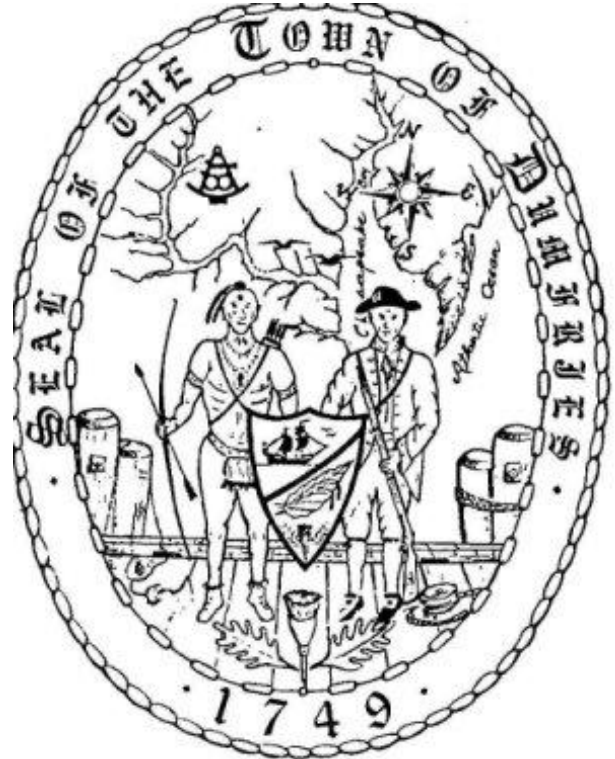
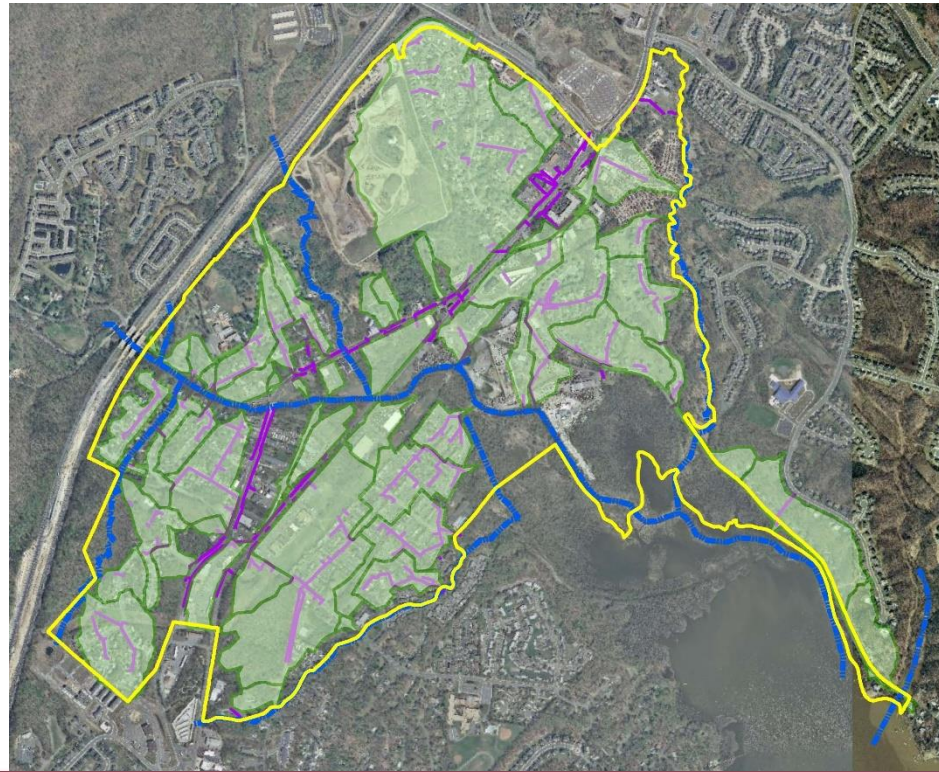


# CHESAPEAKE BAY TMDL ACTION PLAN

MS4 Permit Cycle 2013 - 2018  
Town of Dumfries



## PREPARED FOR:

Town of Dumfries  
17755 Main Street  
Dumfries, Virginia 22026

April 4, 2015



**Draper Aden Associates**  
*Engineering • Surveying • Environmental Services*

DAA Project Number: **B15147-01**

### 3<sup>RD</sup> PARTY REVIEW

This Report has been subjected to technical and quality reviews by:

Name: Clint Pendleton, EIT  
Project Engineer



Signature

4/4/2016

Date

Name: Carolyn A. Howard, PE  
Project Manager



Signature

4/4/2016

Date

Name: Lindsay B. Lally, PE  
Quality Reviewer



Signature

4/4/2016

Date

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## **APPENDICIES**

- A** Town of Dumfries MS4 Program Plan, December 2015
- B** Summary of Public Comments (to be provided at a later date)
- C** BMP-A - Existing Bioretention Basin

## 1.0 INTRODUCTION

Since 2003, the Town of Dumfries (Town) has been subject to the General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4 Permit). The Town's most recent permit (VAR040117) was issued by the Virginia Department of Environmental Quality (DEQ) effective July 1, 2013 and will expire June 30, 2018; this permit time period is hereinafter referred to as the first permit cycle.

In general, the MS4 permit regulates existing storm sewer systems to reduce the amount of stormwater pollution discharged into a waterbody. The permit also requires compliance for MS4 systems discharging to a waterbody with a Total Maximum Daily Load (TMDL) and an assigned Waste Load Allocation (WLA). The permit holder must prepare a TMDL Action Plan to reduce the applicable pollutants of concerns (POC) through the construction of structural stormwater best management practices (BMPs), non-structural operational measures, or a combination of the two.

Currently, there are two waterbodies with TMDLs and WLA reduction requirements for the Town – 1) the Chesapeake Bay TMDL and 2) an E. coli TMDL for Quantico Creek. The Chesapeake Bay TMDL was established by the U.S. Environmental Protection Agency in 2010; its POCs are nitrogen (N), phosphorus (P), and total suspended solids (TSS). The Town's total Chesapeake Bay WLAs and required POC reductions are based on the impervious and pervious (managed turf) acreage within the MS4 service area and the required reduction in loading rates for the Potomac River Basin; refer to Table 3b found in the Department of Environmental Quality's (DEQ) Chesapeake Bay TMDL Special Condition Guidance document dated 05/18/2015 (DEQ Guidance).

As required by the MS4 permit, this document is the Town's Chesapeake Bay TMDL Action Plan (Action Plan) documenting the first permit cycle required POC reductions and proposed compliance means and methods. A separate Action Plan is provided for the Quantico Creek TMDL.

Note: MS4 Permit regulation references are provided in [ ].

## **2.0 MS4 PERMIT AUTHORITY & IMPLEMENTATION PROGRAM**

### **2.1 Current MS4 Implementation Review**

[9VAC25-890-40 Section 1 C.2.a.(1)]

The Town adopted an MS4 Program Plan that documents compliance with the six minimum control measures (MCMs) identified in the MS4 Permit. The MS4 Program Plan is provided in Appendix A and can be found at the Town's website.

Additionally this Action Plan documents compliance with the Special Condition for the Chesapeake Bay TMDL requirements included in the MS4 permit.

### **2.2 Existing Legal Authority Review**

[9VAC25-890-40 Section 1 C.2.a. (1)]

Based upon a review of the Town's ordinances, the Town has sufficient legal authority to meet the requirements of the MS4 Permit and execute the compliance objectives included in this Action Plan.

### **2.3 New or Modified Legal Authorities**

[9VAC25-890-40 Section 1 C.2.a. (2)]

The Town does not anticipate any new or modified legal authorities to be implemented in the future to maintain compliance with the MS4 permit.

### **2.4 Means and Methods to Address New Sources of POCs**

[9VAC25-890-40 Section 1 C.2.a. (3)]

The Town will address new discharges and sources of POCs into the Town's MS4 through its existing legal authorities and its Illicit Discharge Detection & Elimination Program.

### **2.5 Modifications to Action Plan**

[9VAC25-890-40 Section 1 C.2.a. (9)]

Any modification to the Action Plan that occurs during the term of this MS4 Permit as part of its permit reapplication and not during the term of this state permit will be addressed at the time of permit reapplication.

### **3.0 PUBLIC COMMENT PROCESS AND PERIOD**

[9VAC25-890-40 Section 1 C.2.a. (12)]

The Town's MS4 Permit requires a draft version of the Action Plan be made available to the public for review and comment. The Town will provide a 30 day public comment period. When the comment period ends, public comments will be compiled, reviewed, and addressed, as appropriate, in an updated draft of the Action Plan. A summary of the public comments will be provided in Appendix B.

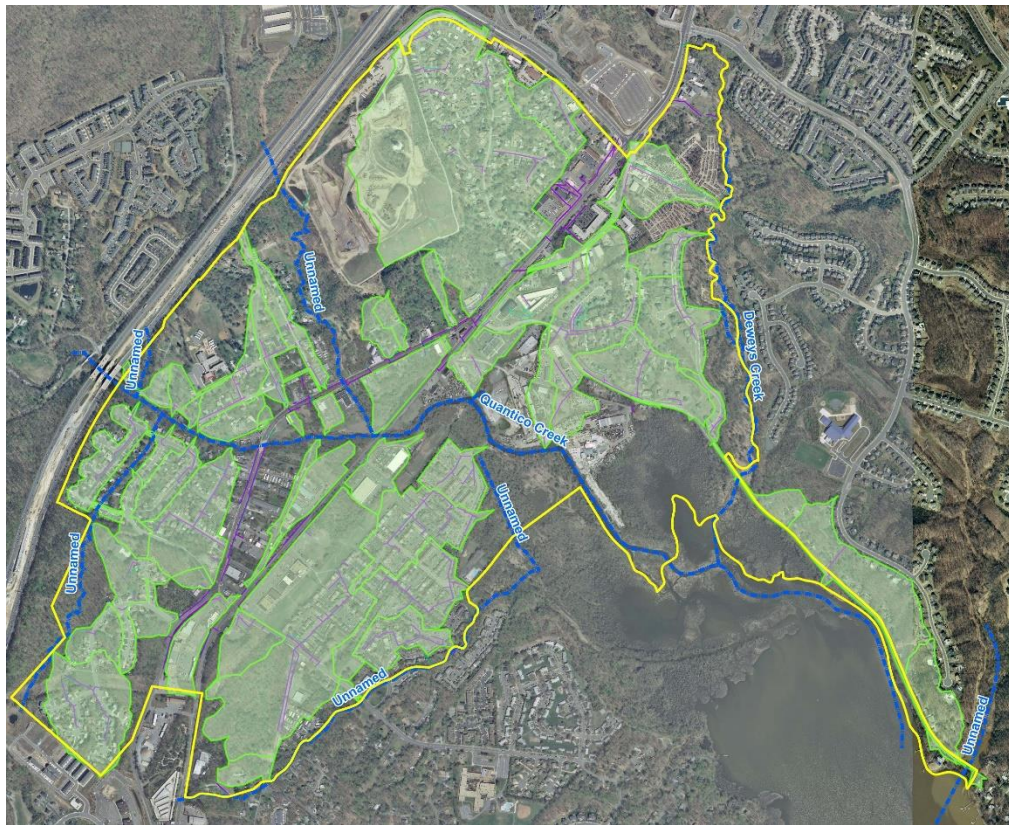


## 4.0 MS4 PERMIT REQUIREMENTS

### 4.1 MS4 Service Area Delineation

[9VAC25-890-40 Section II B.3.a. (1)]

As required by the MS4 Permit, the Town's MS4 service area was delineated using 2013 VGIN Aerial Imagery, 2011 LiDAR topographic information and other GIS data provided by the Town of Dumfries and Prince William County. Additionally, storm sewer information included in the September 2004 USACE Report "Stream Restoration and Stormwater Management Study for Quantico Creek," and a working AutoCAD drawing provided by the Town in September 2015 was used to further define the MS4 areas. To mitigate inconsistencies and gaps in the available storm sewer information, Bing Streetside was utilized and a site visit was conducted to locate structures and determine existing drainage patterns, where possible. The Town's entire MS4 area is within the Quantico Creek and Chesapeake Bay watershed. Figure 1 below shows the Town's MS4 service area shaded in green.



