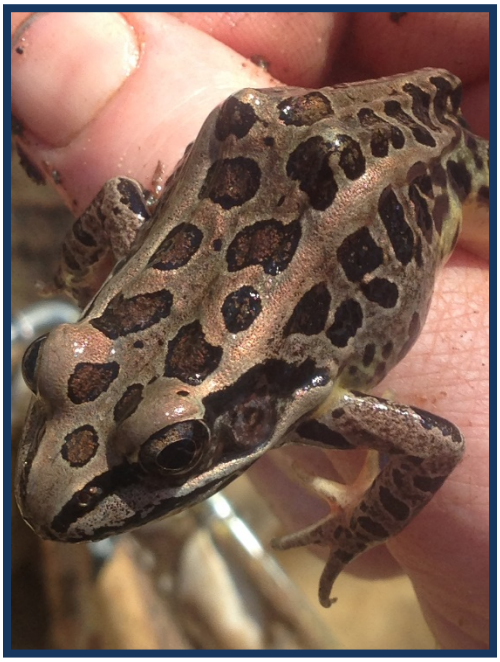
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Municipal Separate Storm Sewer System Discharge Permit
Permit Number MD0068306
Effective Date: February 12, 2014

FISCAL YEAR 2016 ANNUAL REPORT



Anne Arundel County
Department of Public Works
2662 Riva Road
Annapolis, Maryland 21401

February 10, 2017

Fiscal Year 2016 Annual Report for Anne Arundel County Storm Water National Pollutant Discharge Elimination System

Permit Number MD0068306

Submitted to:

Water Management Administration
Maryland Department of the Environment
1800 Washington Boulevard
Baltimore, MD 21230

February 2017

Submitted by:
Anne Arundel County
Department of Public Works
2662 Riva Road
Annapolis, MD 21401

Prepared by:

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I. PURPOSE AND SCOPE

This Annual Report was assembled to detail the activities in Anne Arundel County for the County and State Fiscal Year (FY) beginning July 1, 2015 and ending June 30, 2016. These activities demonstrate compliance with the National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit terms provided by 40 CFR 122.42(c). It describes the components of the stormwater management program and the associated implementation status. The County proposes no revision to the program at this time.

This report also summarizes the monitoring programs implemented by Anne Arundel County, including data collection and analysis. Digital data and specific reports for the major programs conducted during the reporting term can be found within the report's **Appendices**, which are provided in electronic format on the enclosed DVD. Digital data found in **Appendix A** is submitted in the format consistent with the MS4 Geodatabase structure as described in the March 2015 document entitled *National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4), Geodatabase Design and User's Guide, Version 1.1* (MDE 2015).

On February 12, 2014, the County was issued a new, Fourth-Generation, NPDES MS4 Permit. This report is the third Annual Report prepared under that permit.

II. IMPLEMENTATION STATUS – STORMWATER MANAGEMENT PROGRAM

Components of Anne Arundel County's stormwater management program were established to address the requirements outlined in the County's NPDES MS4 permit. The major components also address stormwater Waste Load Allocations (WLAs) associated with Total Maximum Daily Loads (TMDLs), and overall water quality improvement within the County's waterways. Program components include:

- Storm Drain Infrastructure and Impervious Area Inventory;
- Erosion and Sediment Control Program;
- Stormwater Management Program;
- Illicit Connection Detection and Elimination;
- Litter and Floatables;
- Management and Maintenance of County-owned Facilities (e.g., roads, parking lots);
- Public Education and Outreach;
- Watershed Assessment;
- Watershed Restoration Plans;
- TMDL Compliance;
- Watershed Restoration Assessment;
- Stormwater Management Assessment; and
- Program Funding.

The County feels the above programs address the major water quality concerns within County watersheds. Monitoring efforts have shown that the implementation of these programs results in the improvement of water quality, which motivates the County to continue its dedication to these programs. Efforts in these program areas during the reporting period are addressed under the appropriate permit conditions in **Part IV** of this report.

III. WATER QUALITY

The NPDES MS4 Permit issued to Anne Arundel County in February 2014 requires implementation of a stormwater management program to effectively prohibit pollutants in stormwater discharges, to attain applicable WLAs as set forth in approved TMDLs, and to comply with all provisions of the permit. Compliance with permit conditions shall constitute compliance with the Clean Water Act (§402(p)(3)(B)(iii)) and adequate progress toward compliance with Maryland's water quality standards and any U.S. Environmental Protection Agency (EPA) approved stormwater WLAs.

Anne Arundel County endeavors to manage, implement, and enforce a stormwater management program in accordance with the Clean Water Act and corresponding NPDES regulations. The activities undertaken in support of permit compliance, and documented herein, show progress toward reducing pollutants in stormwater discharges, prohibiting unauthorized discharges to the County's storm drain system, and attaining stormwater WLAs for established TMDLs.

