abate any related damages. Once the site is brought back into compliance to the satisfaction of JMU FM, site work may resume. All associated costs will be back-charged to the contractor.

SECTION 6: VARIANCES AND EXCEPTIONS

Variations and exceptions to regulations must ensure protection of off-site properties and resources from damage. Economic hardship is not sufficient reason to request a variance or an exception from VESCL&R or James Madison University Annual Specifications for ESC and SWM. Variations and exceptions are considered to be project specific.

For a variance or exception to become part of the project ESC and SWM plans, a written request must be submitted to the JMU Stormwater Coordinator for review and approval. This request must include an explanation and description of the specific condition necessitating the request. The request must also include a detailed description of the alternative practice and justification that the practice meets the intent of the regulation for which the variance is sought. (Ref. 9VAC25-840-50).

6.1 Variance or Exception Request Policy and Procedure:

- 6.1.1 The design professional shall draft a letter of request to JMU FM and shall be accompanied by complete details and documentation, including justification and impacts associated with the request.
- 6.1.2 All requests shall be considered unapproved until written approval from JMU FM is received. Final approval rests with DEQ.
- 6.1.3 All approved variations or exceptions shall be listed in the General Notes section of the ESC/SWM plans for land disturbing activities and/or included in the Narrative.
- 6.1.4 JMU has included a list of non-VESCH specifications that are acceptable to be used for ESC measures on construction projects in Appendix F. Non-VESCH specifications will require that the manufacturer's planning, construction, installation and maintenance requirements be shown on the approved plan.

SECTION 7: LAND-DISTURBING ACTIVITIES

- 7.1 A list of regulated land-disturbing activities currently under construction and expected to be under construction during this period are included in Appendix E.
- 7.2 James Madison University FM-Engineering will notify the DEQ Harrisonburg Regional Office of the RLD name and contact information at least two weeks prior to construction.
- 7.3 James Madison University FM-Engineering will notify the DEQ Harrisonburg Regional Office of any additional projects involving regulated land disturbing activities unknown at the time of Annual Standards & Specifications submission. This notification shall be provided at least two weeks in advance of land-disturbing activities.

SECTION 8: CONSTRUCTION REQUIREMENTS

All contractors performing land disturbing activities on campus property are required through contract documents to follow existing ESC requirements and obtain all applicable permits before construction activity commences. The CO-7 General Conditions of the Construction Contract requires that the contractor have a responsible land disturber on-site. In addition to contract language, all work performed on University property is required to comply with the Construction and Professional Services Manual (CPSM) published by the Bureau of Capital Outlay Management.

SECTION 9: LONG-TERM MAINTENANCE

Project plans shall contain information on long-term maintenance of BMPs. Permanent stormwater facilities will be inspected as required within stormwater regulations.

ESC/SWM Plan Preparer/Reviewer Checklist

ESC/SWM PLAN PREPARER/REVIEWER CHECKLIST

The Erosion and Sediment Control (ESC) and Stormwater Management (SWM) Plan consists of the Narrative (including any supporting calculations) and the construction sheets (site plan), as noted below.

GENERAL

- _____ Complete set of plans and supporting documentation - Include all sheets pertaining to the site grading and stormwater and any activities impacting erosion and sediment control and drainage:
- Existing conditions
 - Demolition
 - Site grading
 - Erosion and sediment control
 - Storm sewer systems
 - Stormwater management facilities
 - Utility layout
 - Landscaping
 - On-site and off-site borrow and disposal areas that do not have separate approved ESC Plans
 - Calculations
- _____ Professional's seal - The designer's original seal, signature, and date are required on the cover sheet of each Narrative and each set of Plan Sheets. A facsimile is acceptable for subsequent Plan Sheets.
- _____ Number of plan sets - Two hard copy sets of ESC and/or SWM plans and engineering report are to be submitted initially. Five sets are required for final approval. With each submission, also submit a digital copy of the plan set and engineering report in pdf format, and a digital copy of the VRRM spreadsheet. Distribution of the approved plans will be as follows:
- 1 – Project Manager
 - 1 – Design Engineer
 - 2 – Contractor
 - 1 – Stormwater Coordinator
- _____ Variances - Variances requested at the time of plan submission are governed by Section 9VAC25-840-50 of the Virginia Erosion and Sediment Control Regulations and James Madison University Annual Standards and Specifications for ESC and SWM
- _____ Completed Plan Preparer/Reviewer Checklist - Include a completed and signed ESC/SWM Plan Preparer/Reviewer Checklist.

ESC MINIMUM STANDARDS

Yes No NA

- | | | | | |
|--------------------------|--------------------------|--------------------------|-------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-1 | Have temporary and permanent stabilization been addressed in the narrative? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Are practices shown on the plan? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Temporary and permanent seed specifications? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Lime and fertilizer? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Mulching? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Blankets/Matting? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Pavement/Construction Road Stabilization? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-2 | Has stabilization of soil stockpiles, borrow areas, and disposal areas been addressed in the narrative and on the plan? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Have sediment trapping measures been provided? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-3 | Has the establishment and maintenance of permanent vegetative stabilization been addressed? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-4 | Does the plan specifically state that sediment-trapping facilities shall be constructed as a first step in land-disturbing activities? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-5 | Does the plan specifically state that stabilization of earthen structures is required immediately after installation? Is this noted for each measure on the plan? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-6 | Are sediment traps and sediment basins specified where needed and designed to the standard and specification? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-7 | Have the design and temporary/permanent stabilization of cut and fill slopes been adequately addressed? Is Surface Roughening provided for slopes steeper than 3:1? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-8 | Have adequate temporary or permanent conveyances (paved flumes, channels, slope drains) been provided for concentrated stormwater runoff on cut and fill slopes? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-9 | Has water seeping from a slope face been addressed (e.g., subsurface drains)? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-10 | Is adequate inlet protection provided for all operational storm drain and culvert inlets? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-11 | Are adequate outlet protection and/or channel linings provided for all stormwater conveyance channels and receiving channels? Is there a schedule indicating: |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Dimensions of the outlet protection? Lining? Size of riprap? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Cross section and slope of the channels? Type of lining? Size of riprap, if used? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-12 | Are in-stream protection measures required so that channel impacts are minimized? |
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| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-13 | Are temporary stream crossings of non-erodible material required where applicable? |

Yes No NA

- | | | | | |
|--------------------------|--------------------------|--------------------------|-------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-14 | Are all applicable federal, state and local regulations pertaining to working in or crossing live watercourses being followed? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-15 | Has immediate restabilization of areas subject to in-stream construction (bed and banks) been adequately addressed? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-16 | Have disturbances from underground utility line installations been addressed? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | No more than 500 linear feet of trench open at one time? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Effluent from dewatering filtered or passed through a sediment-trapping device? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Proper backfill, compaction, and restabilization? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-17 | Is the transport of soil and mud onto public roadways properly controlled? (i.e., Construction Entrances, wash racks, transport of sediment to a trapping facility, cleaning of roadways at the end of each day, no washing before sweeping and shoveling) |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-18 | Has the removal of temporary practices been addressed? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Have the removal of accumulated sediment and the final stabilization of the resulting disturbed areas been addressed? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | MS-19 | Are properties and waterways downstream from development adequately protected from sediment deposition, erosion, and damage due to increases in volume, velocity and peak flow rate of stormwater runoff? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Is concentrated stormwater runoff leaving the development site discharged to an adequate natural or man-made receiving channel, pipe or storm sewer system? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Are calculations provided to verify the adequacy of all channels and pipes? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | If existing natural receiving channels or previously constructed man-made channels or pipes are not adequate, have provisions been made to prevent downstream erosion? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Have increased volumes of sheet flows that may cause erosion or sedimentation on adjacent property been diverted to a stable outlet, adequate channel, pipe or pipe system, or to a detention facility? |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | Variances requested at the time of plan submission are governed by Section 9VAC25-840-50 of the <i>Virginia Erosion and Sediment Control Regulations</i> . |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | | All Minimum Standards have been listed on a plan set. |

NARRATIVE

- _____ Project description - Briefly describe the nature and purpose of the land-disturbing activity.
 - Provide the area (acres) to be disturbed. This disturbed area shall include laydown, access and any other areas that may be disturbed during the course of the project.
 - Provide the existing impervious area and the increase, or decrease, in impervious area (acres).
 - Estimated schedule for project.
 - Ultimate developed condition of the site.

- _____ Existing site conditions - A description of the existing topography (% slopes), ground cover, and drainage (on-site and receiving channels).
 - Provide the size of drainage areas in pre-development and post-development conditions.
 - Discuss any existing drainage or erosion problems and how they are to be corrected.

- _____ Adjacent areas - A description of all neighboring areas such as residential developments, agricultural areas, streams, lakes, roads, etc., that may be affected by the land disturbance. Discuss any environmentally sensitive areas and any possible problems during and after construction (traffic issues, dust control, increases in runoff, etc.).

- _____ Off-site areas - Describe any off-site land-disturbing activities that may occur (borrow sites, disposal areas, easements, etc.). Identify the Owner of the off-site area and the locality responsible for plan review. Include a statement that any off-site land-disturbing activity associated with this project must have an approved ESC Plan. Submit documentation of the approved ESC Plan for each of these sites.

- _____ Soils - Provide a description of the soils on the site, giving such information as soil name, mapping unit, erodibility, permeability, surface runoff, and a brief description of depth, texture and soil structure.
 - Indicate references for soil information.
 - Provide a copy of soil survey map

- _____ Critical areas - A description of areas on the site that may have potentially serious erosion problems or that are sensitive to sediment impacts (e.g., steep slopes, watercourses, wet weather / underground springs, etc.). Discuss any area(s) of the project which may become critical during the project.

- _____ Erosion and sediment control measures - A description of the structural and vegetative methods that will be used to control erosion and sedimentation on the site. Controls should satisfy applicable minimum standards and specifications in Chapter 3 of the latest edition of the Virginia Erosion and Sediment Control Handbook (VESCH).

- _____ Management strategies / Sequence of construction - Address management strategies, the sequence of construction, and any phasing of installation of ESC measures.

- _____ Permanent stabilization - A brief description, including specifications, of how the site will be stabilized after construction is completed. List any soil testing requirements.

_____ Maintenance of ESC measures - A schedule of regular inspections, maintenance, and repair of erosion and sediment control structures should be set forth. List who will be responsible for ESC maintenance during the course of the project.

_____ Calculations for temporary erosion and sediment control measures - For each temporary ESC measure, provide the calculations required by the standards and specifications. All calculations showing pre-development and post-development runoff should be provided including any worksheets, assumptions and engineering decisions.

_____ Stormwater management - Will the development of the site cause an increase in peak runoff rates? Will the increase in runoff cause flooding or channel degradation downstream? Describe the strategy to control stormwater runoff:

- Provide exhibits showing the drainage divides, the direction of flow, and the size (acreage) of each of the site drainage areas that discharge runoff off-site, both existing and proposed.
- Provide calculations for pre- and post-development runoff from these drainage areas.
- Ensure that Minimum Standard 19 is satisfied for each off-site receiving channel, including those that receive runoff from stormwater management facilities.
- Provide calculations for the design of each permanent stormwater management facility.
- Ensure that increased volumes of sheet flows are diverted to a stable outlet, to an adequate channel, pipe or pipe system, or to a stormwater management facility.
- Provide adequacy calculations (capacity and erosion resistance) for all on-site stormwater conveyances in accordance with the next checklist item.
- Provide a table with the following information for each stormwater management BMP: BMP Type, Geographic Location (Northing/Easting), Total Acres Treated by Facility, Impervious Acres Treated, Pervious Acres Treated

_____ Calculations - Provide the following design calculations, as applicable:

- Drainage area map with time of concentration (TC) path shown and points of analysis with worksheets.
- TC calculation/nomograph
- Locality IDF curve
- Composite runoff coefficient or RCN calculation
- Peak runoff calculations
- TR-55 worksheets
- Stormwater conveyance channel design calculations
- Storm drain and storm sewer system design calculations
- Hydraulic Grade Line if any pipe in the system is more than 90% full for a 10-year storm
- Culvert design calculations
- Drop inlet backwater calculations
- Curb inlet length calculations
- Water quality calculations for BMPs including worksheets.
- Water quantity; Channel protection and flood protection analysis/documentation
- VRRM compliance spreadsheet (digital and printed format)

_____ Maintenance of SWM Facilities – Provide a table with a description of requirements for maintenance of the facility and a recommended schedule for inspections and maintenance. The responsible party for the maintenance of stormwater management facilities will be:

Facilities Management – Operations, Landscape Manager
University Services Building
181 Patterson Street, Room 158, MSC 7007
Harrisonburg, VA 2807
Phone: (540) 568-3411

_____ Water Quality – Is the plan in compliance with the water quality criteria? Provide supporting calculations.

_____ Specifications for stormwater and stormwater management structures - Provide specifications for stormwater and stormwater management structures, i.e., pipe materials, pipe bedding, stormwater structures.

_____ Page numbers – Number the pages of the Narrative and the Calculations.

_____ General Information – Narrative contains project specific information, and where appropriate general information has been modified to represent the project specific information and situation.

SITE PLAN

_____ Vicinity map - A small map locating the site in relation to the surrounding area. Include any landmarks that might assist in locating the site.

_____ Indicate north - The direction of north in relation to the site.

_____ Limits of disturbance – Areas which are to be cleared and graded and areas to be protected during construction. This disturbed area shall include laydown, access and any other areas that may be disturbed during the course of the project. Provide notes on how areas will be marked and for areas NOT to be disturbed.

_____ Existing contours - The existing contours of the site shall be shown as dashed light lines and elevation labeled adequately.

_____ Final contours and elevations - Changes to the existing contours, including final drainage patterns. Note the finished floor elevation (FFE) of all buildings on site, including basements. Proposed contour lines shall be solid and bolder than existing contour lines.

_____ Profile of storm drainage system – Proposed storm drainage components shall be provided in a profile. Pipe diameter, material, inverts, stationing, percent slope, proposed and existing grade, etc. shall be included as part of the profile.

_____ Existing vegetation - The existing tree lines, grassed areas, or unique vegetation.

- _____ Soils map – The boundaries of different soil types, K factor and soil survey classifications.
- _____ Existing drainage patterns – The dividing lines and the direction of flow for the different drainage areas. Include the size (acres) of each drainage area.
- _____ Proposed drainage patterns – The dividing lines and the direction of flow for the different drainage areas. Include the size (acres) of each drainage area.
- _____ Critical areas – Note all areas with potentially serious erosion problems.
- _____ Site development – Show all improvements such as buildings, parking lots, access roads, utility construction, etc.
- _____ Landscape plan – Include a plan showing location and plant selection for landscaped areas.
- _____ Location of practices – Show locations of ESC and SWM practices to be used on the site. Use standard symbols and abbreviations from ESC and SWM handbooks. A legend denoting symbols, line uses and other special characters shall be provided.
- _____ Off-site areas - Include any off-site land-disturbing activities (e.g., borrow sites, disposal areas, etc.) not covered by a separate approved ESC Plan. Discuss who has final authority for off-site areas and who will be responsible for stabilization.
- _____ Detail drawings – Show detail drawings of all SWM and ESC practices to be implemented. Any structural practices used that are not referenced to the ESC handbook or local handbooks should be explained and illustrated with detail drawings. Details should be provided which are clearly dimensioned and reflect the ability to be “built” in the field according to proper design criteria. Alternative ESC/SWM measures must have proper drawings to indicate how and where they are to be constructed. VDOT IS-1 storm drain shaping will be required for storm drain structures.
- _____ Erosion and sediment control notes - At a minimum, include the erosion and sediment control notes found appendix B. Ensure that all applicable Minimum Standards not covered elsewhere in the plan have been addressed.
- _____ Minimum Standards – Minimum Standard 1 through Minimum Standard 19 shall be included in the plan set.
- _____ Legend - Provide a complete listing of all ESC and SWM measures to be used, including the VESCH uniform code symbol and the standard and specification number. Include any other items necessary to identify pertinent features in the plan.
- _____ Property lines and easements - Show all property and easement lines. For each adjacent property, list the deed book and page number and the property owner's name and address.

Project Name: _____

Plan Preparers Signature: _____ Date: _____

General Erosion and Sediment Control Notes

GENERAL EROSION AND SEDIMENT CONTROL NOTES

- ES-1: Unless otherwise indicated, all vegetative and structural erosion and sediment control practices shall be constructed and maintained according to minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook and Virginia Regulations 9VAC25-840 Erosion and Sediment Control Regulations.
- ES-2: The plan approving authority (JMU Stormwater Coordinator) must be notified at least one week prior to the pre-construction conference, one week prior to commencement of land disturbing activity and one week prior to final inspection. The name of the certified responsible land disturber, including their certification number and contact information must be provided to the plan approving authority at least 15 days prior to actual engagement in land disturbing activity.
- ES-3: All erosion and sediment control measures shall be placed prior to or as a first step in clearing.
- ES-4: A copy of the approved erosion and sediment control plan and the Virginia Erosion and Sediment Control Handbook shall be maintained on the site at all times.
- ES-5: Prior to commencing land disturbing activities in areas other than indicated on these plans (including, but not limited to, off-site borrow or waste areas), the contractor shall submit a supplementary erosion control plan to the JMU Stormwater Coordinator for review and approval, or submit documentation that the other area is currently covered under a separate approved erosion and sediment control plan.
- ES-6: The contractor is responsible for installation of any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the plan approving authority.
- ES-7: All disturbed areas are to drain to approved sediment control measures at all times during land disturbing activities and during site development until final stabilization is achieved, after which, upon approval of the plan approving authority, the controls shall be removed. Disturbed soil areas resulting from the removal of temporary measures shall be permanently stabilized.
- ES-8: During dewatering operations, water shall be pumped into an approved filtering device.
- ES-9: The contractor shall inspect all erosion control measures at least once in every two-week period and within 48 hours following any runoff producing storm event. The operator shall inspect in accordance with the Construction General Permit requirements when applicable. Any necessary repairs or cleanup to maintain the effectiveness of the erosion control devices shall be made immediately. Contractor shall submit evidentiaries of inspections reports to the owner or within the Stormwater Pollution Prevention Plan (SWPPP).
- ES-10: The contractor is responsible for the removal of sediment that has been transported onto paved or public roads. At a minimum, tracking shall be cleaned by the end of each work day.
- ES-11: Temporary/Permanent stabilization operations shall be initiated within 7 days after reaching final grade or upon suspension of grading operations for anticipated duration of greater than 14 days or upon completion of grading operations for a specific area.
- ES-12: The contractor shall be responsible for preventing surface and air movement of dust from exposed soils.

ESC/SWM Inspection Report

JAMES MADISON UNIVERSITY

ESC/SWM INSPECTION REPORT

FACILITIES MANAGEMENT - ENGINEERING
181 PATTERSON ST., HARRISONBURG, VA 22807
OFFICE: (540) 568-7606 FAX: (540) 568-3547



PROJECT INFORMATION	PROJECT NAME		INSPECTION DATE
	PROJECT MANAGER	PROJECT NUMBER	INSPECTION TIME
	RLD NAME	RLD NUMBER	INSPECTOR
Does the project require a VSMP General Construction Permit? Yes <input type="radio"/> No <input type="radio"/> Permit Number (if applicable):			

WEATHER DATA	CURRENT CONDITIONS	CURRENT TEMP.	RECENT RAINFALL TOTALS
	ADDITIONAL INFORMATION		

ITEM #1	VIOLATION CODE	<input type="radio"/> INITIAL <input type="radio"/> REPEAT	<i>Description and location of problem/violation. Required or recommended corrective actions. Other Comments.</i>

ITEM #2	VIOLATION CODE	<input type="radio"/> INITIAL <input type="radio"/> REPEAT	<i>Description and location of problem/violation. Required or recommended corrective actions. Other Comments.</i>

ITEM #3	VIOLATION CODE	<input type="radio"/> INITIAL <input type="radio"/> REPEAT	<i>Description and location of problem/violation. Required or recommended corrective actions. Other Comments.</i>

ITEM #4	VIOLATION CODE	<input type="radio"/> INITIAL <input type="radio"/> REPEAT	<i>Description and location of problem/violation. Required or recommended corrective actions. Other Comments.</i>

COMMENTS/NOTES	

REASON FOR INSPECTION
<input type="radio"/> INSTALLATION OF CONTROLS <input type="radio"/> SCHEDULED INSPECTION <input type="radio"/> POST STORM EVENT <input type="radio"/> PROJECT COMPLETION <input type="radio"/> RE-INSPECTION <input type="radio"/> OTHER: _____

STAGE OF CONSTRUCTION
<input type="radio"/> INSTALLATION OF E&S CONTROLS <input type="radio"/> CLEARING & GRUBBING <input type="radio"/> ROUGH GRADING <input type="radio"/> BUILDING CONSTRUCTION <input type="radio"/> FINISH GRADING <input type="radio"/> FINAL STABILIZATION <input type="radio"/> CONSTRUCTION OF SWM FACILITIES <input type="radio"/> MAINTENANCE OF SWM FACILITIES <input type="radio"/> OTHER: _____

RESULT OF INSPECTION
<input type="radio"/> SATISFACTORY <input type="radio"/> SATISFACTORY w/ COMMENTS <input type="radio"/> VIOLATION(S) NOTED <input type="radio"/> NOTICE TO COMPLY <input type="radio"/> STOP WORK ORDER

REQUIRED CORRECTION ACTION DEADLINE DATE

VIOLATION	BRIEF DESCRIPTION
JMU-1	Land Disturbance w/o Approved Plan
JMU-2	Non-Compliance w/ Approved Plan
JMU-3	Maintenance/Repair of Controls
JMU-4	Other/VSMP
MS-1	Stabilization
MS-2	Stockpiles, Waste & Borrow Areas
MS-3	Permanent Vegetation
MS-4	First Step Measures
MS-5	Earthen Structure Stabilization
MS-6	Trap and Basin Sizing
MS-7	Cut and Fill Slopes
MS-8	Concentrated Runoff
MS-9	Water Seeps
MS-10	Inlet Protection
MS-11	Channel / Outlet Protection
MS-12	Watercourse Construction
MS-13	Temporary Stream Crossing
MS-14	Other Watercourse Regulations
MS-15	Bed and Bank Stabilization
MS-16	Utility Construction
MS-17	Construction Entrance, Tracking
MS-18	Control Removal
MS-19	Downstream & Property Protection

Violation code refers to applicable regulation found in the most recent publication of the Virginia Erosion and Sediment Control Regulations (9VAC25-840), Virginia Stormwater Management Permit Regulations (9VAC25-870), or James Madison University's Annual Standards & Specifications for ESC & SWM.
 The required corrective deadline date applies to all violations noted on this report. If listed violation(s) currently constitute non-compliance and/or required corrective actions are not completed by the deadline, a NOTICE TO COMPLY, STOP WORK ORDER, and/or other enforcement actions may be issued to the entity responsible for ensuring compliance on the above project.

VSMP AUTHORITY CONSTRUCTION GENERAL PERMIT CHECKLIST

		Yes	No	N/A
1	Copy of notice of coverage letter posted near main entrance: Part II(C)			
2	Information for public access to electronic format or hard copy of SWPPP posted near main entrance: Part II(D)3			
3	Copy of complete SWPPP available onsite for operators: Part II(A)			
3a	Signed copy of registration statement: Part II(A)1.a			
3b	Copy of permit: Part II(A)1.b			
3c	Copy of notice of coverage letter: Part II(A)1.c			
3d	Narrative description of the nature of construction activity: Part II(A)1.d			
3e	Legible site plan: Part II(A)1.e			
3f	Approved ESC plan, "agreement in lieu of a plan", or ESC plan developed in accordance with department approved annual standards and specifications: Part II(A)2			
3g	Approved SWM plan or SWM plan developed in accordance with department approved annual standards and specifications: Part II(A)3			
3h	Pollution prevention plan: Part II(A)4			
3i	Requirements for discharges to impaired waters, surface waters with an applicable TMDL, exceptional waters (if applicable): Part II(A)5			
3j	Contact information for qualified personnel conducting inspections: Part II(A)6			
3k	SWPPP signed in accordance with Part IIIK: Part II(A)8			
4	SWPPP is being amended, modified and updated: Part II(B)			
4a	SWPPP clearly identifies the contractor(s) that will implement and maintain each control measure identified in SWPPP: Part II(B)3			
4b	Record of dates when major grading activities occurred: Part II(B)4.a(1)			
4c	SWPPP amendments, modifications, or updates signed in accordance with Part III K: Part II(B)5			
5	SWPPP inspections carried out: Part II(F)			
5a	Inspections conducted at required frequency: Part II(F)2			
5b	Inspection reports summarize findings of inspections including corrective actions: Part II(F)4.a-i			
5c	Inspection reports have date and signature of qualified personnel conducting inspections and the operator or authorized representative: Part II(F)4.j			
5d	Inspection reports retained as part of SWPPP: Part II(F)4			
6	Erosion and sediment controls implemented: Part II(A)2.c			
6a	Volume and velocity of stormwater runoff controlled within site to minimize erosion: Part II(A)2.c(1)			
6b	Stormwater discharges, including peak flow rates and total stormwater volume controlled to minimize erosion at outlets and to minimize downstream channel and stream bank erosion: Part II(A)2.c(2)			
6c	Soil exposed during construction activity minimized: Part II(A)2.c(3)			
6d	Disturbance of steep slopes minimized: Part II(A)2.c(4)			
6e	Natural buffers around surface waters provided and maintained, stormwater directed to vegetated areas to increase sediment removal, and maximizes stormwater infiltration: Part II(A)2.c(6)			
6f	Soil compaction minimized and topsoil preserved: Part II(A)2.c(7)			
6g	Stabilization of disturbed areas initiated immediately whenever any clearing, grading, or excavating, or other land-disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for more than 14 days: Part II(A)2.c(8)			
6h	Outlet structures utilized that withdraw stormwater from the surface when discharging from sediment basins or sediment traps: Part II(A)2.c(9)			
7	Pollution prevention plan implemented: Part II(A)4			
7a	Prevent and respond to leaks, spills and other releases including (i) procedures for expeditiously stopping, containing, and cleaning up spills, leaks, and other releases; and (ii) procedures for reporting leaks, spills, and other releases: Part II(A)4.e(1)			
7b	Prevent discharge of spilled and leaked fuels and chemicals from vehicle fueling and maintenance activities (e.g. providing secondary containment such as spill berms, decks, spill containment pallets, providing cover where appropriate, and having spill kits readily available: Part II(A)4.e(2)			
7c	Prevent discharge of soaps, solvents, detergents, and wash water from construction materials, including clean-up of stucco, paint, form release oils, and curing compounds: Part II(A)4.e(3)			
7d	Minimize discharge of pollutants from vehicle and equipment washing, wheel wash water and other types of washing: Part II(A)4.e(4)			
7e	Direct concrete wash water into a leak proof- container or leak-proof settling basin: Part II(A)4.e(5)			
7f	Minimize discharge of pollutants from storage, handling, and disposal of construction products, materials and wastes: Part II(A)4.e(6)			
7g	Prevent discharge of fuels, oils, and other petroleum products, hazardous or toxic wastes, and sanitary wastes: Part II(A)4.e(7)			
7h	Address any other discharge from the potential pollutant-generating activities not addressed above: Part II(A)4.e(8)			
8	Appears to be impact(s) to receiving waters: Part I(B)6, Part I(D), or Part II(A)2c(2) or (5)			

BMP Field Assessment Worksheet

JAMES MADISON UNIVERSITY

FACILITIES MANAGEMENT

181 PATTERSON ST., HARRISONBURG, VA 22807

OFFICE: (540) 568-7606 FAX: (540) 568-3547

BMP FIELD ASSESSMENT WORKSHEET



BMP ID:		Zone:
Inspector:		Rating Key 0 = Good Condition. No action required. 1 = Moderate Condition. See recommendation. 2 = Degraded Condition. Routine maintenance and/or repair needed. 3 = Serious Condition. Immediate need for maintenance, repair and/or replacement. N/A = Not applicable.
Inspection Date:		
Inspection Time:		
Last Storm Event:		
Notes:		
Contributing Drainage Area		Rating
Inlet		
Vegetation/Mulch		
Structure		
Outlet		
Other		
		Overall Rating

Projects

James Madison University
Land Disturbing Activities
January 2015 - December 2015

Project Name	Project Location	Project Manager	Contact Information	Project Description	Approx. Area (acres)	Proposed Construction Start Date	Proposed Construction Finish Date
Arboretum Stream Restoration Project: Phase 1	JMU Arboretum	Abe Kaufman	(540) 568-4201	Restoration of stream with addition of constructed wetlands.	1.5	3/15/2015	7/1/2015
Grace Street Student Housing	50 W. Grace St.	Rick Miller	(540) 568-3007	Construct 500 bed student housing facility.	3.7	10/1/2013	6/30/2015
Infrastructure Phase II: New Steam Lines	Bluestone Dr.	Scott Wachter	(540) 568-3006	Construct new steam lines to serve Student Success Center.	1.1	5/5/2015	11/14/2015
Madison Hall Renovation	E. Grace St.	Scott Wachter	(540) 568-3006	Renovation to existing building	2.5	3/31/2015	7/31/2016
Mason Street Parking Deck	MLK Way	Glenn Wayland	(540) 568-6345	Construction of a new parking deck	2.0	3/28/2015	6/12/2016
Newman Lake Dam Repair	501 Bluestone Dr.	Craig Short	(540) 568-7628	Upgrade dam in order to bring impoundment into compliance with state regulations.	12.6	5/19/2014	2/20/2015
RMH East Tower	235 Cantrell Ave.	Scott Wachter	(540) 568-3006	Demo and construct new building.	1.4	11/16/2014	7/16/2016
South Main Street Soil Stock Pile	1593 S. Main St.	Abe Kaufman	(540) 568-4201	Ongoing soil stock pile area.	6.2	1/4/2010	6/30/2019
University Services Building Annex	Chesapeake Ave.	Rick Miller	(540) 568-3007	Construct new building with parking.	3.0	4/24/2015	4/21/2016
UREC Expansion	701 Driver Dr.	Glenn Wayland	(540) 568-6345	Expand and renovate existing building	10.0	4/29/2014	5/6/2016

Non-VESCH Specifications

NON-VESCH SPECIFICATIONS

AlturnaMats & VersaMats

Dandy Bag

Dandy Curb

Dandy Curb Bag

Dandy Curb Sack

Dandy Dewatering Bag

Dandy Pop

Dandy Sack

Dirt Bag

Erosion Eel

GeoRunner

Grate Pyramid

Gutter Buddy

Gutter Gator

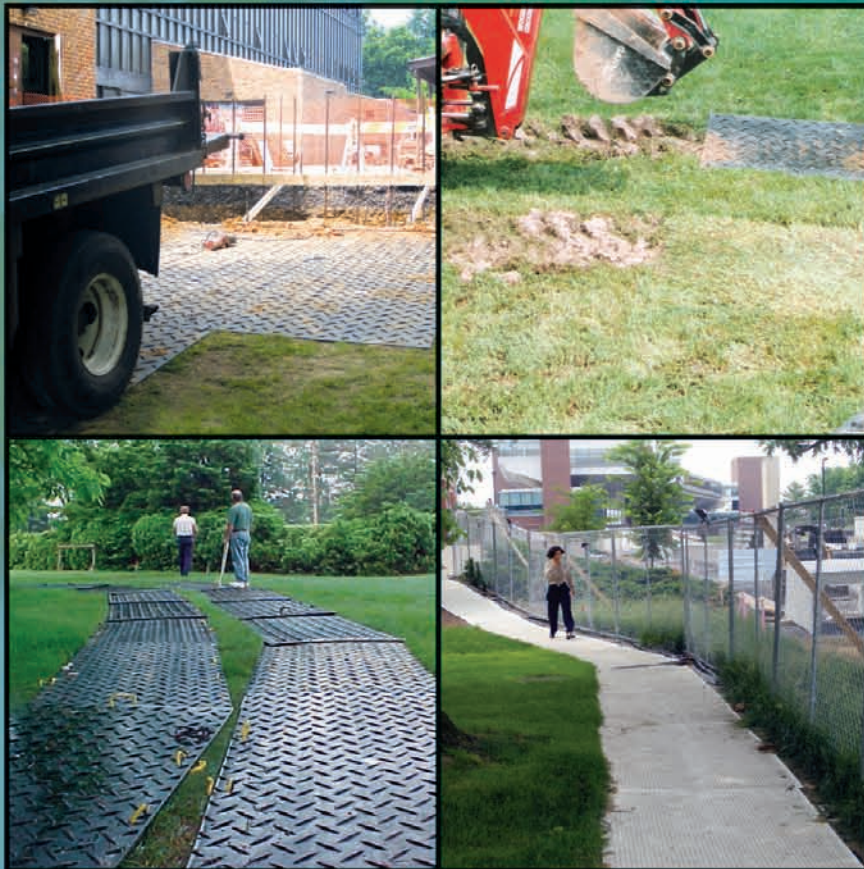
Silt Sack

Terra Tube

Please note that all Non-VESCH specifications will require that the manufacturer's planning, construction, installation and maintenance requirements be shown on the approved plan.