**Figure 1: Town of Dumfries MS4 Service Area**

Note: MS4 Service Area is shown in green. Corporate boundary is shown in yellow.

As per DEQ's Guidance, the following areas were excluded from the Town's MS4 service area:

1. Concentrated flows from properties owned and/or maintained by other MS4 permit holders—the Virginia Department of Transportation (VDOT) and Prince William County;
2. The VDOT maintained US Route 1 (Main Street and Fraley Boulevard); and
3. Privately owned areas within the Town that drain directly to streams and do not drain into or provide conveyance for the Town's MS4 system.

The Town may also exclude from its MS4 service area land regulated under any general VPDES permit that addresses industrial stormwater; however, these areas were not excluded in the initial mapping. Areas of sheet flow from other MS4 jurisdictions crossing into the Town's corporate limits were included in the Town's MS4 area, as per the DEQ Guidance.

As a result of the MS4 system delineation, Dewey's Creek, a tributary of Quantico Creek that runs north-south through the Town, does not have connections from the MS4 system, and, therefore, the creek and the adjacent privately-owned areas are outside the MS4 area.

GIS data and aerial imagery were used to determine the Town's regulated impervious and pervious acres. Impervious areas include buildings, roads, parking lots, sidewalks, recreational surfaces, and other similar features. Once the impervious areas were delineated, the features were clipped using the MS4 service area layer and resulting acreages were calculated.

Corporate Limits	986.93	Acres		
MS4 Service Area	575.57	Acres		
Impervious Area	182.29	Acres	31.7	%
Pervious Area	345.38	Acres	60.0	%
Forest Area	47.90	Acres	8.3	%
MS4 Area of Total Corporate Limits	58.32	%		

**Table 2A: Town of Dumfries MS4 Service Area Summary**



The extent of the MS4 service area and the land cover shown in this Action Plan are based on the latest GIS information dated 2013, not the July 1, 2009 condition. The Town reserves the right to make future adjustments to the MS4 service area and its land cover condition as more detailed and reliable information becomes available including but not limited to the following:

1. Removing areas of the MS4 service area that were created after June 30, 2009;
2. Adjusting the land cover condition in areas that were developed/redeveloped after June 30, 2009; and
3. Refining the MS4 service area as new data is made available to the Town.

#### **4.2 Chesapeake Bay Action Plan Development**

[9VAC25-890-40 Section I C.2.a]

The MS4 permit requires the Action Plan must show compliance with the following Special Conditions.

Special Condition 4 POC load estimate from existing sources (i.e. constructed prior to 7/1/2009)

Special Condition 5 1st permit cycle POC load reduction requirement from existing sources

Special Condition 6 Means and methods to meet POC load reduction requirements from existing sources

Special Condition 7 Means and methods to meet POC load reduction requirements from new sources (i.e. constructed between 7/1/2009 and 6/30/2014)

Special Condition 8 Means and methods to meet POC load reduction requirements from grandfathered projects constructed after 6/30/2014

The tables for the Potomac River basin included in the DEQ Guidance document were used in the development of this Action Plan.

## 5.0 POC REQUIRED OFFSETS FOR EXISTING & NEW SOURCES

### 5.1 Special Condition 4: POC Load Estimate from Existing Sources

[9VAC25-890-40 Section 1 C.2.a. (4)]

The POC Edge of Stream (EOS) loading rate for the Potomac River Basin is as provided in Table 2b in the DEQ Guidance. A summary of the Town's estimated POC load is provided in Table 5A below.

Pollutant	Subsource	Total Existing (Est.) Acres Served by MS4 (06/30/09)	2009 EOS Loading Rate	Estimated Total POC Load Based on 2009 Progress Run
Nitrogen	Regulated Urban Impervious	182	16.860	3,073
	Regulated Urban Pervious	345	10.070	3,478
	<b>Total:</b>			<b>6,551</b>
Phosphorous	Regulated Urban Impervious	182	1.620	295
	Regulated Urban Pervious	345	0.410	142
	<b>Total:</b>			<b>437</b>
Total Suspended Solids	Regulated Urban Impervious	182	1171.320	213,520
	Regulated Urban Pervious	345	175.800	60,718
	<b>Total:</b>			<b>274,238</b>

Table 5A: Town of Dumfries Estimate of Existing Source Loads

## 5.2 Special Condition 5: 1st Permit Cycle POC Load Reduction Requirement From Existing Sources

[9VAC25-890-40 Section 1 C.2.a. (5)]

First permit cycle required reduction loading rate from existing sources is as provided in Table 3b in the DEQ Guidance. A summary of the Town's estimated POC reductions required for the first permit cycle is provided in Table 5B below.

Pollutant	Subsource	Total Existing (Est.) Acres Served by MS4 (06/30/09)	Est. Required Reduction in Loading Rate (lbs/acre/yr)	Total Est. Reduction Required (lbs/yr)
Nitrogen	Regulated Urban Impervious	182	0.07587	13.8
	Regulated Urban Pervious	345	0.03021	10.4
<b>Total:</b>				<b>24.2</b>
Phosphorous	Regulated Urban Impervious	182	0.01296	2.4
	Regulated Urban Pervious	345	0.00149	0.5
<b>Total:</b>				<b>2.9</b>
Total Suspended Solids	Regulated Urban Impervious	182	11.71320	2135.2
	Regulated Urban Pervious	345	0.76913	265.6
<b>Total:</b>				<b>2400.8</b>

**Table 5B: Total 1<sup>st</sup> Permit Cycle POC Estimated Reductions Required from Existing Sources**

### **5.3 Special Condition 7: 1st Permit Cycle POC Load Reduction Requirement From New Sources**

[9VAC25-890-40 Section 1 C.2.a. (7)]

This special condition applies to those permittees that have 1) adopted an average impervious land cover condition greater than 16% for the design of post-development stormwater management facilities under the Chesapeake Bay Preservation Act, or 2) allowed projects to be built with an impervious land cover condition greater than 16% for the design of post-development stormwater management (SWM) facilities through a “fee-in-lieu of” or similar program.

The Town does not utilize an average land cover condition greater than 16% in the design of post-development stormwater management facilities and does not have projects developed with a “fee-in-lieu of” or similar program; therefore, Special Condition 7 is not applicable.

### **5.4 Special Condition 8: 1st Permit Cycle POC Load Reduction Requirement From Grandfathered Projects**

[9VAC25-890-40 Section 1 C.2.a. (8), (10)]

The Town is required to calculate new POC loads from grandfathered projects initiating construction after July 1, 2014, disturbing one acre or greater and with water quality requirements less stringent than 16% impervious cover. Unlike POCs from sources in Special Condition 7, loads from grandfathered projects must be 100% offset prior to the completion of the project. The Town does not utilize an average land cover condition greater than 16% in the design of post-development stormwater management facilities; therefore, Special Condition 8 is not applicable.

The Town is aware of one (1) grandfathered project located at 17733 Main Street (GPIN 8189-81-7785) to be redeveloped for commercial uses; the project area is approximately 0.7 acres.

## 5.5 Total 1st Permit Cycle POC Load Reduction Requirements

[9VAC25-890-40 Section 1 C.2.a. (5), (7), (8)]

The total POC load reduction requirements for the first permit cycle to meet Special Conditions 5, 7, and 8 are summarized in Table 5C below.

		<i>Est. Reduction Required (lbs/yr)</i>			
<b>Pollutant</b>	<b>Subsource</b>	<b>Existing Sources</b>	<b>New Sources</b>	<b>Grandfathered Projects</b>	<b>TOTAL</b>
<i>Nitrogen</i>	Regulated Urban Impervious	13.8	0.0	0.0	13.8
	Regulated Urban Pervious	10.4	0.0	0.0	10.4
<b>Total:</b>					<b>24.2</b>
<i>Phosphorous</i>	Regulated Urban Impervious	2.4	0.0	0.0	2.4
	Regulated Urban Pervious	0.5	0.0	0.0	0.5
<b>Total:</b>					<b>2.9</b>
<i>Total Suspended Solids</i>	Regulated Urban Impervious	2135.2	0.0	0.0	2,135.2
	Regulated Urban Pervious	265.6	0.0	0.0	265.6
<b>Total:</b>					<b>2,400.8</b>

**Table 5C: Total 1<sup>st</sup> Permit Cycle POC Load Reduction Requirements**

## 6.0 MEANS & METHODS TO MEET THE POC LOAD REDUCTIONS

[9VAC25-890-40 Section 1 C.2.a. (6), (7), (8)]

### 6.1 Street Sweeping

The Town will take credit for its existing street sweeping program to meet required POC reductions for the first permit cycle. As noted in Town's MS4 Program Plan dated 12-1-15, the Town maintains a schedule to sweep every street, approximately 21.7 curb miles, at least monthly using a regenerative sweeper. Approximately half the streets are swept more than once per month, depending on the weather conditions. The Town will maintain this level of effort for each MS4 permit cycle and revise documentation of the amount of debris collected, as needed and as additional lane miles may be added to the street sweeping program.

Using the Qualifying Street Lanes Method outlined in the TMDL Guidance, the following Table 6A summarizes reductions achieved through the Town's street sweeping program.