IV. STANDARD PERMIT CONDITIONS

A. Permit Administration

Anne Arundel County shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) for the implementation of this permit. The County shall provide the coordinator's name, title, address, phone number, and email address. Additionally, the County shall submit in its annual reports to MDE an organizational chart detailing personnel and groups responsible for major NPDES program tasks in this permit. MDE shall be notified of any changes in personnel or organization relative to NPDES program tasks.

Status:

Coordination of Anne Arundel County's NPDES MS4 Permit was performed by the Department of Public Works (DPW) Watershed Protection and Restoration Program (WPRP) for FY2016 (1 July 2015 – 30 June 2016). The program coordinators during this reporting year are:

Mr. Erik Michelsen
Administrator
Watershed Protection and Restoration Program
Anne Arundel County Department of Public Works
2662 Riva Road, MS 7409
Annapolis, MD 21401
410-222-7520
pwmich20@aacounty.org

Ms. Ginger Ellis
Environmental Planning Administrator
Watershed Protection and Restoration Program
Anne Arundel County Department of Public Works
2662 Riva Road, MS 7409
Annapolis, MD 21401
410-222-4240
pwelli16@aacounty.org

Ms. Janis Markusic
Program Manager/Senior Planner
Watershed Protection and Restoration Program
Anne Arundel County Department of Public Works
2662 Riva Road, MS 7409
Annapolis, MD 21401
(410) 222-4240
pwmark02@aacounty.org

Figure 1 shows the County's organizational chart for FY 2016. Several new positions were added within the Watershed Protection and Restoration Program (WPRP) structure to support compliance with the MS4 Permit. Information on specific positions and personnel responsible for permit compliance and stormwater program tasks follows.

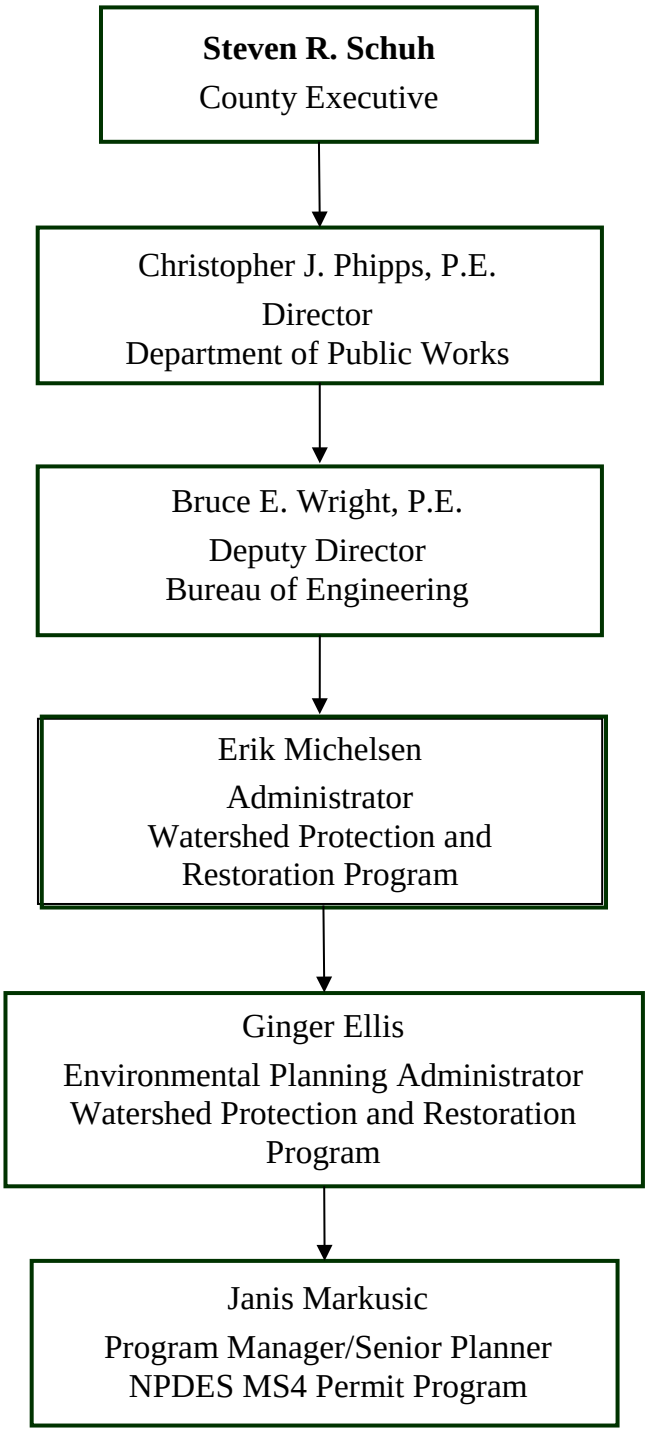


Figure 1. Organization Chart for NPDES Permit Administration (7/1/2015 through 6/30/2016)

Additional County staff members responsible for components of the NPDES MS4 Permit requirements during FY2016 are listed below.