*Alturna*MATS®

The Original drive-on, ground protection mats



The mats preferred by professionals worldwide

*Protect Your Turf & Save Thousands in
Ground Restoration Costs...*



AlturnaMATS®

World's Toughest Ground Protection Mat



AlturnaMATS *Built Tough!*

The Original Ground Protection Mats Featuring Maximum Traction Diamond Plate Tread Design

These rugged mats are made of 1/2" thick polyethylene so they are virtually indestructible. They withstand vehicles weighing up to 120 tons, bend but do not break and feature a Limited Lifetime Warranty. AlturnaMATS have been tested in record cold and heat. AlturnaMATS are an environmentally friendly mat as they are made from recycled plastic materials.

With AlturnaMATS, getting stuck is virtually eliminated. They are available smooth on one side or smooth on both sides, ideal for removing dirt or gravel.

- Easily supports 120 ton vehicles
- Rugged 1/2" thick polyethylene
- Bold cleat design for great traction
- Build a roadway or working platform in minutes
- Leave turf smooth, even in soft conditions
- No more splintered, warped, water logged plywood
- Simply hosing down leaves the mats clean
- Available in both black or white mats
- Mats can be locked together with Turn-A-Links forming a continuous roadway
- Limited Lifetime Warranty

Sizes to meet your needs

Black	White	Weight
4' x 8'	4' x 8'	86 lbs.
3' x 8'	3' x 8'	64.5 lbs.
3' x 6'	3' x 6'	51 lbs.
2' x 8'	2' x 8'	43 lbs.
2' x 6'	2' x 6'	32.25 lbs.
2' x 4'	2' x 4'	21.5 lbs.



Landscaping



Tree Care



Construction



Concrete



S

VersaMATS

Most Versatile Mats in the Industry



Reverse Side



VersaMATS

Easy to Walk On - Safe to Work On - Great to Drive On
Featuring an Exclusive Slip-Resistant Tread Design

VersaMATS literally are the most versatile ground protection mats in the industry. The flat, slip-resistant tread permits pedestrians to walk safely on the mats, yet they are as rugged as the original AlturnaMATS. The reverse side has the same diamond plate tread as AlturnaMATS, providing great traction for vehicles.

VersaMATS are also available in white, making them ideal for safe use as long walkways even in darkened conditions. They are also available smooth on one side.

- Leaves turf smooth even in soft soil conditions
- Tough 1/2" thick polyethylene
- Two practical cleat designs... for walking and vehicle traffic
- Withstand 120-ton loads
- Build a temporary roadway or walkway in minutes
- Lock together with Turn-A-Links
- Limited Lifetime Warranty

Sizes to meet your needs

Black	White	Weight
4' x 8'	4' x 8'	86 lbs.
3' x 8'	3' x 8'	64.5 lbs.
2' x 8'	2' x 8'	43 lbs.



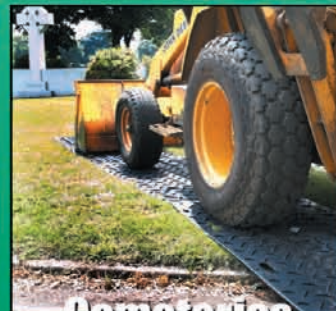
Snow/Slush



Utilities



Golf Courses



Cemeteries



Drilling

AlturnaMATS

One Piece Plastic Outrigger Pads



Safety Tech Pads

Deliver the safety, quality and performance you expect from the industry leader.



Stock Models

MODEL	LOAD CAPACITY		WIDTH	LENGTH	HEIGHT	WEIGHT	SQ. IN.
	VERTICAL	45 DEGREE					
PAD1515.75	40,000# (KG20,412)	18,000# (KG9,072)	15" (C38.1)	15" (C38.1)	.75" (C1.905)	5.5# (KG3.40)	225 (CT1,451.70)
PAD18181	55,000# (KG24,948)	30,000# (KG13,608)	18" (C45.72)	18" (C45.72)	1" (C2.54)	11.0# (KG4.99)	324 (CT2,090.45)
PAD24241	60,000# (KG27,216)	35,000# (KG15,876)	24" (C60.96)	24" (C60.96)	1" (C2.54)	20.0# (KG9.07)	576 (CT3,761.35)
PAD24242	62,000# (KG28,123)	40,000# (KG18,144)	24" (C60.96)	24" (C60.96)	2" (C5.08)	38.0# (KG17.24)	576 (CT3,761.35)
PAD30301	81,000# (KG36,741)	41,000# (KG18,597.6)	30" (C76.2)	30" (C76.2)	1" (C2.54)	31.0# (KG14.06)	900 (CT5,806.8)
PAD36361	93,000# (KG42,184.8)	43,000# (KG19,504.8)	36" (C91.44)	36" (C91.44)	1" (C2.54)	45.0# (KG20.41)	1296 (CT8,361.79)
PAD48481	135,000# (KG61,236)	52,000# (KG23,587.2)	48" (C121.92)	48" (C121.92)	1" (C2.54)	80.0# (KG36.29)	2304 (CT14,865.4)
PAD30302	85,000# (KG38,556)	43,000# (KG19,504.8)	30" (C76.2)	30" (C76.2)	2" (C5.08)	62.0# (KG28.12)	900 (CT5,806.8)
PAD36362	98,000# (KG44,252.8)	45,000# (KG20,412)	36" (C91.44)	36" (C91.44)	2" (C5.08)	90.0# (KG40.83)	1296 (CT8,361.79)
PAD48482	140,000# (KG63,504)	55,000# (KG24,948)	48" (C121.92)	48" (C121.92)	2" (C5.08)	160.0# (KG72.58)	2304 (CT14,865.4)

*8" X 10" OUTRIGGER LEG APPLIED UNDER TWO SEPARATE CONDITIONS: 10,000# VERTICALLY & 10,000# WITH A 45° ANGLE.
 **HANDLE LOCATED ON WIDTH SIDE OF ALL PADS. PADS 900 SQ. IN. & LARGER HAVE 2 OR MORE HANDLES OPPOSITE EACH OTHER.
 ***CUSTOM SIZE PADS ARE AVAILABLE. REQUIRES A MINIMUM ORDER. LEAD TIME FOR NON-STOCK ITEMS IN 30-45 DAYS
 KEY: C = CENTIMETERS; KG = KILOGRAMS; CT = SQUARE CENTIMETERS

Safety Tech Pad Features:

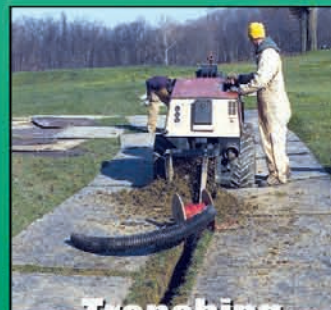
- Reliable Load Distribution
- Lightweight
- Safety Texturing
- Memory Recovery
- Lifetime Guarantee



Manufactured Housing



Recreation Areas & Events



Trenching



Septic Pumping

AlturnaMATS®



"AlturnaMATS, Your Single Source for Professional Ground Protection Mats."

AlturnaMATS & VersaMATS each leave turf smooth, even under heavy vehicle traffic. No costly turf repair bills and you'll Never Get Stuck Again.

AlturnaMATS, Inc. markets two different ground mats described in this brochure...

- **AlturnaMATS:** Featuring a bold diamond plate tread for maximum traction.
- **VersaMATS:** Featuring a flat, slip-resistant tread on one side designed for pedestrian traffic, and the bold diamond plate tread on the other side for vehicle traffic.

These mats virtually eliminate damage to lawns and landscaped areas throughout the world...from North America, Asia, Australia, Europe, to even Antarctica. These rugged mats are the popular choice among professionals. They are easy to use, lock into place to form a continuous, solid roadway or work platform

and they last for years. They are unequalled for quality and performance under the most hazardous conditions.

Each mat can be used in a broad variety of applications such as construction, golf courses, utilities, landscaping, tree care, cemeteries, drilling, sewage...wherever saving the costs of ground restoration is a factor. And they are great to save heavy vehicles from getting stuck in mud.

AlturnaMATS and VersaMATS provide locking links designed of steel to fit into holes on each end of the mats, locking them end-to-end to create a continuous roadway, or you can easily create a large platform for working vehicles.

Don't Get Stuck in a Rut

Now there is no reason to create ruts such as shown here after a stumpier traversed this front lawn. The owner had the ruts repaired at a cost of \$1,800 and needless to say, never used the tree removal company again.

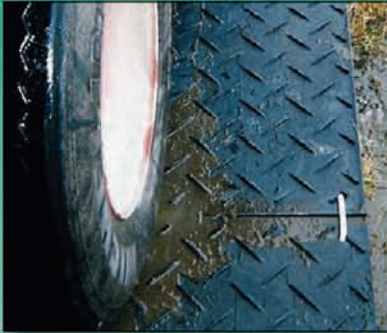


www.alturnamats.com

AlturnaMATS Accessories

Turn-A-Links

Single Turn-A-Link

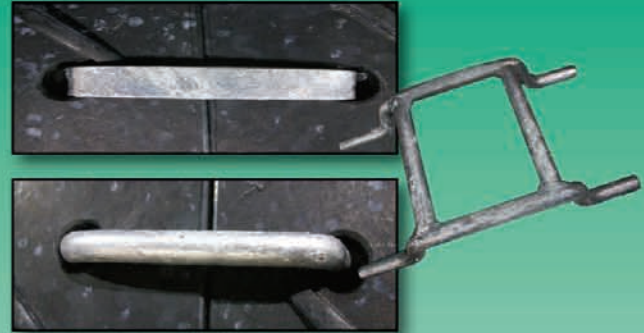


Steel links lock mats together to form a semi-permanent, yet portable, continuous roadway, walkway or working platform.

Double Turn-A-Link



Galvanized Turn-A-Link: Single or Double



The same steel material, but with a galvanized coating: easier to locate & harder to rust.

		Item #	Ship Wt.
Round Links	Single	RTL-S-G	8 oz.
	Double	RTL-G-G	20 oz.
Flat Links	Single	FTL-S-G	8 oz.
	Double	FLT-D-G	20 oz.
EZ Links	Single	EZL-S	4 oz.
	Double	EZL-D	6 oz.

Handi-Hooks



AlturnaMATS' Handi-Hooks make moving mats easier, even in wet areas. Made of steel rod, painted white.

Length	Weight
3' (91.44 cm)	2.5 lbs. (1.13 kg)

E-Z Link System



E-Z Links are a quick & convenient linking system for the AlturnaMATS VersaMATS. The links are available in single or double, & are suitable for pedestrian applications as well as movement of light, compact equipment (less than 12,000 GVW) when on stable ground conditions.

Single E-Z Link



MAT-PAK



This complete package is the handy way to transport and store your AlturnaMATS.

Consists of:

- 12 Mats (4' x 8' or 3' x 8')
- 1 Metal storage, skid rack
- 20 Single Turn-A-Links
- 2 Handi-Hooks
- 2 Ratchet Straps

MAT-PAK	Item No.	Weight
Original Diamond Plate		
Black - 4' x 8' Package	AMCP4	1126 lbs.
Black - 3' x 8' Package	AMCP3	868 lbs.
White - 4' x 8' Package	WMCP4	1126 lbs.
White - 3' x 8' Package	WMCP3	868 lbs.
VersaMATS		
Black - 4' x 8' Package	VMCP4	1126 lbs.
Black - 3' x 8' Package	VMCP3	868 lbs.
White - 4' x 8' Package	WVCP4	1126 lbs.
White - 3' x 8' Package	WVCP3	868 lbs.

AlturnaMATS®

Phone: 888-544-6287 • Fax: 814-827-2903 • E-mail: sales@alturnamats.com

www.alturnamats.com

AlturnaMATS *VersaMATS*®

Easy to Walk On... Safe to Work On... Great to Drive On
Plus... Perfect for storing materials on work site and out of the mud

VersaMATS Features:

- New, flat tread design
- New, AlturnaGrip slip resistant finish
- Safe to walk on
- Virtually eliminates ground restoration costs from vehicle damage
- Limited Lifetime Warranty
- Tough 1/2" thick polyethylene
- Eliminates need for plywood which splinters and warps
- Withstands heavy truck loads
- Prepared for linking together with flat Turn-a-Links
- Easy to handle
- Flexible, conforming to ground variations
- Field tested in record cold and heat
- Water and chemical resistant
- Sizes: 4' x 8' and 3' x 8'



Turn-a-Links lock *VersaMATS* together

VersaMATS are a totally new mat design, created for both pedestrian and vehicular traffic. The new flat, slip resistant finish assure safe foot traffic without fear of turning an ankle and vehicles can cross soft terrain without fear of getting stuck. *VersaMATS* are ideal for a wide variety of applications wherever pathways, parking areas and vehicle movement are considerations.



Withstand heavy vehicle loads



Easy and safe to walk on



VersaMATS lock together to form continuous walkway

AlturnaMATS®

www.alturnamats.com

VersaMATS® Ground Protection Mats

Ideal for a Wide Range of Applications

VersaMATS Applications:

- Tree care industry
- Cemeteries
- Landscape industry
- General construction
- Golf courses
- Movie production companies
- Park and recreation facilities
- Special event contractors and operators
- Rental companies
- Educational facilities
- Municipalities

Flat Turn-a-Links permit locking the mats together to form a roadway or working platform which make VersaMATS ideal for staging and parking areas. The mats are tough and flexible, conforming to ground variations, yet they support heavy vehicles crossing soft terrain. Millions of dollars are spent each year on equipment repairs due to unnecessary damage to vehicle drive trains, frames and bodies. Plus, VersaMATS eliminate expensive wrecker removal and towing charges.



Turn-a-Links, made of 1/4" x 3/4" cold roll steel are of flat design. When creating a continuous roadway or working platform, they form a low profile, minimizing the possibility of tripping. Turn-a-Links are available as single units for connecting straight line pathways and as double units for connecting larger working platforms. Handi-Hooks are designed to slip into prepared holes for easy maneuvering of VersaMATS.

Sizes to Suit Your Need

Size	Item Number	Approx. Ship. Wt. lbs. kg.
4' x 8' (1.22 x 2.44m)	VM48	86.00 (39.00)
3' x 8' (0.91 x 2.44m)	VM38	64.00 (29.25)
Handi Hook	AMHH	2.50 (1.13)
Turn-a-Link (Single)	FTL-S	8 oz. (227 gr.)
Turn-a-Link (Double)	FTL-D	20 oz. (567 gr.)



No more plywood!

Plywood often breaks during the first use. It splinters, warps, gets water logged and is awkward to handle. Plywood often lasts less than one year. AlturnaMATS eliminates all the aforementioned.

AlturnaMATS®

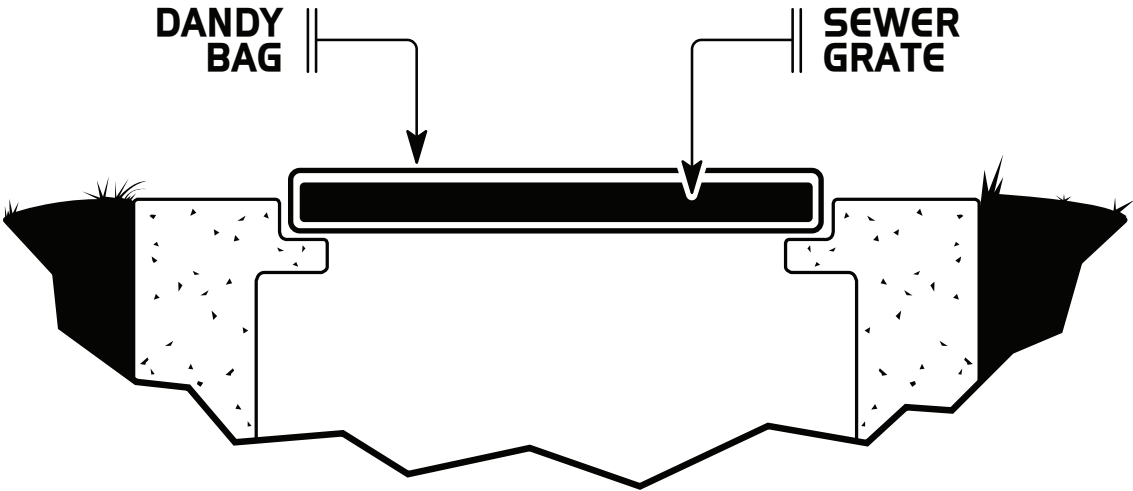
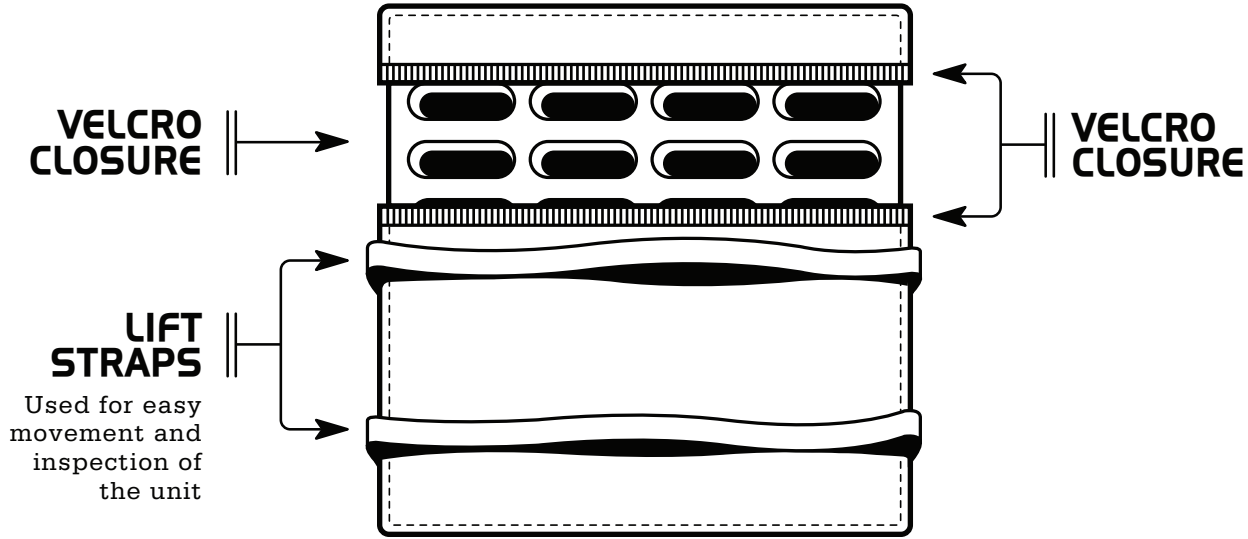
www.alturmat.com

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888-544-6287 814-827-8884

> DANDY BAG® <



DANDY BAG®

INLET PROTECTION SYSTEM GUIDE SPECIFICATION

PRODUCT:

DANDY BAG®

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 Description:

1.1 Work covered under this item consists of installing a Dandy Bag® inlet protection system. The purpose is to keep silt, sediment and construction debris out of the storm water system.

2.0 Material:

2.1 The Dandy Bag® inlet protection unit shall be a **sewn in the U.S.A.** geotextile fabric unit fitted to the individual grate(s) and completely enclosing the grate(s).

2.2 The Dandy Bag® shall have lifting devices to allow manual inspection of the storm water system.

2.3 The Dandy Bag® unit shall utilize an orange monofilament fabric manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 X 300
Elongation	ASTM D 4632	%	40% X 25%
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec ¹	3.5
Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	gal/min/ft ²	250
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange ¹

¹The color orange is a trademark of Dandy Products, Inc.
The property values listed above are effective October 2010 and are subject to change without notice.

3.0 Installation:

- 3.1 Place the empty Dandy Bag® over the grate as the grate stands on end.
- 3.2 *For oil and sediment model; to install or replace absorbent, place absorbent pillow in pouch, on the bottom (below-grade side) of the unit.*
- 3.3 Tuck the enclosure flap inside to completely enclose the grate.
- 3.4 Holding the lifting devices, insert the grate into the inlet being careful not to damage the Dandy Bag® unit.

4.0 Maintenance:

- 4.1 The contractor shall remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by engineer/inspector. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.
- 4.2 *For oil and sediment model; remove and replace absorbent when near saturation.*

5.0 Method of Measurement:

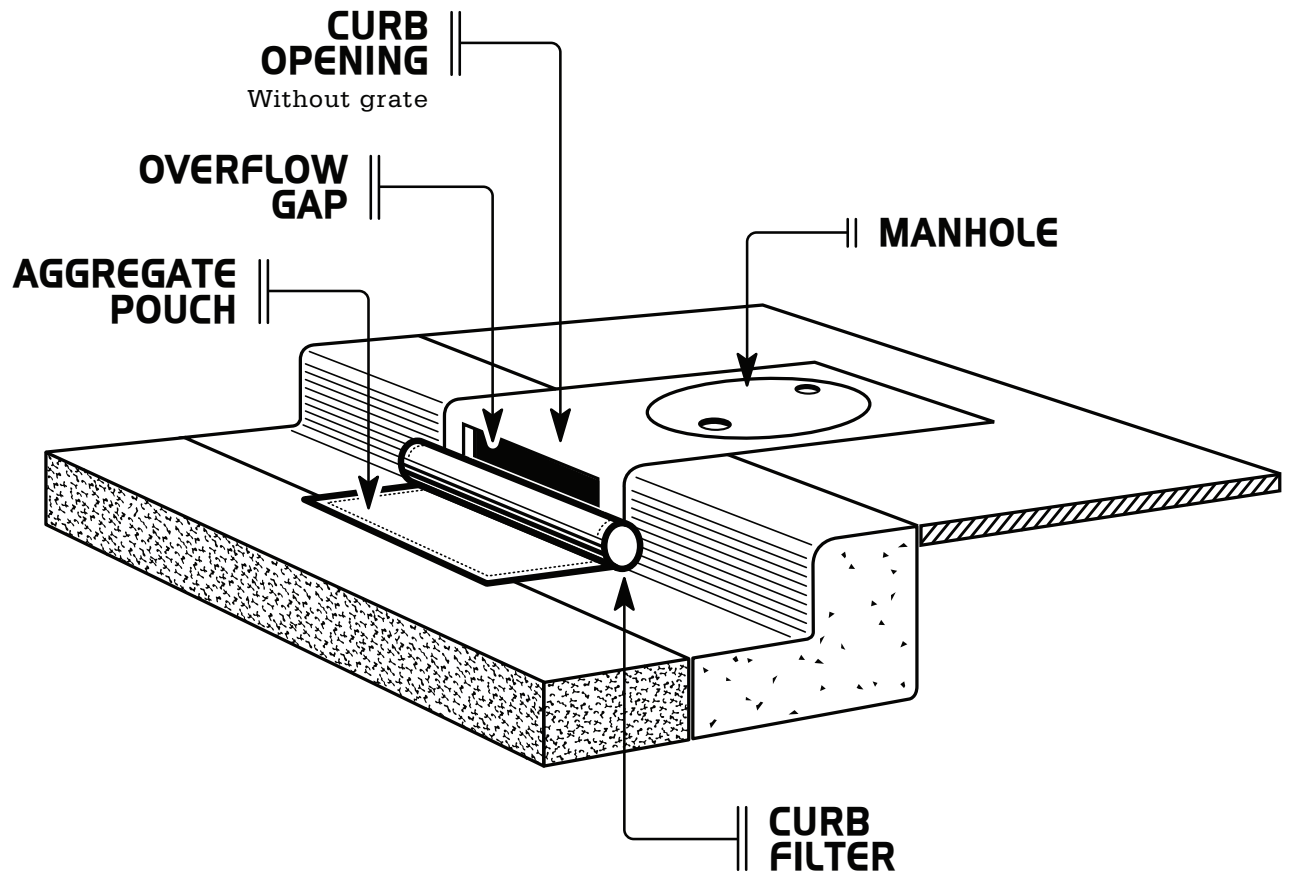
- 5.1 The quantity to be paid is for the actual number of Dandy Bag® inlet protection units installed

6.0 Basis of Payment:

- 6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the Dandy Bag® inlet protection units.
- 6.2 Payment for the completed work will be made at the contract prices for:

<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
Dandy Bag®	EA	Inlet Protection Unit (# _____ Inlet)

▶ **DANDY CURB™** ◀



DANDY CURB®
GRATELESS CURB INLET AND MEDIAN BARRIER INLET
PROTECTION SYSTEM GUIDE SPECIFICATION

PRODUCT:

DANDY CURB®

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 Description:

1.1 Work covered under this item consists of installing a Dandy Curb® inlet protection system for inlets and median barrier inlets without grates. The purpose is to keep silt, sediment and construction debris out of the storm system.

2.0 Material:

2.1 The Dandy Curb® inlet protection system shall be a **sewn in the U.S.A.** fabric unit enclosing a porous structure in the form of a cylindrical tube placed in front of and extending beyond the inlet opening on both sides.

2.2 The Dandy Curb® inlet protection system shall have a pouch on the street side of the sewn unit for aggregate or other material to hold the unit in place.

2.3 The Dandy Curb® unit shall utilize an orange monofilament fabric that is manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 x 300
Grab Tensile Elongation	ASTM D 4632	%	40 x 25
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec ¹	3.5
Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	gal/min/ft ²	250
Ultraviolet Resistance	ASTM D 4355	%	70

Color			Orange ¹
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¹The color orange is a trademark of Dandy Products, Inc.

The property values listed above are effective October 2010 and are subject to change without notice.

3.0 Installation:

3.1 Place Dandy Curb® inlet protection unit on ground with aggregate pouch on street side near inlet it will be installed on.

3.2 *For oil and sediment model, to install or replace absorbent, place absorbent sock in pouch.*

3.3 Fill pouch with aggregate such as #5-7, 8's or similar to a level (at least ½ full) that will keep unit in place during a rain event and create a seal between the Dandy Curb® and the surface of the street. Reseal Velcro access.

3.4 Center the unit against curb or median inlet opening so that the curb side of the unit creates a seal with the curb or median barrier and inlet structure. There will be approximately twelve (12) inches of the inlet protection unit overhanging on each side of the opening. If the unit is not installed in this manner, it will not function properly.

4.0 Maintenance:

4.1 The contractor shall remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by engineer/inspector. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.

4.2 *For oil and sediment model; remove and replace absorbent when near saturation.*

5.0 Method of Measurement:

5.1 The quantity to be paid is for the actual number of Dandy Curb® inlet protection units installed.

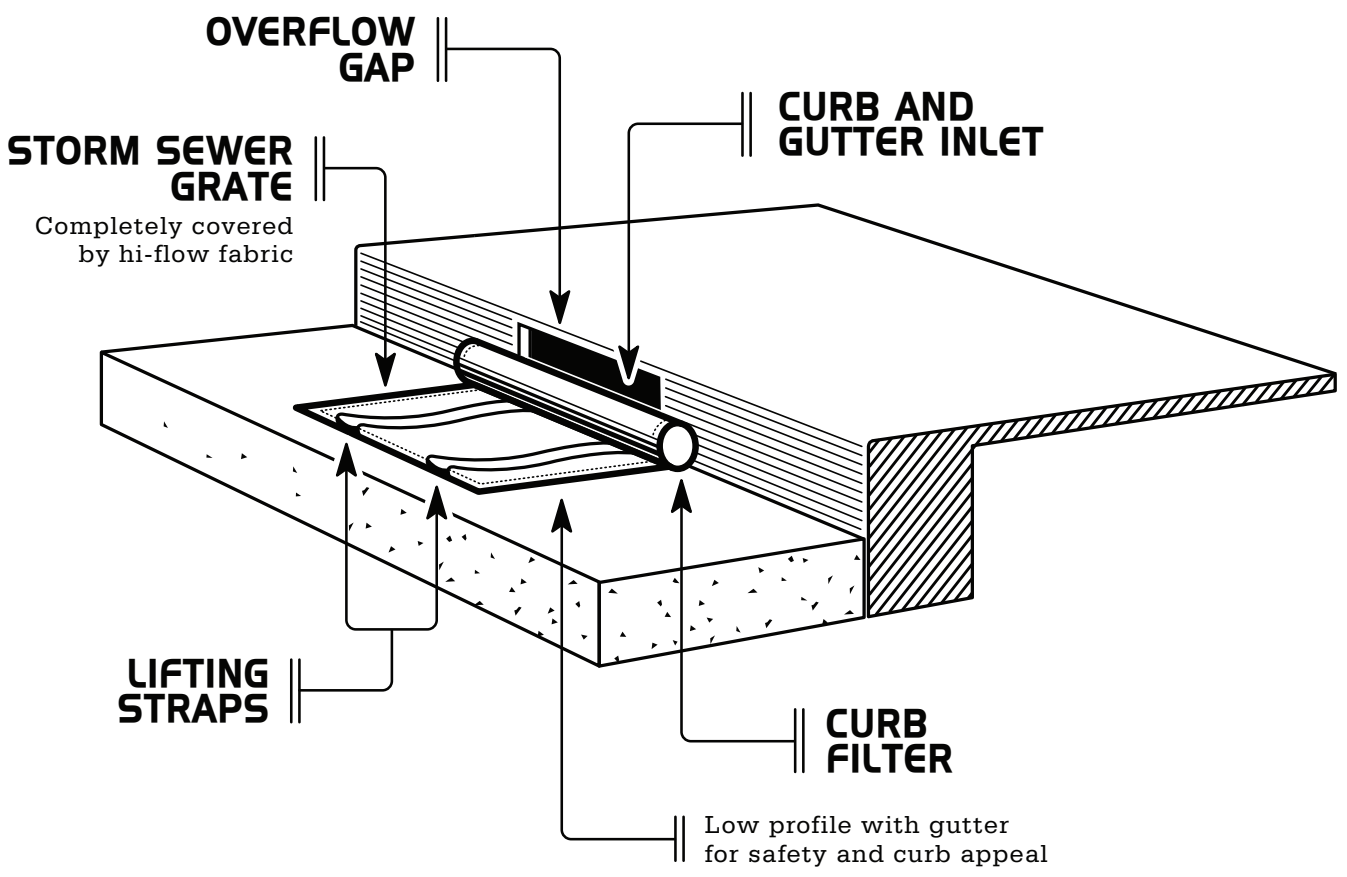
6.0 Basis of payment:

6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the True Dam® inlet protection units.

6.2 Payment for the completed work will be made at the contract prices for:

<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
Dandy Curb®	EA	Inlet Protection Unit (#_____Inlet)

▶ **DANDY CURB BAG™** ◀



DANDY CURB BAG®

CURB AND GUTTER INLET/GRATE PROTECTION SYSTEM GUIDE SPECIFICATION

PRODUCT:

DANDY CURB BAG®

MANUFACTURER:

Dandy Products, Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E-mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 Description:

1.1 Work covered under this item consists of installing a Dandy Curb Bag® curb and gutter inlet protection system. The purpose is to keep silt, sediment and construction debris out of the storm water system.

2.0 Material:

2.1 The Dandy Curb Bag® curb and gutter inlet protection unit shall be a **sewn in the U.S.A.** geotextile fabric unit enclosing a porous structure in the form of a cylindrical tube placed in front of and extending beyond the inlet opening on both sides and have a geotextile fabric envelope fitted to the individual grate(s) on the street side of the sewn unit for grate(s) to be inserted and to completely enclose the grate(s).