Town of Dumfries - Estimate of Current Street Sweeping Reductions				
Lane Miles Swept:		21.67 miles		
Acres Swept:		26.27 acres		
Regenerative/Vacuum Street Sweeping				
Pollutant	Estimated Pre-Sweep Annual Nutrient Loading Rate (lbs/acre/yr)	Pre-Sweep Annual Baseline Load (lbs/yr)	Pick-up Factors	Total Credit (lbs/yr)
Nitrogen	15.4	405	0.05	20.2
Phosphorous	2.0	53	0.06	3.2
Total Suspended Solids	865	22,721	0.25	5680.2

**Table 6A: Estimate of Current Street Sweeping Reductions**

The Town's current street sweeping program provides an excess of the first permit cycle's required reductions for phosphorous and total suspended solids as shown in Table 6C below; however, the nitrogen removal requirement is not met.



## 6.2 Credit for BMPs Installed Prior to July 1, 2009

The Town proposes to utilize credit from an existing bioretention basin east of Town Hall to meet the first permit cycle POCs removal requirements; refer to Appendix C for Figure BMP-A showing the location of the existing bioretention facilities. BMP-A was completed in 2008. Calculations assume the bioretention facility is a Level 1 facility. Refer to Table 6B for a summary of BMP-A POC load reductions.

Pollutant	Subsource	Total Existing (Est.) Acres Served by BMP-1	2009 EOS Loading Rate (lbs/acre/yr)	Estimated Total POC Load	VA SW BMP Clearinghouse Efficiency for Bioretention Level 1	Total Est. Reduction Achieved (lbs/yr)
Nitrogen	Regulated Urban Impervious	0.64	16.86	10.8	64%	6.90
	Regulated Urban Pervious	0.08	10.07	0.8	64%	0.51
<b>Total:</b>				<b>11.6</b>		<b>7.41</b>
Phosphorous	Regulated Urban Impervious	0.64	1.62	1.0	55%	0.57
	Regulated Urban Pervious	0.08	0.41	0.0	55%	0.02
<b>Total:</b>				<b>1.1</b>		<b>0.59</b>
Total Suspended Solids	Regulated Urban Impervious	0.64	1171.32	748.5	55%	411.66
	Regulated Urban Pervious	0.08	175.80	13.9	55%	7.64
<b>Total:</b>				<b>762.4</b>		<b>419.30</b>

**Table 6B: Total POC Estimated Load Reductions from Existing BMP-A**

## 6.3 Additional Means and Methods

The Town reserves the right to implement and take credit for additional facilities or practices as provided for in the Chesapeake Bay TMDL Special Condition Guidance. Reductions achieved will be documented to DEQ in the Town's annual report.

## 6.4 POC Reduction Goals through Action Plan Implementation

			<b>BMP Implementation</b>			
			<i>Estimated Reduction of POC (lbs/yr)</i>			
<b>Pollutant</b>	<b>Subsource</b>	<b>1st Permit Cycle Total Est. Reduction Required (lbs/yr)</b>	<b>Street Sweeping</b>	<b>Exist. BMP A - Bioretention</b>	<b>Total Est. Achieved</b>	<b>Total Add'l Required for 1st Permit Cycle (lbs/yr)</b>
Nitrogen	Regulated Urban Impervious	13.8	20.2	6.9	27.1	-13.3
	Regulated Urban Pervious	10.4	0.0	0.5	0.5	9.9
<b>Totals:</b>		24.3	20.2	7.4	27.6	<b>(3.4)</b>
Phosphorous	Regulated Urban Impervious	2.4	3.2	0.6	3.7	-1.4
	Regulated Urban Pervious	0.5	0.0	0.0	0.0	0.5
<b>Totals:</b>		2.9	3.2	0.6	3.7	<b>(0.9)</b>
Total Suspended Solids	Regulated Urban Impervious	2135.2	5680.2	411.7	6091.8	-3956.6
	Regulated Urban Pervious	265.6	0.0	7.6	7.6	258.0
<b>Totals:</b>		2400.8	5680.2	419.3	6099.5	<b>(3698.6)</b>

**Table 6C: Total Estimated POC Reductions Achieved with Action Plan Implementation in the 1<sup>st</sup> Permit Cycle**

## 7.0 ESTIMATED COSTS FOR ACTION PLAN IMPLEMENTATION

[9VAC25-890-40 Section 1 C.2.a. (11)]

Since street sweeping is incorporated into the Town's current budget and the bioretention is an existing facility, no significant capital expenditures are anticipated to comply with the first permit cycle requirements for POC reductions.

## **APPENDIX A – MS4 PROGRAM PLAN**



# Town of Dumfries, Virginia

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## MS4 Program Plan

Cycle: July 1, 2013 – June 30, 2018  
Permit Number: VAR040117

In compliance with the Virginia Stormwater Management Program (VSMP)  
General Permit for Stormwater Discharges from Small Municipal Separate  
Storm Sewer Systems (MS4)



# Town of Dumfries

# MS4 Program Plan

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## 1. Introduction

The Town of Dumfries is an incorporated town located in Northern Virginia and is surrounded by Prince William County. The Town comprises approximately 1.6 square miles of urban mixed use land development located approximately 25 miles south of Washington, D.C. The town is an operator of a Small Municipal Separate Storm Sewer System (MS4). A *municipal separate storm sewer* means “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:

1. Owned or operated by a federal, state, Town, 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 CWA that discharges to surface waters;
2. Designed or used for collecting or conveying stormwater;
3. That is not a combined sewer; and
4. That is not part of a publicly owned treatment works.”

The US Census in 2010 determined the Town’s population to be 4,961, that the Town is within an Urbanized Area, and thus subject to the General VPDES Permit for Discharges of Stormwater from Small Municipal Separate Storm Sewer Systems, which became effective July 1, 2013 and will expire on June 30, 2018 when a new permit cycle is expected to become effective. As required by the MS4 permit, this report addresses items of the Town of Dumfries MS4 Program pertinent to the Virginia General Permit for Discharges from Small Municipal Storm Sewer Systems.



## 2. Watersheds

The Town of Dumfries's 1.6 square miles is highly urbanized and is encompassed by a sole watershed area, Quantico Creek, which discharges into the Potomac River. If appropriate measures are not taken to protect and prevent further degradation to Quantico Creek, water quality will decline beyond current existing conditions.

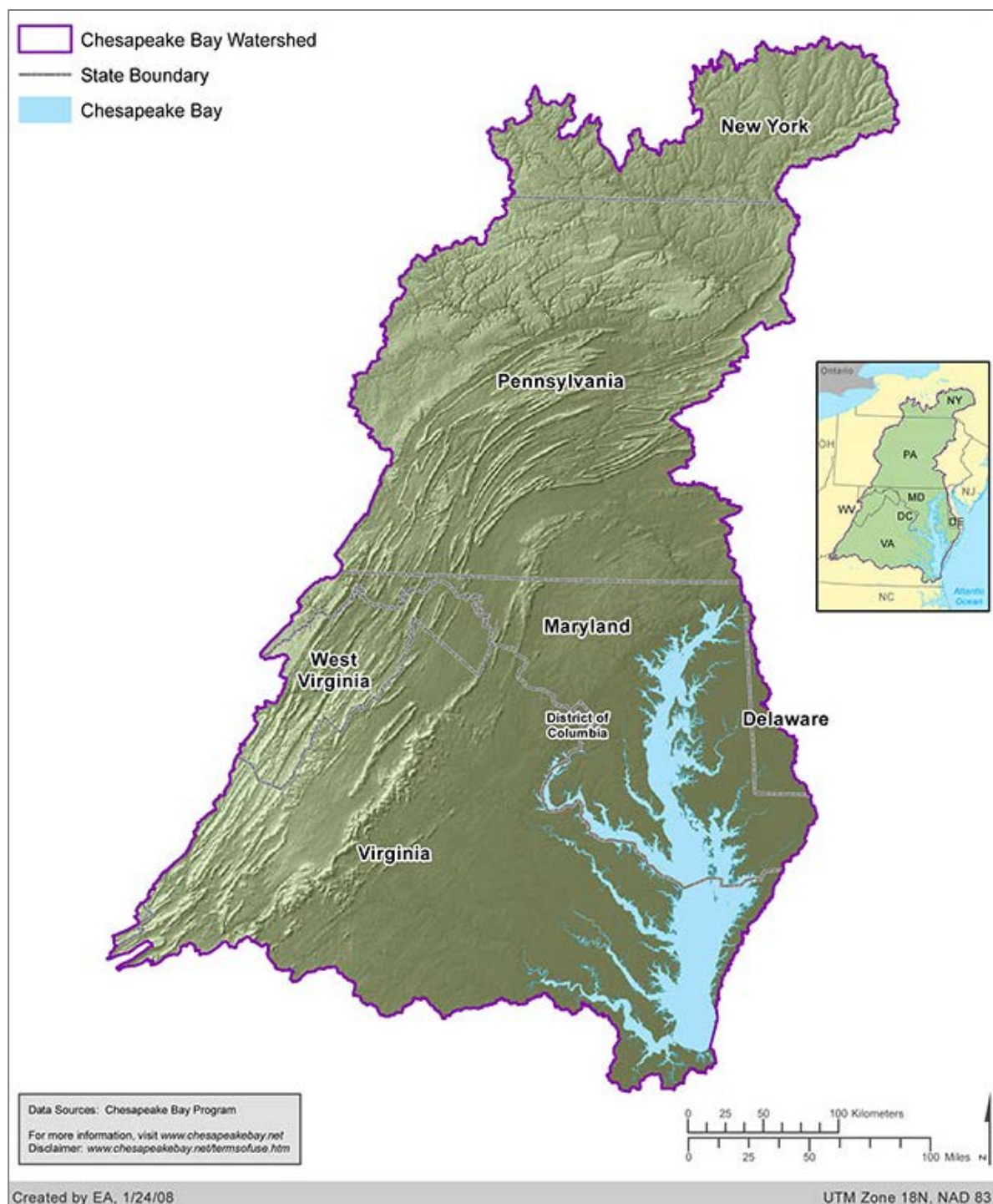
Subwatershed Name	Hydrologic Unit Code (HUC)	Approximate Length (miles) within Dumfries	Approximate Drainage Area (acres)	Impairments	TMDL WLA?
Quantico Creek	020700110104	1.45	4,877	<ul style="list-style-type: none"> <li>▪ PCB in Fish Tissue</li> <li>▪ Estuarine Bioassessments</li> <li>▪ Sediment</li> </ul>	No



*Quantico Creek Watershed, Prince William County, VA*

The Town of Dumfries also drains into the Chesapeake Bay Watershed. The Chesapeake Bay Watershed is 64,000 square miles and includes portions of New York, Pennsylvania, Delaware, Maryland, West Virginia, and Virginia. Altogether, more than 100,000 streams, creeks and rivers make up the Chesapeake Bay Watershed. As part of the Special Conditions for the Chesapeake Bay TMDL, the MS4 Permit requires

the Town of Dumfries to address impairments for phosphorus, nitrogen, and sediment that enter the Chesapeake Bay.