Department of Public Works:

- Doug Burkhardt, Engineer Manager
  Bureau of Engineering, Technical Engineering
  Provides managerial support and oversight for geographic information systems (GIS) data collection and geodatabase development activities associated with urban best management practices (BMPs) and closed storm drain system records.

- Jeff Cox, Program Manager
  Bureau of Highways, Infrastructure Management Division
  Programs and maintains GIS databases for the closed storm drain system, associated infrastructure databases, and the County's roads inventory.

- Darryl Hockstra, Engineer Manager
  Bureau of Highways, Infrastructure Management Division
  Administers the Infrastructure Management Division and oversees the capital program associated with publicly owned stormwater management practices that include repair and maintenance; and the storm drain/culvert conveyance system inspection, repair and maintenance program.

- Wayne McCready, GIS Specialist
  Bureau of Highways, Infrastructure Management Division
  Maintains associated infrastructure databases, develops GIS inspection tools, and creates CADD drawings of closed storm drain system and culverts.

- Ken Pensyl, Acting Senior Engineer
  Bureau of Highways, Infrastructure Management Division
  Administers the Stormwater Management Section that is responsible for the inspection, repair and maintenance of publicly owned storm drain/culvert system as well as the inspection, repair and maintenance program

- Vacant, Engineer III
  Bureau of Highways, Infrastructure Management Division
  Inspects publicly owned storm drain infrastructure and oversees public stormwater management inspection staff.

- Rick Davis, Engineer III
  Bureau of Highways, Infrastructure Management Division
  Northern District storm drainage and culverts project manager

- Robert Savidge, Engineer III
  Bureau of Highways, Infrastructure Management Division
  Central/Southern District storm drainage and culverts project manager

- Ron Rose, Construction Inspector Supervisor, Northern District
  Bureau of Highways, Infrastructure Management Division
  Investigates storm drainage complaints and provides construction inspection services for drainage projects in the northern district

- Clark Rosendale, Construction Inspector Supervisor, Central & Southern Districts
  Bureau of Highways, Infrastructure Management Division
  Investigates storm drainage complaints and provides construction inspection services for drainage projects in the central and southern districts

- Chuck Henney, Program Specialist II
  Bureau of Highways, Infrastructure Management Division
  Manages, inspects and maintains a subset of urban stormwater best management practices that are the responsibility of DPW. Investigates BMP and SWM pond complaints and provides construction inspection services for resulting projects

- Rich Olsen, Program Specialist II
  Bureau of Highways, Infrastructure Management Division
  Manages, inspects and maintains a subset of urban stormwater BMPs that are the responsibility of DPW. Investigates stormwater management practices complaints and provides construction inspection services for resulting projects.

- Alex Baquie, Assistant Chief Road Operations
  Bureau of Highways, Road Operation Division
  Administers the County's Road Operation Division; maintains the Bureau's permit coverage under the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity); develops and implements Stormwater Pollution Prevention Plans (SWPPPs) associated with Road Operations district yard facilities; documents the use of pesticides, herbicides, fertilizers, and de-icing materials associated with road maintenance activities; implements the County's street sweeping and inlet cleaning programs; conducts roadside litter clean-up activities; and provides support for volunteer watershed and stream clean-up activities.

- Raghu Badami, Engineer Manager
  Bureau of Engineering, Watershed Protection and Restoration Program
  Administers the Modeling and Analysis Unit responsible for providing water quality, pollutant loading, and impervious area data management, analysis, tracking and reporting for NPDES MS4 permit, TMDL and the County's Phase II Watershed Implementation Plan (WIP); and Stormwater Remediation Fee oversight and support.

- Rick Fisher, Senior Engineer
  Bureau of Engineering, Watershed Protection and Restoration Program
  Administers the Watershed Assessment Program; manages watershed assessment contracts; manages the technical engineering and water quality models in support of NPDES MS4 Permit activities, individual TMDL compliance, and the Phase II WIP; coordinates data, tracking, and reporting of impervious surface reduction and pollutant load credit; manages the County's impervious surface and land cover GIS layers; and documents the locations and descriptions of watershed restoration projects.

- Melissa Harlinski, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Maintains, updates, and provides quality control of GIS data layers (e.g., impervious surfaces, land cover) that support the engineering and water quality models utilized for supporting NPDES MS4 and TMDL Restoration Plan activities.

- Melissa Bragg, GIS Specialist
  Bureau of Engineering, Watershed Protection and Restoration Program
  Provides GIS analysis to support the engineering and water quality models utilized for supporting NPDES MS4 and TMDL compliance activities. Maintains, updates and provides quality control of GIS data.

- Vacant, Program Manager
  Bureau of Engineering, Watershed Protection and Restoration Program, Administers the SW Fee Support Unit, oversees fee assessment, appeals and credit processing and tracking. Assists with Historic BMP record database update and input into MS4 Geodatabase.

- Vacant, Program Specialist II,
  Bureau of Engineering, Watershed Protection and Restoration Program
  Provides program management support to the Modeling and Analysis Stormwater Remediation Fee Unit carrying out assignments related to fee assessment, appeals and credit processing and tracking, and stormwater Best Management Practice (BMP) performance review.