2.2 The Dandy Curb Bag® shall have lifting devices to allow manual inspection of the storm water system.

2.3 The Dandy Curb Bag® unit shall utilize an orange monofilament fabric that is manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 x 300
Grab Tensile Elongation	ASTM D 4632	%	40 x 25
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec ¹	3.5

Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	gal/min/ft ²	250
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange ¹

¹The color orange is a trademark of Dandy Products, Inc.

The property values listed above are effective October 2010 and are subject to change without notice.

3.0 Installation:

3.1 Place the empty Dandy Curb Bag® unit over the grate as the grate stands on end.

3.2 *For oil and sediment model; to install or replace absorbent, place absorbent pillow in pouch, on the bottom (below-grade side) of the unit.*

3.3 Tuck the enclosure flap inside to completely enclose the grate.

3.4 Holding the lifting devices, being careful not to damage the sewn fabric unit, insert the grate into its frame, street side edge first, then lower back edge with cylindrical tube into place. The cylindrical tube should be partially blocking the curb hood opening when installed properly.

4.0 Maintenance:

4.1 The contractor shall remove all accumulated sediment and debris from surface and vicinity of unit after each rain event or as directed by engineer/inspector. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.

4.2 *For oil and sediment model; remove and replace absorbent when near saturation.*

5.0 Method of Measurement:

5.1 The quantity to be paid is for the actual number of Dandy Curb Bag® inlet protection units installed

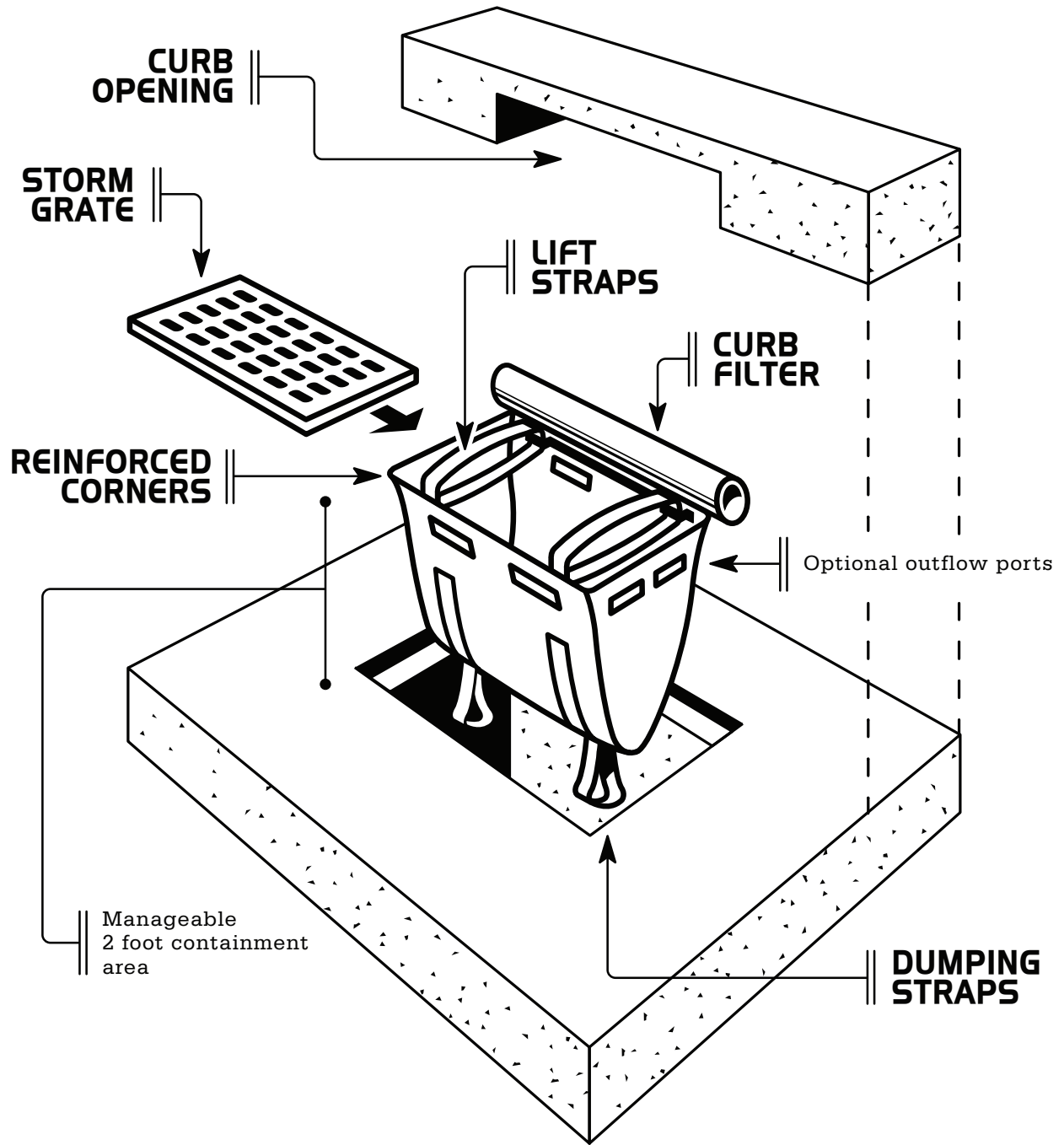
6.0 Basis of payment:

6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the Dandy Curb Bag® inlet protection units.

6.2 Payment for the completed work will be made at the contract prices for:

<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
Dandy Curb Bag®	EA	Curb Inlet Protection Unit (#_____Inlet)

▶ DANDY CURB SACK™ ◀



**DANDY CURB SACK®
CURB AND GUTTER INLET PROTECTION SYSTEM GUIDE
SPECIFICATION**

PRODUCT:

DANDY CURB SACK®

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 Description:

1.1 Work covered under this item consists of installing a Dandy Curb Sack® curb and gutter inlet protection system. The purpose is to keep silt, sediment and construction debris out of the storm water system.

2.0 Material:

2.1 The Dandy Curb Sack® curb and gutter inlet protection unit shall be a sewn geotextile fabric unit **made in the U.S.A.** enclosing a porous structure in the form of a cylindrical tub placed in front and extending beyond the inlet opening on both sides and have a geotextile fabric sack attached designed to fit the opening of the catch basin or drop inlet and to hang underneath the grate and into the catch basin.

2.2 The Dandy Curb Sack® shall have lifting straps to allow removal of the unit and manual inspection of the storm water system.

2.3 The Dandy Curb Sack® unit shall utilize an orange monofilament fabric that is manufactured in the U.S.A with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 x 300
Grab Tensile Elongation	ASTM D 4632	%	40 x 25
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec ¹	3.5
Permeability	ASTM 4491	cm/sec	0.25

Water Flow Rate	ASTM 4491	gal/min/ft ²	250
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange ¹

¹The color orange is a trademark of Dandy Products, Inc.

The property values listed above are effective October 2010 and are subject to change without notice.

3.0 **Installation:**

3.1 Remove the grate from the catch basin.

3.2 *For Oil and Sediment Model; to install or replace absorbent, place absorbent pillow in unit, on the bottom (below-grade side) of the unit.*

3.3 Stand the grate on end. Move the top lifting straps out of the way and place the grate into the Dandy Curb Sack® unit so that the grate is below the top straps and above the lower straps. The grate should be cradled between the upper and lower straps.

3.4 Holding the lifting devices, insert the grate into the inlet, then lower back edge with cylindrical tube into place, being careful that the grate remains in place and being careful not to damage the Dandy Curb Sack® unit. The cylindrical tube should partially block the curb hood opening when installed properly.

4.0 **Maintenance:**

4.1 Remove all accumulated sediment and debris from vicinity of unit after each storm event.

4.2 After each storm event and at regular intervals, look into the Dandy Curb Sack® unit. If the unit is more than 1/3 full of accumulated sediment, the unit must be emptied.

4.3 To empty the unit, using the lifting straps lift the unit out of the inlet and remove the grate. Transport the unit to an appropriate location for removal of the contents. Holding the dumping straps on the outside at the bottom of the unit, turn the unit upside down, emptying the contents. Reinstall unit as above.

4.4 *For Oil and Sediment Model; remove and replace absorbent when near saturation.*

4.5 Dispose of unit and/or absorbent in accord with applicable Federal, state and local environmental laws and regulations.

5.0 **Method of Measurement:**

5.1 The quantity to be paid is for the actual number of Dandy Curb Sack® inlet protection units installed

6.0 Basis of payment:

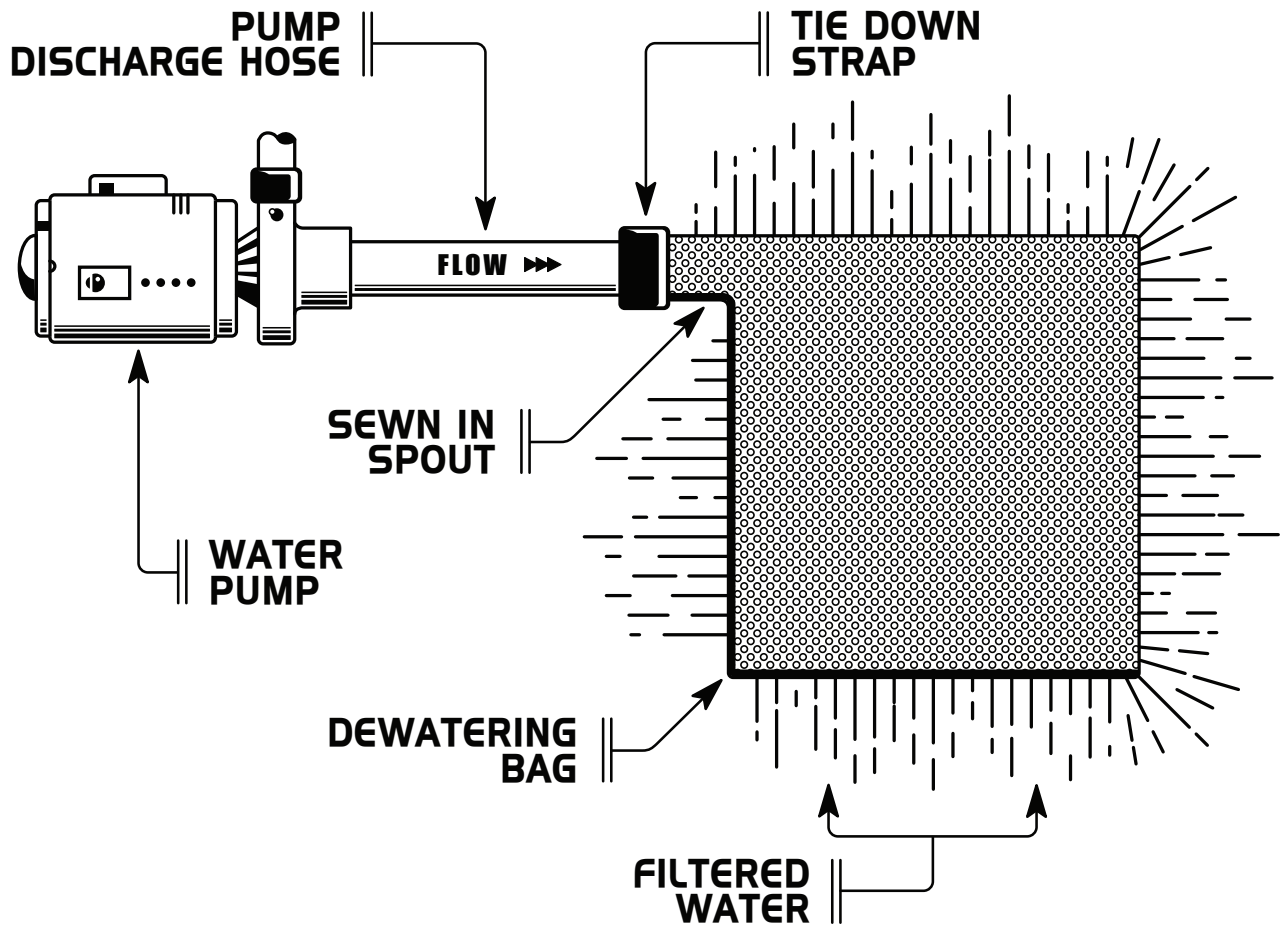
6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the Dandy Curb Sack® inlet protection units.

6.2 Payment for the completed work will be made at the contract prices for:

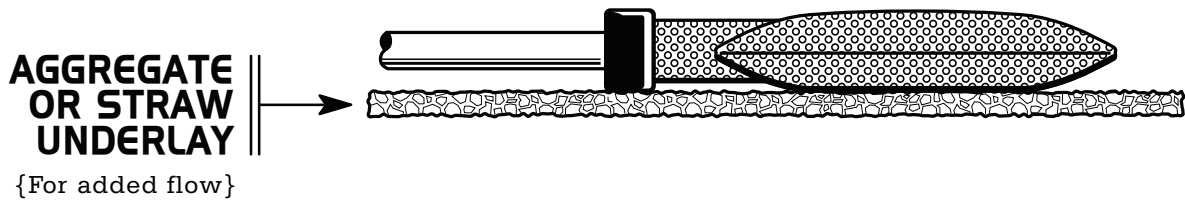
<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
Dandy Curb Sack®	EA	Inlet Protection Unit (# _____ Inlet)

DANDY DEWATERING BAG™

TOP VIEW



SIDE VIEW



DANDY DEWATERING BAG™
PUMPED WATER SEDIMENT CONTROL SYSTEM GUIDE
SPECIFICATIONS

PRODUCT:

DANDY DEWATERING BAG™

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E Mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 Description:

1.1 Work covered under this consists of furnishing, installing, maintaining, and removal of the Dandy Dewatering Bag™. The purpose is to control sediment discharge in any dewatering or pumped water application.

2.0 Material:

2.1 The Dandy Dewatering Bag™ shall be a bag sewn of nonwoven fabric **in the U.S.A.** using a double needle machine and a high strength thread.

2.2 The Dandy Dewatering Bag™ shall have a spout opening large enough to accommodate at least a four (4) inch pump discharge hose with an attached strap to tie unit closed.

2.3 The Dandy Dewatering Bag™ Seams shall be a double stitched “J” type seam with an average wide width strength per ASTM D-4884 of 60lb/in for a 8 oz. fabric manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	MARV
Grab Tensile Strength	ASTM D 4632	kN (lbs)	0.9 (205)
Grab Tensile Elongation	ASTM D 4632	%	50
Puncture Strength	ASTM D 4833	kN (lbs)	0.58 (130)
Mullen Burst Strength	ASTM D 3786	kPa (psi)	2618 (380)
Trapezoid Tear Strength	ASTM D 4533	kN (lbs)	0.36 (80)
% Open Area	COE - 22125-86	%	N/A
Apparent Opening Size	ASTM D 4751	mm (US Std Sieve)	.0180 (80)

Permittivity	ASTM D 4491	sec ¹	1.2
Permeability	ASTM 4491	cm/sec	0.21
Water Flow Rate	ASTM 4491	l/min/m ² (gal/min/ft ²)	3866 (95)
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Black

3.0 Installation:

- 3.1 Lifting straps (not included) should be placed under the unit to facilitate removal after use.
- 3.2 Unfold Dandy Dewatering Bag™ on a stabilized area over dense vegetation, straw, or gravel (if an increased drainage surface is needed) or as detailed in plans.
- 3.3 Insert discharge hose from pump into Dandy Dewatering Bag™ a minimum of six (6) inches and tightly secure with attached strap to prevent water from flowing out of the unit without being filtered.

4.0 Maintenance:

- 4.1 Replace the unit when ½ full of sediment or when sediment has reduced the flow rate of the pump discharge to an impractical rate.
- 4.2 Remove and dispose of the sediment in a manner satisfactory to the engineer/inspector or in one of the following ways:
 - A) Remove the unit and sediment from environmentally sensitive areas and waterways. At the approved disposal site, slit the unit; remove the sediment and grade smoothly into the existing topography. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.
 - B) Bury unit on site; remove any visible fabric and seed.

5.0 Method of Measurement:

- 5.1 The quantity to be paid is for the actual number of Dandy Dewatering Bags™.

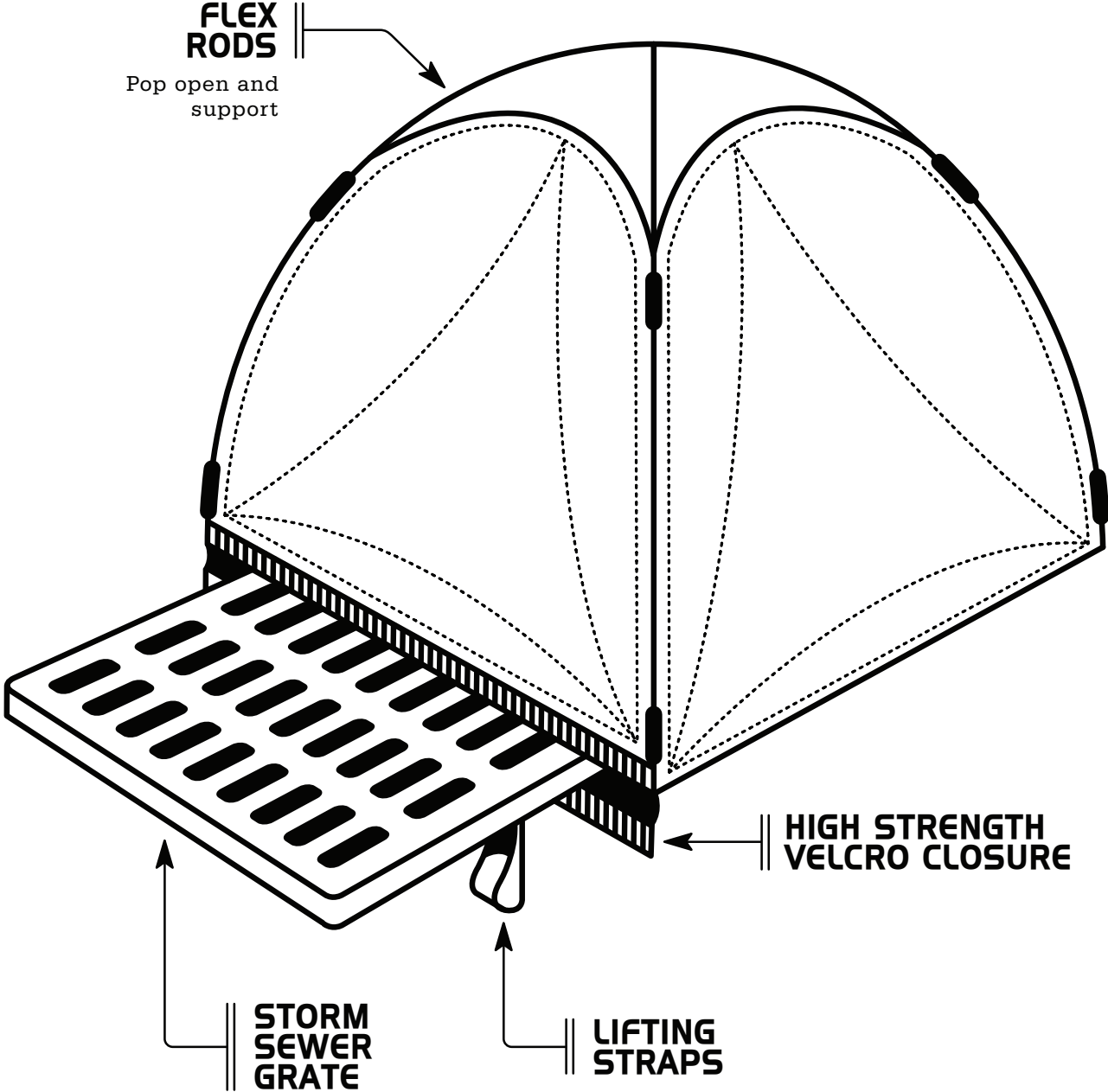
6.0 Basis of Payment:

6.1 The unit price shall include labor, equipment, and materials necessary to install, maintain, and remove the Dandy Dewatering Bag™.

6.2 Payment for the completed work will be made at the contract prices for:

<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
Dandy Dewatering Bag™	EA	Pumped Water Sediment Control Unit (#_____UNITS)

> DANDY POP™ <



DANDY POP[®] (POP-UP DANDY BAG[®]) INLET PROTECTION SYSTEM GUIDE SPECIFICATION

PRODUCT: DANDY POP[®]

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 Description:

1.1 Work covered under this item consists of installing a Dandy Pop[®] inlet protection system. The purpose is to keep silt, sediment and construction debris out of the storm water system.

2.0 Material:

2.1 The Dandy Pop[®] inlet protection unit shall be a **sewn in the U.S.A.** geotextile fabric dome unit with a fully-covered support frame. The unit shall enclose the grate.

2.2 The Dandy Pop[®] shall unfold for installation to a height of approximately 24” (twenty-four inches).

2.3 The Dandy Pop[®] shall have lifting devises sewn to the bottom of the unit to assist in installation and to allow manual inspection of the storm water system.

2.4 The Dandy Pop[®] shall utilize an orange monofilament fabric that is manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 x300
Grab Tensile Elongation	ASTM D 4632	%	40 x 25
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec ¹	3.5
Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	gal/min/ft ²	250

Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange ¹

¹The color orange is a trademark of Dandy Products, Inc.

The property values listed above are effective October 2010 and are subject to change without notice.

3.0 Installation:

- 3.1 Pop open the Dandy Pop[®] near the inlet.
- 3.2 Stand the grate on end and slide the Dandy Pop[®] over the grate.
- 3.3 For oil and sediment model; to install or replace absorbent, place absorbent pillow in pouch, on the bottom (below-grade side) of the unit. As desired, or required, attach absorbent pillow to provided tether loop.
- 3.4 Turn the grate 180° on end (turn twice) so that the opening is facing up.
- 3.5 Pull up slack and seal velcro[®] to enclose the grate.
- 3.6 Lay the grate flat, and holding the lifting devices, insert the grate into the inlet making sure that the grate seats completely in the frame.

4.0 Maintenance:

- 4.1 The contractor shall remove all accumulated sediment and debris from panels and surface and vicinity of unit after each rain event or as directed by engineer/inspector. Dispose of unit no longer in use at an appropriate recycling or solid waste facility.
- 4.2 *For oil and sediment model; remove and replace absorbent when near saturation.*

5.0 Method of Measurement:

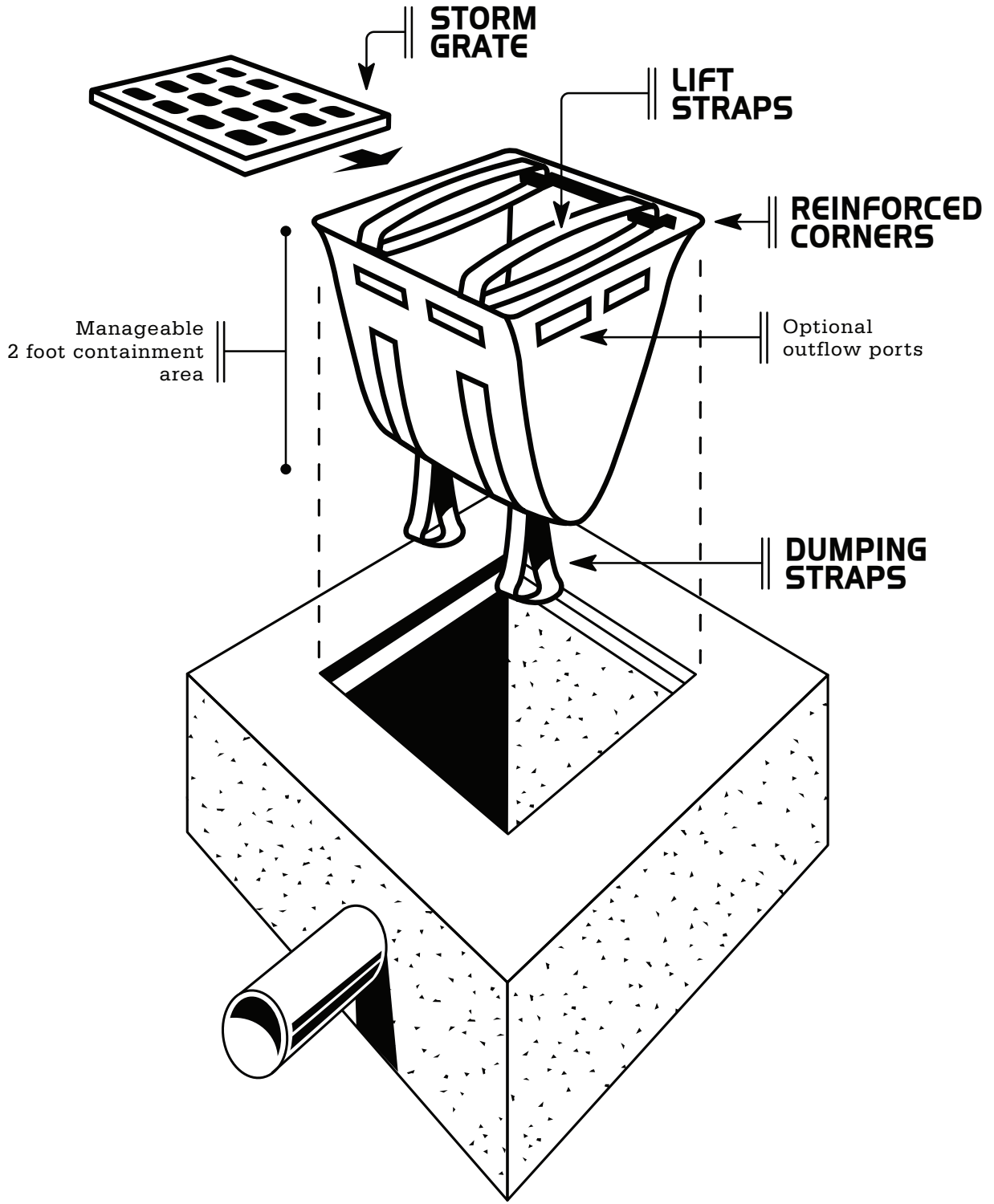
- 5.1 The quantity to be paid is for the actual number of Dandy Pop[®] inlet protection units installed

6.0 Basis of payment:

- 6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the Dandy Pop[®] inlet protection units.
- 6.2 Payment for the completed work will be made at the contract prices for:

<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
Dandy Pop [®]	EA	Inlet Protection Units (# _____ INLET)

DANDY SACK™



DANDY SACK®

INLET PROTECTION SYSTEM GUIDE SPECIFICATION

PRODUCT:

DANDY SACK®

MANUFACTURER:

Dandy Products Inc.
P.O. Box 1980
Westerville, Ohio 43086
Phone: 800-591-2284
Fax: 740-881-2791
E mail dlc@dandyproducts.com
Web www.dandyproducts.com

1.0 Description:

1.1 Work covered under this item consists of installing a Dandy Sack® inlet protection system. The purpose is to keep silt, sediment and construction debris out of the storm water system.

2.0 Material:

2.1 The Dandy Sack® inlet protection unit shall be a **sewn in the U.S.A.** geotextile fabric unit.

2.2 The Dandy Sack® shall have lifting straps to allow removal of the unit and manual inspection of the storm water system.

2.3 The Dandy Sack® unit shall utilize an orange monofilament fabric that is manufactured in the U.S.A. with the following characteristics:

PROPERTY	TEST METHOD	UNITS	TEST RESULTS
Grab Tensile Strength	ASTM D 4632	lbs	450 x 300
Grab Tensile Elongation	ASTM D 4632	%	40 x 25
Puncture Strength	ASTM D 4833	lbs	130
Mullen Burst Strength	ASTM D 3786	psi	600
Trapezoid Tear Strength	ASTM D 4533	lbs	165 x 150
% Open Area (POA)	COE - 22125-86	%	28
Apparent Opening Size	ASTM D 4751	US Std Sieve	30
Permittivity	ASTM D 4491	sec ¹	3.5
Permeability	ASTM 4491	cm/sec	0.25
Water Flow Rate	ASTM 4491	gal/min/ft ²	250
Ultraviolet Resistance	ASTM D 4355	%	70
Color			Orange ¹

¹The color orange is a trademark of Dandy Products, Inc.

The property values listed above are effective October 2010 and are subject to change without notice.

3.0 Installation:

- 3.1 Remove the grate from the catch basin.
- 3.2 *For Oil and Sediment Model; to install or replace absorbent, place absorbent pillow in unit, on the bottom (below-grade side) of the unit.*
- 3.3 Stand the grate on end. Move the top lifting straps out of the way and place the grate into the Dandy Sack® unit so that the grate is below the top straps and above the lower straps. The grate should be cradled between the upper and lower straps.
- 3.4 Holding the lifting devices, insert the grate into the inlet, being careful that the grate remains in place and being careful not to damage the Dandy Sack® unit.

4.0 Maintenance:

- 4.1 Remove all accumulated sediment and debris from vicinity of unit after each storm event.
- 4.2 After each storm event and at regular intervals, look into the Dandy Sack® unit. If the unit is more than 1/3 full of accumulated sediment, the unit must be emptied.
- 4.3 To empty the unit, using the lifting straps lift the unit out of the inlet and remove the grate. Transport the unit to an appropriate location for removal of the contents. Holding the dumping straps on the outside at the bottom of the unit, turn the unit upside down, emptying the contents. Reinstall unit as above.
- 4.4 *For Oil and Sediment Model; remove and replace absorbent when near saturation.*
- 4.5 Dispose of unit and/or absorbent in accord with applicable Federal, state and local environmental laws and regulations.

5.0 Method of Measurement:

- 5.1 The quantity to be paid is for the actual number of Dandy Sack® inlet protection units installed

6.0 Basis of Payment:

- 6.1 The unit price shall include labor, equipment, and materials necessary to complete the work and maintain the Dandy Sack® inlet protection units.
- 6.2 Payment for the completed work will be made at the contract prices for:

<u>ITEM</u>	<u>UNIT</u>	<u>DESCRIPTION</u>
Dandy Sack®	EA	Inlet Protection



Pumped Sediment Removal System

Whenever accumulated water must be pumped!

Protect the environment effectively and economically with Dirtbag®! Collect sand, silt and fines. Avoid silting streams, surrounding property and storm sewers. As more and more emphasis is put on saving our wetlands, regulations are becoming more stringent regarding the pumping of dirty water from holes around construction sites—such as foundations, pipe line construction, repairing municipal water/sewer lines, marine construction, utility, highway and site development areas. Dirtbag® applications are endless.

Use Recommendations

ACF Environmental manufactures Dirtbag® using a variety of woven and nonwoven geotextile fabrics. The fabric properties on the Specifications page affirm the strength of Dirtbag® and are a result of tests conducted at on-site laboratories at the geotextile factory. All test methods are ASTM or industry standards.

Each standard Dirtbag® has a fill spout large enough to accommodate a 4" discharge hose. Straps are attached to secure the hose and prevent pumped water from escaping without being filtered.

Strap the neck of Dirtbag® tightly to the discharge hose. To increase the efficiency of filtration, place the bag on an aggregate or haybale bed to maximize water flow through the surface area of the bag.



Dirtbag® is full when it no longer can efficiently filter sediment or pass water at a reasonable rate. Flow rates will vary depending on the size of Dirtbag®, the type and amount of sediment discharged into Dirtbag, the type of ground, rock or other substance under the bag. Under most circumstances Dirtbag® will accommodate flow rates of 750 gallons per minute. Use of excessive flow rates or overfilling Dirtbag® with sediment will cause ruptures of the bags or failure of the hose attachment straps.

Dirtbag must be monitored during use.

Easy To Use

First, Dirtbag® is easy to transport to the site. To install, simply unfold and insert up to 4" pump discharge the hose into the hand-sewn spout and secure with the attached straps. Pump dirty water into Dirtbag®. The bag collects sediment silt as the clean water gently filters out from all sides.

Compare Dirtbag® to the alternatives such as straw bale forts which are more cumbersome to transport, to build and to clean afterward. Best of all, Dirtbag® poses no threat to the environment when disposed properly.