Chesapeake Bay Watershed Map

### 3. Organizational Structure

The Town of Dumfries' Public Works Department coordinates the Town's municipal separate storm sewer system (MS4) program. The Public Works Department's Public Works Director is responsible for developing and updating the MS4 Program Plan and submitting Annual Reports. The Town Manager is responsible for providing the appropriate certification for documents. The Department of Community Services, Police Department, and other relevant town staff are the major contributors to Dumfries' MS4 Program although it is recognized that this is a town-wide and community-wide program.

The MS4 Program Plan that follows identifies which town department and title of the staff person(s) responsible for implementing specific best management practices.

### 4. Contact Information

<b><u>Principal Executive Officer</u></b>
Title: Town Manager Name: Daniel Taber Address: 17755 Main St. Dumfries, VA 22026 Phone: (703) 221-3400 Email: <a href="mailto:dtaber@dumfriesva.gov">dtaber@dumfriesva.gov</a>

<b><u>Duly Authorized Representative</u></b>
Title: Public Works Director Name: Richard West Address: 17755 Main St. Dumfries, VA 22026 Phone: (703) 221-3400 Email: <a href="mailto:rwest@dumfriesva.gov">rwest@dumfriesva.gov</a>

## **5. MS4 Program Plan**

The MS4 Program Plan details the Town of Dumfries' comprehensive program to manage the quality of stormwater runoff discharged from the MS4. This section of the MS4 Program plan is categorized into the following six minimum control measures and special conditions for TMDLs:

1. Public education and outreach on stormwater impacts
2. Public involvement and participation
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction runoff control for development and redevelopment
6. Good housekeeping and pollution prevention for municipal operations
7. Virginia TMDL Special Conditions
8. Chesapeake Bay TMDL Special Conditions

This MS4 Program Plan will be reviewed annually and updated as necessary. This MS4 Program Plan will remain on file in the Public Works Department and on Dumfries' stormwater webpages:

<http://www.dumfriesva.gov/governmentpublic-works-municipal-separate-storm-sewer-system-ms4>

## Minimum Control Measure #1: Education & Outreach on Stormwater Impacts

The MS4 Permit requires the Town of Dumfries to design public education and outreach programs with consideration of the following goals:

1. Increasing target audience knowledge about the steps that can be taken to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns.
2. Increasing target audience knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications.
3. Implementing a diverse program with strategies that are targeted towards audiences most likely to have significant stormwater impacts.

<b>BMP 1.1 Develop and Implement Stormwater Public Education and Outreach Program</b>
<p><b>1.1.1 Description:</b> The Town shall continue to implement an education and outreach program as included in the registration statement until the program is updated to meet the conditions of this permit.</p>
<p><b>1.1.2 Goals and Objectives:</b> The MS4 Permit requires the Town of Dumfries to design public education and outreach programs with consideration of the following goals:</p> <ol style="list-style-type: none"> <li>1. Increasing target audience knowledge about the steps that can be taken to reduce stormwater pollution, placing priority on reducing impacts to impaired waters and other local water pollution concerns.</li> <li>2. Increasing target audience knowledge of hazards associated with illegal discharges and improper disposal of waste, including pertinent legal implications.</li> <li>3. Implementing a diverse program with strategies that are targeted towards audiences most likely to have significant stormwater impacts.</li> </ol>
<p><b>1.1.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Assistant Public Works Director</i>  <i>Public Works and Zoning Program Administrator</i></p>
<p><b>1.1.4 Schedule of Implementation:</b> High-priority issues for education and outreach are set forth in the Education and Outreach Program. These issues will be evaluated annually. Existing efforts will either be continued or activities for new issues will be developed. The Town will use citizen calls, complaints, site visits, and other methods of outreach to help inform our selection of priority issues each year.</p>

**1.1.5 Annual Reporting Requirements:**

- A list of education and outreach activities conducted during the reporting period for each high-priority water quality issue, the estimated number of people reached, and the estimated percentage of the target audience or audiences that will be reached (See BMP 1.2).
- A list of education and outreach activities that will be conducted during the next reporting period for each high-priority water quality issue, the estimated number of people that will be reached, and the estimated percentage of the target audience or audiences that will be reached (See BMP 1.3).

**Program Plan Requirements:**

- The MS4 Program Plan shall describe how the conditions of the permit shall be updated.

**Permit Cycle Requirement (*five years*):**

- Evaluate the education and outreach program for:
  - Appropriateness of the high-priority stormwater issues;
  - Appropriateness of the selected target audiences for each high-priority stormwater issue;
  - Effectiveness of the messages or messages being delivered; and
  - Effectiveness of the mechanism or mechanisms of delivery employed in reaching target audiences.

**1.1.6 Describe how the Conditions of this Permit shall be attained.**

The Education and Outreach Plan will be referenced in the 2014-15 MS4 Annual Report. Education and outreach initiatives occurred in the 2014-15 reporting year, but they will not coincide with the Education and Outreach Plan until the 2015-2016 reporting year.

**BMP 1.2 List of Education and Outreach Activities Conducted During Reporting Period**

**1.2.1 Description:** The Town shall continue to document the annual activities for the reporting period.

**1.2.2 Goals and Objectives:** Accurately and consistently document, report, and announce all education and outreach activities conducted during the annual reporting cycle.

**1.2.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

*Public Works and Zoning Program Administrator*

**1.2.4 Schedule of Implementation:** The Town will follow its Public Education and Outreach Program for its annual activity implementation. The program will be evaluated annually as set forth in BMP 1.1 and activities for the current reporting period submitted accordingly.



**1.2.5 Annual Reporting Requirements:**

- A list of education and outreach activities conducted during the reporting period for each high-priority water quality issue, the estimated number of people reached, and the estimated percentage of the target audience or audiences that will be reached.

**BMP 1.3 List of Education and Outreach Activities To Be Conducted During Next Reporting Period**

**1.3.1 Description:** The Town shall continue to announce and list the education and outreach activities planned for the next reporting period. Proposed education and outreach initiatives include:

- Handing out educational brochures at Town events on various topics such as impacts of pet waste on water quality, basic stormwater management practices, and proper disposal of leaves.
- In-person trainings for automobile washes, automobile repair shops, and restaurants to address the basics of stormwater runoff and how improper water discharges from these establishments can degrade water quality in local waters.

**1.3.2 Goals and Objectives:** Accurately and consistently promote, announce, document and report all upcoming education and outreach activities, including those planned for the next program year.

**1.3.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

*Public Works and Zoning Program Administrator*

**1.3.4 Schedule of Implementation:** The Town will follow its Public Education and Outreach Program for its annual activity implementation, including that of each upcoming year. The program will be evaluated annually as set forth in BMP 1.1 and activities for the forthcoming reporting period submitted accordingly.

**1.3.5 Annual Reporting Requirements:**

- A list of education and outreach activities that will be conducted during the next reporting period for each high-priority water quality issue, the estimated number of people that will be reached, and the estimated percentage of the target audience or audiences that will be reached.

## Minimum Control Measure #2: Public Involvement/Participation

<b>BMP 2.1: Maintaining Updated MS4 Program Plan and Annual Reports</b>
<p><b>2.1.1 Description:</b> The Town of Dumfries will review and, as needed, will update the MS4 Program Plan in conjunction with the Annual Report as required at a minimum of once a year. The Town shall post copies of the MS4 Program Plan on its website within 30 days of submittal of the Annual Report. The Town shall solicit public comment of the MS4 Program Plan prior to applying for coverage and address how comments were received on the MS4 Program Plan as part of the reapplication package.</p>
<p><b>2.1.2 Goals and Objectives:</b> To solicit public participation and comment through availability of MS4 Program Plan.</p>
<p><b>2.1.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Public Works and Zoning Program Administrator</i></p>
<p><b>2.1.4 Schedule of Implementation:</b></p> <ul style="list-style-type: none"> <li>• Promote availability of the MS4 Program Plan to citizens (posting online, etc.): Years 1-5</li> <li>• Solicit and receive public comment on MS4 Program Plan prior to applying for coverage: Years 4-5</li> <li>• Update MS4 Program Plan as needed: Years 1-5</li> </ul>
<p><b>2.1.5 Policies and Procedures:</b> The Public Works Director is responsible for updating and making available the MS4 Program Plan. The Public Works Director will make the Town's MS4 Program Plan and Annual Reports available on the Town's website: <a href="http://www.dumfriesva.gov">www.dumfriesva.gov</a>.</p> <p>This MS4 Program Plan will be reviewed annually and updated as necessary. The Town will receive and document public comments on the proposed MS4 Program Plan and address comments, as appropriate, in updates to the MS4 Program Plan. Prior to applying for coverage for the next permit cycle (2018-2023), the Town of Dumfries will notify the public and provide for receipt of comment of the proposed MS4 Program Plan that will be submitted with the registration statement.</p>
<p><b>2.1.6 Annual Reporting Requirements:</b></p> <ul style="list-style-type: none"> <li>• The Town shall post copies of the MS4 Program on the Town website within 30 days of submittal of the Annual Report (Due each October 1).</li> <li>• Post copies of the Annual Report to the Town website within 30 days of submittal to VDEQ and retain copies of Annual Reports online for the duration of this state permit.</li> </ul>

<b>BMP 2.2: Public Participation Events</b>
<p><b>2.2.1 Description:</b> The Town of Dumfries will participate in at least four local activities annually. Participation can be through promotion, sponsorship, or other involvement. Information for these activities will be advertised, tracked, and stored in the Town’s archives and online. The four activities planned for the five year permit cycle may vary. Below are examples of four proposed events:</p> <ul style="list-style-type: none"> <li>• Quantico Creek Clean Up</li> <li>• Storm Drain Marking</li> <li>• Elementary School Field Trips</li> <li>• Informational Table at Town Events</li> </ul>
<p><b>2.2.2 Goals and Objectives:</b> To increase public participation to reduce stormwater pollutant loads; improve water quality; and support local restoration and clean-up projects, programs, groups, meetings or other opportunities for public involvement.</p>
<p><b>2.2.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Public Works Assistant Director</i>  <i>Public Works and Zoning Program Administrator</i></p> <p><u>Community Services Department</u>  <i>Community Services Director</i></p>
<p><b>2.2.4 Schedule of Implementation:</b></p> <ul style="list-style-type: none"> <li>• Annually evaluate success of events completed in previous reporting year (Years 1-5)</li> <li>• Next reporting year, identify four (4) activities in which the Town will participate (Years 1-5)</li> </ul>
<p><b>2.2.5 Procedure for Implementation:</b></p> <p>The Public Works Director is responsible for ensuring that at least four (4) activities are identified, and that a responsible lead is identified for each activity.</p>
<p><b>2.2.6 Annual Reporting Requirements</b></p> <ul style="list-style-type: none"> <li>• Documentation of compliance with the public participation requirements of permit.</li> </ul> <p><b>Program Plan Requirements</b></p> <ul style="list-style-type: none"> <li>• The MS4 Program Plan shall include written procedures for implementing this program.</li> </ul>