- Bertha Berrios, GIS Specialist,
  Bureau of Engineering, Watershed Protection and Restoration Program
  Assists the Modeling and Analysis Stormwater Remediation Fee Unit with researching and tracking fee assessment, appeals and credits.

- Sheri Lott, Engineer Manager
  Bureau of Engineering, Watershed Protection and Restoration Program
  Administers the CIP Restoration Project Implementation unit responsible for design and construction of WPRP restoration projects.

- Nasrin Dahlgren, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Erica Jackson, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- James Woods,, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Diron Baker, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Gerry Ingelsby, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Dennis McMonigle, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Ken Weeks, Engineer III
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Masoud Ghatineh, Senior Engineer
  Bureau of Engineering, General Engineering
  Manages design and construction of watershed restoration projects as required through the County's tidal waters dredging program.

- Chris Victoria, Water Quality Compliance Specialist
  Bureau of Engineering, Watershed Protection and Restoration Program
  Assists in documenting ecological condition of County watersheds and waterways, and conducts applied research to ensure the credibility of WPRP monitoring and assessment. Assists with NPDES MS4 Permit compliance and TMDL and watershed support.

- Vacant, Planner II
  Bureau of Engineering, Watershed Protection and Restoration Program
  Provides consultant oversight for stormwater monitoring, biological monitoring, and geomorphic assessment of County stream reaches including those identified in **Part F** of this permit. Assists Program Manager with implementation of the Illicit Discharge Detection and Elimination (IDDE) Program as identified in **Part D.3** of this permit.

- Liz Shipley, Program Specialist II
  Bureau of Engineering, Watershed Protection and Restoration Program
  Provides program support for surface water and biological monitoring projects and coordinates projects with ecological restoration permit requirements.

- Bryan Perry, Program Specialist I
  Bureau of Engineering, Watershed Protection and Restoration Program
  Provides technical support for surface water, stormwater, and ecological monitoring projects.

- Robb Fish, Program Specialist II
  Bureau of Engineering, Watershed Protection and Restoration Program
  Fulfills the public education and outreach requirements of the County's NPDES MS4 permit ensuring that continual outreach to the public regarding the development of its watershed assessments and restoration plans is achieved and public input is solicited and incorporated.

- Kim Cluney, Management Assistant II
  Bureau of Engineering, Watershed Protection and Restoration Program
  Provides management, oversight and accountability for all revenue and expenditures associated with the Watershed Protection and Restoration Fund (WPRF). Ensures that the integrity of the dedicated revenue fund and structure is maintained to support compliance with the MS4 permit.

- Kurt Svendsen, Management Assistant I
  Bureau of Engineering, Watershed Protection and Restoration Program
  Serves as office manager for the WPRP responsible for the oversight and execution of the divisions' operating budget.

- Maria Ramallosa, Financial Clerk II
  Bureau of Engineering, Watershed Protection and Restoration Program
  Supports the Financial Management Assistants in tracking revenues and expenditures associated with the WPRF, processing procurements for restoration work, and maintaining established reports to ensure Fund integrity.

- Christian Tait, Program Manager, Regulatory Compliance Officer
  Bureau of Utility Operations
  Responsible for maintaining the Utilities Operations facilities' permit coverage under the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity) and the development/implementation of SWPPPs associated with Water Reclamation Facilities.

- Rhody Holthaus, Assistant Director
  Bureau of Waste Management Services
  Responsible for ensuring implementation of the Waste Management Services facilities' permit coverage under the MDE General Permit No. 12-SW (General Discharge Permit

for Stormwater Associated with Industrial Activity) for the County's three landfill facilities.

- Chandra Chithaluru, Environmental Monitoring Manager
  Bureau of Waste Management Services
  Responsible for maintaining the Waste Management Services facilities' permit coverage under the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity), and for the development and implementation of SWPPPs associated with the County's three landfill facilities.

Office of Planning & Zoning:

- Chris Soldano, Assistant Planning & Zoning Officer
  Development Division
  Oversees components of the County's Stormwater Management Program to ensure consistency with State requirements, including the updating of County stormwater legislation and of the County's Stormwater Practices and Procedures Manual.

- David Braun, Chief Engineer
  Development Division
  Oversees the review of stormwater management on new development and redevelopment projects. In FY17, stormwater engineering review for development and redevelopment projects is moved to the Department of Inspections & Permits.

Department of Inspections & Permits:

- Eva Kerchner, Assistant Director
  Oversees components of the County's Erosion and Sediment Control Program and Stormwater Management Program that are the responsibility of the Department of Inspections and Permits

- John Peacock, Chief of Environmental Enforcement
  Environmental Programs
  Administers the County's Stormwater Management Program and the County's Erosion and Sediment Control Program to ensure compliance with State regulations. Tracks, inspects, and enforces all permits for private and public stormwater management BMPs related to new development and redevelopment projects. Oversees triennial inspection of stormwater BMPs. Tracks development projects disturbing more than one acre and reports this information to MDE as required by the Program and the NPDES MS4 Permit. Oversees staff who respond to County Environmental Compliance Hotline and provides follow-up enforcement for IDDE Program.