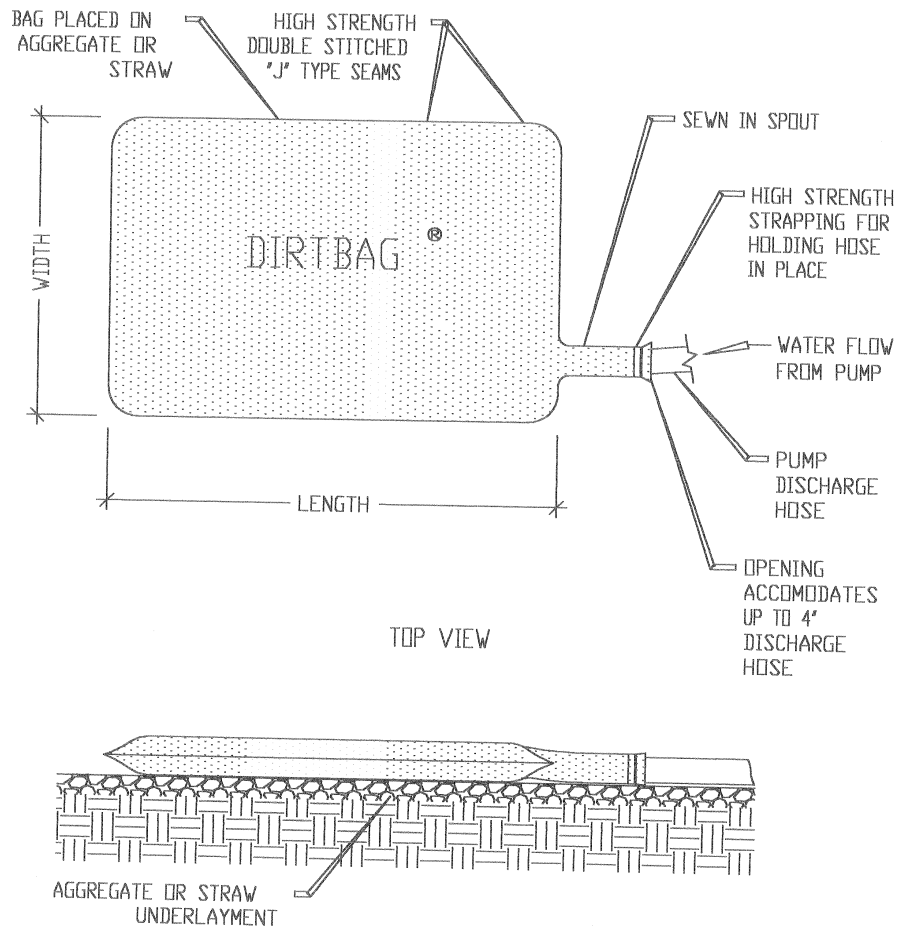
Dirtbag® Features

- Designed and produced from a variety of fabrics to meet engineering specifications for flow rates, strength and permeability.
- Stabilized to provide resistance to ultra-violet degradation.
- Meets municipal, state and Corps of Engineers specifications.
- Available in 10' x 15', 12 ½' x 15' and 15' x 15' sizes. Custom sizes available.

Hillside Installation on Straw Underlayment



Typical Dirtbag® Construction



Dirtbag® Specification

Control of Sediment In Pumped Water

All properties are Minimum Average Roll Value (MARV) except the weight of the fabric which is given for information only. Depending on soil conditions and filtration requirements, additional geotextile options are available. Please call our engineering staff for solutions.

1.0 Description

1.1 This work shall consist of furnishing, placing and removing Dirtbag® pumped sediment control device as directed by the design engineer or as shown on the contract drawings. Dirtbag® pumped-silt control system is marketed by:

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

2.0 Materials

2.1 Dirtbag®

2.1.1 Dirtbag® shall be manufactured using a polypropylene nonwoven geotextile sewn into a bag with a double needle matching using a high strength thread.

2.1.2 Each standard Dirtbag® has a fill spout large enough to accommodate a 4" discharge hose. Straps are attached to secure the hose and prevent pumped water from escaping without being filtered.

2.1.3 Dirtbag® seams shall have an average wide width strength per ASTM D-4884 as follows:

Dirtbag® Style	Test Method	Test Method
Dirtbag® 53	ASTM D-4884	60 lbs./in
Dirtbag® 55	ASTM D-4884	100 lbs./in

Property	Test Method	Units	Test Results	
			Style 53	Style 55
Weight	ASTMD-3776	oz/yd	8	10
Grab Tensile	ASTMD-4632	lbs.	205	250
Puncture	ASTMD-4833	lbs.	110	150
Flow Rate	ASTMD-4491	gal/min/ft ²	110	85
Permittivity	ASTMD-4491	sec. ⁻¹	1.5	1.2
Mullen Burst	ASTMD-3786	lbs. in ²	350	460
UV Resistant	ASTMD-4355	%	70	70
AOS % Retained	ASTMD-4751	US Sieve	80	100

3.0 Construction Sequence

3.1.1 To install Dirtbag® on a slope so incoming water flows downhill through Dirtbag® without creating more erosion. Strap the neck of Dirtbag® tightly to the discharge hose. To increase the efficiency of filtration, place the bag on an aggregate or haybale bed to maximize water flow through the surface area of the bag.

3.1.2 Dirtbag® is full when it no longer can efficiently filter sediment or allow water to pass at a reasonable rate. Flow rates will vary depending on the size of Dirtbag®, the type and amount of sediment discharged into Dirtbag®, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies. Under most circumstances Dirtbag® will accommodate flow rates of 750 gallons per minute. Use of excessive flow rates or overfilling Dirtbag® with sediment will cause the bag to rupture or failure of the hose attachment straps.

*Must be monitored during use.

3.1.3 Dispose Dirtbag® as directed by the site engineer. If allowed, Dirtbag® may be cut open and the contents seeded after removing visible fabric. Dirtbag® is strong enough to be lifted with optional straps if it must be hauled away. Off-site disposal may be facilitated by placing Dirtbag® in the back of a dump truck or flatbed prior to use and allowing the water to drain from the bag while in place, thereby eliminating the need to lift Dirtbag®.

4.0 Basis of Payment

4.1 The payment for any Dirtbag® used during construction is to be included in the bid of overall erosion and sediment control plan unless a unit price is requested.

*ACF Environmental is not liable for failures or misuse of the Dirtbag.



Above: Dirtbag® installation shown on inclined hillside for maximum flow.

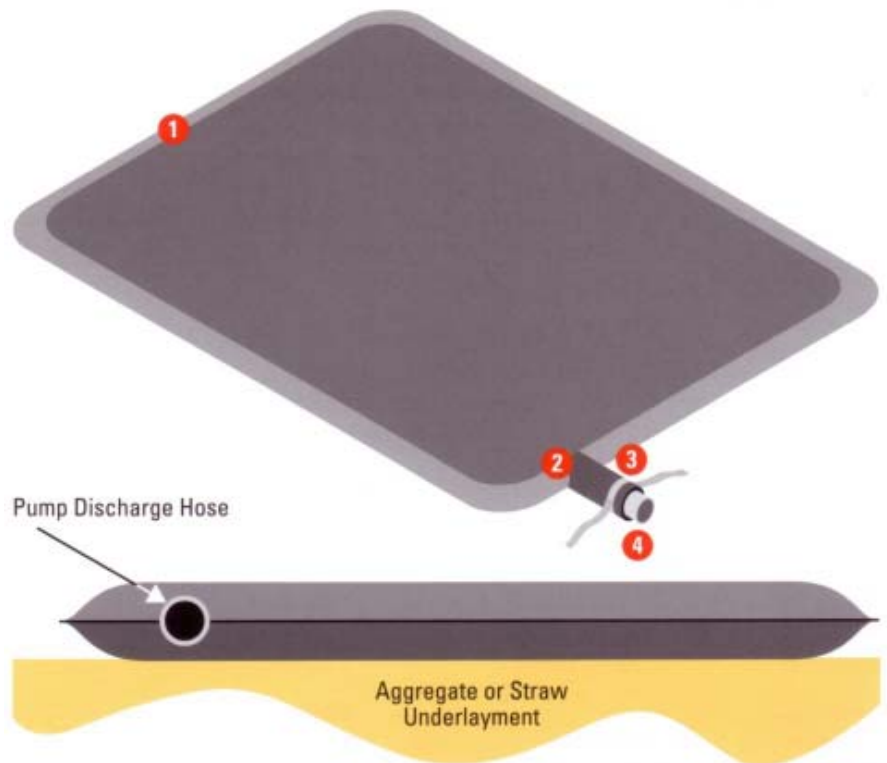
Dirtbag® Features:

1. High strength double stitched "J" type seams.
2. Sewn in spout.
3. High strength strapping for holding hose in place.
4. Hose opening accommodate up to 4" discharge hose.

For optimal flow, install over straw or aggregate.

Disposal

Dispose of Dirtbag® as directed by the site engineer. If allowed, Dirtbag® may be cut open and the contents seeded after removing visible fabric. Dirtbag® is strong enough to be lifted with optional straps if it must be hauled away. Off-site disposal may be facilitated by placing Dirtbag® in the back of a dump truck or flatbed prior to use and allowing the water to drain from the bag while in place, thereby eliminating the need to lift Dirtbag®.



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

ACF Environmental
 "Complete Source for Stormwater Solutions"

Distributed by:

Dirtbag® Specifications Control of Sediment In Pumped Water

1.0 Description

1.1 This work shall consist of furnishing, placing and removing the DIRTBAG® pumped sediment control device as directed by the design engineer or as shown on the contract drawings. The dirtbag® pumped-silt control system is marketed by:

ACF Environmental, Inc.
2831 Cardwell Drive
Richmond, Virginia 23234
Phone: 800-448-3636
Fax: 804-743-7779

2.0 Materials

2.1 Dirtbag®

2.1.1 The DIRTBAG® shall be a nonwoven bag which is sewn with a double needle matching using a high strength thread.

2.1.2 The DIRTBAG® seams shall have an average wide width strength per ASTM D-4884 as follows.

Dirtbag Style	Test Method	Test Result
Dirtbag® 53	ASTM D-4884	60 LB/IN
Dirtbag® 55	ASTM D-4884	100 LB/IN

2.1.3 Each standard DIRTBAG® has a fill spout large enough to accommodate a 4" discharge hose. Attached are straps to secure the hose and prevent pumped water from escaping without being filtered.

2.1.4 The geotextile fabric shall be nonwoven fabric with the following properties:

Properties	Test Method	Units	Nonwoven	
			53	55
Weight	ASTM D-3776	Oz/yd	8	10
Grab Tensile	ASTM D-4632	Lbs.	203	250
Puncture	ASTM D-4833	Lbs.	130	165
Flow Rate	ASTM D-4491	Gal/Min/Ft2	80	70
Permittivity	ASTM D-4491	Sec. ⁻¹	1.5	1.3
Mullen Burst	ASTM D-3786	Lbs. ⁱⁿ²	400	550
UV Resistant	ASTM D-4355	%	70	70
AOS % Retained	ASTM D-4751	%	100	100

All properties are minimum average roll value except the weight of the fabric which is given for information only.

3.0 Construction Sequence

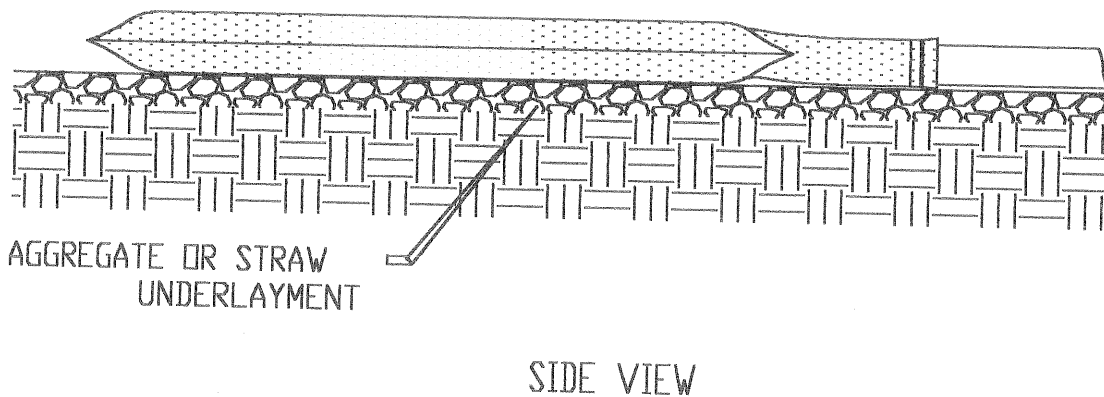
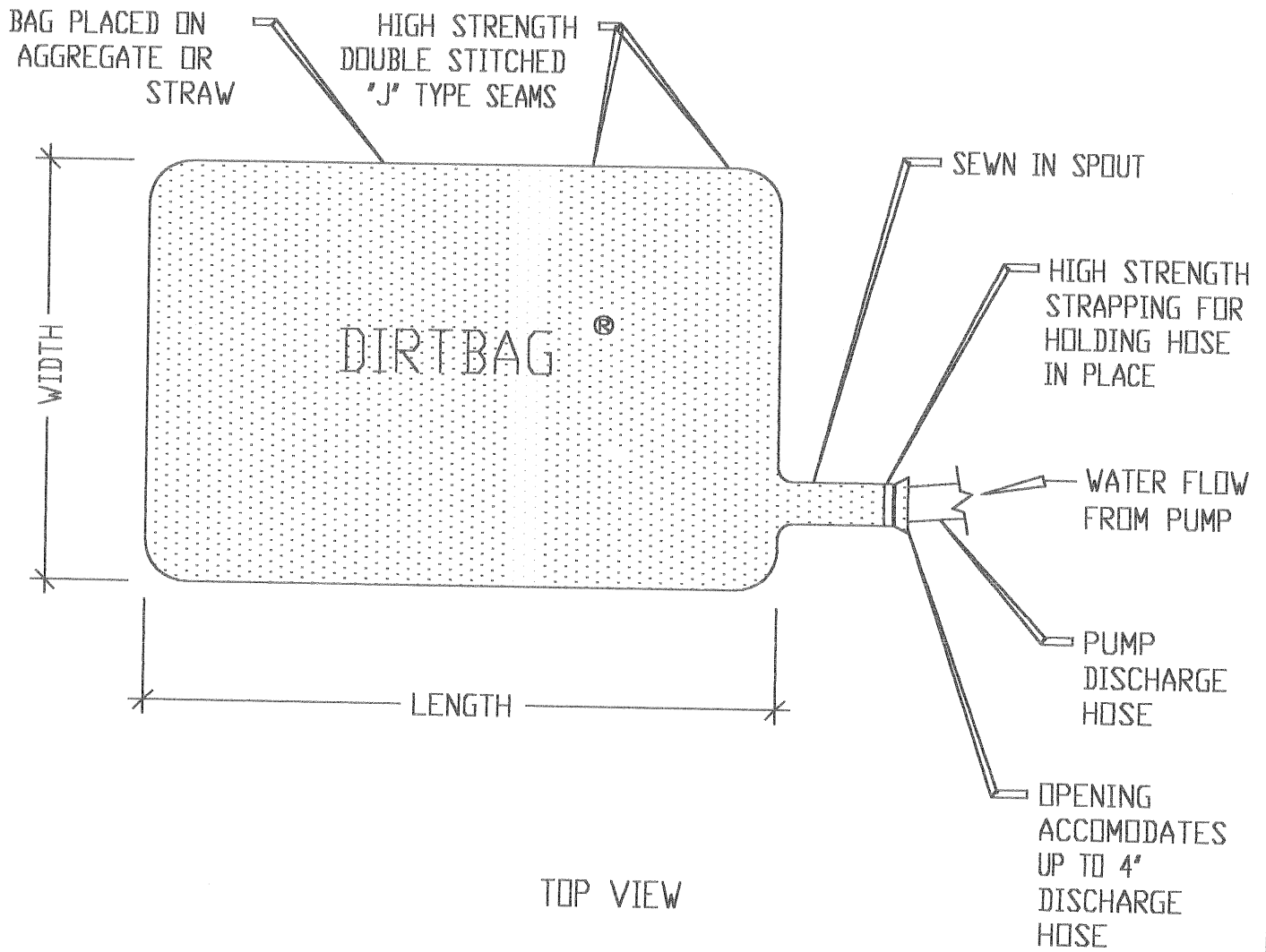
3.1.1 Install DIRTBAG® on a slope so incoming water flows downhill through the DIRTBAG® without creating more erosion. Strap the neck of the DIRTBAG® tightly to the discharge hose. To increase the efficiency of filtration, place the bag on an aggregate or haybale bed to maximize water flow through the surface area of the bag.

3.1.2 The DIRTBAG® is full when it no longer can efficiently filter sediment or pass water at a reasonable rate. Flow rates will vary depending on the size of the DIRTBAG®, the type and amount of sediment discharged into the DIRTBAG®, the type of ground, rock or other substance under the bag and the degree of the slope on which the bag lies. Under most circumstances DIRTBAG'S® will accommodate flow rates of 1500 gallons per minute. Use of excessive flow rates or overfilling DIRTBAG® with sediment will cause ruptures of the bags or failure of the hose attachment straps.

3.1.3 Dispose DIRTBAG® as directed by the site engineer. If allowed, the DIRTBAG® may be cut open and the contents seeded after removing visible fabric. DIRTBAG is strong enough to be lifted with added straps if it must be hauled away (extra option). Off-site disposal may be facilitated by placing the DIRTBAG® in the back of a dump truck or flatbed prior to use and allowing the water to drain from the bag in place, thereby dismissing the need to lift the DIRTBAG®.

4.0 Basis of Payment

4.1 The payment for any DIRTBAG® used during construction is to be included in the bid of overall erosion and sediment control plan unless a unit price is requested.



DETAIL OF DIRTBAG PUMPED SILT CONTROL SYSTEM

PROJECT:

CITY:

DR. BY:

STATE:

DATE:

DR. NO:

EROSION EEL™

The Erosion EEL™, by its very nature, functions to help prevent physical degradation of the environment by enhancing water quality.



What Is The ErosionEEL™

The ErosionEEL™ is an environmentally friendly, low impact erosion and sediment control device.

Erosion EEL™ Advantages

- *Easy installation with no trenching required*
- *Replaces silt fence, rock check dams, temporary diversion berms, and storm/inlet drain protection*
- *May be placed over multiple surfaces including soil, asphalt, concrete, and surface rock*
- *DOT Approved in many states*
- *Durable, reusable, and easily moved, thereby making it very cost-effective compared to silt fence and other BMPs*
- *Increased flow rates through the filter material as compared to silt fence preventing localized flooding during storm events*

ErosionEEL™ is reusable within a project and can be moved to other project sites:

Minimizes the amount of new product manufacturing (involving extraction of natural resources, additional manufactured products into the environment).

At the end of EEL cycle, rubber material is cleaned and reused in new EELs that are produced.

Call ACF Environmental for more information.



800-448-3636

Benefits and Features

- Three-dimensional Filter - Sediment retention roll/tube
Function: Suspended particle capture; flow control
- Woven polypropylene geotextile exterior
- Nominal 9.5" diameter
- Manufactured lengths = Nominal 10ft and 4.5ft
- Internal fill Material Mixture
Washed shredded rubber (metal removed) - Supplier: MTR AASHTO - specified hardwood chips (0.5" to 0.75" in size)

Environmental Compatibility

Synthetic Precipitation Leach Procedure (SPLP)

pH of 4.2 and pH 7.0 (modified SPLP)

Testing for metals, volatiles, surfactants, base/neutral extractables, acid extractables

Rubber Fill Material Results

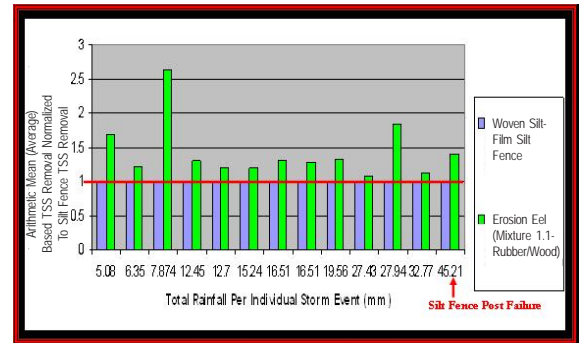
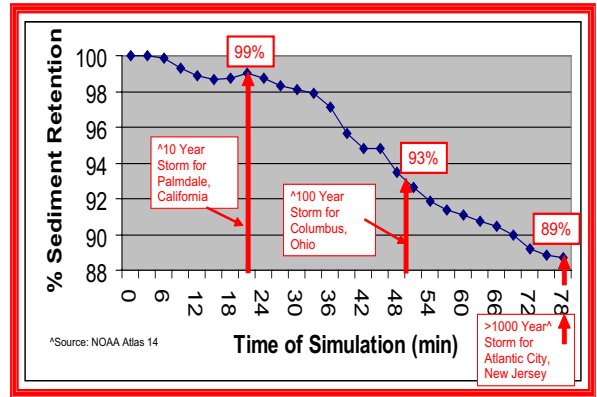
No adverse levels of any constituents have been extracted (relative to human exposure and aquatic toxicity)

Synthetic Fibers (nylon, PP, PET)

No adverse levels of any constituents have been extracted (relative to human exposure and aquatic toxicity)

Performance

The test results for the ErosionEEL™ at the San Diego State University Soil Erosion Research Laboratory revealed that the EEL is very resilient under extreme rainfall intensities and slope conditions. The protocol used was designed to fail all BMPs in order to determine the performance limits. However, the ErosionEEL™ retained as high as 89% solids from a 33% barren slope under rainfall conditions at or exceeding the 1000 year storm event.



ACF Environmental

"Complete Source for Storm Water Solutions"



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

Distributed by:



(800) 644-9223
www.thebmpstore.com



FRIENDLY ENVIRONMENT
100 Prince Street
Shelbyville, TN 37160
Phone: 1-866-H2O-EELS
Alternate Phone: (931) 639-0729
E-Mail: info@friendlyenvironmentUS.com

Installation Instructions for the Erosion Eel™

1. Erosion Eels can be placed at the top, on the face, or at the toe of slopes to intercept runoff, reduce flow velocity, releasing the runoff as sheet flow, and provide reduction/removal of suspended solids from the runoff.
2. Erosion Eels shall be installed along the ground contour, at the toe of slopes, at an angle to the contour to direct flow as a diversion berm, around inlet structures, in a ditch as a check dam to help reduce suspended solids loading and retain sediment, or as a general filter for any disturbed soil area.
3. No trenching is required for installation of Erosion Eels.
4. Prepare the bed for Eel installation by removing any large debris including rocks, soil clods, and woody vegetation (>1 inch in size). Erosion Eels can also be placed over paved surfaces including concrete and asphalt with no surface preparation required.
5. Rake bed area with a hand rake or by drag harrow.
6. All surfaces shall be uniformly and well-compacted for maximum seating and stability of the Eels in place.
7. Do not place Eel directly over rills and gullies until area has been hand excavated and raked to provide a level bedding surface in order for the Eels to seat uniformly with no bridging effects that would allow flow to bypass under the bag.
8. For locations where Eels will be placed in concentrated flows (such as check dams, inlet protection) and for perimeter controls at primary discharge locations, bed the Eels in a jute mesh (or FlocMat™) cradle.
9. If more than one erosion Eel is placed in a row, install the Eels by firmly butting the sewn end against tied end of the Eels together to form a butt joint. No wraps are required around the joints locations.
10. Eels shall be installed where the handles will be positioned at the very top of the bag.

11. Place anchoring posts for check dam applications behind (downstream of) the Eels.
12. Posts should be metal t-posts with a minimum weight of 1.25 lbs/ft steel 5 to 7 ft. lengths rolled from high carbon steel. Post should be hot dipped galvanized or coated with a weather-resistant paint. Post should have a metal anchor plate.
13. Do not drive the post through the erosion Eels. Install the Eels by bedding them in a jute cradle and placing them in contact with (e.g., butted against) the anchoring post.
14. T-post are to be embedded a minimum of 2 ft on most moderately sloped applications. Embed posts a minimum of 3 ft. into ground on slopes greater than 25%.





GEORUNNER®

FLOW PROTECTION MATS



PROTECT SOIL FROM THE EFFECTS OF WATER FLOW

GEORUNNER® FLOW PROTECTION MATS are an economical solution for protecting soils from scour in erosive environments. GEORUNNER® mats protect soils from erosion and vegetation loss in areas with intermittent or concentrated flows, and when embankments are exposed to fluctuating water levels. They offer resistance to shear stresses, and protect more efficiently than typical vegetation or rip rap systems.

GEORUNNER® mats are stabilized with a strong anchor system designed to resist pullout caused by high-flow lifting forces, even in saturated soils. The mat's open mesh design allows dense and stabilizing vegetation growth. End-to-end and side-to-side connections create a completely integrated and secure mat system. Fully anchored units can be driven on by mowing or other lawn maintenance equipment.

SHEET FLOW & POINT FLOW APPLICATIONS

- Stormwater Channels & Containment Ponds
- Swales & Drainage Ditches
- Culvert Outfall Protection
- Shoreline Protection
- Parking Lot Runoff Areas
- Spillways/DownChutes/ Drop Structures



*protecting soils
from erosive forces*

GEORUNNER®

SURFACE PROTECTION MATS



PROTECT SOIL FROM THE EFFECTS OF TRAFFIC

GEORUNNER® SURFACE PROTECTION MATS reduce soil compaction and turf damage caused by concentrated light-to-medium loads from vehicles and foot traffic. While excellent for temporary use, the mats can also be used for permanent, light-weight applications.

Benefits include reducing mud tracking from construction site entrances, bridging over sandy areas for light-weight access of vehicles, wheel chairs or foot traffic. The mat's open mesh design allows sunlight and water to permeate, maintaining healthy turf. The mats are light-weight, easily transported between jobs and only require minimal storage space. They're easily cleaned for multiple uses and do not absorb water and soil like plywood.

SOIL & TURF PROTECTION APPLICATIONS

- Construction vehicle and equipment access over grass
- Light-weight trail-hardening system over sand or soils
- Barrier-free access across sandy areas and around playground equipment
- Deck/patio protection from construction site debris
- Storage surface for small trailers and boats
- Garage/basement floor liner



DISTRIBUTED BY:

creating
sustainable
environments®

PRESTO GEOSYSTEMS®

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670 North Perkins Street
Appleton, Wisconsin 54912-2399, USA

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www.prestogeo.com

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GR/01 JAN 2011
Printed in the U.S.A.
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AP-6083-R1

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November 2012

PRODUCT SPECIFICATION (CSI FORMAT)

SECTION _____

FLOW PROTECTION SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. Work Included: This Section includes providing all material, labor, tools and equipment for installation of the GeoRunner® Flow Protection System as shown on the Contract Drawings and as specified in this Section.
- B. The GeoRunner System shall be used for flow and scour protection.

1.2 RELATED SECTIONS AND DIVISIONS

- A. The applicable provisions of the General Conditions shall govern the work in this Section.
- B. Section 0130000 – Administrative Requirements
- C. Section 0220000 – Site Preparation
- D. Section 312000 – Earth Moving
- E. Section 312500 - Erosion and Sedimentation Control

1.3 REFERENCES

- A. American Society of Testing and Materials (ASTM)

1.4 SUBMITTALS

- A. Submit manufacturer's shop drawings in accordance with Section 0130000, Submittals including Manufacturer's product data, section layout, connection details, anchorage requirements and product samples.
- B. Submit qualifications certifying the installer is experienced in the installation of the specified products.
- C. Submit qualifications of Manufacturer's field representative certifying the field representative is experienced in the installation of the specified products.
- D. No material will be considered as an equivalent to the GeoRunner material specified herein unless it meets all requirements of this specification, without exception. Manufacturers seeking to supply what they represent as equivalent material must submit records, data, independent test results, samples, certifications, and documentation deemed necessary by the Engineer to prove equivalency. The Engineer shall approve or disapprove other Manufacturers materials in accordance with the General Conditions

after all information is submitted and reviewed.

1.5 QUALITY ASSURANCE AND CONTROL

- A. The flow protection material including anchors shall be provided from a single Manufacturer for the entire project.
- B. If required, provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging and location of packaging
- C. Pre-Installation Meeting: Prior to installation of any materials, conduct a pre-installation meeting to discuss the scope of work and review installation requirements. The pre-installation meeting shall be attended by all parties involved in the installation of the system.
- D. Manufacturer's Field Representative Qualifications:
 - 1. Manufacturer shall provide a qualified field representative on site at the start of construction to ensure the flow protection system is installed in accordance with the Contract Documents.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in Manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and Manufacturer.
- B. The materials shall be stored in accordance with Manufacturer's instructions. The materials shall be protected from damage and out of direct sunlight.
- C. The materials shall be delivered, unloaded and installed in a manner to prevent damage.

1.7 WARRANTY

- A. The Manufacturer shall warrant each GeoRunner section that it ships to be free from defects in materials and workmanship at the time of manufacture. The Manufacturer's exclusive liability under this warranty or otherwise will be to furnish without charge to the original f.o.b. point a replacement for any section which proves to be defective under normal use and service during the 10 year period which begins on the date of shipment. The Manufacturer reserves the right to inspect any allegedly defective section in order to verify the defect and ascertain its cause.
- B. This warranty shall not cover defects attributable to causes or occurrences beyond the Manufacturer's control and unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation, improper alteration or improper application.
- C. In no event shall the Manufacturer be liable for any special, indirect, incidental or consequential damages for the breach of any express or implied warranty or for any other reason, including negligence, in connection with the system.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

- A. Presto Geosystems, PO Box 2399, Appleton, Wisconsin 54912-2399. Toll Free (800) 548-3424. Phone (920) 738-1328. Fax (920) 738-1222.
E-Mail info@prestogeo.com. Website www.prestogeo.com.

2.2 FLOW PROTECTION SYSTEM

- A. Properties
 - 1. Material shall be constructed of polymer.
 - 2. Color shall be green.
 - 3. Color shall be uniform throughout all units in a pallet.
 - 4. Mats shall provide corrosion and chemical resistance.

5. Minimum tensile strength shall be 3,000 pounds.

B. Unit Dimensions

1. Nominal Width shall be 24 inches (0.6 m).
2. Nominal Length shall be 48.75 inches (1.2 m).
3. Nominal Depth shall be 0.5 inches (1.3 cm).
4. Nominal Area shall be 8 ft² (0.74 m²).
5. Nominal mesh openings shall be 0.84 inches (21 mm) square.
6. Mesh open area shall be 55% of total area.
7. Nominal weight shall be 8 pounds (3.6 kg).

C. Connection Accessories

1. Nylon, X-mas tree rivets shall be used to secure the panels together on the short end (2 feet). Three rivets are required for each panel. The rivets shall be 0.312 inches thick by 1.163 inches long.
2. Heat treated metal side clips are used to secure the panels together on the long end (4 feet). Two side clips are required for each panel to panel connection. The side clips shall be 22 gauge heat treated steel with zinc clear chromate plate.

2.3 EARTH ANCHOR SYSTEM

A. Earth Anchor

1. The earth anchor consists of Duckbill® anchor, 3/32 galvanized cable, ferrule, Gripple® and anchor brace. Duckbill anchor break strength shall be 300 lb.
2. Four anchors shall be provided for each flow protection mat. Six anchors are required on the row of panels on the upstream/upslope end of the project.
3. The anchors shall be located per Manufacturer's instructions.

B. Accessories

1. The drive rod is used to engage and drive the Duckbill anchor head to the depth of the cable or until the desired resistance is achieved.

2.4 ADDITIONAL COMPONENTS

A. Seeding

1. If required, the seed shall be as specified in the Specifications with the following minimum requirements:
 - a) The seed shall conform to the requirements of the governing authority and for restrictions on noxious weeds.
 - b) The seed shall be delivered in sealed containers showing percentage of seed mix, year of production and location of packaging.
2. The seed shall be installed immediately after the topsoil is placed.
3. If required, fertilize and water in accordance with the Contract Documents.