### Minimum Control Measure #3: Illicit Discharge Detection and Elimination

<b>BMP 3.1: Storm Drain System, Outfalls, and Information Map</b>
<p><b>3.1.1 Description:</b> The Town of Dumfries will maintain an updated map of the Town’s MS4 system.</p>
<p><b>3.1.2 Goals and Objectives:</b> Maintenance and updates of the Storm Drain System Map.</p>
<p><b>3.1.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Assistant Public Works Director</i>  <i>Maintenance Crew</i></p>
<p><b>3.1.4 Policies and Procedures:</b></p> <p>The storm sewer system map must show the following, at a minimum:</p> <ul style="list-style-type: none"> <li>• The location of all MS4 outfalls. In cases where the outfall is located outside of the MS4 operator's legal responsibility, the operator may elect to map the known point of discharge location closest to the actual outfall. Each mapped outfall must be given a unique identifier, which must be noted on the map; and</li> <li>• The name and location of all waters receiving discharges from the MS4 outfalls and the associated HUC.</li> </ul> <p>The associated information table shall include for each outfall the following:</p> <ul style="list-style-type: none"> <li>• The unique identifier;</li> <li>• The estimated MS4 acreage served;</li> <li>• The name of the receiving surface water and indication as to whether the receiving water is listed as impaired in the Virginia 2010 303(d)/305(b) Water Quality Assessment Integrated Report; and</li> <li>• The name of any applicable TMDL or TMDLs.</li> </ul>
<p><b>3.1.5 Schedule of Implementation:</b></p> <ul style="list-style-type: none"> <li>• Update Town’s Storm Drain System Map: Years 1-5</li> <li>• Have complete and updated storm sewer system map and information table: Year 3</li> </ul>
<p><b>3.1.6 Annual Reporting Requirements:</b></p> <ul style="list-style-type: none"> <li>• None. Data available upon request.</li> </ul>

<b>BMP 3.2: Maintenance of BMP Tracking System</b>
<b>3.2.1 Description:</b> The Town of Dumfries will maintain a BMP tracking system.
<b>3.2.2 Goals and Objectives:</b> Maintenance and update of the BMP tracking system
<b>3.2.3 Responsible Departments/Employees:</b>  <u>Public Works Department</u> <i>Public Works Director</i> <i>Assistant Public Works Director</i> <i>Public Works and Zoning Program Administrator</i>
<b>3.2.4 Policies and Procedures:</b>  The BMP Tracking System must contain: <ul style="list-style-type: none"> <li>• All eligible developed/urban BMPs that have been implemented and documented since July 1, 1999;</li> <li>• General BMP information such as BMP type, location/address, property owner, installation date, and maintenance agreement information;</li> <li>• Utilize Quality Assurance/Quality Control Measures to ensure integrity of the data.</li> </ul>
<b>3.2.5 Schedule of Implementation:</b> <ul style="list-style-type: none"> <li>• Update BMP Tracking System: Year 2</li> <li>• Have complete and updated BMP Tracking System: Year 3</li> </ul>
<b>3.2.6 Annual Reporting Requirements:</b> <ul style="list-style-type: none"> <li>• None. Data available upon request.</li> </ul>

<b>BMP 3.3: Bacteria Sampling and Testing</b>
<b>3.3.1 Description:</b> The Town of Dumfries will maintain an updated map of the Town's MS4 system.
<b>3.3.2 Goals and Objectives:</b> Continue annual bacteria sampling and testing to report to DEQ.
<b>3.3.3 Responsible Departments/Employees:</b>  <u>Public Works Department</u> <i>Public Works Director</i> <i>Assistant Public Works Director</i> <i>Public Works and Zoning Program Administrator</i>  <u>Prince William County Soil &amp; Water Conservation District</u> <i>Volunteers</i>

**3.3.4 Policies and Procedures:**

The Prince William County Soil & Water Conservation District utilizes volunteers to take bacteria samples from four identified point sources and report the results to DEQ annually.

**3.3.5 Schedule of Implementation:**

- Annual reporting of bacteria sampling and testing: Years 1-5

**3.3.6 Annual Reporting Requirements:**

- Data is submitted to DEQ annually and posted on the State's website.

**BMP 3.4 Notification of Regulated Downstream MS4**

**3.4.1 Description:** The Town of Dumfries will notify, in writing, any downstream regulated MS4 to which the small regulated MS4 is physically interconnected.

**3.4.2 Goals and Objectives:** To notify downstream regulated MS4s and to be notified from upstream MS4s to assist in identifying the potential source of pollutants should an illicit discharge be found.

**3.4.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Public Works Assistant Director*

*Public Works and Zoning Program Administrator*

**3.4.4 Implementation Schedule:**

- Send written notice to downstream MS4: Year 3
- Document received written notice from upstream MS4 (PWC, VDOT): Year 2

**3.4.5 Annual Reporting Requirements:**

- A list of written notifications of physical interconnection given by the Town to other MS4s.

**BMP 3.5: Illicit Discharges & Connections Ordinance**

**3.5.1 Description:** The Town of Dumfries will effectively prohibit non-stormwater discharges into the storm sewer system by adopting an Illicit Discharges and Connections ordinance.

**3.5.2 Goals and Objectives:** To use an Illicit Discharge & Connections ordinance to operate an IDDE program effectively to eliminate non-stormwater discharges to storm sewer system.



**3.5.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Public Works and Zoning Program Administrator*

Town Attorney's Office

*Town Attorney*

**3.5.4 Schedule of Implementation:**

- Enact ordinance: Year 3
- Utilize ordinance to prohibit non-stormwater discharges to MS4: Years 3-5

**3.5.5 Annual Reporting Requirements:**

- None, unless ordinance is adopted or amended.

**BMP 3.6: Written Procedures to Detect & Eliminate Illicit Discharges**

**3.6.1 Description:** The Town of Dumfries shall implement and update written procedures to detect, identify, and address unauthorized non-stormwater discharges to the MS4.

**3.6.2 Goals and Objectives:** Written procedures utilized shall include:

- Dry weather field screening methodologies
- Schedule of field screening activities
- Minimum number of field screening activities completed annually
- Methodologies to collect general information
- Time frame upon which to conduct an investigation
- Methodologies to determine the source of illicit discharge
- Mechanisms to eliminate source of illicit discharges
- Methods for conducting a follow-up investigation
- Mechanism to track all investigations

**3.6.3 Responsible Department/Employees:**

Public Works Department

*Public Works Director*

*Public Works Assistant Director*

*Public Works and Zoning Program Administrator*

**3.6.4 Schedule of Implementation:**

- Utilize written procedures to effectively detect, identify, and address illicit discharges: Years 1-5
- Update written procedures as needed/required: Years 1-5

### **3.6.5 Written Procedures:**

#### **a. Dry Weather Field Screening Methodologies**

- Dry screening of outfalls from Dumfries' MS4 will be done annually to include outfalls to be inspected, as required by the MS4 permit. The Town has less than 50 known outfalls.
- Dry screening inspections will be defined as inspections performed when precipitation is less than 0.5 inches within a 48 hour period, per the MS4 permit.
- Inspections of outfalls will be performed by trained Town staff.
- Number of outfalls inspected will be reported to DEQ annually with the MS4 Annual Report including
  - The screenings results, and
  - Detail of any follow-up actions necessitated by screening results.
- Outfalls are already identified; if any new outfalls are found they will be recorded into a Town database.
- Inspection instructions shall be as follows:
  1. Walking from downstream to upstream (in the stream so as to not disturb water or sediments which could alter assumptions of an outfall) inspect outfalls one at a time.
  2. Note the:
    - a. Date
    - b. Outfall Number
    - c. Size of Outfall
    - d. Time since last rain
    - e. Quantity of the last rain
    - f. Site descriptions, see regulations
    - g. Estimated discharge,
    - h. Visual observations: odor, color, clarity, floatables, deposits or stains, vegetation condition, structural condition, biology) – good/ bad
  3. In the event that an outfall is suspected to have an illicit discharge, document the outfall/illicit discharge and fill out the Town's standard illicit discharge reporting form. The suspected illicit discharge shall be handled with illicit discharge procedures set forth.
- Outfall inspection data will be maintained by the Public Works Department.
- Dry weather field screening to detect illicit discharges in specific areas may also be defined based on criteria such as infrastructure, land use, historical illegal discharges, dumping or cross connections..

#### **b. Illicit Discharge Investigation Procedures**

- The Town will follow its IDDE Investigation Process based on regulatory requirements and best management practices as enumerated and cited in its written procedures. The procedures shall be monitored and updated from time to time to adapt to changing best practices or evolving regulations (see Appendix A - IDDE Investigation Procedures).

### **3.6.6 Annual Reporting Requirements:**

- The total number of outfalls screened during the reporting period, the screening results, and detail of any follow-up actions necessitated by the screening results.

- A summary of each investigation conducted by the operator of any suspected illicit discharge. The summary must include: (i) the date that the suspected discharge was observed, reported, or both; (ii) how the investigation was resolved, including any follow-up, and (iii) resolution of the investigation and the date the investigation was closed.

#### **BMP 3.7: Promotion and Facilitation of Public Reporting of Illicit Discharges**

**3.7.1 Description:** The Town of Dumfries shall operate and promote an online pollution reporting form for citizens to report illicit discharges. Citizens may also call the Town of Dumfries for reporting.

**3.7.2 Goals and Objectives:** To encourage citizen action in reporting pollution by phone, email, or online reporting form and Public Works phone number. Citizen involvement will assist Town in investigating and eliminating illicit discharges. [www.dumfriesva.gov](http://www.dumfriesva.gov)

#### **3.7.3 Responsible Department/Employees:**

Public Works Department

*Public Works Director*

*Public Works Assistant Director*

*Public Works and Zoning Program Administrator*

#### **3.7.4 Schedule of Implementation:**

- Operate and promote online pollution reporting form: Years 1-5
- Continue fielding pollution reports: Years 1-5

#### **3.7.5 Annual Reporting Requirements:**

- None. Data available upon request.

### **Minimum Control Measure #4: Construction Site Stormwater Runoff Control**

#### **BMP 4.1: Ordinance and other legal authorities to require Erosion & Sediment Controls**

**4.1.1 Description:** The Town of Dumfries will implement its ordinance and legal authorities to require erosion and sediment controls on construction sites that disturb 10,000 square feet or greater, or land-disturbing activities in jurisdictions in Tidewater Virginia, as defined in § 62.1-44.15:68 of the Code of Virginia, that disturb 2,500 square feet or greater and are located in areas designated as Resource Protection Areas (RPA), Resource Management Areas (RMA) or Intensely Developed Acres (IDA), pursuant to the Chesapeake Bay Preservation Area Designation and Management Regulations adopted pursuant to the Chesapeake Bay Preservation Act. Legal authorities include:

- Chapter 26, Article IV of the Town Code describes the Erosion and Sediment Control Ordinance.
- Town's Subdivision (Chapter 54) and Zoning Ordinance (Chapter 70)
- References from above ordinances and documents to the "Virginia Erosion and Sediment Control Regulations" and the Virginia Erosion & Sediment Control Handbook

Additional information about the Town's erosion and sediment control program can be found at: [www.dumfriesva.gov](http://www.dumfriesva.gov) (Note: The Town of Dumfries utilizes an agreement in lieu of a plan for the construction of single-family residences as provided in Code of Virginia §62.1-44.15:55.)