- Stephen Trumpler, Environmental Programs Supervisor
  Manages stormwater inspection staff responsible for inspecting private stormwater BMPs.

- Stormwater Inspection Staff
  Six (6) inspectors are dedicated to the stormwater management program. In FY16, those inspectors are:

Tyler Smith	Bradlee Burnham
Mary Ford	Joseph Maxwell
Mike Schindler	Dennis Gills

Anne Arundel Soil Conservation District:

- John Czajkowski, District Manager
  Oversees development plan review for erosion and sediment control compliance.

Anne Arundel Department of Health:

- Don Curtian, Deputy Director
  Bureau of Environmental Health
  Oversees the Housing and Food Protection Services and Sanitary Engineering divisions of the Environmental Health Bureau, including Environmental Sanitarian response to hotspots associated with food service facilities that are identified through the IDDE program. Oversees programs associated with administering the Bay Restoration Fund within the County, and recreational water quality monitoring at designated bathing beaches.

B. Legal Authority

Anne Arundel County shall maintain adequate legal authority in accordance with NPDES regulations 40 CFR Part 122.26 throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall notify MDE within 30 days and make the necessary changes to maintain adequate legal authority. All changes shall be included in the County's annual report.

Status:

Anne Arundel County maintains the authority to comply with the terms of this permit. As documented in prior Annual Reports, this includes implementation of the 2000 Maryland Stormwater Design Manual (MDE 2000) as well as the 2007 Stormwater Management Act. The County Code has been revised to incorporate these stormwater management requirements, and subsequently renumbered, over the past 10 years. As of November 2010, Article 16 of the County Code contains the stormwater management program, and erosion and sediment control regulations. Article 17 contains the subdivision and development requirements. Article 18 contains the zoning regulations. A copy of the final approved implementing legislation and other associated documentation was provided in a prior years' Annual Report.

The County Stormwater Management Practices and Procedures Manual was updated and became effective on November 22, 2010. A letter was received from MDE in September

2011 stating that Article 16 and the County Stormwater Management Practices and Procedures Manual have been approved.

The State's biannual review of the County's delegated erosion and sediment control program was conducted in FY15. As a result of this review, the County was required to update the erosion and sediment control ordinance to maintain delegation of authority. The County introduced a revised ordinance for County Council approval in FY16 (Bill #83-15). The legislation was approved in late September 2015 and became effective on November 13, 2015. A copy of the approved and signed legislation was provided to MDE in October 2015 and the County's delegation of authority for this program was subsequently continued through June 30, 2017. A copy of this legislation accompanied the County's FY15 Annual Report in Appendix B.

As reported in a prior year's Annual Report, Anne Arundel County established a Watershed Protection and Restoration Program in 2013 as mandated by §4-202.1 of the Environment Article of the State Code for the purpose of supporting compliance with the requirements of the County's NPDES MS4 permit, the Chesapeake Bay TMDL, local watershed TMDLs, and stormwater WIPs through stormwater management practices and stream and wetland restoration activities. The Program also maintains and administers the Watershed Protection and Restoration Special Revenue Fund established under Article 13. Title 7. §4-11-119 of the Anne Arundel County Code. During FY16, no changes were made to this enabling legislation.

The entire County Code, including Articles 13, 16, and 17, can be found online through the County website at http://www.aacounty.org/our-county/county-code/, under the link for the County Code.

C. Source Identification

Sources of pollutants in stormwater runoff countywide shall be identified and linked to specific water quality impacts on a watershed basis. The source identification process shall be used to develop watershed restoration plans. The following information shall be submitted annually for all County watersheds within the permit area in geographic information system (GIS) format with associated tables as required in PART V of this permit.

1. ***Storm drain system*: *all infrastructure, major outfalls, inlets, and associated drainage areas delineated;***

Status:

In 2008, Anne Arundel County completed a Countywide inventory of storm drain inlets, manholes, outfalls, culverts, and pipes for all County watersheds. In 2016, the County continued to capture updates for incorporation into the County storm drain maps and the County GIS. Furthermore, the County continues to populate the drainage area information for the County outfalls, following the watershed study

schedule as presented in **Part IV.E** of this permit. To maintain accuracy of the closed storm drain system mapping, the County has been conducting a re-inspection of the Countywide system on a regular basis. The storm drain outfall database was prepared in the format required by MDE and is included in *Outfall* feature class of the MS4 Geodatabase (**Appendix A**).