B. Sod

1. If required, the sod shall be as specified in the Specifications with the following minimum requirements:
 - a) The sod shall consist of a dense, well rooted growth of permanent and desirable grasses indigenous to the area it is being installed.
 - b) The sod shall be free from weed and undesirable grasses.
 - c) Protect roots from dehydration and do not deliver more sod than can be installed in a 24 hour period.
 - d) The sod shall support its own weight without tearing, when suspended vertically by holding the upper two corners.
2. Sod shall be installed immediately after the infill is placed.
3. If required, fertilize in accordance with the Contract Documents.

C. Erosion Control Blanket (ECB)

1. If required, the ECB shall be as specified in the Specifications and used to protect the seed or sod.
2. The ECB shall be installed per the Manufacturer's instructions.
3. The ECB shall be secured by the Georunner anchor per Manufacturer's instructions.

D. Turf Reinforcement Mat (TRM)

1. If required, the TRM shall be as specified in the Contract Documents and used to protect the seed or sod.
2. The TRM shall be installed per the Manufacturer's instructions.
3. The TRM shall be secured by the Georunner anchor per Manufacturer's instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify site conditions are as indicated on the drawings. Notify the Engineer if site conditions are not acceptable. Do not begin preparation or installation until unacceptable conditions have been corrected.

3.2 INSTALLATION

A. Sub Grade Preparation

1. Prepare sub grade as specified and install protection system in accordance with Manufacturer's instructions. No depressions should exist that can retain water.
2. On-site time for installation assistance by the Manufacturer's field representative shall be ____ day(s) with one trip. All travel and expense costs for Manufacturer's field representative installation assistance shall be included in the base bid price.
3. Excavate or fill foundation soils as required to elevations and dimensions as indicated on the drawings or as directed by the Engineer.
4. Ensure foundation soil meets specification requirements and is examined by the Engineer. If unacceptable foundation soils are encountered, excavate affected areas and replace these areas with suitable quality material as directed by the Engineer.

B. Surface Treatment

1. The specified surface treatment shall be installed immediately after the sub grade is prepared. The surface treatment shall be fertilized and watered in accordance with the Contract Documents.
2. The TRM or ECB shall be placed after the surface treatment is installed and in accordance with Manufacturer's instructions. TRMs or ECBs will be secured by the anchors.

C. Placement and Connection

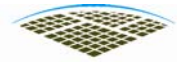
1. Verify all flow protection panels are installed correctly and in accordance with Manufacturer's instructions.
2. Adjacent units should not protrude above the desired surface elevation.
3. The panels shall be placed with the long direction (4 foot length) in the direction of flow.
4. Interconnect the 2 foot ends of adjoining sections by nesting the overlapping tabs and connect with 3 rivets in the pre-drilled holes.
5. Interlock the 4 foot side connections and secure together with 2 side clips equally spaced.
6. The mat protection system can be assembled in-place or pre-assembled at an off-site area and moved into place. Individual units may be used to join pre-assembled mats.
7. The mats can be cut with a hand or power saw to custom fit contours and around obstructions.

D. Anchoring

1. If required, secure the mats to the surface with earth anchors.
2. Provide 4 anchors per mat per Manufacturer's instructions, with additional anchors to be placed at the high end of the slope.
3. Engage the drive rod with the Duckbill anchor head and drive into the soil to the length of the tendon or until the desired resistance is achieved.
4. Twist and remove the drive rod and slide the anchor brace/Griptide into panel opening.
5. Using a wire gripper or other method, pull the trailing end of the cable tight engaging the cable and Griptide. The Griptide will be recessed into the panel opening and below the top of the panel when tensioned.
6. Cut the cable approximately 2 inches above the panel and loop the end back into the Griptide head (Recommended). This also allows for re-tensioning in the future, if required. Alternatively, the cable may be cut flush with the Griptide.



PRESTO GEOSYSTEMS



GEORUNNER®

GEORUNNER®

FLOW PROTECTION SYSTEM

INSTALLATION GUIDELINE



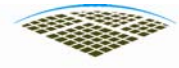
PRESTO GEOSYSTEMS

670 N PERKINS STREET, APPLETON, WISCONSIN, USA 54914

Ph: 800-548-34241 or 1-920-738-1328 • Fax: 920-738-1222

E: info@prestogeo.com www.prestogeo.com

GRFP-00-14 DEC 2010



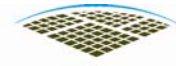
NOTE: The following installation techniques and recommendations may require an evaluation by Presto Geosystems to determine the applicability of use for individual project requirements.

Base Preparation

1. Prepare the sub grade as specified. No depressions shall exist that can retain water.
2. If flowing water is present, a sub-drain and outlet may be required. Ensure that proper slope is maintained throughout the drainage system and that the outlet is free from any obstructions preventing free drainage.
3. Excavate or fill foundation soils as required to elevations and dimensions as indicated on the drawings or as directed by the Engineer.
4. Ensure foundation soil meets specification requirements and is examined by the Engineer. If unacceptable foundation soils are encountered, excavate affected areas and replace these areas with suitable quality material as directed by the Engineer.

Surface Treatment

1. The specified surface treatment shall be installed immediately after the sub grade is prepared and approved. The surface treatment shall be fertilized and watered in accordance with the Contract Documents.
2. If required, seed shall conform to the requirements of the governing authority and for restrictions on noxious weeds.
3. If required, sod shall consist of a dense, well rooted growth of permanent and desirable grasses indigenous to the area it is being installed.
4. If specified, the turf reinforcement mat (TRM) or erosion control blanket (ECB) shall be placed and secured after the surface treatment is installed and in accordance with Manufacturer's recommendations. The type of TRM/ECB shall be based on the specific application. Consult with Presto Geosystems or project engineer for TRM/ECB recommendation.
5. In cases where the vegetation is intact and the application doesn't require additional protection, the GeoRunner panels may be placed directly over the surface.
6. Installing the Georunner panels directly over bare ground is not recommended.



Installation of GeoRunner® Panels

1. GeoRunner panels should be placed down so that the flat surface of the 2 in x 24 in center band is facing up. The bottom side of the GeoRunner panel has four, ¼ inch diameter x ¼ inch long molded-in locator buttons on one end.
2. The panels shall be placed with the locator buttons on the downstream side of the panel and with the long direction (4 foot length) in the direction of flow. Refer to Figure 1.

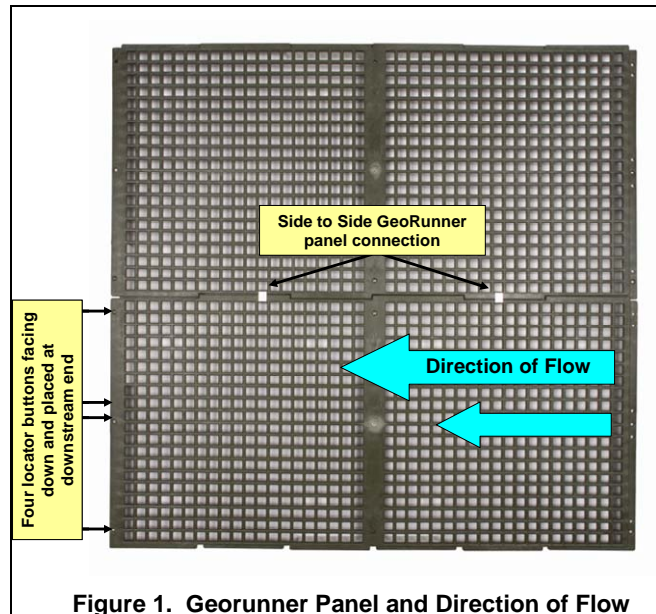


Figure 1. Georunner Panel and Direction of Flow

3. Snap the GeoRunner 2 ft. ends together to engage the locator buttons.
4. Insert three rivets in the hole locations to secure the panels. Refer to Figure 2.
5. The GeoRunner panels are easily laid down in a running row and column pattern.
6. The panels can be installed in-place or assembled off to the side of the installation site and transferred to the installation area.

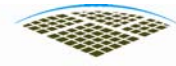


Figure 2. Install Rivets

7. When panels are attached side-to-side, interlock the 4 foot (long edge) side connections and secure with 2 side clips evenly spaced. Refer to Figure 3.

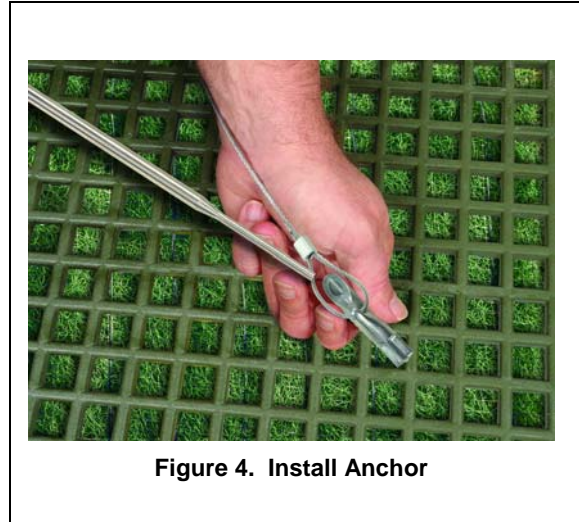


Figure 3. Connect Panels with Side Clips



Anchoring GeoRunner® Panels

1. A minimum of four earth anchors shall be installed for each Georunner panel. Additional anchors may be required to keep the panels smooth and to ensure contact with sub grade. Refer to Georunner drawing 1 for recommended anchor placement.
2. Install earth anchors by inserting the drive rod into the Duckbill® anchor head. Refer to Figure 4.
3. Drive earth anchor into the soil with a sledge hammer or impact hammer to the length of the cable or until the desired resistance is achieved.
4. Twist and remove the drive rod. Drive rod may require “rocking” action to remove from earth.

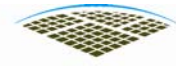


5. Using a wire gripper or other method, pull the cable firmly to remove slack and to set the earth anchor. Refer to Figure 5. The cable will move approximately 2 inches and the Duckbill will rotate beneath the surface to become permanently fixed in place, creating a “deadman”.
6. Slide the Gripper® into the anchor brace. Gripper must be inserted from the side of the brace in order to lock below the two opposing brace nipples. Refer to Figure 6.



7. Slide the anchor brace/Gripper into the same panel opening as the cable. Refer to Figure 7.
8. The anchor brace/Gripper will be recessed into the panel opening and located below the top of the panel.
9. Stand on anchor brace and pull cable tight to secure Georunner mat to ground surface.





10. **Recommended:** Cut the cable approximately 2 inches above the Gripple to allow for re-tensioning in the future, if required. Refer to Figure 8.
11. Loop the cut end back into the Gripple head. Refer to Figure 9. Looping the cable locks the free end safely as the Gripple is bi-directional and will permanently hold the free end of the cable.



Figure 8. Cut the cable to loop the trailing end



Figure 9. Loop cable back in the Gripple

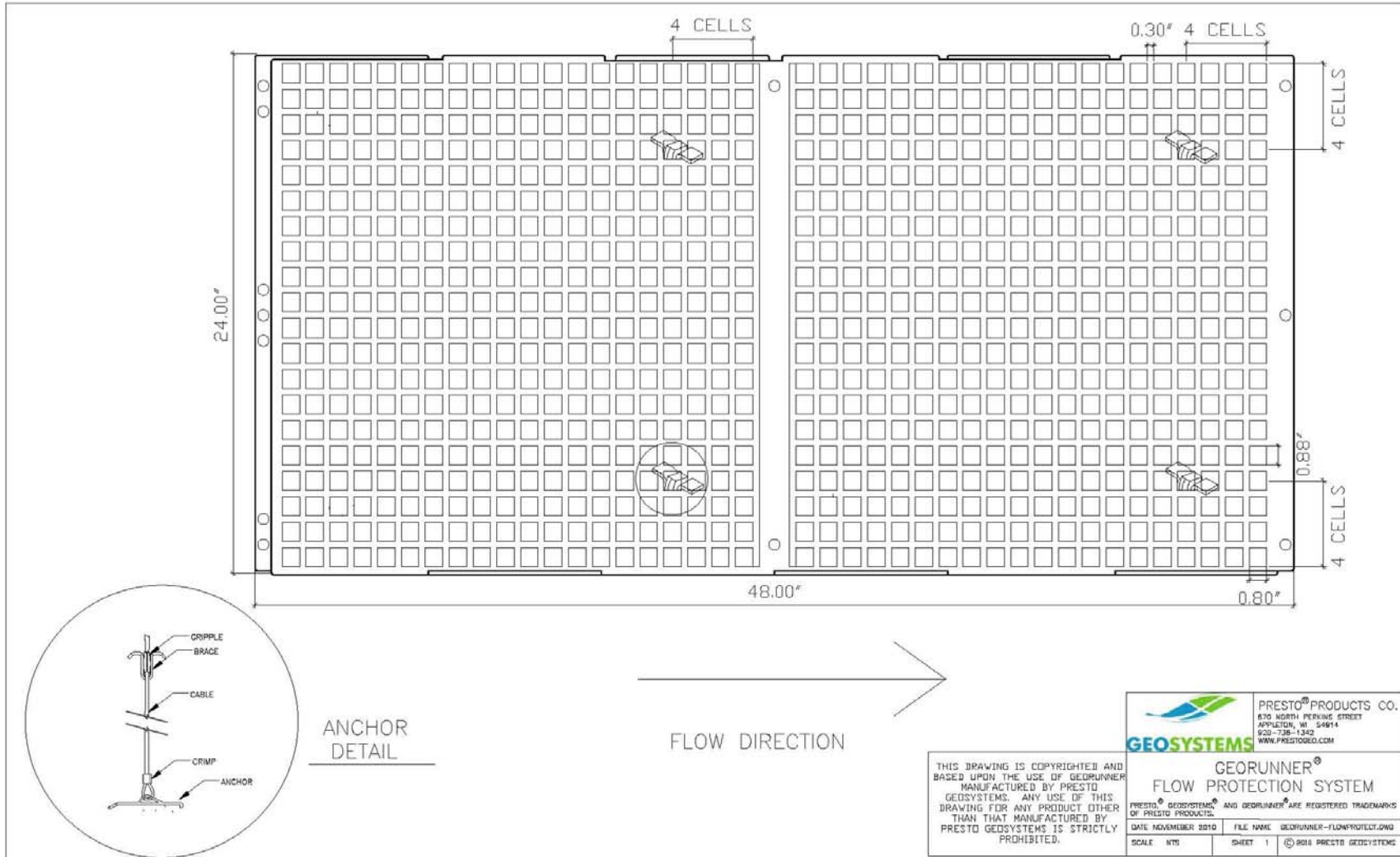
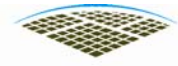
12. **Alternative to steps 10 and 11 above:** If preferred, the cable may be cut flush with the Gripple to remove the trailing end. Refer to Figure 10.



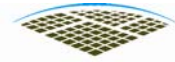
Figure 10. Cut the cable flush with the Gripple

Maintenance

1. The GeoRunner area can be mowed and maintained once adequate vegetation has been established. A minimum blade height of 4 inches is recommended. Ensure that no edges or areas protrude that could catch on the mower blades.
2. Thermal expansion of the exposed GeoRunner panels due to high temperatures is normal. This expansion may result in intermittent bulging of the secured GeoRunner system. As vegetation is established, the turf will insulate the GeoRunner system and the potential for thermal expansion will be minimized.
3. The surface is relatively flat and smooth, but caution should be exercised to assure all components are properly installed to prevent trip hazards.



Drawing 1. GeoRunner Anchor Pattern



Limited Warranty

Presto Geosystems warrants each Georunner® panel which it ships to be free from defects in materials and workmanship at the time of manufacture. Presto's exclusive liability under this warranty or otherwise will be to furnish without charge to Presto's customer at the original f.o.b. point a replacement for any section which proves to be defective under normal use and service during the 10-year period which begins on the date of shipment by Presto. Presto reserves the right to inspect any allegedly defective section in order to verify the defect and ascertain its cause.

This warranty does not cover defects attributable to causes or occurrences beyond Presto's control, not in conformance with ordinary use, or unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation, improper alteration or improper application.

PRESTO MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, IN CONNECTION WITH THE GEORUNNER® SYSTEM. IN NO EVENT SHALL PRESTO BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OR FOR ANY OTHER REASON, INCLUDING NEGLIGENCE, IN CONNECTION WITH THE GEORUNNER® SYSTEM.

Geosystems® and Georunner® are registered trademarks of Presto Products Company. Gripple® is a registered trademark of Gripple, Inc. Duckbill® is a registered trademark of Foresight Products, LLC.

Disclaimer

This document has been prepared for the benefit of customers interested in the Georunner Flow Protection System. It was reviewed carefully prior to publication. Presto assumes no liability and makes no guarantee or warranty as to its accuracy or completeness. Final determination of the suitability of any information or material for the use contemplated, or for its manner of use, is the sole responsibility of the user.

Project drawings and specifications take precedence over all Manufacturers' recommendations.

GRATE PYRAMID



Type A - for grated drop inlets



Type B - for riser pipe installation



Type C - for small grates

Grate Pyramid Reusable Inlet Protection

Installs in minutes

Grate Pyramid is a reusable inlet protection device used to protect inlet structures from sediment and debris during construction. The heavy duty frame forms a sturdy barricade over most drop inlets. The high-flow geotextile filter skirt stops sediment and debris while allowing the filtered water to leave the site. Built in overflow prevents ponding during major wet weather events.

Grate Pyramid attaches easily to the inlet grate with provided attachment hooks. The high flow filter is reusable and replaceable when necessary. The Type B unit easily attaches to riser pipes.

The easy installation of Grate Pyramid provides huge cost savings over the typical wood frame and fabric units. Once construction is complete, the unit can be cleaned and stored for reuse.

Grate Pyramid Advantages

- No lifting of heavy grates
- Saves on labor
- Strong, light weight, portable
- Quick and easy assembly
- Proven, reliable performance
- Reusable and easy to clean
- High Visibility / Added jobsite safety

For more information about Temporary Inlet Protection, contact ACF Environmental.



Installation Procedure for Type A Grate Pyramid



Standard drop inlet grate.



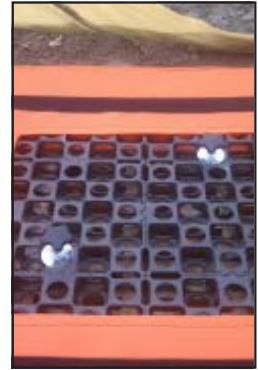
Install Grate Pyramid base over grate.



Install anchors.



Install base with 2 to 4 anchors as needed.



Install safety caps on anchors.



Install tower frame.



Push button to lock tower into base.



Slide tower filter over frame.



Tightly secure base to tower.



Installation completed.

Grate Pyramid Filter Specifications

Woven polypropylene geotextile is stabilized to resist degradation due to ultraviolet exposure and is resistant to commonly encountered mildew, insects and soil chemicals and is non-biodegradable. Polypropylene is stable with a PH range of 2 to 13.

Property	Test Method	Minimum Average Roll Value
Grab Tensile Strength	ASTM D4632	237 x 255 lbs
Grab Tensile Elongation	ASTM D4632	15-20 %
Puncture Strength	ASTM D4833	104 lbs
Mullen Burst	ASTM D3786	542 lbs
Trapezoid Tear	ASTM D4533	85 x 115 lbs
UV Resistance @ 500 hrs	ASTMD4355	80%
AOS	ASTM D4751	20 Sieve
Permittivity (sec-1)	ASTM D4491	.473 (sec-1)
Flow Rate	ASTM D4491	200 gpm/ft ²

Results quoted above are the mean of multiple tests conducted at an independent testing facility.

Sizing of Grate Pyramid

Grate Pyramid should be a minimum of 2" larger than the inlet grate in both length and width. Grate Pyramid is manufactured in standard widths of 16" and can be made in lengths of 7" increments.



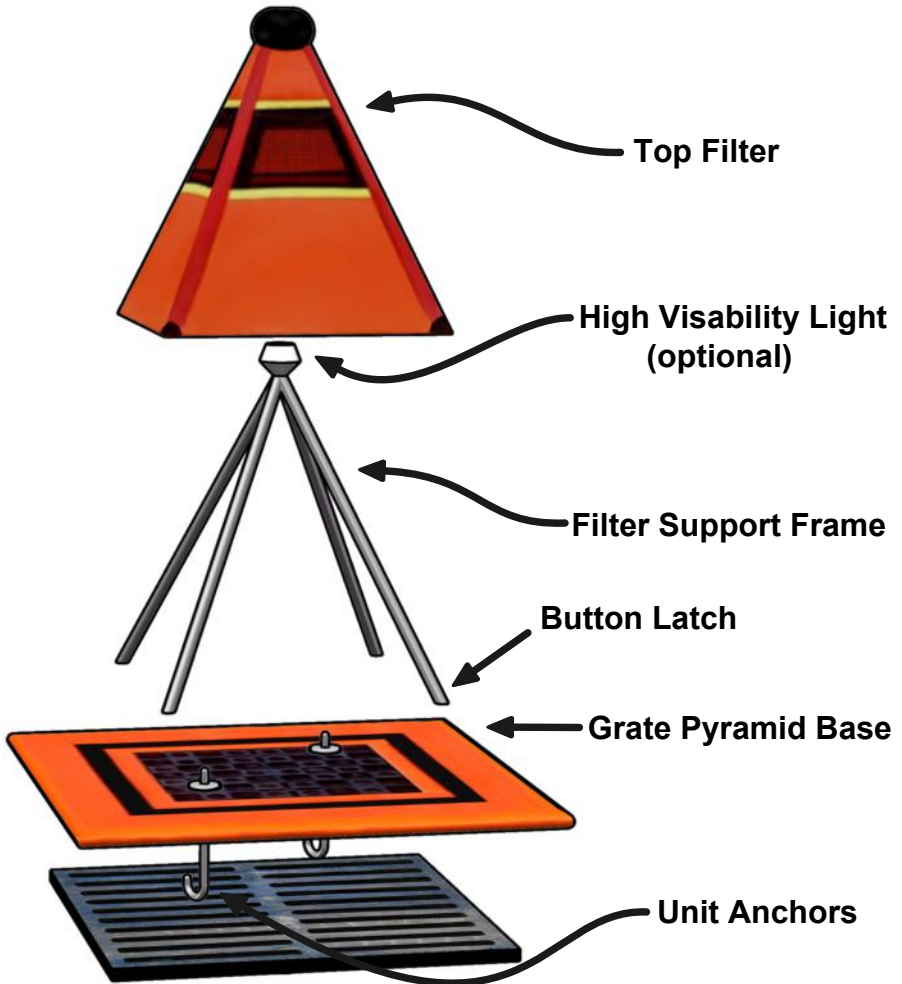
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 "Complete Source for Stormwater Solutions"

Distributed by:

Grate Pyramid

Reusable Inlet Protection





Curb Inlet Drain Filters

88.2% Reduction in Total Suspended Solids

87.4% Reduction in Hydrocarbons



Gutterbuddy™ Curb Inlet and Ditch Pavement Filters

Gutterbuddy™ Advantages

- Easy to transport, install and maintain
- Keeps out sand, asphalt millings and other fine sediment
- Available in regular and super flow
- Washable
- Reusable

Gutterbuddy™ Curb Inlet Filters

effectively prevent sediment, debris and other pollutants from entering storm water systems. The filtering action lets water freely flow through the fibrous material while stopping sediment and debris. Built-in overflows drain water even more quickly during extreme events.

Long lasting Gutterbuddy™ Curb Inlet Filters are 9” in diameter and can be purchased in 4’, 6’, 8’, 10’, 12’, 14’ and 16’ lengths. These inlet filters are flexible enough to conform to any curb radius, allowing for quick and easy installation.

Gutterbuddy™ Ditch Pavement Filters

effectively prevent sediment, debris and other pollutants from entering storm water systems or other areas that ditch pavement is used to channel water runoff. Their filtering action lets water freely flow through the fibrous material while stopping sediment and debris. Each ditch pavement filter comes with a stake hole at each end and has bendable steel in the middle of the fabric that allows it to conform to all types of ditch pavement.

For more information about Gutterbuddy™ Curb Inlet and Drainage Ditch Filters, call your ACF Environmental or SI Geosolutions distributor.

PROBLEM:



Failed Inlet Protection

SOLUTION:



Gutterbuddy™ Curb Inlet Drain Filter



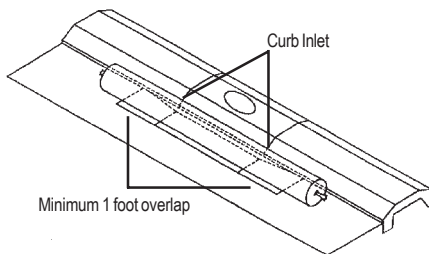
Gutterbuddy™ Specification

For Curb Gutter Storm Drains

1.0 Description

1.1 This work shall consist of furnishing, placing, maintaining and removing the Gutterbuddy™ sediment control device as directed by the engineer and as shown on the contract drawings. The Gutterbuddy™ sediment control system distributed by:

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



2.0 Materials

2.1 GUTTERBUDDY™

The Gutterbuddy™ shall be synthetic filter manufactured from recycled synthetic fibers.

2.1.1 The Gutterbuddy™ will be manufactured to be 9” in diameter and are available in 4’, 6’, 8’, 10’, 12’, 14’ and 16’ lengths and a minimum of twenty-four (24) inches longer than the curb inlet opening. This will allow for sufficient length to cover the inlet with twelve (12) inches beyond the inlet on both ends.

3.0 Construction Sequence

3.1 General

3.1.1 Install the Gutterbuddy™ in front of the curb inlet opening. Each end of the Gutterbuddy™ should overlap the curb inlet approximately 12”.

3.1.2 The Gutterbuddy™ should be cleaned if a visual inspection shows silt and debris build up around the Gutterbuddy™.

3.1.3 To remove the Gutterbuddy™, lift out of the opening.

3.1.4 The Gutterbuddy™ is reusable. Once the construction project is complete and it is no longer needed for sediment control, remove, clean and store out of the sunlight until needed on the next project.

3.1.5 Ponding is likely if sediment is not removed regularly. Inspection of Gutterbuddy™ should be on a regular basis and immediately after major rain events.

4.0 Basis of Payment

4.1 The payment for any Gutterbuddy™ used during the construction is to be included in the bid of the overall erosion and sediment control plan and priced by the linear foot.



ACF Environmental

“Complete Source for Storm Water Solutions”

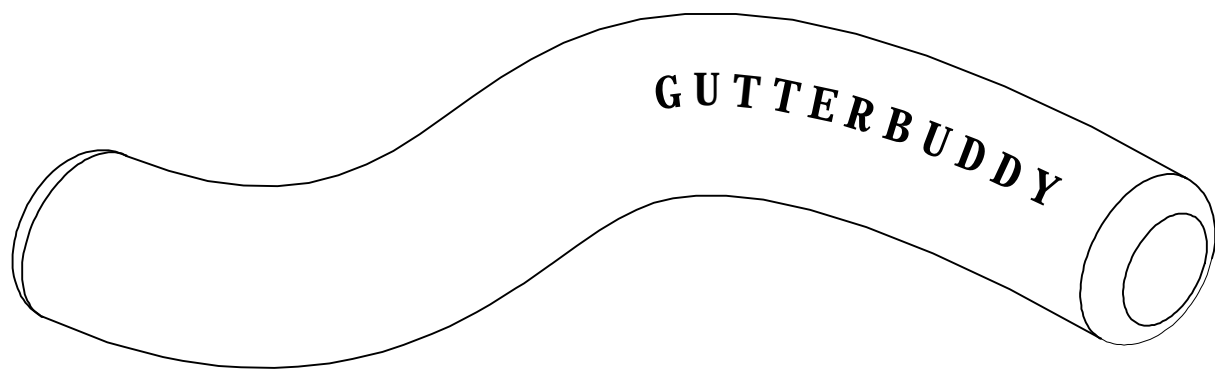
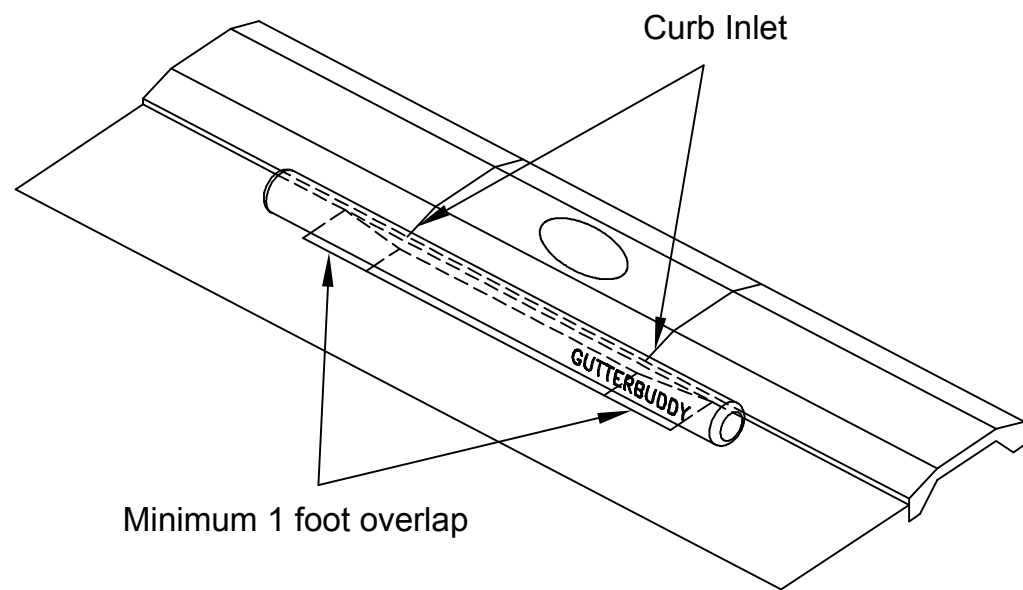


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GUTTERBUDDY[®] Curb Inlet Drain Filters

PROJECT:

CITY:

DR. BY:

STATE:

DATE:

DR. NO:



Sediment Containment



GutterGator™ Curb Inlet Filter

GutterGator™ Advantages

- *7" Tall - allows for overflow*
- *Unique design - ships in 4' box*
- *Easy to transport and install*
- *Easy to assemble*
- *Keeps sediment, trash, and debris out of storm sewers*
- *Easy to clean and reuse*
- *Weight pocket holds unit in place*
- *Unique multi-dimensional outer filter with rigid inner frame allows high flow rates*
- *Low profile to curb helps prevent damage from vehicles*
- *Tie back straps for additional support*
- *Custom sizes available*

GutterGator™

The GutterGator™ is the latest inlet filter technology available from ACF Environmental.

Designed for curb inlets, GutterGator™ is designed for high flow volumes while maintaining maximum sediment retention.

With its unique multi-dimensional outer filter combined with a rigid inner frame, the GutterGator™ maintains a low profile to the curb preventing damage.

Save time and money! GutterGator™ installs in seconds, removes in minutes and is reusable. Stop sediment in its tracks with GutterGator!

Call ACF Environmental for more information.



GutterGator
Assembly Instructions:



1. Remove GutterGator grids and sleeves from box.



2. Slide grid sections to desired length.



3. Insert grid section into GutterGator sleeve.



4. Install stabilizer arms.



5. Seal velcro on GutterGator sleeve.



6. Remove Gatorweight from box.

GutterGator
Assembly Instructions con't:



7. Place 7lb minimum weight (Gatorweight recommended) into each weight pocket into each weight pocket.



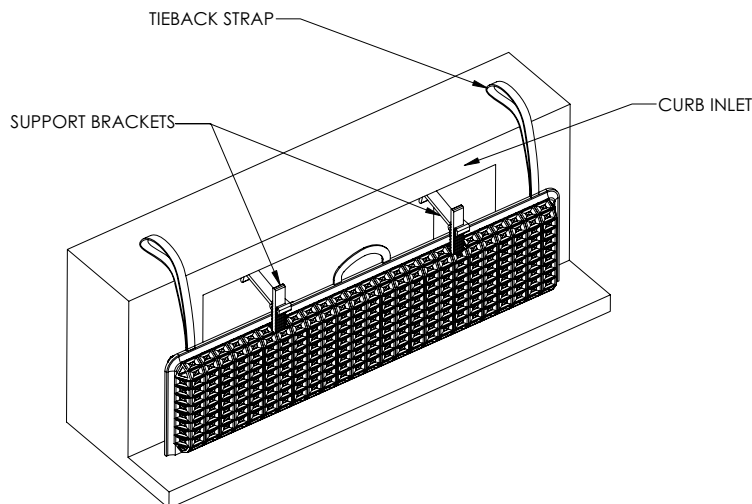
8. Slide weight pockets into curb throat, holding unit tight to curb face. (leave 12" overlap on each end of curb opening)



9. Use GutterGator tiebacks if applicable.



10. Clean unit after each wet weather event.



11. Replace GutterGator sleeves as needed.

GutterGator Specification:

For Curb Gutter Storm Drains

1.0 Description

1.1 This work shall consist of furnishing, placing, maintaining and removing the GutterGator sediment control device as directed by the engineer and as shown on the contract drawings. The GutterGator sediment control system manufactured by:

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

2.0 Materials

2.1 GUTTERGATOR

2.1.1 The GutterGator will be manufactured to 3' molds in 3', 6', 9', 12', 15' and 18' lengths and a minimum of twenty-four (24) inches longer than the curb inlet opening. This will allow for sufficient length to cover the inlet with twelve (12) inches beyond the inlet on both ends.