The Town requires that land disturbance not begin until an erosion and sediment control plan or an agreement in lieu of a plan is approved by the Town.

**4.1.2 Goals and Objectives:** To prevent degradation of properties, stream channels, waters, and other natural resources.

**4.1.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Public Works Assistant Director*

**4.1.4 Schedule of Implementation:**

- Town Ordinance is in place (Chapter 26, Article IV) per Code of Virginia, § 10.1-560 et seq.; local erosion and sediment control programs, Code of Virginia, § 10.1-562

**4.1.5 Written Plan Review Procedures and all associated documents utilized in plan review:**

- Procedures for Site Plan Review
- Site Plan Review Checklist:
- Design and Construction Standards Manual
- Town Code (E&S Control):
- Virginia Erosion and Sediment Control Law
- State Water Control Board; Erosion and Sediment Control Regulations; Chapter 840
- Town Code Sections:
  - Sec 26-102. Submission and approval of plans; contents of plans
  - Sec 26-103. Permits; fees; security for performance

**4.1.6 Written Inspection Procedures and all associated documents utilized during inspection, including the inspection schedule:**

- Town Code Sec. 26-104. Monitoring, reports and inspections

**4.1.7 Written Procedures for Compliance and Enforcement, including a progressive compliance and enforcement strategy, where appropriate:**

- Town Code Sec. 26-105. Penalties, injunctions, and other legal actions

**4.1.8 Annual Reporting Requirements:**

- None. Data available upon request.

## **BMP 4.2: Inspections and Tracking of Land Disturbance Activities**

### **4.2.1 Description:**

Town Inspectors will inspect land-disturbing activities for compliance with an approved erosion and sediment control plan or agreement in lieu of a plan in accordance with minimum standards. Inspections shall take place (a) upon initial installation of erosion and sediment controls, (b) at least once during every two week period; (c) within 48 hours of any runoff producing storm event; and (d) upon completion of the project and prior to the release of any applicable performance bonds.

The Town shall also:

- Utilize legal authority to require compliance with an approved plan when an inspection finds that the approved plan is not being properly implemented.
- Utilize, as appropriate, legal authority to require changes to an approved plan when an inspection finds that the approved plan is inadequate to effectively control soil erosion, sediment deposition, and runoff to prevent the unreasonable degradation of properties, stream channels, waters, and other natural resources.

The Town shall ensure that inspections are conducted by personnel who hold a certificate of competence in accordance with 9VAC25-850-40.

The MS4 Annual Reports shall include:

- (a) total number of land disturbing activities,
- (b) total number of acres disturbed,
- (c) total number of inspections conducted, and
- (d) a summary of enforcement actions taken including total number and type of enforcement actions taken during reporting period.

**4.2.2 Goals and Objectives:** To prevent degradation of properties, stream channels, waters, and other natural resources.

### **4.2.3 Responsible Departments/Employees:**

#### Public Works Department

*Public Works Director*

*Public Works and Zoning Program Administrator*

#### Planning & Zoning Department

*Zoning Administrator*

### **4.2.4 Schedule of Implementation:**

- Conduct Inspections of Land Disturbing Activities: Years 1-5 (Town Inspectors)
- Track regulated land-disturbing activities: Years 1-5 (Public Works and Zoning Program Administrator)
- Maintain copies of inspection reports from construction inspections: Years 1-5 (Public Works and Zoning Program Administrator)
- Maintain documentation of certificates of competence of staff members who conduct erosion and sediment control inspections: Years 1-5 (Public Works and Zoning Program Administrator)

**4.2.5 Annual Reporting Requirements:**

- Total number of regulated land-disturbing activities
- Total number of acres disturbed
- Total number of inspections conducted
- Summary of enforcement actions taken, including the total number and type of enforcement actions taken during the reporting period

**BMP 4.3: Require VSMP Permit for Land Disturbing Activities**

**4.3.1 Description:** The Town of Dumfries requires all land disturbing activities encompassing areas of over 2,500 square feet to secure a VSMP storm water permit, through the Town's MS4 Permit Program, for the activity.

**4.3.2 Goals and Objectives:** To prevent degradation of properties, stream channels, waters, and other natural resources.

**4.3.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Public Works Assistant Director*

*Public Works and Zoning Program Administrator*

Planning & Zoning Department

*Zoning Administrator*

**4.3.4 Schedule of Implementation:**

- Require VSMP permit for all land disturbing activities over 2,500 SF: Years 1-5

**4.3.5 Annual Reporting Requirements:**

- None. Data available upon request.

**BMP 4.4: Promote to the Public a Mechanism for Receipt of Complaints Regarding Regulated Land Disturbing Activities**

**4.4.1 Description:** The Town of Dumfries promotes reporting of construction site issues through contact with the public at public outreach & education events described in MCM 1 and 2, and also promotes reporting through its website at [www.dumfriesva.gov](http://www.dumfriesva.gov). Calls are received by the Departments of Public Works and Planning & Zoning.

**4.4.2 Goals and Objectives:** To prevent degradation of properties, stream channels, waters, and other natural resources.

**4.4.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Public Works Assistant Director  
Public Works and Zoning Program Administrator*

Planning & Zoning Department  
*Zoning Administrator*

**4.4.4 Schedule of Implementation:**

- Promote and respond to complaints received by the public regarding regulated land disturbing activities: Years 1-5

**4.5.5 Annual Reporting Requirements:**

- None. Data available upon request.

## Minimum Control Measure #5: Post-Construction Stormwater Management in New Development & Redevelopment

### **BMP 5.1: Ordinance and other legal authorities to address Post-Construction Runoff**

**5.1.1 Description:** The Town of Dumfries will implement its ordinance to address post-construction runoff from new development and redevelopment projects to ensure compliance with the Virginia Stormwater Management Act and attendant regulations. Legal authorities include:

- Chapter 26, Article V of the Town Code describes the Stormwater Management Ordinance

Additional information about the Town's stormwater management program can be found at: <http://www.dumfriesva.gov/governmentpublic-works-municipal-separate-storm-sewer-system-ms4>

**5.1.2 Goals and Objectives:** To ensure the general health, safety, and welfare of citizens and protect the quality and quantity of state waters from potential harm from unmanaged stormwater, including protection from a land disturbing activity causing unreasonable degradation of properties, water quality, stream channels, and other natural resources.

**5.1.3 Responsible Departments/Employees:**

Public Works Department  
*Public Works Director*  
*Assistant Public Works Director*

**5.1.4 Schedule of Implementation:**

- Ordinance is in place (Chapter 26, Article V) per Code of Virginia, § 15.2-2114, Local regulation of stormwater



**5.1.5 Written policies and procedures utilized to ensure that stormwater management facilities are designed and installed in accordance with Section II B 5b:**

The following documents outline procedures:

- Procedures for Site Plan Review: <http://www.dumfriesva.gov/businesses/site-development>
- Site Plan Process: <http://www.dumfriesva.gov/government/planningandzoning/site-plan>
- Design and Construction Standards Manual: The Town has adopted Prince William County's DCSM <http://www.pwcgov.org/government/dept/development/Id/Pages/dcsn.aspx>
- Chapter 26, Article V of the Town Code describes the Stormwater Management Ordinance
- Virginia Stormwater Management Act
- State Water Control Board; Virginia Stormwater Management Program (VSMP) Regulation; Chapter 870
- Virginia Stormwater Management Handbook
- Department of Environmental Quality Guidance Documents: <http://www.deq.virginia.gov/Programs/Water/Laws,Regulations,Guidance/Guidance/StormwaterManagementGuidance.aspx>
- Virginia Runoff Reduction Method (VRRM) Spreadsheets
- VSMP Technical Bulletins

For privately owned stormwater management facilities the following documents also apply:

- Design & Construction Standards Manual

**5.1.6 Written policies and procedures utilized in conducting inspections:**

See documents listed in 5.1.5.

**5.1.7 Written procedures for inspection, compliance and enforcement to ensure maintenance is conducted on private stormwater facilities to ensure long-term operation in accordance with approved design:**

See documents listed in 5.1.5.

**5.1.8 Written procedures for inspection and maintenance of operator-owned stormwater management facilities:**

The Town will establish a program for inspection and maintenance of stormwater management facilities owned by the Town in the form of a "Stormwater Post Construction Inspection Manual".

The manual will list all of the stormwater management facilities the Town is responsible for, by department, and include the following: type of stormwater management facility, the Town ID #, a periodic inspection checklist, and the annual inspection check list. The periodic inspection checklist is optional; however, departments will be encouraged to utilize them as stormwater management facilities are maintained. If deficiencies are found during maintenance, they are to be reported to the responsible party within the department, and repairs are to be scheduled.

The annual inspection checklist provided in the manual is to be used by the "Stormwater Inspection Staff" (led by the Public Works Director). These inspections will be conducted annually by Stormwater Inspectors

and the results will be provided to the Public Works Director and the responsible person within the given department. If deficiencies are found during annual inspections, repairs will be budgeted and scheduled.

**5.1.9 Annual Reporting Requirements:**

- None, unless ordinance or procedures are amended.

**BMP 5.2: Require long-term operation and maintenance of stormwater management facilities not owned by the Town**

**5.2.1 Description:** The Town shall require adequate long-term operation and maintenance of stormwater management facilities by the owner by requiring the owner to develop a recorded inspection schedule and maintenance agreement.

The Town provides developers with a template maintenance agreement in the Design and Construction Standards Manual (Section 720.15). The maintenance agreement requires that the owner submit to the Town an annual inspection report, along with one certified by a professional engineer every 3 years, to assure safe and proper functioning of the facilities.

If maintenance is neglected by the owner, the maintenance agreement allows the Town, after proper notice is provided, to enter upon the property and take whatever steps necessary to correct deficiencies and charge the costs of such repairs to the owner.

**5.2.2 Goals and Objectives:** To ensure that stormwater management facilities and BMPs are properly functioning as they were designed to control stormwater quantity and quality.

**5.2.3 Responsible Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

**5.2.4 Schedule of Implementation:**

- Require owners to develop recorded inspection schedule and maintenance agreements: Year 1
- Implement a schedule to inspect all privately owned stormwater management facilities at least once every 5 years: Year 3

**5.2.5 Annual Reporting Requirements:**

- None, unless procedures amended.