The County is able to identify which storm drain structures are outfalls by querying the GIS for structures with no hydraulic connection to any other structure downstream. The County then focuses on these discharge points for delineation of contributing drainage area. As of June 30, 2016, there are 5,868 closed storm drain outfalls in the County. As of June 30, 2016, there are 2,112 major outfalls in the County. According to 40 CFR 122.26, a major municipal separate storm drain outfall is defined as an outfall pipe with an internal diameter of 36 inches or greater or an outfall pipe with an internal diameter of 12 inches or greater that receives storm water from industrially zoned lands. In addition, as of June 2016, there are 36,650 storm drain inlets.

During FY16, the County identified 85 new major outfalls and removed 16 duplicate and 3 non-County owned outfalls from the major outfalls inventory. The drainage areas for these new outfalls have been delineated and added to the inventory of major outfall drainage areas submitted in *Outfall* feature class of the MS4 Geodatabase (**Appendix A**).

The County will continue to develop and report drainage areas for major outfalls as the watershed assessments are completed. Concurrently, the County will begin developing drainage areas and completing the required geodatabase fields for all County storm drain outfalls.

2. <u>Industrial and commercial sources</u>: industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants:

Status:

The NPDES MS4 Permit requires that sources of pollutants in stormwater runoff be identified and linked to specific water quality impacts on a watershed basis. A methodology for determining these land uses is described below. The data and GIS coverage are found in the. 2016 Commercial and Industrial Outfalls geodatabase provided in **Attachment A**. This database follows the same format as previous submittals (FY2014 and FY2015) with the exception of new FY2016 features that are attributed with the MDE_Outfall_ID and MDE_Outfall_Drain_ID attribute fields. This allows linkage back to the outfalls in the MS4 Geodatabase.
Attachment 2 to the Basis for Final Determination to Issue Anne Arundel County's NPDES MS4 Permit (11-DP-3316; MD0068306) is a memorandum from the U.S. EPA to MDE dated November 29, 2012. Specific to the development of the above referenced methodology, is a paragraph on Page 4 of this memorandum that

addresses Industrial/Commercial Monitoring as a component of the MS4 permit. EPA proposes the language included in the permit as part of the Source Identification Section (**Part IV.C.2**), further indicating that these identified sites correlate to the required visual surveys of commercial and industrial areas that are conducted under the Illicit Discharge Detection and Elimination (IDDE) program as described in the NPDES MS4 Permit (**Part IV.D.3**)

Page 6 of the Anne Arundel County NPDES MS4 Permit Fact Sheet, developed by MDE as a companion document to the Permit, describes requirements for an effective IDDE program. Included in this program description, is the requirement that the County routinely survey commercial and industrial areas, and monitor major storm drain outfalls to identify illicit discharges. Major storm drain outfalls are defined by the Clean Water Act (40 CFR 122.26) as:

> A municipal separate storm sewer outfall that discharges from a single pipe with an inside diameter of 36 inches or more or its equivalent (discharge from a single conveyance other than circular pipe which is associated with a drainage area of more than 50 acres); or for municipal separate storm sewers that receive storm water from lands zoned for industrial activity (based on comprehensive zoning plans or the equivalent), an outfall that discharges from a single pipe with an inside diameter of 12 inches or more or from its equivalent (discharge from other than a circular pipe associated with a drainage area of two acres or more).

To meet the **Part IV.C.2** requirement of identifying commercial and industrial land uses and sites that have the potential to contribute pollutants to the storm drain system, and to correlate this requirement with that found in **Part IV.D.3.b**, the County has developed a GIS coverage and geodatabase upon intersecting the following GIS layers and data:

- Industrial and commercial polygons from Anne Arundel County 2014 Land Cover
- County closed storm drain system inlets, pipes, and outfalls

Specifically, inlets in designated Industrial and Commercial land cover polygons were identified and the closed storm drain pipes intersecting these inlets were selected. Closed storm drain pipes connecting to the already selected pipes were also selected to provide the closed storm drain system network connected to the chosen inlets. Once this network was identified, the outfalls intersecting the closed storm drain pipes were selected. All outfalls not meeting the definition of a "major outfall" were removed from the selected set of outfalls. In 2016, Anne Arundel County updated this list to include 74 new major outfalls draining Commercial and Industrial lands, bringing the total to 1,003 commercial and industrial outfalls. These outfalls are a subset of the major outfalls GIS layer found in the *Outfall* feature class of the MS4 Geodatabase of this report (**Appendix A**).

3. <u>Urban best management practices (BMPs):</u> stormwater management facility data including outfall locations and delineated drainage areas;

Status:

Information on the County's stormwater management facilities (e.g., urban BMPs, alternative BMPs, restoration BMPs) is incorporated into the MS4 Geodatabase included as part of the County's FY16 NPDES MS4 Annual Report submittal (**Appendix A**). The 11,603 BMP records are those that we can confirm as active or completed. The County has updated the structure type to comply with the latest MDE guidance on urban BMP data reporting (MDE 2015).