3.0 Construction Sequence

3.1 General

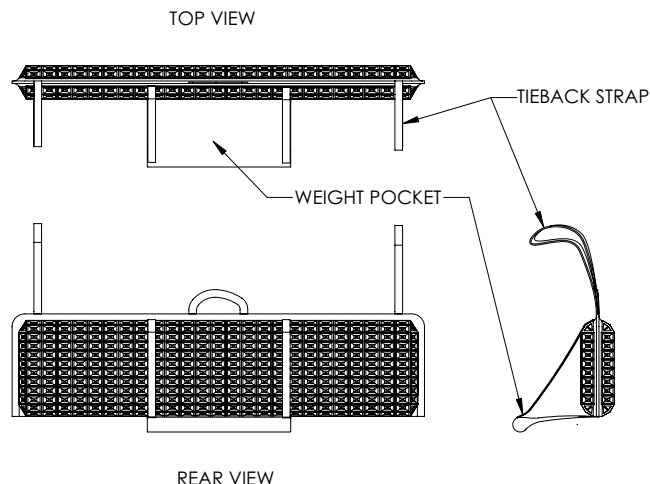
3.1.1 Install the GutterGator in front of the curb inlet opening. Drop 7lb weight sock into inlet opening, secure tie back straps, if applicable. Each end of the GutterGator should overlap the curb inlet approximately 12".

3.1.2 The GutterGator should be cleaned if a visual inspection shows sediment and debris build up around the GutterGator.

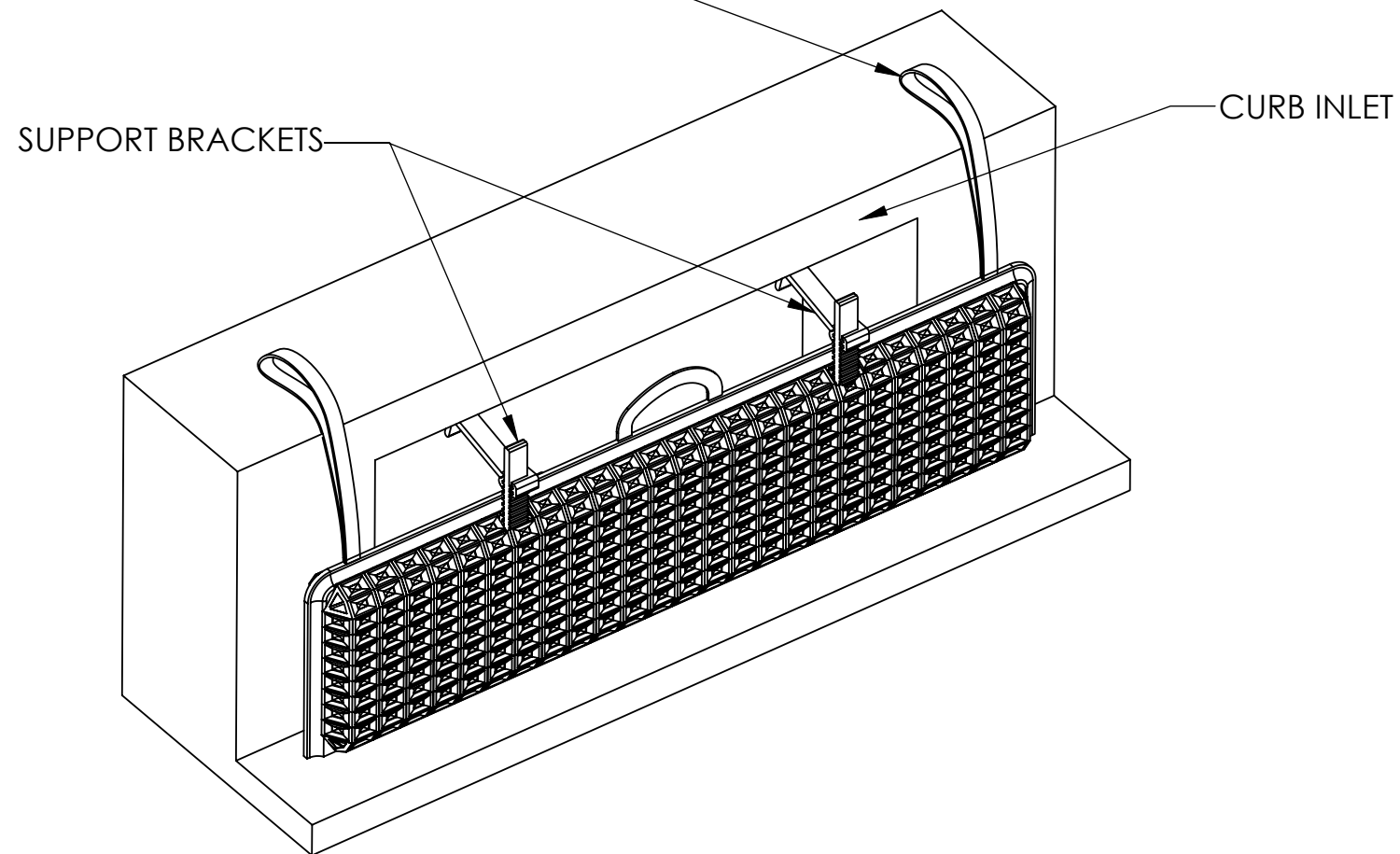
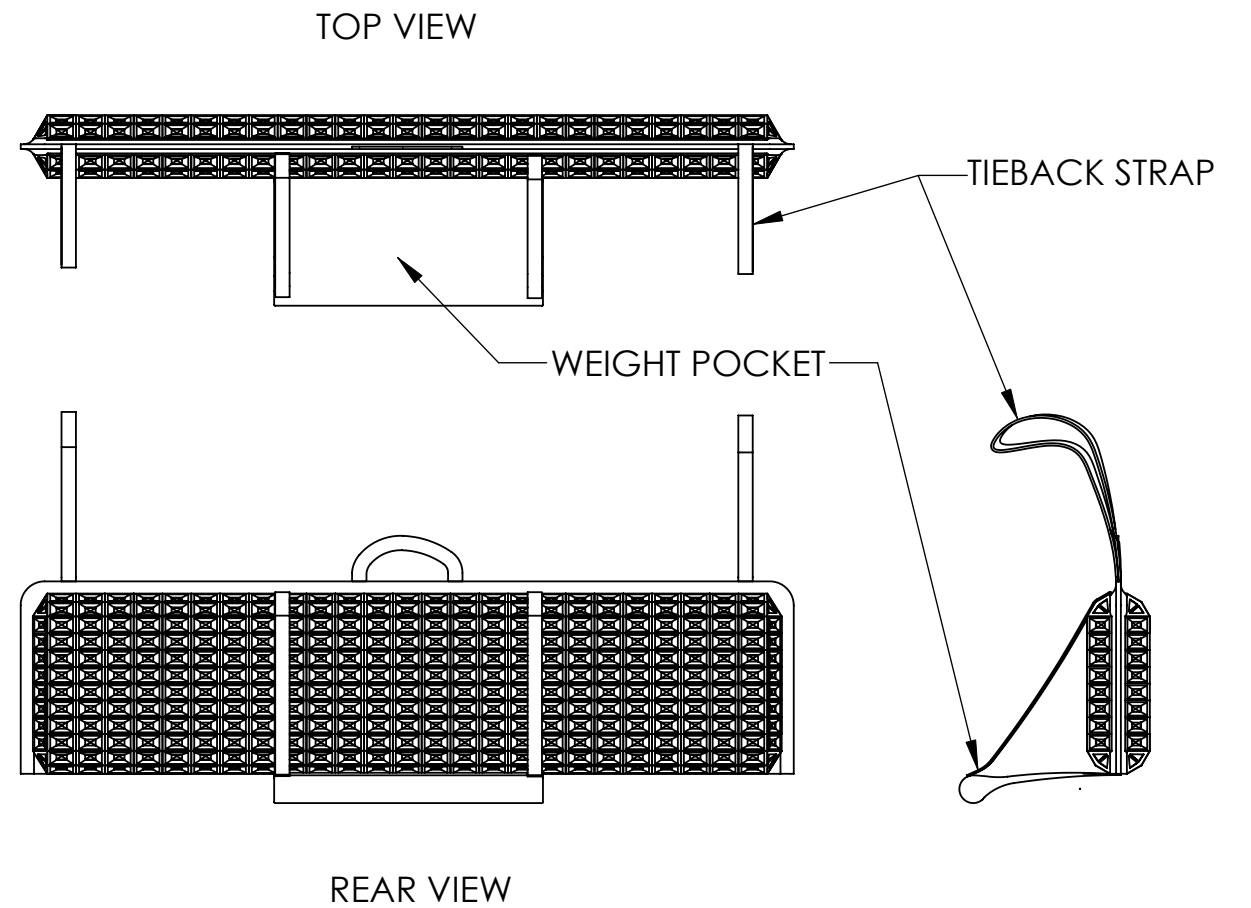
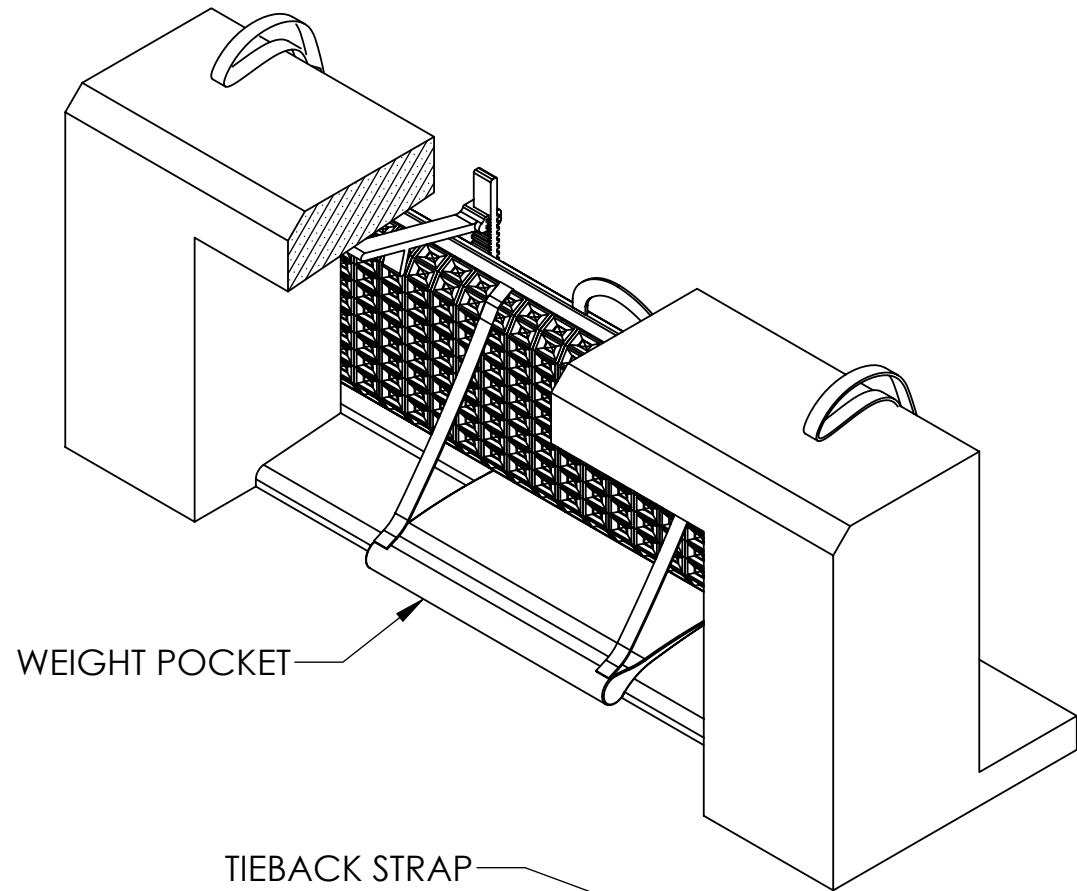
3.1.3 To remove the GutterGator, lift out of curb opening with provided carrying handle.

3.1.4 Clean as needed. Store out of direct sunlight.

3.1.5 Ponding is likely if sediment is not removed regularly. Inspection of GutterGator should be on a regular basis and immediately after wet weather events.



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GUTTER GATOR SLIM



Environmental
Your Complete Source for
Geosynthetic Solutions

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SILTSACK®

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

Catch Basin Sediment Capture Device

Keeping catch basins free of silt!

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.



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



Typical Siltsack® Construction



Installed Siltsack held in place by grate.

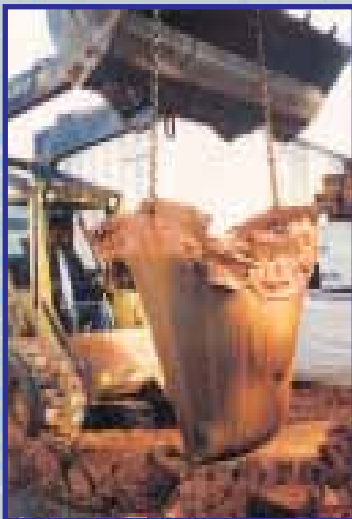
New Type C



Adjustable hanging frame.

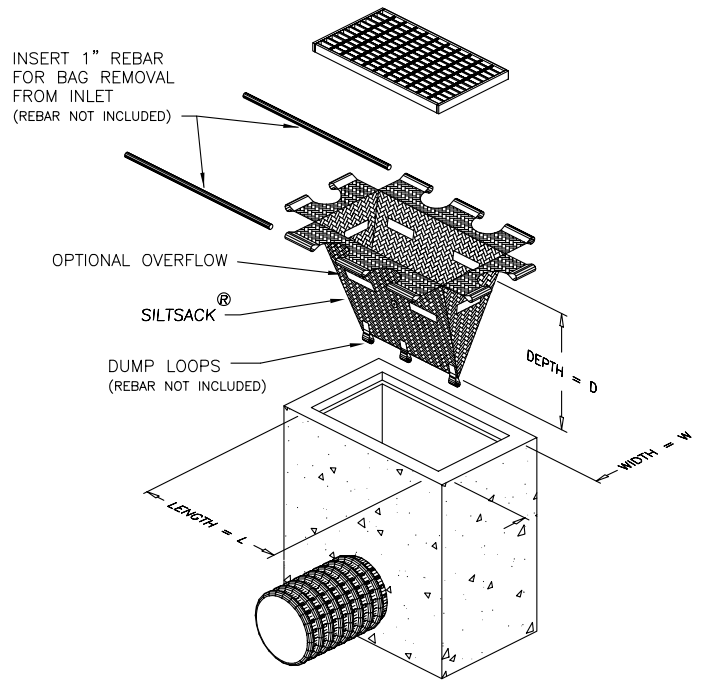


Adjustable frame installed. Adjusts from 16x24 to 24x36.

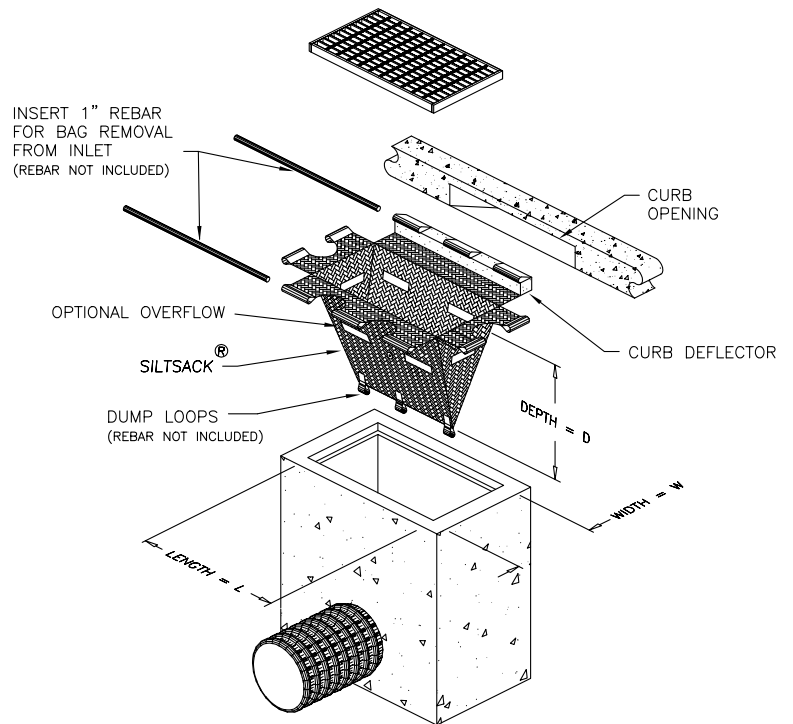


Sediment captured by Siltsack® can easily be removed from the site.

Type A



Type B



Siltsack® Specification
Control of Sediment Entering Catch Basins
 (Stormwater 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 site 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

2.0 Materials

2.1 Siltsack®

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

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 cord is covered with sediment, Siltsack should be emptied, cleaned and placed back into the basin.

Siltsack Regular Flow

Property	Test Method	Units	Test Results
Grab Tensile	ASTM D-4632	lbs.	315
Grab Elongation	ASTM D-4632	%	15
Puncture	ASTM D-4833	lbs.	140
Mullen Burst	ASTM D-3786	P.S.I.	800
Trapezoid Tear	ASTM D-4533	lbs.	125x125
UV Resistance (@500 hrs)	ASTM D-4355	%	80
AOS	ASTM D-4751	US Sieve	40
Flow Rate	ASTM D-4491	Gal/Min/Ft ²	50
Permittivity	ASTM D-4491	sec ⁻¹	0.70

or SILTSACK® High Flow

Property	Test Method	Units	Test Results
Grab Tensile	ASTM D-4632	lbs.	255x275
Grab Elongation	ASTM D-4632	%	20x15
Puncture	ASTM D-4833	lbs.	135
Mullen Burst	ASTM D-3786	P.S.I.	420
Trapezoid Tear	ASTM D-4533	lbs.	40x50
UV Resistance	ASTM D-4355	%	90
AOS	ASTM D-4751	US Sieve	20
Flow Rate	ASTM D-4491	Gal/Min/Ft ²	200
Permittivity	ASTM D-4491	sec ⁻¹	1.50

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 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 unit where the contents will be collected. Place the rebar through the lift straps (connected to the bottom of the sack) and lift. This will lift Siltsack from the bottom 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 sunlight until next use.

4.0 Basis of Payment

4.1 Payment for all Siltsacks used during 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.

**Siltsack is covered by U.S. Patent No. 5,575,925.*

Installation and Maintenance for Type A Siltsack



Remove grate from catch basin.



Slide Siltsack® over one side of grate.



Slide Siltsack® over opposite side of grate.



Replace Siltsack® and grate inlet into recess.



Installed Siltsack®.



To remove Siltsack®, clean area around grate and slide rebar through Siltsack® pockets.



Slowly remove Siltsack® from inlet.



Removed Siltsack® is now ready for cleanout.



To clean Siltsack® attach rebar through empty loops at bottom and lift to empty.

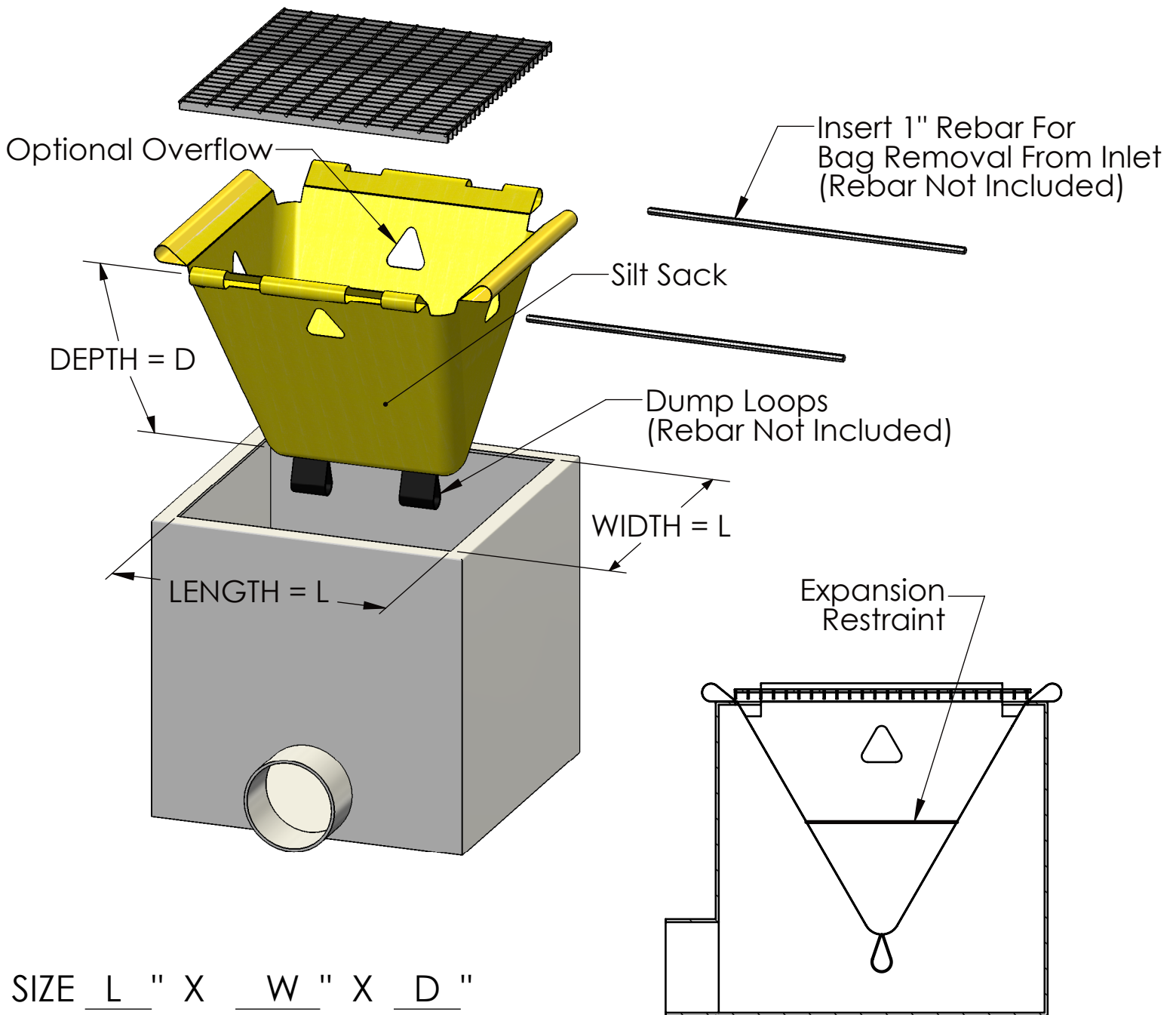


2831 Cardwell Road
Richmond, Virginia 23234
(800) 448-3636 • FAX (804) 743-7779
www.acfenvironmental.com

ACF Environmental
"Complete Source for Stormwater Solutions"

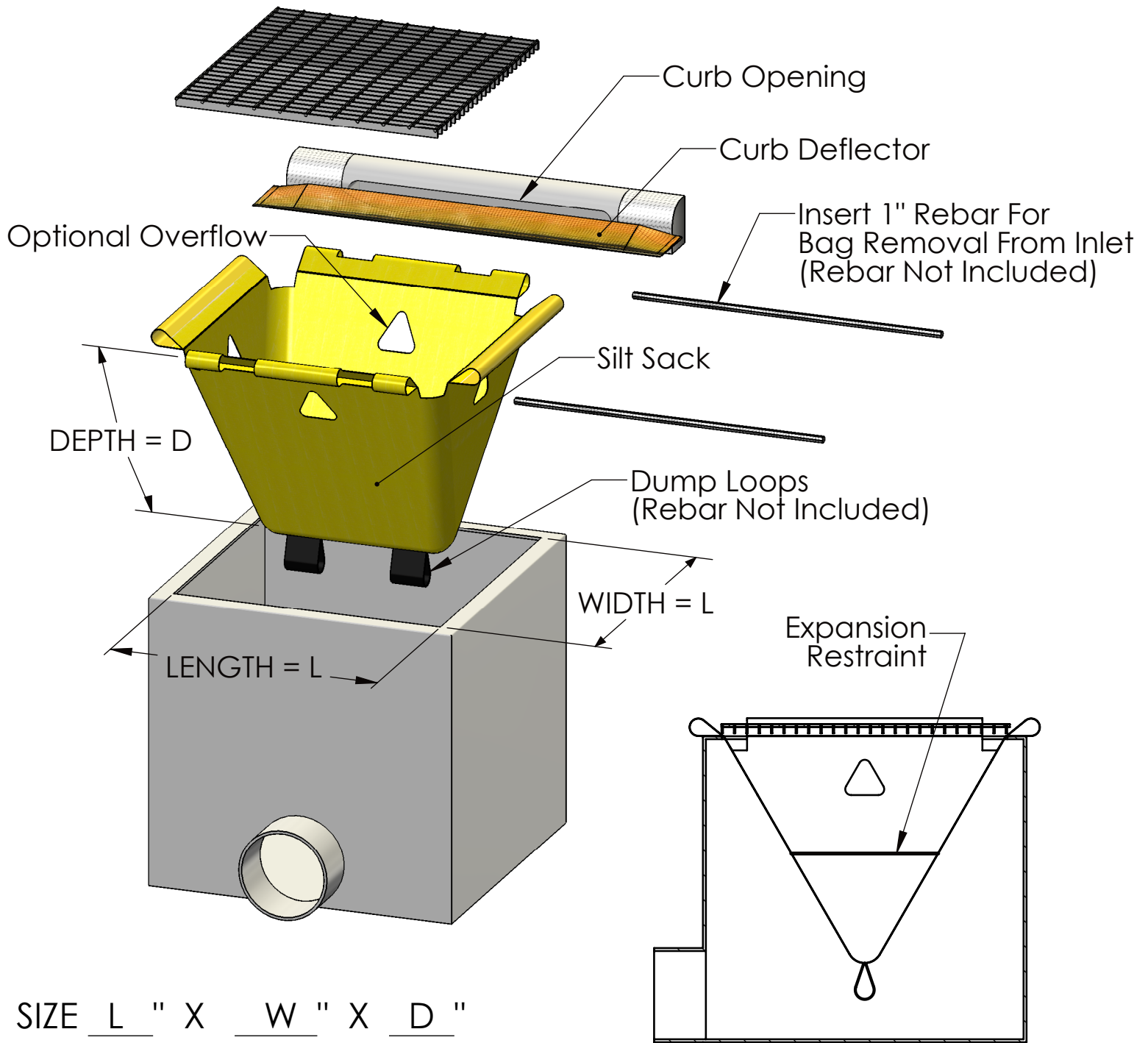
Distributed by:

Silt Sack - Type A



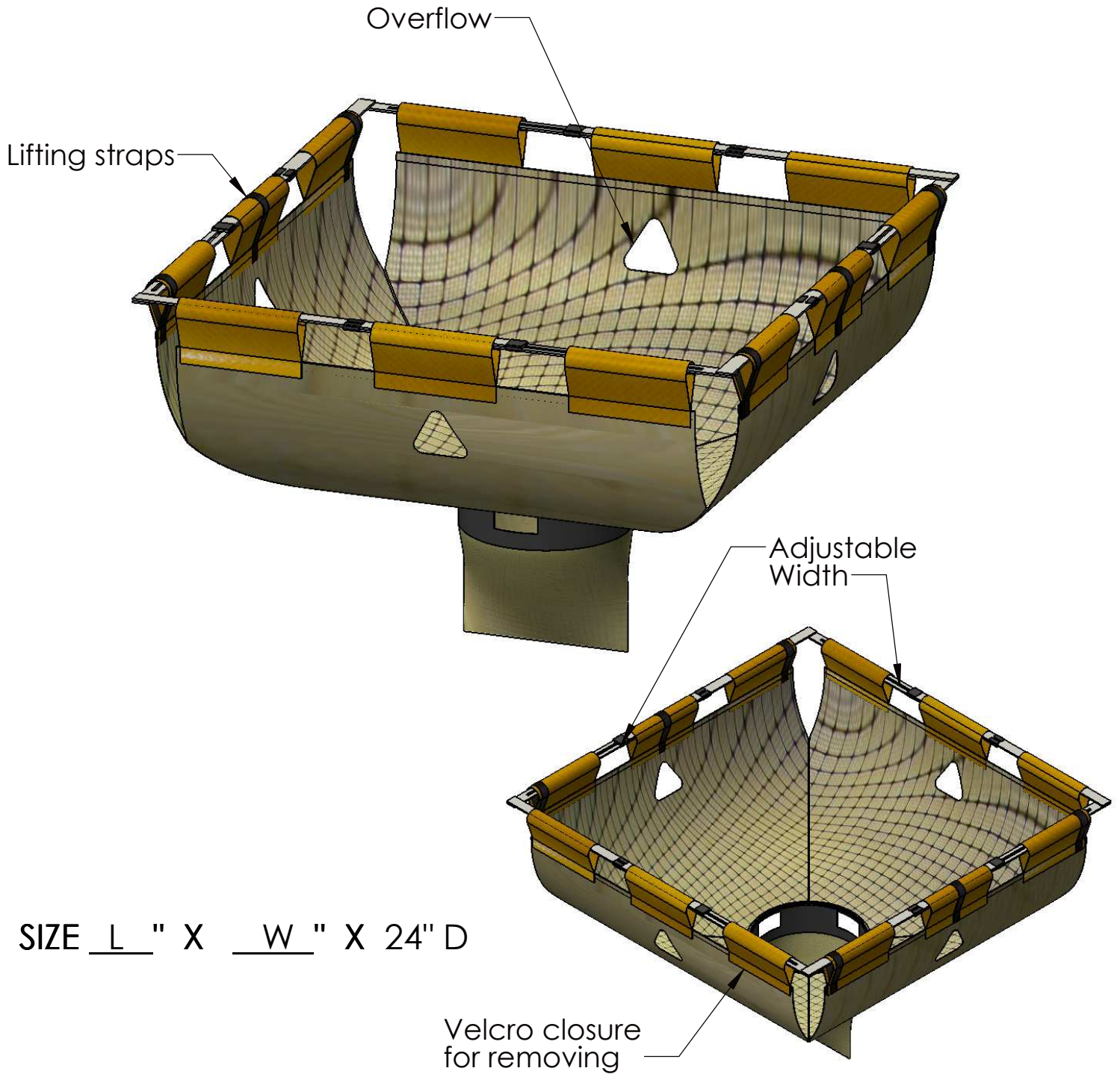
2831 Cardwell Road
Richmond, VA 23234
WWW.ACENVIRONMENTAL.COM

Silt Sack - Type B



2831 Cardwell Road
Richmond, VA 23234
WWW.ACFENVIRONMENTAL.COM

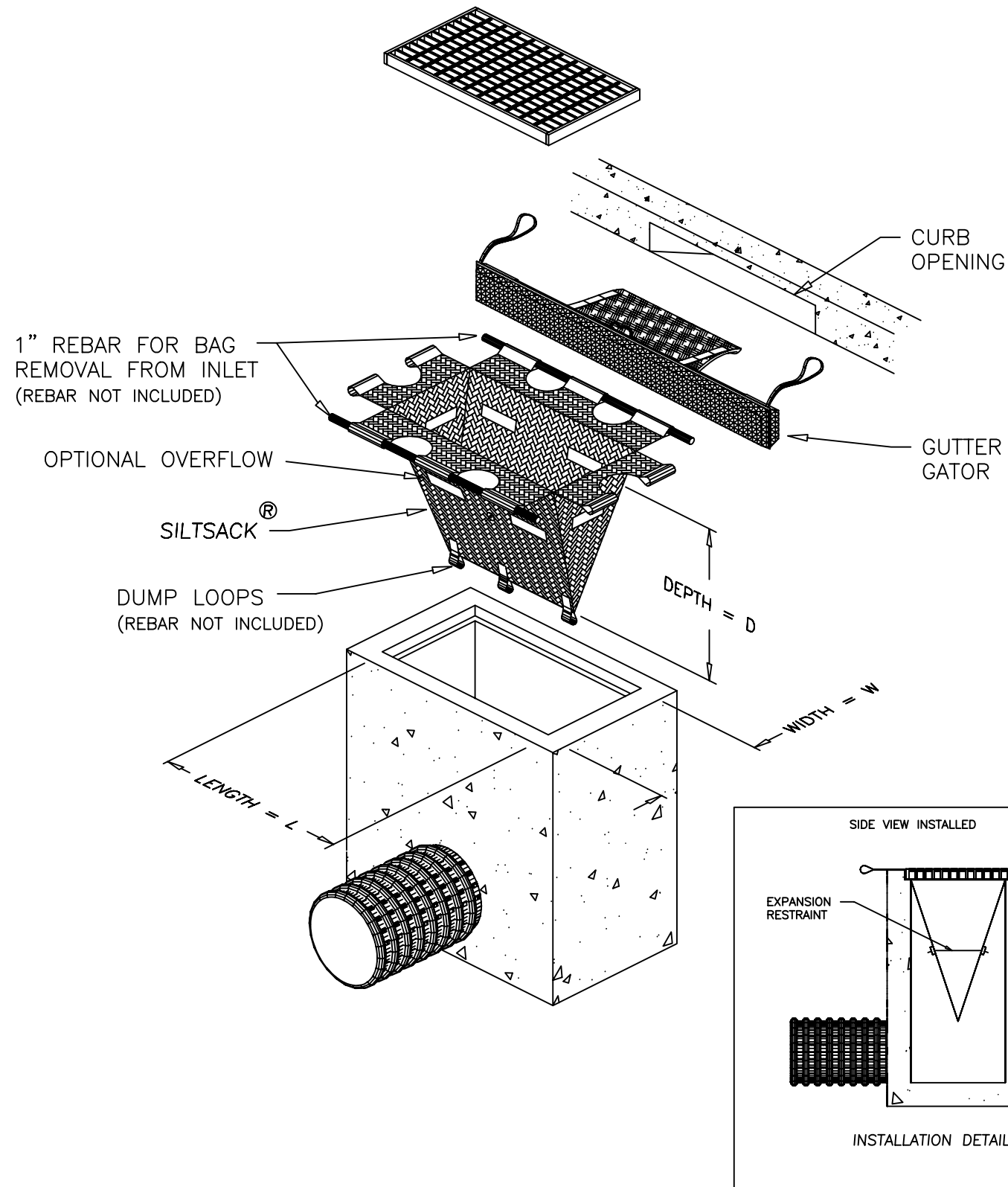
Silt Sack - Type C



SIZE L " X W " X 24" D



2831 Cardwell Road
Richmond, VA 23234
WWW.ACFENVIRONMENTAL.COM



SILTSACK® GUTTER GATOR® COMBINATION
SPECIFICATIONS

NOTE: THE SILTSACK® WILL BE MANUFACTURED FROM A WOVEN POLYPROPYLENE FABRIC THAT MEETS OR EXCEEDS THE FOLLOWING SPECIFICATIONS.