<b>BMP 5.3: Require long-term operation and maintenance of stormwater management facilities owned by the Town</b>
<p><b>5.3.1 Description:</b> The Town shall require adequate long-term operation and maintenance of stormwater management facilities owned by the Town. Town Inspectors inspect stormwater management facilities annually, generally in the Fall, and inform Town departments responsible for the stormwater management facilities of any deficiencies found.</p> <p>Town departments are responsible for maintaining stormwater management facilities on properties they manage unless an alternative agreement has been established.</p>
<p><b>5.3.2 Goals and Objectives:</b> To ensure that stormwater management facilities and BMPs are properly functioning as they were designed to control stormwater quantity and quality.</p>
<p><b>5.3.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Assistant Public Works Director</i></p>
<p><b>5.3.4 Schedule of Implementation:</b></p> <ul style="list-style-type: none"> <li>• Maintain list of all known Town-owned facilities: Years 1-5</li> <li>• Inspect Town-owned stormwater facilities: Years 1-5</li> </ul>
<p><b>5.3.5 Annual Reporting Requirements:</b></p> <ul style="list-style-type: none"> <li>• None, unless procedures amended.</li> </ul>

<b>BMP 5.4: Track stormwater management facilities</b>
<p><b>5.4.1 Description:</b> The Town shall maintain an updated electronic database of all known operator-owned and privately-owned stormwater management facilities that discharge into the MS4. The database shall include:</p> <ul style="list-style-type: none"> <li>(a) The stormwater management facility type;</li> <li>(b) A general description of the facility's location, including the address or latitude or longitude;</li> <li>(c) The acres treated by the facility, including total acres, as well as the breakdown of pervious and impervious acres;</li> <li>(d) The date the facility was brought online (MM/YYYY). If the date is not known, the Town shall use June 30, 2005, as the date brought online for all previously existing stormwater management facilities;</li> <li>(e) The sixth order hydrologic unit code (HUC) in which the stormwater management facility is located;</li> <li>(f) The name of any impaired water segments within each HUC listed in the 2010 § 305 (b)/ 303 (d) Water Quality Assessment Integrated Report to which the stormwater management facility discharges;</li> <li>(g) Whether the stormwater management facility is operator-owned or privately owned;</li> <li>(h) Whether a maintenance agreement exists if the stormwater management facility is privately owned; and</li> </ul>

(i) The date of the operator's most recent inspection of the stormwater management facility.
<b>5.4.2 Goals and Objectives:</b> To ensure that stormwater management facilities and BMPs are properly functioning as they were designed to control stormwater quantity and quality.
<b>5.4.3 Responsible Departments/Employees:</b>  <u>Public Works Department</u> <i>Public Works Director</i> <i>Assistant Public Works Director</i> <i>Public Works and Zoning Program Administrator</i>
<b>5.4.4 Schedule of Implementation:</b>  <ul style="list-style-type: none"> <li>• Track all new stormwater management facilities that require a maintenance agreement: Years 1-5</li> <li>• Maintain list of all known Town-owned facilities: Years 1-5</li> <li>• Inspect and verify details regarding Town-owned stormwater facilities: Years 1-3</li> </ul>
<b>5.4.5 Annual Reporting Requirements:</b> <ul style="list-style-type: none"> <li>• Total number of inspections completed and, when applicable, the number of enforcement actions taken to ensure long-term maintenance.</li> <li>• Submit an electronic database or spreadsheet of all stormwater management facilities brought online during each reporting year with the appropriate annual report.</li> </ul>

## Minimum Control Measure #6: Pollution Prevention/Good Housekeeping for Municipal Operations

<b>BMP 6.1: Develop Written Procedures to Minimize or Prevent Discharges</b>
<p><b>6.1.1 Description:</b> The Town of Dumfries shall develop and implement written procedures for daily operations designed to minimize or prevent discharges. Procedures shall be written for: daily street and parking lot maintenance, equipment maintenance, and pesticide, herbicide, and fertilizer application, storage and transport of materials.</p>
<p><b>6.1.2 Goals and Objectives:</b> Written procedures for daily operations shall be designed to:</p> <ul style="list-style-type: none"> <li>• Prevent illicit discharges</li> <li>• Ensure the proper disposal of waste</li> <li>• Prevent the discharge of vehicle wash water</li> <li>• Require BMPs for discharging water pumped from construction and maintenance activities</li> <li>• Minimize pollutant runoff from bulk storage areas</li> <li>• Prevent pollutant discharges from municipal automobiles and equipment</li> <li>• Ensure application of fertilizers and pesticides is conducted under manufacturer's recommendations</li> </ul>
<p><b>6.1.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Assistant Public Works Director</i></p> <p>Procedures will be developed by the Public Works Department in coordination with other department representatives.</p>
<p><b>6.1.4 Schedule of Implementation:</b></p> <ul style="list-style-type: none"> <li>• Develop and implement written procedures for daily operations: Year 3</li> <li>• Update written procedures as needed or required: Years 3-5</li> </ul>
<p><b>6.1.5 Annual Reporting Requirements:</b></p> <ul style="list-style-type: none"> <li>• A summary report on the development and implementation of the daily operational procedures.</li> </ul>

**BMP 6.2: Identify All Municipal High-Priority Facilities and Municipal High-Priority Facilities With a High Potential For Pollutant Discharges**

**6.2.1 Description:** The Town of Dumfries identified all municipal high-priority facilities. The Town shall continue to update this list as new facilities are created or as existing facilities are modified or updated.

**6.2.2 Goals and Objectives:** To identify municipal facilities that may create pollutant discharges to the MS4. This identification process shall allow the Town to develop and implement Stormwater Pollution Prevention Plans for these facilities, in order to effectively prevent and eliminate pollutant discharges from municipal facilities.

**6.2.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

Facilities will be identified by the Public Works Department in coordination with other department representatives

**6.2.4 Schedule of Implementation:**

- Identify High Priority & High Potential Facilities: Year 3
- Update list of High Priority & High Potential Facilities as necessary: Years 3-5

**6.2.5 Identification of High Priority & High Potential Facilities:**

High priority facilities are defined as facilities that include any of the following:

(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.

High priority facilities with a high potential for discharging pollutants are defined as including any of the following:

- (a) Areas where residuals from using, storing or cleaning machinery or equipment remain and are exposed to stormwater;
- (b) Materials or residuals on the ground or in stormwater inlets from spills or leaks;
- (c) Material handling equipment (except adequately maintained vehicles);
- (d) Materials or products that would be expected to be mobilized in stormwater runoff during loading/unloading or transporting activities (e.g., rock, salt, fill dirt);
- (e) Materials or products stored outdoors (except final products intended for outside use where exposure to stormwater does not result in the discharge of pollutants);
- (f) Materials or products that would be expected to be mobilized in stormwater runoff contained in open, deteriorated or leaking storage drums, barrels, tanks, and similar containers;
- (g) Waste material except waste in covered, non-leaking containers (e.g., dumpsters);
- (h) Application or disposal of process wastewater (unless otherwise permitted); or
- (i) Particulate matter or visible deposits of residuals from roof stacks, vents or both not otherwise regulated (i.e., under an air quality control permit) and evident in the stormwater runoff.

The following are the municipal facilities identified as either High Priority or High Priority with a Potential For Discharging Pollutants by the Town of Dumfries:

**High Priority Facilities:**

1. Public Works Shop Facility

**6.2.6 Annual Reporting Requirements:**

- None. Data available upon request.

**BMP 6.3: Develop and Implement Specific Stormwater Pollution Prevention Plans (SWPPPs) for High Priority Facilities With a High Potential for Discharging Pollutants**

**6.3.1 Description:** The Town of Dumfries shall develop and implement site-specific Stormwater Pollution Prevention Plans for identified high priority facilities with a high potential for discharging pollutants. Any facilities covered under a separate VPDES permit shall be excluded from this requirement. Each SWPPP shall be evaluated and updated as necessary to reflect any discharge, release or spill from the facility. A copy of each SWPPP shall be kept and updated and utilized as part of staff training.

**6.3.2 Goals and Objectives:** To prevent and eliminate pollutant discharges from municipal facilities that are labeled as high priority with a high potential for discharging pollutants.

Each SWPPP developed shall include:

- A site description including a site map identifying outfalls, direction of flows, existing source controls, and receiving bodies of water.
- A discussion and checklist of potential pollutants and sources.
- A discussion of all potential non-stormwater discharges.
- Written procedures designed to reduce and prevent pollutant discharges.
- A description of the applicable training required.
- Annual site compliance evaluation procedures.
- Inspection and maintenance schedule for site specific source controls.
- The date of each inspection and associated findings.
- Date, material discharged, released or spilled, and quantity discharged for each event that occurs.

**6.3.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

**6.4.4 Annual Reporting Requirements:**

- Summary report on the development and implementation of all required SWPPPs

#### **6.4: BMP Implement Turf and Landscape Nutrient Management Plans**

**6.4.1 Description:** The Town of Dumfries shall implement turf and landscape nutrient management plans developed by a certified nutrient management planner on all lands owned or operated by the Town where nutrients are applied to a contiguous area greater than one acre.

**6.4.2 Goals and Objectives:** To utilize turf and landscape nutrient management plans to responsibly apply nutrients to municipal properties.

Facilities Requiring Nutrient Management Plans:

1. Ginn Memorial Park
2. Weems-Botts

The Town shall not apply any deicing agent containing urea or other forms of nitrogen or phosphorous to any parking lots, roads, sidewalks, etc.

#### **6.4.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

*Maintenance Crew*

#### **6.4.4 Schedule of Implementation:**

- Identify all lands owned or operated by the Town where nutrients were applied to a contiguous area greater than one acre: Year 2
- Implement turf and landscape nutrient management plans for at least 30% of applicable lands: Year 3
- Implement turf and landscape nutrient management plans for at least 70% of all applicable lands: Year 4
- Implement turf and landscape nutrient management plans for all applicable lands: Year 5

#### **6.4.5 Annual Reporting Requirements:**

- Summary of the turf and landscape management plan (total acreage, acreage of lands upon which turf and landscape nutrient management plans have been implemented; and updated list of properties with longitude/latitude).



**BMP 6.5: Implement Employee Training On Written Procedures to Minimize or Prevent Discharges**

**6.5.1 Description:** The Town of Dumfries shall conduct stormwater training for municipal employees. Training shall be designed specifically for different departments and their duties and daily operations and how it relates to stormwater management. The Town shall document training activities, employees in attendance, and other applicable information.

**6.5.2 Goals and Objectives:** To train municipal employees on stormwater management and various ways to minimize or prevent pollutant discharges.