The BMP data included in this annual report are submitted in the required MS4 Geodatabase format. This data submittal represents a transition year during which the County moved the MS4 data, including the BMPs, into the MS4 Geodatabase required tables and feature classes. There may be some records where data fields have null values or error codes due to either incorrect dates or currently unidentified data. The County is aware that all mandatory data fields must be completed and, through the Urban BMP Database Historic Records Review and Update project (addressed below), we anticipate providing complete datasets in future MS4 Annual Report submittals. For this FY16 Annual Report data submittal, the reader is also referred to the ReadMe document that accompanies the MS4 Geodatabase (**Appendix A**) for explanation of null and/or blank values. For example, a "-888" error code is used in the *ChemicalMonitoring* table to represent data that was not collected; in this case as a result of sensor malfunction. A "-999" error code is used in the *BMPDrainageArea* table to represent data that is missing and will be populated later. Dates coded as "1/1/1899" are used for missing or inapplicable values. For example, in the *BMP* table, projects that are planned but not complete do not have the mandatory built-date as of yet.

Nearly all of the BMPs in the County's dataset prior to FY16 are represented by a BMP Point of Investigation (POI) that is associated with a single BMP structure or practice (i.e., one record in the *BMPPOI* feature class is associated with one record in the BMP table of the MS4 Geodatabase). For new BMP records added to the dataset in FY16, where appropriate, the County has adopted the strategy recommended by MDE of designating a BMP POI to represent multiple structures and/or practices that work in concert as a system or are part of a treatment train (i.e., one record in the *BMPPOI* feature class corresponds to multiple records in the *BMP* table of the MS4 Geodatabase).

During the FY16 reporting year, the County initiated the comprehensive Urban BMP Database Historic Records Review and Update project. This project supports ongoing Urban BMP Database improvements and supports the required database enhancements associated MS4 Geodatabase design. This work effort was introduced in the FY15 Annual Report and the project's scope of work was included as an appendix to that report. During FY16 the County engaged a qualified

consultant, using the County's competitive procurement process, to assist with the Historic Records Review and Update. The procurement process was completed in spring 2016, the consultant was awarded the project in mid-May 2016, and a kick off meeting was held in early June 2016. Following the kick off meeting, the County and consultant began the coordinated effort to comprehensively review and update the Urban BMP data fields for the Phase I BMP records (those dating from 2002 through the end of FY2015). A Quality Assurance Project Plan (QAPP) and specific Standard Operating Procedures (SOPs) were developed to ensure consistency in data review and update. The majority of the Phase I work effort has occurred in FY17, not during the FY16 reporting period. As of the end of Calendar Year 2016 (first six months of FY17), the consultant successfully reviewed 1,900 permits and 6,100 individual stormwater BMP practices associated with those permits. It is noted that these updated records are not yet incorporated into the MS4 Geodatabase accompanying this annual report. The consultant is on schedule to complete Phase I of this work effort by July 1, 2017, and the County anticipates including these updated records in the MS4 Geodatabase for the FY2017 NPDES MS4 Annual Report and in the NPDES MS4 Permit Reapplication.

The specific schedule to initiate Phase II of the Historic Records Review and Update (pre-2002 BMP records) has not been set as of the writing of this FY16 Annual report. The County and the consultant are working closely on the Phase I effort, and anticipate a seamless transition between Phase I and Phase II of this project with Phase II beginning in July 2017 and extending through Fiscal Year 2018. The County will continue to keep MDE updated on the progress of this work.

4. ***Impervious surfaces: Public and private land use delineated, controlled impervious areas based on, at a minimum, Maryland's hierarchical eight-digit sub basins;***

Status:

As noted in the FY15 NPDES MS4 Annual Report, the County contracted with Axis Geospatial in 2014 to update the impervious surface and land cover datasets utilizing imagery captured for the state of Maryland's High Resolution Aerial Ortho-photography during the spring of 2014. Both datasets were completed and accepted by the County. As was noted in the FY15 Report, the total impervious surface acreage increased from 39,209 acres to 42,312 acres, a total increase of 3,103 acres. The increase in impervious area is attributed to both new development and the County's efforts to capture impervious features not previously captured (e.g., gravel driveways, unpaved parking areas). The County strives to develop more consistent and comprehensive data for attributes not fully identified in prior impervious area datasets (e.g., paved pathways through community property, sidewalks, decks, patios). Impervious surface calculations for this reporting year are based on the 2014 impervious surface layer.

Impervious Cover

The impervious surface layer is crucial to the County's Watershed Management Tool (WMT). The WMT consists of many watershed analysis models for characterizing the existing conditions of the watershed. The WMT also provides predictive modeling for future conditions, restoration approaches, and preservation scenarios. These models are fully integrated with GIS and currently use the 2014 impervious layer for many different watershed and planning analyses, including hydrologic analysis, Rosgen Level 1 stream classification, pollutant loading estimates, and stream sediment loading estimates.

Non-Jurisdictional Land within the County

For NPDES reporting, the County is responsible for accounting for all impervious and BMP information pertaining to County-owned land and private lands directly under the jurisdiction of the Anne Arundel County government. The City of Annapolis, the Baltimore Washington International Thurgood Marshall Airport (BWI), Fort George G. Meade (FGGM), the Patuxent Research Refuge, State Highway and Federal Highway roads, State and Federal facilities are examples of land areas that are outside the stormwater authority of Anne Arundel County.