REGULAR FLOW SILTSACK®

(FOR AREAS OF LOW TO MODERATE PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH	ASTM D-4632		300 LBS
GRAB TENSILE ELONGATION	ASTM D-4632		20 %
PUNCTURE	ASTM D-4833		120 LBS
MULLEN BURST	ASTM D-3786		800 PSI
TRAPEZOID TEAR	ASTM D-4533		120 LBS
UV RESISTANCE	ASTM D-4355		80 %
APPARENT OPENING SIZE	ASTM D-4751		40 US SIEVE
FLOW RATE	ASTM D-4491		40 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491		0.55 SEC -1

HI-FLOW SILTSACK®

(FOR AREAS OF MODERATE TO HEAVY PRECIPITATION AND RUN-OFF)

PROPERTIES	TEST METHOD	UNITS	
GRAB TENSILE STRENGTH	ASTM D-4632		265 LBS
GRAB TENSILE ELONGATION	ASTM D-4632		20 %
PUNCTURE	ASTM D-4833		135 LBS
MULLEN BURST	ASTM D-3786		420 PSI
TRAPEZOID TEAR	ASTM D-4533		45 LBS
UV RESISTANCE	ASTM D-4355		90 %
APPARENT OPENING SIZE	ASTM D-4751		20 US SIEVE
FLOW RATE	ASTM D-4491		200 GAL/MIN/SQ FT
PERMITTIVITY	ASTM D-4491		1.5 SEC -1

OIL-ABSORBANT SILTSACK®

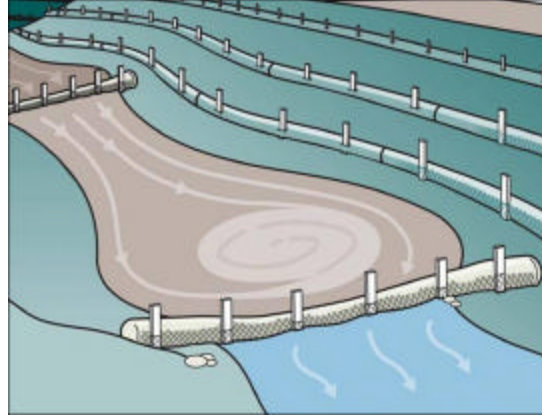
(FOR AREAS WHERE THERE IS A CONCERN FOR OIL RUN-OFF OR SPILLS)

DEPENDING ON YOUR PARTICULAR APPLICATION, THE SILTSACK CAN BE MADE FROM EITHER ONE OF THE ABOVE FABRICS WITH AN OIL-ABSORBANT PILLOW INSERT OR, MADE COMPLETELY FROM AN OIL-ABSORBANT SILTSACK WITH A WOVEN PILLOW INSERT.

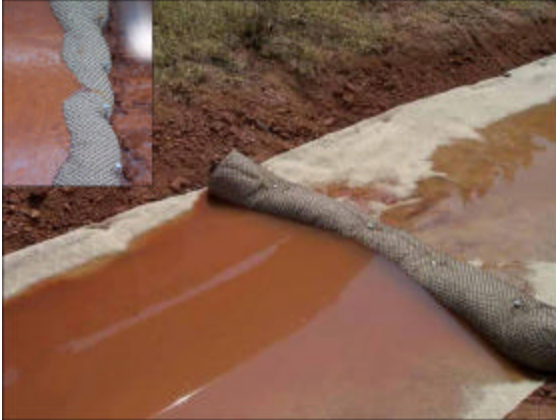
DETAIL OF INLET SEDIMENT CONTROL DEVICE
WITH GUTTER GATOR

ACF Environmental – Geosynthetic Best Management Practices (BMPs) Fiber Filtration Tubes (FFT)

A **Fiber Filtration Tube (FFT)** is an engineered composite of Thermally Refined™ wood fibers, man-made fibers and performance-enhancing polymers encased within cylindrical tubes composed of a heavy-duty, knitted, high density polyethylene mesh.



Fiber Filtration Tubes come in different diameters and lengths for a variety of applications;



Sediment Retention Device (SRD) When utilized as a SDR, the Fiber Filtration Tubes allows water to flow freely through its matrix, providing three-dimensional filtration of soil particles and facilitating the release of flocculants to coagulate and aggregate suspended soil particles. The resulting combination of **Flow, Flocculation and Filtration** separates Fiber Filtration Tubes from other fiber rolls and wattles.



Slope Interruption Device (SID) When utilized as a SID, Fiber Filtration Tubes absorb concentrated flow and distribute it more evenly downstream of the tube.



For more information on specific products, applications, features and benefits, design, installation etc, please contact:

- Slope Interruption Devices ((SIDs)
- Channel//Ditch Flow Checks
- Bio--Swale/Storm Water Treatment Systems

• Drain Inlet Protection

• Perimeter Sediment Control

Terra-Tubes are most beneficial when used as systematic components of a Storm Water Pollution Prevention Plan (SWPPP). They are an ideal complement to other erosion control technologies, such as:

- Hydraulically--Applied Products
- Erosion Control Blankets ((ECBs)
- Turf Reinforcement Mats (TRMs)



Appendix B

Policies & Procedures

Daily Operational Procedures
Illicit Discharge Detection and Elimination (IDDE)
Land-Disturbing Activities
Stormwater Management Facilities



FACILITIES MANAGEMENT DEPARTMENT

POLICY: IV: — Daily Operational Procedures for Stormwater Control Best Management Practices

APPROVED: *Towana Moore, Associate Vice President, Business Services*

Policy Review: Annually

Dated: May 2015

Updated: May 2015

I. PURPOSE

The purpose of this policy is to develop and implement written procedures designed to minimize or prevent pollutant discharge as required by state and federal stormwater regulations. These procedures will include daily operations such as (i) road, street, and parking lot maintenance; (ii) vehicle and equipment maintenance; (iii) the application, storage, transport, and disposal of pesticides, herbicides, and fertilizers; and (iv) the storage of erodible materials. Procedures will be designed to:

1. Prevent illicit discharges;
2. Ensure the proper disposal of waste materials, including landscape wastes;
3. Prevent the discharge of municipal vehicle wash water into the MS4 without authorization under a separate VPDES permit;
4. Prevent the discharge of wastewater into the MS4 without authorization under a separate VPDES permit;
5. Require implementation of best management practices when discharging water pumped from utility construction and maintenance activities;
6. Minimize the pollutants in stormwater runoff from bulk storage areas (e.g., salt storage, topsoil stockpiles) through the use of best management practices;
7. Prevent pollutant discharge into the MS4 from leaking municipal automobiles and equipment; and
8. Ensure that the application of materials, including fertilizers and pesticides, is conducted in accordance with the manufacturer's recommendation.

II. DEFINITIONS

Best Management Practice (BMP) – Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices to prevent or reduce pollution of surface waters and groundwater systems.

Virginia Department of Environmental Quality (DEQ) – State department responsible overseeing the universities stormwater related programs and the enforcement of stormwater legislation.

Illicit Discharge – Any discharge to a MS4 that is not composed entirely of stormwater, except discharges pursuant to a separate VPDES permit, discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3). (water line flushing, landscape irrigation, diverted stream flows, rising ground waters, uncontaminated groundwater infiltration as defined in 40 CFR 35.2005(20), uncontaminated pumped ground water, potable water sources, foundation drains, air conditioning condensation, irrigation water, springs, water from crawl space pumps, footing drains, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges, and street wash water.)

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains.

Stormwater Management Facility - A structural best management practice that controls stormwater runoff and changes the characteristics of that runoff, including but not limited to, the quantity and quality, the period of release, or the velocity of flow.

Virginia Pollutant Discharge Elimination System (VPDES) – A permit program allowing the discharge of stormwater from MS4s, industrial activities and construction activities.

III. RESPONSIBILITIES

- A. Director of Facilities Management: Responsible for the overall implementation of this policy and procedures.
- B. Stormwater Coordinator: Responsible for fulfilling training requirements to FM employees. This will be done through annual stormwater training sessions and new FM employee orientation.

IV. PROCEDURES

- A. Road, Street, and Parking Lot Maintenance
 - a. Sweep or vacuum roads, streets and parking lots regularly, or as needed, to collect dirt, waste, and debris. Debris may be stored at the designated area at the South Main Stockpile Site, or covered as erodible material (refer to section D) at the designated area at the lower section of the R2 parking lot. Dispose as solid waste by transporting to an approved facility.
 - b. Any pavement, concrete or other maintenance and repair projects shall be done in a manor to prevent discharges of waste material to storm conveyance systems. Appropriate control

measures shall be implemented and wastes disposed of properly. Before any work begins, evaluate where drainage ways are located and determine adequate measures to install to protect drainage areas before work begins (e.g., concrete wash out areas, saw cutting waste water collection and disposal, etc.)

B. Vehicle and Equipment Maintenance

a. Vehicle and Equipment Storage

Ensure that vehicles and equipment are not leaking oil or other fluids. If leaks are noted, contact Garage Supervisor for maintenance.

b. Vehicle and Equipment Washing

Wastewater from cleaning vehicles and equipment must be discharged into a sanitary sewer drain at a site that is approved for discharge. Pollutants released while washing vehicles and equipment include surfactants, petroleum hydrocarbons, toxic organic compounds, oils and greases, nutrients, metals, and suspended solids.

Approved washing locations are:

- i. Transportation Wash Bay at South Main Street Facility (1603 South Main Street)
- ii. Wash Bay at University Sports Park Maintenance Shop (1285 Kelsey Lane)
- iii. Other preferred or contracted privately owned car wash facilities.
(Contact your supervisor for approved list)
- iv. In instances where it is not practicable to move machinery/equipment to a wash bay before transporting, field washing may be allowed without the use of chemicals (soaps, degreasers, etc.) as long as it is done in a large grassed area with little or no slope away from storm drainage systems.

c. Vehicle and Equipment Maintenance

- i. Maintenance and repair activities must be conducted indoors whenever possible. If work must be performed outdoors, drip pans or other containment devices shall be used beneath the vehicle or equipment to capture all spills and drips. Tarps or other methods shall also be employed to prevent precipitation from coming in contact with vehicle and equipment leaks.
- ii. Maintenance and repair areas may not be hosed down to outdoor areas. All cleaning must be done inside and by using appropriate control measures.
- iii. Drains located inside buildings must be connected to the sanitary sewer. Sanitary sewer connections should not be made without prior approval from any appropriate agencies.
- iv. All fluids shall be stored and disposed of properly by following the product manufacturer's recommendations.

C. Pesticides, Herbicides and Fertilizers

a. Application

Pesticides, herbicides and fertilizers shall only be applied by certified personnel or personnel currently fulfilling the hands on requirement for obtaining certification. All applications shall follow the guidelines included in the campus integrated pest management (IPM) plan and/or the nutrient management plan (NMP). Other applicable guidelines to follow when applying are:

- i. Avoid spraying over impervious surfaces.
- ii. Do not spray when wind could affect proper application.
- iii. Do not apply to bare or eroding soil.

- iv. Do not apply near water systems. Maintain a buffer zone of at least 20' between waterways and application of chemicals.
 - v. Only limited use of fertilizers and pesticides may be used in bioretention areas (rain gardens, filterra units, etc.) for the purposes of assisting initial and new plantings, and controlling weeds and invasive species."
 - vi. Do not apply if it is raining or immediately before rain is expected (unless the label directs such timing).
- b. Storage
- Chemicals shall either be stored in an enclosed area, or in an area under cover that is protected from precipitation and does not receive flow from stormwater run-off. If possible, keep chemicals in their original containers and mark date of purchase on each container to enable using older product first. Preferred storage location is inside the storage building at the end of Chesapeake Avenue (old Rockingham Cooperative building).
- c. Transport
- Chemicals shall be transported in leak proof containers.
- d. Disposal
- Chemicals shall only be disposed of as recommended by the product manufacturer.

D. Erodible Material Storage (Soil, sand, road salt, etc.)

Cover and contain materials to prevent erosion whenever possible. Erosion results in stormwater contamination and the loss of valuable product. The preferred storage location for erodible materials is the South Main Street Soil Stockpile Site which has an active construction general permit for land disturbance with adequate control measures installed. The Stormwater Pollution Prevention Plan (SWPPP) for this project can be viewed at either the Stormwater Coordinator or Landscape Managers office. If erodible material is to be stored at any other location, the following measures shall be applied.

- i. Place temporary plastic sheeting (polyethylene, polypropylene, hypalon, or equivalent material) over the material and anchor to prevent contact between erodible material and precipitation.
- ii. Install a berm or other method upslope of storage pile to prevent stormwater run-off from draining through stock pile.
- iii. Install erosion control measures, as needed, downslope of storage pile.
- iv. Inspect after each run-off event to make sure no erosion is present.

E. Deicing and Snow Removal

Use of salt for roadway and walkway deicing, shall be applied as recommended by the manufacturer and only as needed using minimum quantities.

- a. Maintenance after Deicing and Snow Removal

Increase maintenance of stormwater structures as necessary to ensure proper operation of drainage systems. Sweep or clean up accumulated deicing and anti-icing materials and grit from roads as soon as possible after the road surface clears in order to prevent access debris from entering the storm sewer system and allow drainage of snow melt.

- b. Storage

The primary storage area for road salt is the South Main Salt Shed. If stored at any other

location, refer to section D for Erodible Material Storage.

F. Spill Control & Response

Spill control kits are located at several locations throughout campus and shall be kept adequately stocked. Be aware of drainage ways and where the nearest spill control kit is located when working outside with chemicals.

Festival Loading Dock
Harrison Hall
Huffman Hall
ISAT Loading Dock
Memorial Hall
Power Plant
Recycling
Rose Library
Showker Hall
Taylor Hall
UREC
USB Garage

HAZWOPER SHEDS
Harrison Hall Annex
Power Plant
ISAT/CS Building



Spill kits can be unlocked with key A473

For small spills, spot clean immediately, dry clean only (no water spraying), and sweep up absorbents and dispose of properly. For large spills contact Work Control at (540) 568-6101 or campus police at (540) 6911 for assistance.

Spills should be documented using the Facilities Management HAZWOPER Incident Report. In the event of an audit from DEQ or EPA, JMU will need to provide documentation about the spill and clean up procedures implemented (e.g., if auditor notices a stain adjacent to a gas pump or storage bin, they will want to see documentation of the incident.)

V. **EVALUATION**

This policy with procedures will be evaluated annually and updated as needed.

Policy #4310

Illicit Discharge Detection and Elimination (IDDE)

Date of Current Revision: February 2014

Responsible Officer: Associate Vice President, Business Services

1. PURPOSE

Establish methods for controlling the introduction of pollutants into the municipal separate storm sewer system (MS4) in order to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process, as implemented through the Virginia Stormwater Management Program (VSMP) Permit for James Madison University (JMU).

2. AUTHORITY

The Board of Visitors has been authorized by the Commonwealth of Virginia to govern James Madison University. See Code of Virginia section 12-164.6; 23-9.2:3. The board has delegated the authority to manage the university to the president.

3. DEFINITIONS

Affiliate: An individual who has a formal affiliation with the university and receives some services from the university, but is not a student or employee of the university and receives no remuneration from the university (Formal affiliation means that a necessary relationship exists between the university and the individual to provide a service of value to the university). Affiliates are defined in Policy 1337 and include employees of contractors such as ARAMARK, Pitney Bowes, Follett, etc.

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices, to prevent or reduce the pollution of surface waters and groundwater systems.

Contractor: An individual or company, including a subcontractor, hired to perform services on university property.

Illicit Discharge: Any discharge to a municipal separate storm sewer system that is not composed entirely of stormwater, except discharges pursuant to VPDES or state permit (other than the state permit for discharges from the municipal separate storm sewer), discharges resulting from firefighting activities, and discharges identified by and in compliance with 9VAC25-870-400 D 2 c (3).

Municipal Separate Storm Sewer: A conveyance or system of conveyances otherwise known as a municipal separate storm sewer system, including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains:

- a. Owned or operated by a federal, state, city, town, county, district, association, or other public body, created by or pursuant to state law, having jurisdiction or delegated authority for erosion and sediment control and stormwater management, or a designated and approved management agency under § 208 of the Clean Water Act (CWA) that discharges to surface waters;
- b. Designed or used for collecting or conveying stormwater;
- c. That is not a combined sewer; and
- d. That is not part of a publicly owned treatment works.

Municipal Separate Storm Sewer System (MS4): All separate storm sewer systems that are defined as “large” or “medium” or “small” municipal separate storm sewer systems or designated under 9VAC25-870.

Visitor: A person who is not enrolled at, compensated by or an affiliate of the university.

4. APPLICABILITY

This policy is applicable to all students, faculty, staff, contractors, affiliates and visitors of James Madison University.

5. POLICY

No university employee, student, visitor, contractor or department shall cause or allow discharges into the university’s storm sewer system which are not composed entirely of stormwater, except for the allowed discharges provided in the Virginia Stormwater Management Program (VSMP) Permit Regulations (9VAC25-870). Prohibited discharges include, but are not limited to: oil, anti-freeze, grease, chemicals, wash water, paint, animal waste, garbage, and litter. The spilling, dumping, or disposal of materials other than stormwater to the storm drainage system is prohibited.

6. PROCEDURES

a. Field Screening

Field observations of MS4 outfalls shall be conducted at least once per year during dry weather conditions. Observations shall be recorded using the current inspection form and information entered into a tracking database.

If flow is observed, or evidence suggests that illicit discharges may exist, further investigation shall be administered by any of the following methods:

- i. Tracing discharge up storm sewer system;
- ii. Taking a sample of discharge for analysis in order to determine if a pollutant is present and identify the pollutant;
- iii. Implement best management practices to eliminate illicit discharges;
- iv. Scheduling follow up observations; and
- v. Any other appropriate measures deemed necessary.

b. Notification of Spills and Illicit Discharges

Once a spill or illicit discharge has been observed, the incident shall be reported to the Stormwater Coordinator and Safety & Training Coordinator. If those individuals are unavailable, contact Work Control or Campus Police. Failure to provide notification of the incident shall be a violation of this policy.

An initial investigation shall be performed within one business day of receiving notification and appropriate measures taken in order to prevent further discharge and begin remediation of pollution.

c. Tracking

Field observations shall be tracked in a database. Data fields to be included shall be:

- i. Date discharge observed/reported

- ii. Location of discharge
- iii. Summary
 - 1. Results of investigation
 - 2. Any follow-up to investigation
 - 3. Resolution of investigation
- iv. Date investigation closed

d. Enforcement

When a violation of this policy has been detected, JMU may order compliance, by either verbal notice or written notice, to the responsible party. Such notice may require without limitation:

- i. The performance of monitoring, analyses, and reporting;
- ii. The elimination of prohibited discharges or connections;
- iii. Cessation of any violating discharges, practices, or operations;
- iv. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
- v. Payment of any fee, penalty, or fine assessed against JMU to cover remediation cost;
- vi. The implementation of new stormwater management practices; and
- vii. Disciplinary action up to and including dismissal, where appropriate.

The listed requirements will be at the expense of the responsible party.

In the event that adequate measures are not initiated, JMU may issue work orders to correct the violation and bill the responsible party for expenses incurred.

If additional measures are required for enforcement, the president will be notified.

e. Training/Education

A training program for Stormwater Pollution Prevention/Good Housekeeping and Illicit Discharge Detection & Elimination (IDDE) will be presented for Facilities Management employees on an annual basis, and during new employee orientation for Facilities Management staff.

Educational materials for Stormwater Pollution Prevention and Illicit Discharge Detection & Elimination will be distributed through various forms of media to the members of the JMU community.

7. RESPONSIBILITIES

Stormwater Coordinator: Responsible for administration, implementation and enforcement of this policy.

All students, faculty, staff, contractors, affiliates and visitors of James Madison University are responsible for abiding by this policy and reporting illicit discharges to the proper authority.

8. SANCTIONS

Regarding employees of JMU and affiliates, sanctions will be commensurate with the severity and/or frequency of the offense and may include termination of employment.

Regarding students, sanctions will be commensurate with the severity and/or frequency of the offense and may include suspension or expulsion.

9. EXCLUSIONS

The following discharges to the municipal storm sewer system are allowed as they are considered to be not significant contributors of pollutants to the MS4:

- a. Discharges that are covered under a separate individual or general Virginia Pollutant Discharge Elimination System (VPDES) or Virginia Stormwater Management Program (VSMP) permit for non-stormwater discharges.
- b. Discharges or flows which are not significant contributors of pollutants to the municipal separate storm sewer system
 - Water line flushing
 - Landscape irrigation
 - Diverted stream flows
 - Rising ground waters
 - Potable water sources
 - Foundation drains
 - Air conditioning condensation
 - Irrigation water
 - Springs
 - Water from crawl space pumps
 - Footing drains
 - Flows from riparian habitats and wetlands
 - Dechlorinated swimming pool discharges
 - Street wash water

10. INTERPRETATION

Authority to interpret this policy rests with the President and is generally delegated to the Associate Vice President of Business Services.



FACILITIES MANAGEMENT DEPARTMENT

POLICY: IV: 11 — Land-Disturbing Activities
Policy Review: Annually

DATED: July 2009
UPDATED: February 2014

APPROVED: *Towana Moore, Associate Vice President, Business Services*

I. PURPOSE

The purpose of this policy is to establish guidelines to ensure all land-disturbing activities are in compliance with regulations set forth by the Department of Environmental Quality (DEQ).

II. DEFINITIONS

Best Management Practice (BMP) - A management practice that seeks to prevent or reduce the pollution of surface waters and groundwater systems from the impacts of land-disturbing activities.

Common Plan of Development – A contiguous area where separate and distinct construction activities may be taking place at different times on different schedules.

Erosion and Sediment Control Plan - A site-specific plan identifying best management practices to minimize accelerated soil erosion and sedimentation.

Land-disturbing activity - any land change that may result in soil erosion from water or wind and the movement of sediments into state waters or onto lands in the commonwealth, including, but not limited to, clearing, grading, excavating, transporting, and filling of land.

Responsible Land Disturber (RLD) - Means an individual holding a certificate of competence issued by DEQ, or previously issued by DCR, who will be in charge of and responsible for carrying out the land-disturbing activity in accordance with the approved plan. The RLD may be the owner, applicant, permittee, designer, superintendent, project manager, contractor, or any other project or development team member. The RLD must be designated on the plan or permit as a prerequisite for plan approval by the Plan-Approving Authority

III. RESPONSIBILITIES

A. Director of Facilities Management - Responsible for the overall implementation of this procedure.

- B. Assistant Director of Facilities Management for Operations and/or Service Managers - Responsible for ensuring that the requirements outlined in this procedure are followed for all land-disturbing activities undertaken by Facilities Management Operations.
- C. Project Manager - Responsible for ensuring that the requirements outlined in this procedure are followed for all land-disturbing activities which they are managing.
- D. Stormwater Coordinator - Responsible for reviewing and approving erosion and sediment control plans and conducting site inspections to ensure compliance with the James Madison University Erosion and Sediment Control Annual Standards and Specifications and the Virginia Erosion and Sediment Control Regulations.

IV. PROCEDURE

- A. Any land-disturbing activity smaller than 10,000 square feet in area is not required to have a site-specific erosion and sediment control plan unless that activity is part of a common plan of development. Although a formal plan is not required, erosion and sediment control best management practices still need to be implemented to minimize soil erosion and sedimentation. Contact the Stormwater Coordinator if there are any questions regarding what practices should be implemented at the site.
- B. An erosion and sediment control plan must be prepared and submitted to FM-Engineering for review and approval before any land-disturbing activity equal to or exceeding 10,000 square feet in area may commence. Please refer to the James Madison University Erosion and Sediment Control Annual Standards and Specifications for an outline of the requirements.
- C. A stormwater management plan must be prepared and submitted for review and approval before any land-disturbing activity equal to or exceeding 1 acre in area may commence. The responsible land disturber for the activity must also obtain a VSMP General Permit for Discharges of Stormwater from Construction Activities and prepare all necessary attachments to meet permit requirements.
- D. For all land-disturbing activities equal to or exceeding 1 acre the project manager must also ensure a copy of all the following materials is given to the Stormwater Coordinator for the reporting requirements of the University's MS4 permit:
 - 1. Copy of signed VSMP permit application
 - 2. Stormwater Pollution Prevention Plan (SWPPP)
 - 3. Cover letter from DEQ with VSMP permit number and the date of coverage
 - 4. Approved Stormwater Management Plan & Calculations
 - 5. All inspection reports conducted by the RLD during construction
 - 6. Any actions by DEQ (site inspections, correspondence, notices, etc.) that are issued for the project
 - 7. Actions taken in response to the DEQ directives

8. Any incidents that occurred on the project during the reporting
9. “As Built” CAD files of all projects completed during the reporting period for updating the GIS system
10. Copy of the VSMP Notice of Termination form



FACILITIES MANAGEMENT DEPARTMENT

POLICY: IV: 10— Stormwater Management Facilities
Policy Review: Annually

DATED: September 1997
UPDATED: February 2014

APPROVED: *Towana Moore, Associate Vice President, Business Services*

I. PURPOSE

The purpose of this policy is to establish guidelines for the design, installation, acceptance, inspection, and maintenance of stormwater management facilities installed on campus.

II. DEFINITIONS

Best Management Practice (BMP) – Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices, including both structural and nonstructural practices to prevent or reduce pollution of surface waters and groundwater systems.

DEQ – Virginia Department of Environmental Quality

Municipal Separate Storm Sewer System (MS4) – A conveyance or system of conveyances including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains.

Stormwater Management Facility - A structural best management practice that controls stormwater runoff and changes the characteristics of that runoff, including but not limited to, the quantity and quality, the period of release, or the velocity of flow.

III. RESPONSIBILITIES

- A. Director of Facilities Management- Responsible for the overall implementation of this procedure.
- B. Assistant Director of Facilities Management for Operations and/or Service Managers- Responsible for ensuring that stormwater management facilities are properly maintained when work orders are issued for maintenance and/or repair.
- C. Project Manager- Responsible for ensuring that stormwater management facilities are designed in accordance with the appropriate water quality and water quantity design criteria as required in

“Providing Quality, Efficient and Safe Facilities for JMU”

9VAC25-870 and installed in accordance with the approved site plan and applicable requirements of the Department of Environmental Quality (DEQ) and any annual standards and specifications adopted by the university..

- D. Stormwater Coordinator - Responsible for overseeing site plan review, long-term maintenance inspections, preparation of report for work orders for BMPs requiring maintenance, and submitting the required annual report to the Department of Environmental Quality.

IV. PROCEDURE

A. Design & Plan Review

Project Manager will ensure that a site plan is designed to incorporate required stormwater management facilities that will meet water quality and water quantity standards and assist in meeting the University's MS4 reduction goals.

Stormwater Coordinator shall oversee review of plans to ensure compliance with stormwater regulations.

Project construction shall not begin until site plan has been approved for erosion and sediment control and stormwater management.

B. Installation & Approval

Project Manager, or project inspector, shall observe construction of the stormwater management facility to ensure compliance with approved plan.

Project Manager shall have contractor provide any requested as-built documentation and have engineer provide an as-built certification.

Stormwater Coordinator will file as-built certification with BMP files for use during maintenance inspections.

C. Long-Term Maintenance & Inspections

Stormwater Coordinator shall oversee required inspections on stormwater management facilities. Any required maintenance shall be documented and information included in a work order to Operations or outside contractor for remedial work.

Assistant Director of Facilities Management for Operations shall ensure that maintenance is performed as instructed by work order, unless outside contractor is hired for repair.

Stormwater Coordinator will perform a final inspection once informed of completion of remedial work.