Training Shall Be Designed To Include:

1. Biennial training to field personnel in the recognition and reporting of illicit discharges
2. Biennial training to employees in good housekeeping and pollution prevention practices that are to be employed during road, street, and parking lot maintenance.
3. Biennial training to employees in good housekeeping and pollution prevention practices that are to be employed in and around maintenance and public works facilities.
4. Biennial training to employees in good housekeeping and pollution prevention practices that are to be employed in and around recreational facilities.
5. Ensure that employees and contractors who apply pesticides and herbicides are properly trained and certified in accordance with the Virginia Pesticide Control Act.
6. Ensure that plan reviewers, inspectors, program administrators, and construction site operators hold the proper certification as required under Virginia Erosion and Sediment Control Law.
7. Ensure that applicable employees obtain the proper certifications as required by Virginia Erosion and Sediment Control Law.
8. Emergency response employees shall have training in spill response.
9. Keep documentation on each training event including training date, number of employees attending, and the objective of the training event for a period of three years after each event.

**6.5.3 Responsible Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

**6.5.4 Schedule of Implementation:**

- Implement biennial training events: Years 2-5
- Ensure that pesticide and herbicide applicators hold proper certification: Years 3-5
- Ensure that plan reviewers, inspectors, program administrators, and construction site operators hold proper certification: Years 1-5
- Ensure that applicable employees obtain the proper certifications as required by Virginia Erosion and Sediment Control Law: Years 1-5
- Spill response training for emergency personnel: Years 2-5
- Keep documentation of training events: Years 2-5

**6.5.5 Annual Reporting Requirements:**

- Summary report on the required training, including a list of training events, the training date, the number of employees attending training and the objective of the training.

**BMP 6.6: Require Municipal Contractors Use Appropriate Control Measures and Procedures for Stormwater Discharges to the MS4 System**

**6.6.1 Description:** The Town of Dumfries shall require that municipal contractors use appropriate control measures and procedures for stormwater discharges to the MS4 system.

**6.6.2 Goals and Objectives:** To reduce or eliminate potential discharges from municipal contractors.

Oversight of municipal contractors will be the responsibility of Town inspectors or Town project manager(s). Include contract language in the Town's Terms & Conditions to ensure compliance. The document will be accessible on the Town webpage for download.

**6.6.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Public Works Assistant Director*

*Public Works and Zoning Program Administrator*

**6.6.4 Schedule of Implementation:**

- Develop new contract provisions requiring municipal contractors to use appropriate control measures and procedures for stormwater discharges to the MS4 system: Year 3
- Require municipal contractors use control measure and procedures for stormwater discharges: Years 3-5

**6.6.5 Annual Reporting Requirements:**

- Report on activities to develop procedures.

**BMP 6.7: Street Sweeping**

**6.7.1 Description:** The Town of Dumfries maintains a schedule to sweep every street at least monthly. Approximately half the streets are swept more than once per month, largely depending on the weather.

**6.7.2 Goals and Objectives:** To reduce or eliminate potential discharges from public rights-of-way.

<p><b>6.7.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Assistant Public Works Director</i>  <i>Maintenance Crew</i></p>
<p><b>6.7.4 Schedule of Implementation:</b></p> <ul style="list-style-type: none"> <li>Sweep all streets at least once per month: Years 1-5</li> </ul>
<p><b>6.7.5 Annual Reporting Requirements</b></p> <ul style="list-style-type: none"> <li>Summary report on activities.</li> </ul>

<b>BMP 6.8: Litter Pickup</b>
<p><b>6.8.1 Description:</b> The Town of Dumfries has a dedicated part-time position for litter pickup. The position is able to remove litter from public rights-of-way and other public properties at least three days per week.</p>
<p><b>6.8.2 Goals and Objectives:</b> To reduce or eliminate potential discharges from public rights-of-way.</p>
<p><b>6.8.3 Responsible Departments/Employees:</b></p> <p><u>Public Works Department</u>  <i>Public Works Director</i>  <i>Assistant Public Works Director</i>  <i>Maintenance Crew</i></p>
<p><b>6.8.4 Schedule of Implementation:</b></p> <ul style="list-style-type: none"> <li>Litter removal at least 3 days per week: Years 1-5</li> </ul>
<p><b>6.8.5 Annual Reporting Requirements:</b></p> <ul style="list-style-type: none"> <li>Summary report on activities</li> </ul>

<b>BMP 6.9: Snow and Ice Removal</b>
<p><b>6.9.1 Description:</b> The Town of Dumfries shall require that any staff or contractors use appropriate control measures and procedures for stormwater discharges to the MS4 system.</p>
<p><b>6.9.2 Goals and Objectives:</b> To reduce or eliminate potential discharges from public rights-of-way.</p> <p>Oversight of any municipal contractors will be the responsibility of Town inspectors. Include contract language in the Town's Terms &amp; Conditions to ensure compliance.</p>

**6.9.3 Responsible Departments/Employees:**

Public Works Department

*Public Works Director*

*Assistant Public Works Director*

**6.9.4 Schedule of Implementation:**

- Use best available practices for snow and ice removal and the storage of the require materials:  
Years 1-5

**6.10.5 Annual Reporting Requirements:**

- Summary report on activities

### Virginia Total Maximum Daily Load (TMDL) Special Conditions

The Town will work on developing the TMDL Action Plan to address pollutants which the Town's MS4 has been assigned a waste load allocation. This Plan will also include the Potomac River TMDL's for bacteria and PCBs.

The TMDL Action Plan will identify the best management practices and interim milestone activities. The TMDL Action Plan will be submitted to the Virginia Department of Environmental Quality with the July 1, 2015 through June 30, 2016 Annual Report.

### Chesapeake Bay Total Maximum Daily Load (TMDL) Special Conditions

In its Phase I and Phase II Chesapeake Bay TMDL Watershed Implementation Plans (WIP), the Commonwealth committed to a phased approach for MS4s to implement necessary pollutant reductions (phosphorus, nitrogen, and sediment). This permit (2013-2018) requires an implementation of 5% pollutant reductions as specified in the 2010 Phase I WIP.

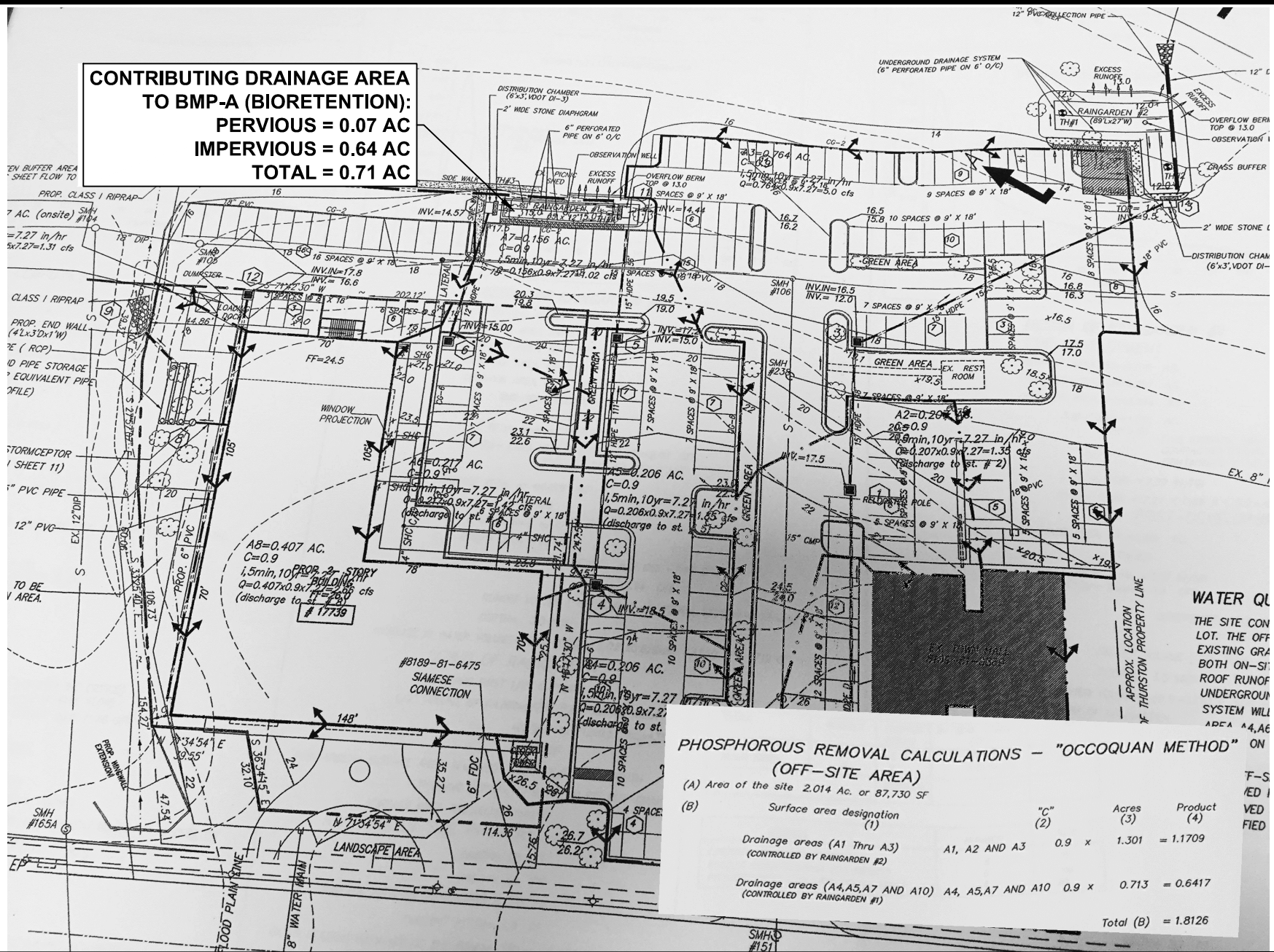
The Town will work on developing the Chesapeake Bay TMDL Action Plan during the first three years of this permit cycle in accordance with the permit requirements. The Chesapeake Bay TMDL Action Plan will be submitted to the Virginia Department of Environmental Quality with the July 1, 2015 through June 30, 2016 Annual Report.

Prior to the start of the 2018-2023 permit cycle, as part of the Town's reapplication package, the Town shall document that sufficient control measures have been implemented to meet the compliance target identified in the MS4 permit and draft a second phase Chesapeake Bay TMDL Action Plan to reduce an additional 35% of pollutants from existing and new sources as described in the permit.

## **APPENDIX B – PUBLIC COMMENTS**

## **APPENDIX C – BMP-A EXISTING BIORETENTION BASIN**

**CONTRIBUTING DRAINAGE AREA  
TO BMP-A (BIORETENTION):**  
**PERVIOUS = 0.07 AC**  
**IMPERVIOUS = 0.64 AC**  
**TOTAL = 0.71 AC**



**TOWN OF DUMFRIES  
EXISTING BMP-A (BIORETENTION)  
DUMFRIES, VIRGINIA**

DESIGNED: N/A  
 DRAWN: N/A  
 CHECKED: N/A  
 DATE: 12/23/2015

PROJECT: B15147B-01  
 SCALE: N.T.S.

**FIGURE  
BMP-A**