D. Reporting

Stormwater Coordinator will be responsible for preparing and submitting required annual BMP report to DEQ. A copy of this report will be kept in the Engineering Department file. The report shall include the following information:

- i. Type of structural stormwater facility installed as defined in the Virginia Stormwater Management Handbook or Virginia Stormwater BMP Clearinghouse
- ii. Geographic Location (Hydrologic Unit Code)
- iii. Where applicable, the impaired surface water that the stormwater management facility is discharging into
- iv. Number of acres treated

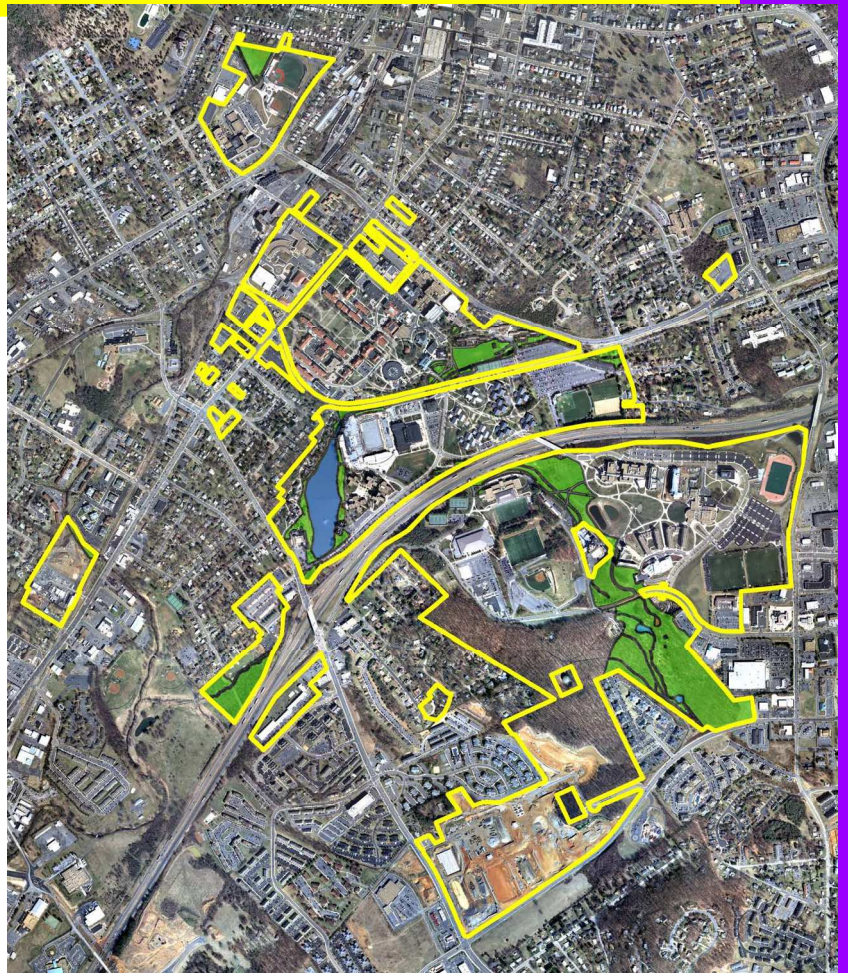
E. Evaluation

This procedure shall be reviewed annually.

Chesapeake Bay TMDL Action Plan

2015

Chesapeake Bay Action Plan



Dale Chestnut

JMU Facilities – Engineering & Construction

6/16/2015

2015 Chesapeake Bay Action Plan
James Madison University – Harrisonburg, Virginia

June 2015

Submitted to satisfy the terms of the
General VPDES Permit for Discharges of Stormwater from
Small Municipal Separate Storm Sewer Systems (MS4)

Registration Number: VAR040112

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Abbreviations

CGP – Construction General Permit

DCR – Virginia Department of Conservation and Recreation

DEQ – Virginia Department of Environmental Quality

EOS – Edge of Stream

ESC – Erosion and Sediment Control

JMU – James Madison University

MCM – Minimum Control Measure

MS4 – Municipal Separate Storm Sewer System

POC – Pollutant of Concern

RUI – Regulated Urban Impervious

SWPPP – Stormwater Pollution Prevention Plan

TMDL– Total Maximum Daily Load

VSMP – Virginia Stormwater Management Program

Introduction

This Action Plan was created to satisfy Section I.C. of the 2013-2018 General Permit for Discharges of Stormwater from Small (Phase II) Municipal Separate Storm Sewer Systems (MS4). Section I.C. is the Special Condition for the Chesapeake Bay Total Maximum Daily Load (TMDL), which requires reductions of the Chesapeake Bay pollutants of concern (POCs) from existing development, including both impervious and pervious land that drains to James Madison University's MS4. The Chesapeake Bay POCs include nitrogen, phosphorus, and sediment. This Action Plan was developed to conform to the Virginia Department of Environmental Quality (DEQ) Guidance Memo No. 15-2005, dated May 18, 2015.

The Action Plan provides a review of the current MS4 program, which demonstrates James Madison University's (JMU) ability to ensure compliance with the Special Condition. It describes the required reduction in POCs, as well as the means and methods to be utilized in achieving 5.0% of the total reductions during the 2013 - 2018 permit cycle, as required by the permit. The required POC reductions are based on the Level 2 scoping run reduction for existing development, as defined in Virginia's Phase II Watershed Implementation Plan. Level 2 implementation refers to a modeled pollution reduction level of effort. It equates to an average reduction of 9.0% of nitrogen loads, 16% of phosphorus loads, and 20% of sediment loads from impervious regulated acres from the 2009 baseline loads. From pervious regulated acres, Level 2 implementation requires the reduction of 6.0% of nitrogen loads, 7.25% of phosphorus loads and 8.75% sediment loads from the 2009 baseline loads. Further discussion of required pollution reductions may be found in Virginia's Phase II Watershed Implementation Plan.

The Action Plan is composed of the following elements:

1. Current Program and Existing Legal Authority
2. New or Modified Legal Authority
3. Means and Methods to Address Discharges from New Sources
4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern Required Reductions
5. Means and Methods to Meet the Required Reductions and Schedule
6. Means and methods to Offset Increased Loads Form New Sources Initiating Construction Between July 1, 2009 and June 30, 2014
7. Means and Methods to Offset Increased Loads from Grandfathered Projects that Begin Construction After July 1, 2014
8. List of Future Projects, and Associated Acreage that Qualify as Grandfathered
9. An Estimate of the Expected Cost to Implement the Necessary Reductions
10. Public Comments on Draft Action Plan

The Action Plan was completed in June, 2015, and will be submitted to the DEQ with JMU's MS4 Program Annual Report for the reporting period of July 1, 2014 through June 30, 2015. Should the Action Plan need to be updated to reflect new project opportunities, to address projects deemed infeasible, or for any other reason, updates will be submitted to the Department in accordance with the Program Plan Modification section of the General Permit (GP Section II.F.1).

1. Current Program and Existing Legal Authority

James Madison University falls under the Phase II MS4 regulations as a small municipal storm sewer system operator, based on the definition found in 40 CFR 122.26(b)(8). As an operator of a small MS4, JMU must develop, implement, and enforce a MS4 Program designed to reduce the discharge of pollutants from the small MS4 to the maximum extent practicable, to protect water quality, to ensure compliance with water quality standards, and to satisfy the water quality requirements of the Clean Water Act and its attendant regulations.

As the operator of the MS4, and other campus infrastructure, University Administration has assigned the Facilities Management Department the responsibility of, and authority to administer a comprehensive and compliant Stormwater Management Program. JMU has developed and administered a compliant MS4 program since it was first permitted in 2007. The core of the program revolves around the six minimum controls measures (MCM) found in the Phase II MS4 General Permit. Best management practices implemented to comply with the minimum control measures and outcomes achieved can be found in JMU's MS4 Program Plan and annual reports, respectively. The MCMs include:

1. Public education and outreach on stormwater impacts
2. Public involvement/participation
3. Illicit discharge detection and elimination (IDDE)
4. Construction site stormwater runoff control
5. Post-construction stormwater management
6. Pollution prevention/good housekeeping for municipal operations

The Facilities Management Department maintains four stormwater policies that provide it with the authority to administer the program and comply with the MCMs. The policies describe in detail their purpose, definitions, responsibilities, and procedures. They provide guidance to faculty, staff, students and the public, which results in the efficient administration of the program, and continuity of operations within the Stormwater Division. These policies can be found in the Appendices of the MS4 Program Plan, and are viewed annually. The MS4 Program Plan will be updated with various additional policies and procedures according to the schedule established in the 2013 Phase II MS4 General Permit. The existing policies and their most recent version include:

- Illicit Discharge Detection and Elimination (IDDE) Policy & Procedure, February 2014
- Land-Disturbing Activities Policy & Procedure, February 2014
- Stormwater Management Facilities Policy & Procedure, February 2014
- Erosion and Sediment Control/Stormwater Management (ESC/SWM) Annual Standards & Specifications, November 2014
- Daily Operating Procedures for Stormwater Control Best Management Practices, May 2015

MCMs 4 and 5 regulate construction and post-construction stormwater management, respectively. § 62.1-44.15:54 of the Virginia Administrative Code allows state agencies to adopt their own Virginia Erosion and Sediment Control (ESC) Program. JMU has administered its own ESC program since 2009, with the oversight of the Virginia Department of Conservation and Recreation (DCR), and now DEQ. As of July 1, 2014, the University now also administers its own Virginia Stormwater Management Program (VSMP), as allowed by § 62.1-44.15:27. JMU submits ESC and stormwater management Annual Standards & Specifications for approval by DEQ to ensure all development on the campus conforms with the intent of the Virginia Erosion and Sediment Control Law, the Virginia Stormwater Management Act, and attendant regulations.

Regarding legal authority over contractor activities, all contractors performing land disturbing activities on JMU properties are required, through contract documents, to obtain all applicable permits before construction activity commences, and to follow JMU's Annual Standards and Specifications. CO-7 of the General Conditions of the Construction Contract addresses requirements of related to land disturbance.

1.1 Ability to Address Special Condition for the Chesapeake Bay TMDL

The existing program provides adequate authority to address the Special Condition for the Chesapeake Bay TMDL. The required deliverables will be produced with existing Facilities Management staff, and outside support available to staff. Projects implemented to achieve pollutant reduction targets, and strategies to fund them, will be developed and managed by existing staff. A robust recordkeeping system will provide long-term continuity for managing load reductions and maintenance activities. Additionally, through the development of a Stormwater Management Master Plan and Stormwater Retrofit Opportunities study, staff has inventoried additional options for POC reductions, beyond what is identified in the Action Plan. Existing staff will also provide for the adoption of stormwater practices and infrastructure into a long-term stormwater asset management program. Funds to meet the Special Condition may continue to be requested from the University General Fund, and may be supplemented with grant funds.

2. New or Modified Legal Authority

*General Permit Section
I.C.2.a.(2)*

No new legal authorities are required for compliance with the Special Condition for the Chesapeake Bay TMDL. JMU already possess the authorities necessary to meet the pollution reduction goals identified in Section 4.

However, compliance may be more easily managed by communicating and formalizing responsibilities with neighboring MS4 jurisdictions. JMU and neighboring jurisdictions have decided that each will be responsible for the drainage areas that fall within their municipal boundary. JMU and the City of Harrisonburg are in discussions about formalizing this agreement with a Memorandum of Understanding. This plan will be updated to reflect any agreements that JMU enters into that affect the management of the MS4.

3. Means and Methods to Address Discharges from New Sources

*General Permit Section
I.C.2.a.(3)*

When it comes to site development, JMU has the advantage of being both the project manager and the VSMP authority (as of July 2014), administering site design, stormwater regulatory conformance, and construction all within the same department. Therefore, the University is in a good position to design projects that meet or exceed the requirements of the Erosion and Sediment Control Law and Virginia Stormwater Management Act and regulations.

JMU's VESC Program and VSMP operate under DEQ approved Annual Standards and Specifications. JMU requires all development projects that are 10,000 square feet or greater to have an ESC plan that conforms to the Annual Standards and Specifications. The VSMP requires the development of a Stormwater Pollution Prevention Plan (SWPPP) for all construction projects that require a VSMP permit. The SWPPP includes the following elements:

- Erosion and Sediment Control Plan
- Stormwater Management Plan
- Pollution Prevention Plan
- Description of control measures necessary to address a TMDL

The Project Manager is responsible for requiring site design that meets the technical criteria of the Virginia Stormwater Management Regulations, and that a VSMP Construction General Permit (CGP) is obtained from DEQ. The Stormwater Coordinator is responsible for reviewing and providing comments to confirm conformance of the plans with the regulations and Annual Standards and Specifications. The Stormwater Coordinator may seek qualified assistance for plan review, at his discretion.

Pre-construction meetings are routinely held to clarify ESC and SWM expectations. Construction sites are inspected regularly by certified personnel to ensure compliance with the CGP, approved plans, and all applicable regulations, standards and specifications. Inspection reports are issued to project personnel, and violations corrected under the supervision of the Project Manager. The General Conditions of the Construction Contract document requires contractors to have a Responsible Land Disturber on-site. A detailed procedure that allows for variances and exceptions that are still protective of offsite property and resources is documented in the Annual Standards and Specifications.

Permanent stormwater facilities are inspected for conformance to plans, specifications and standards, and as-built drawings are submitted to the Stormwater Coordinator to file and draw upon for long-term inspections of permanent stormwater facilities. Stormwater management plans must include maintenance information. Inspections of stormwater facilities will be conducted annually, and work orders submitted for maintenance, as needed. Maintenance is performed by Facilities Management staff or a contractor of the department. Additional information on these programs, policies, and procedures may be found in the MS4 Program Plan Appendices, as noted in section 1.

Prior to 2014, new sources of stormwater discharges were regulated by the Virginia Department of Conservation and Recreation. Implementation of JMU's VSMP began July 1, 2014 with oversight from DEQ and the State Water Control Board.

4. Estimated Existing Source Loads and Calculated Total Pollutant of Concern Required Reductions

*General Permit Section
I.C.2.a.(4) & (5)*

For the purposes of the 2015 Action Plan, JMU estimated existing source loads and total pollutant of concern (POC) required reductions using its 2009 baseline jurisdictional boundary, excluding open water and unregulated acreage that sheet flows directly to waters of the United States, to represent the MS4 service area. The 2009 baseline jurisdictional boundary was identified using JMU's property record Geographic Information System data. Pervious and impervious acreage from which loads were derived were delineated by Vanasse Hagen Brustlin, Inc. in a 2013 study that was used to develop a stormwater master plan for JMU. For the study, a GIS analysis of aerial imagery was conducted to categorize land cover into pervious and impervious categories. Construction site plans from projects constructed between the aerial imagery year and the study year were used to update the land cover data to reflect the most recent conditions. A map of JMU's MS4 service area used for this plan can be found in Figure 1.

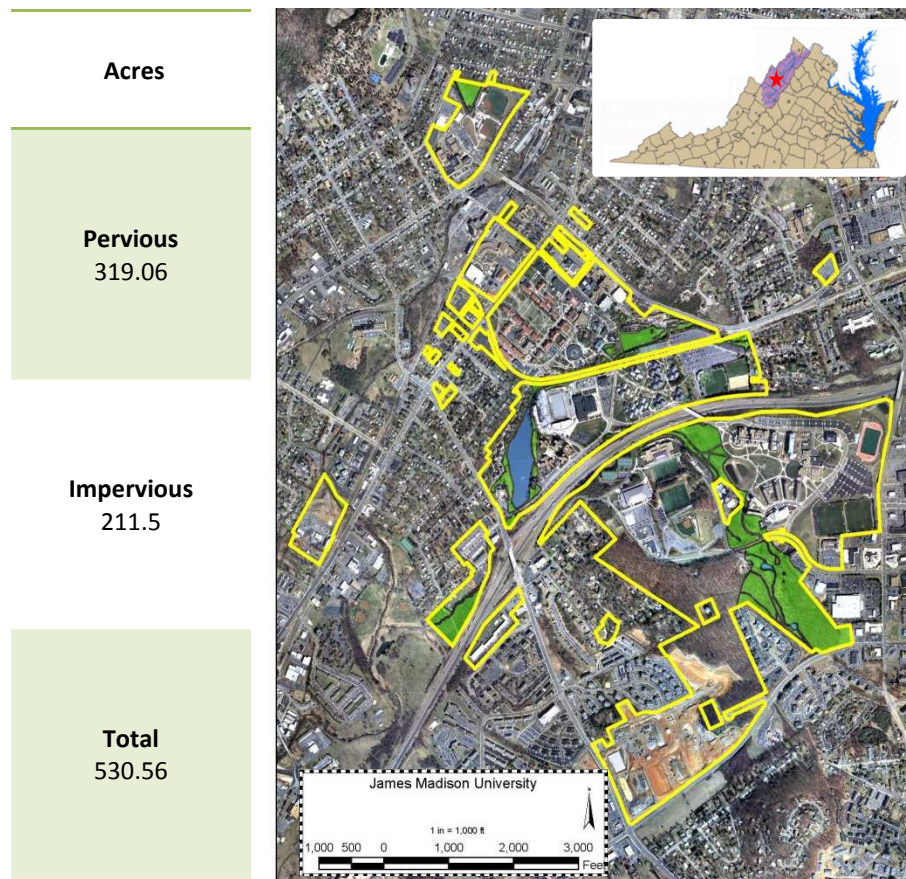


Figure 1. Regulated urban acreage inside service area (jurisdictional boundary – indicated by yellow outline). Open Water (blue) and unregulated acreage sheet flowing to waters of the U.S. (green) are excluded.

The baseline loads and required POC required reductions will be recalculated after mapping of JMU’s MS4 drainage areas is complete, and more accurate land cover estimates can be made. Recalculations will be included in the second phase of the Action Plan, to be submitted with the reapplication package, in accordance with Section I.C.5.b. of the MS4 General Permit.

The estimated existing source loads and POC required reductions are based on the regulated urban acreage identified in Figure 1, and the Level 2 scoping for POC reductions identified in Virginia’s Phase II Watershed Implementation Plan. Level 2 scoping provides for the reduction (from 2009 baseline loads) of 9.0% of nitrogen loads, 16% of phosphorus loads, and 20% of sediment loads from impervious regulated acres, and 6.0% of nitrogen loads, 7.25% of phosphorus loads and 8.75% sediment loads from pervious regulated acreage. The Phase II MS4 permit requires that 5% of the reduction targets (identified in Table 2) be achieved within the 2013 – 2018 permit term (referred to by the permit, and in the tables below, as “first permit cycle”).

Table 1 includes the information required by Phase II MS4 Permit, Section I.C.2 Tables 2b and 3b, entitled: “Table 2b: Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin,” and “Table 3b: Calculation Sheet for Determining Total POC Reductions Required During this Permit Cycle for the Potomac River Basin.”

Table 1. Estimated Existing Source Loads and Total POC Reductions Required in First Permit Cycle

Pollutant	Land Cover ¹ & L2 % Reduction	2009 EOS Loading Rate ² (lbs/acre)	Estimated Total POC Load Based on 2009 Progress Run (lbs)	First Permit Cycle Required Reduction in Loading Rate ³ (lbs/ acre)	Total Reduction Required First Permit Cycle (lbs)
Total Nitrogen	RUI 9%	16.86	3,565.89	.07587	16.05
	RUP 6%	10.07	3,212.93	.03021	9.64
Total Phosphorus	RUI 16%	1.62	342.63	.01296	2.74
	RUP 7.25%	0.41	130.81	.00148625	0.47
Total Suspended Solids	RUI 20%	1,171.32	247,734.18	11.7132	2,477.34
	RUP 8.75%	175.80	56,090.75	.769125	245.40

*RUI = Regulated Urban Impervious; RUP = Regulated Urban Pervious; EOS = Edge of Stream; POC = Pollutant of Concern

¹ 2009 EOS Loading Rate as listed in Section I Part C Table 2b - Calculation Sheet for Estimating Existing Source Loads for the Potomac River Basin

² 2009 EOS Loading Rate as listed in Part II of the Chesapeake Bay TMDL Special Condition Guidance document for the Potomac River Basin

³ Reduction Loading Rate listed as “Corrected Loading Rate” in Part II of the Chesapeake Bay TMDL Special Condition Guidance document for the Potomac River Basin

5. Means and Methods to Meet the Required Reductions and Schedule

Stream restoration, and land use changes associated with stream restoration projects, are the primary strategies JMU will use to achieve the pollution reductions called for by the General Permit. Bioretention will also play a part. Calculations to determine the pollution reductions to result from these projects adhere to the guidelines established in Guidance Memo No. 15-2005. Projects completed since 2009 will be used to account for part of the required POC reductions, and the remainder will be reduced by a planned stream restoration project. Together, these projects exceed 100% of the pollutant of concern (POC) reductions required of JMU through 2028. Accordingly, pollution reductions achieved during this permit cycle will be applied to the POC reductions required in subsequent permit cycles. Additionally, all means and methods included in this plan are guaranteed to be credited at the efficiencies established at the time this Action Plan is submitted, according to the Guidance Memo (Part III. Eligible BMPs and Credit Opportunities), which states “Likewise, if the BMPs included in the initial Action Plan result in reductions beyond the required 5% those reductions will also be guaranteed at the efficiencies available at the time the Action Plan is submitted.” Table 2 compares the required pollutant reductions to those which are planned by 2018.

Table 2. Pollutant reductions required versus planned.

	TP	TN	TSS
Required by 2018, lbs. (5%)	3.22	25.7	2,722.74
Required by 2028, lbs. (100%)	64.3	513.71	54,454.78
Planned by 2018, lbs.	292.12	1,862.52	443,826.99

This section of the Action Plan describes the projects JMU plans to use to achieve its permitted pollution reduction goals required by 2018 (and beyond). However, JMU maintains flexibility to remove any of the identified projects from the plan, adapt them, or to consider different projects as opportunities arise, as long as the changes do not compromise JMU’s ability to comply with the goals and schedule established in the General Permit.

5.1 Completed and Planned Projects

JMU has implemented several stormwater best management practices and stream restoration projects since 2009, and prior to the submission of this plan in June, 2015. These projects, described in Table 3, were developed to address in-stream erosion caused by watershed urbanization. The approved interim rates for urban stream restoration were used to calculate the mass reduction of POCs per length of stream restored found in Appendix V.J. of the Guidance Memo.

Land use changes associated with adding grass buffers to the restored streams also yielded pollutant reductions, and are included as a strategy in this plan. Efficiencies from Table V.H.1. of the Guidance Memo were used to calculate these reductions. A bioretention filter was also completed in 2012. Chesapeake Bay Program efficiencies were used to calculate POC reductions resulting from the bioretention filter.

The one project that will not be completed until after the Action Plan is submitted, is a stream restoration project that will be implemented on campus, at the Edith J. Carrier Arboretum. The project will restore 1,080 feet of a headwaters tributary to Blacks Run, an impaired waterbody in Harrisonburg, Virginia. The design for the restoration includes the creation of 0.37 acres of interconnected wetland cells in a large floodplain area that is to be reconnected to the tributary by the project.

The POC reductions for the Arboretum stream restoration project were calculated using two protocols found in Appendix V.J. of the Guidance Memo. These protocols were approved in 2014 by the Chesapeake Bay Program’s Urban Stormwater Workgroup and Water Quality Goal Implementation Team. Details of the protocols can be found in the guidance document entitled *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects*, and include Protocol 1: Sediment Prevented, and Protocol 3: Floodplain Reconnection. The estimates do not take into consideration potential rate reductions due to sediment transport/delivery or the limited stream flow of the project reach. The degraded condition of the stream, information about the calculations and other project design details are documented in the *Final Design and Pollutant Reduction Report* completed in January, 2015. This document is available upon request.

Table 3 summarizes the completed and proposed projects, and their associated POC reductions. Detailed pollution reduction calculations for each project are located in the electronic spreadsheet ledger submitted with this plan, as directed by the Guidance Memo. Baseline reductions in credit calculated for unregulated land in the drainage area of the projects are included in the spreadsheet, where applicable. The spreadsheet ledger contains the following data:

- the total reductions required;
- each practice that will be implemented;
- the approximate location of the project;
- the load that will be reduced by each project, and
- the project schedules.

Table 3. Projects completed since 2009.

ID	Project Name/Description	BMP Total Removal			Status
		TP	TN	TSS	
ST1	SRP: East Campus (1031')	69.74	71.03	45,895.20	Complete
ST1a	SRP: East Campus Land Use Change - Pervious to Grass		2.75		Complete
ST2	SRP: Siberts Creek - Segment 'A' (407')	27.63	29.47	18,231.23	Complete
ST3	SRP: Siberts Creek - Segment 'B' (498')	33.80	36.09	22,283.14	Complete
ST4	SRP: Siberts Creek - Segment 'C' (711')	47.91	47.45	31,446.04	Complete
ST4a	SRP: Siberts Creek Land Use Change - Pervious to Grass		4.31		Complete
S4	SRP: Siberts Creek Bioretention	1.87	13.02	1,551.38	Complete
ST5	SRP: Arboretum w/ Constructed Wetlands	11.17	1,658.4	324,420.0	Planned

5.2 Project Schedules

All of the previously constructed projects had a completion date of September 15, 2012, as they were constructed at essentially the same time, and were deemed “stabilized” on that date. The Arboretum stream restoration was initiated in September of 2013. Construction is estimated to start on July 1, 2015, and conclude in November, 2015, after which the project will be monitored by JMU’s Department of Integrated Science and Technology. The Facilities Management Department will inspect the project annually to ensure that it continues to function as designed.

6. Means and methods to Offset Increased Loads From New Sources Initiating Construction Between July 1, 2009 and June 30, 2014

*General Permit Section
I.C.2.a.(7)*

JMU does not have increased loads to offset in this category, as it has never used an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities.

7. Means and Methods to Offset Increased Loads from Grandfathered Projects that Begin Construction After July 1, 2014

*General Permit Section
I.C.2.a.(8)*

JMU will not have increased loads to offset in this category. As the VSMP authority, the University will not use an average land cover condition greater than 16% impervious cover for the design of post-development stormwater management facilities for grandfathered projects.

8. List of Future Projects, and Associated Acreage that Qualify as Grandfathered

*General Permit Section
I.C.2.a.(10)*

JMU has two projects that would qualify for grandfathering in accordance with 9VAC25-870-48. Should any revisions be made to the plans that would increase the amount of Total Phosphorus discharged from the site, the plans will no longer be considered grandfathered. It is undetermined whether either of these projects will ever be built. The projects include:

1. Name: James Madison University Port Republic Road Athletics Complex
Approval Date: March 15, 2010
Acres: 4.2

This project was completed in 2013, but was not fully constructed as planned. Minor site work to accommodate a concession stand, bleachers, and artificial turf remains.

2. Name: CISAT Campus Pond Relocation
Approval Date: March 10, 2011
Acres: 4.93

No increase in impervious surface will occur with this project.

9. An Estimate of the Expected Cost to Implement the Necessary Reductions

*General Permit Section
I.C.2.a.(11)*

JMU estimates that the projects described in section 5 will cost approximately \$485,000 to implement. All of the projects were funded, in part, by federal grants that were matched by JMU with a mix of cash and in-kind contributions. The most significant allocation of funds, to date, will go to the planned Arboretum stream restoration. The University will provide \$100,000 to implement this project. The estimated cost does not account for long-term operation and maintenance of the improvements.

There may not be a need to implement projects in future Action Plans, as all reductions are anticipated to be met during this permit cycle. However, if needed, JMU's funding strategy for the future would include a combination of continuing to pursue grants, incorporation of projects into the Capital Improvements Plan, and continuing to request funding from the University general fund, when needed.

10. Public Comments on Draft Action Plan

*General Permit Section
I.C.2.a.(12)*

The Facilities Management Department informed the public of the draft Chesapeake Bay Action Plan and 2-week public comment period before finalizing and submitting the Plan to the DEQ. An article was published in the Facilities Management Human Resources monthly newsletter on June 1, 2015, which is sent to all Facilities Management staff (587 employees). The draft document was also added to the Facilities Management Department webpage on the JMU website on May 29, 2015, where it could be accessed by any member of JMU's faculty, staff, student body, or the community. The webpage is located at www.jmu.edu/facmgt/sustainability/Stormwater/ms4.shtml. These outreach efforts informed the public of the development of the Chesapeake Bay Action Plan draft, and directed them to the location on the Facilities Management Department webpage where the draft could be obtained. The article and webpage also instructed the public on how to provide comments on the plan. Documentation regarding outreach efforts will reside with the Action Plan documents.

The Department requested that comments be emailed to the Stormwater Coordinator. Seven responses were received with no requests for changes to the plan. There were further explanations related to the TMDL requirements and how numbers were calculated. The Stormwater Coordinator documented all comments, which will reside with the Action Plan documents. All comments were taken into consideration before finalizing the Action Plan. Final guidance for the development of the Action Plan was not available until May, 2015, after much of the student body had left Harrisonburg for summer vacation. As such, this segment of the public was not accessible to be engaged during the public comment period. However, awareness of the plan and its contents will continue to grow as a result of JMU's on-going public education and involvement activities, and the Facilities Management Department will encourage and accept feedback on the plan, year-round.

Resources

Chesapeake Bay Program - Urban Stormwater Workgroup and Water Quality Goal Implementation Team. (2014) *Recommendations of the Expert Panel to Define Removal Rates for Individual Stream Restoration Projects*

<http://chesapeakestormwater.net/bay-stormwater/baywide-stormwater-policy/urban-stormwater-workgroup/urban-stream-restoration/>

Ecosystem Services, Inc. (2015) *Edith J. Carrier Arboretum Stream Restoration Final Design and Pollutant Reduction Report.*

James Madison University. (2014) *Municipal Separate Storm Sewer (MS4) Plan*

<http://www.jmu.edu/facmgt/sustainability/Stormwater/files/ms4-program-plan.pdf>

Virginia Department of Environmental Quality. (2013) *General Permit for Discharges of Stormwater from Small (Phase II) Municipal Separate Storm Sewer Systems*

<http://lis.virginia.gov/cgi-bin/legp604.exe?000+reg+9VAC25-890-40>

Virginia Department of Environmental Quality. (2015) *Guidance Memo No. 15-2005*

<http://www.deq.virginia.gov/Portals/0/DEQ/Water/Guidance/152005.pdf>

Virginia Department of Environmental Quality. (2012) *Phase II Watershed Implementation Plan*

<http://www.deq.virginia.gov/Portals/0/DEQ/Water/TMDL/Baywip/vatmdlwipphase2.pdf>

ID	Project Name/Description	Location	Construction Estimate	Pollutant Load			BMP Efficiency			BMP Total Removal			Project Initiated	Estimated Dates	
				TP	TN	TSS	TP	TN	TSS	TP	TN	TSS		Construction Start	Construction Completed
ST1	Stream Restoration Project: East Campus (1031')	38°26'02.44" N 78°51'57.61" W	\$26,800.00							69.74	71.03	45,895.20			9/15/2012
ST1a	Stream Restoration Project: East Campus Land Use Change - Pervious to Grass	38°26'02.44" N 78°51'57.61" W									2.75				9/15/2012
ST2	Stream Restoration Project: Siberts Creek - Segment 'A' (407')	38°26'16.35" N 78°51'48.62" W	\$23,200.00							27.63	29.47	18,231.23			9/15/2012
ST3	Stream Restoration Project: Siberts Creek - Segment 'B' (498')	38°26'18.26" N 78°51'58.06" W	\$28,400.00							33.80	36.09	22,283.14			9/15/2012
ST4	Stream Restoration Project: Siberts Creek - Segment 'C' (711')	38°26'15.84" N 78°52'06.26" W	\$40,500.00							47.91	47.45	31,446.04			9/15/2012
ST4a	Stream Restoration Project: Siberts Creek Land Use Change - Pervious to Grass	38°26'18.26" N 78°51'58.06" W									4.31				9/15/2012
S4	Stream Restoration Project: Siberts Creek Bioretention	38°26'15.95" N 78°52'01.57" W	\$26,000.00	4.15	52.06	2820.69	0.45	0.25	0.55	1.87	13.02	1,551.38			9/15/2012
ST5	Arboretum Stream Restoration Project w/ Constructed Wetlands	38°25'39.49" N 78°51'39.30" W	\$340,000.00							111.17	1,658.40	324,420.00	9/1/2013	7/1/2015	11/1/2015
Total			\$484,900.00							Total Credit	292.12	1,862.52	443,826.99		
										TP	TN	TSS			
										MS4 Credit					

	1st Permit Required Reductions (5%)	2nd Permit Required Reductions (35%)	3rd Permit Required Reductions (60%)	Total
Total Nitrogen	25.69	179.80	308.22	513.71
Total Phosphorus	3.22	22.51	38.58	64.30
Total Suspended Solids	2,722.74	19,059.17	32,672.87	54,454.78