Using the County's parcel layer along with the Consolidated Property File (CPF), a GIS layer of parcels not considered the responsibility of Anne Arundel County was developed. Data analyses indicate that the State Government owns approximately seven percent of the land within the County boundary, the Federal Government owns seven percent, the County local government owns twelve percent, two percent is under the jurisdiction of the City of Annapolis, and seventy-two percent is privately owned.

A breakdown of land area and impervious surfaces within Anne Arundel County, based on the 2014 impervious area dataset, is listed in Table 1. These data reveal that approximately twenty percent of the impervious acres within the County boundary are outside the jurisdictional authority of the County with respect to stormwater management.

Table 1. Land Cover and Impervious Distribution by Land Ownership/Jurisdiction

Anne Arundel County Land Cover Categories	City of Annapolis	State	Federal	County	Private	City of Annapolis	State	Federal	County	Private	City of Annapolis	State	Federal	County	Private
	Land Acres					Impervious Acres					Percent Impervious				
Airport	0	1,032	0	68	105	0	832	0	47	74	0%	81%	13%	69%	71%
Commercial	976	653	1,410	1,832	7,687	671	319	861	1,070	5,202	69%	49%	61%	58%	68%
Industrial	39	346	349	419	4,087	13	233	168	213	2,636	34%	67%	48%	51%	65%
Transportation	191	3,886	707	3,304	1,551	151	2,865	381	2,193	423	79%	74%	54%	66%	27%
Pasture/Hay	0	111	362	229	5,312	0	1	5	9	46	0%	1%	1%	4%	1%
Row Crops	0	135	477	253	11,208	0	3	1	13	110	0%	2%	0%	5%	1%
Residential 1/2-acre	112	47	39	1,191	9,475	30	10	11	649	1,851	27%	22%	27%	55%	20%
Residential 1/4-acre	1,786	89	112	2,724	14,779	677	11	28	1,635	3,621	38%	13%	25%	60%	24%
Residential 1/8-acre	569	111	624	3,071	15,707	251	22	201	1,744	5,053	44%	20%	32%	57%	32%
Residential 1-acre	46	87	2	846	10,614	9	10	0	376	1,654	21%	12%	5%	44%	16%
Residential 2-acre	32	172	15	1,020	22,471	10	20	1	379	2,897	30%	12%	7%	37%	13%
Open Space	242	2,975	2,653	3,618	11,358	13	183	176	394	609	5%	6%	7%	11%	5%
Water	22	185	198	365	1,594	1	0	0	2	11	3%	0%	0%	1%	1%
Open Wetland	6	242	29	400	903	0	0	0	0	1	0%	0%	0%	0%	0%
Forested Wetland	0	64	93	53	75	0	0	1	0	0	0%	0%	1%	0%	0%
Woods	798	8,361	11,002	13,229	72,404	12	93	92	282	668	1%	1%	1%	2%	1%
Utility	0	33	220	48	1,630	0	1	7	6	67	0%	4%	3%	12%	4%
SubTotal	4,818	18,529	18,292	32,670	190,959	1,837	4,605	1,934	9,012	24,924	38%	25%	11%	28%	13%
Total	**265,268**					**42,312**						**16%**			

5. ***Monitoring locations: locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual; and***

Status:

a. Parole Plaza, Church Creek, and Picture Spring Branch

In compliance with the NPDES MS4 Permit, Part IV.F, the County maintains three monitoring sites, Parole Plaza, Church Creek, and Picture Spring Branch, where the required chemical, physical, and biological monitoring of watershed restoration efforts and stormwater management application is conducted. A summary of the 2016 permit year monitoring efforts at these sites is found in **Part IV.F**, and the complete monitoring reports for the reporting year are included in **Appendix B** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2015-2016*) and **Appendix C** (*Biological and Geomorphological Conditions in the Picture Spring Branch Subwatershed: 2015-2016*).

The *MonitoringSite* feature class contained in the MS4 Geodatabase gives the location of the Parole Plaza, Church Creek, and Picture Spring Branch monitoring sites. The *ChemicalMonitoring* table contains results from FY16 and is included in the MS4 Geodatabase provided in **Appendix A**.

b. Countywide Biological Monitoring Program

Since 2004, the County has implemented a Countywide biological monitoring program focusing on benthic macroinvertebrates and modeled after the Maryland Biological Stream Survey (MBSS). The program uses a probability-based stratified random sampling design so that overall watershed condition can be evaluated and comparisons between different watershed units can be made. A total of 24 Primary Sampling Units (PSUs) are sampled in a five-year rotation called a Round. Round 1 began in 2004 and ended in 2008. Round 2 began in 2009 and concluded in 2013.

The results of Rounds 1 and 2 have been reported in prior years' Annual Reports. During the 2014 through 2016 reporting periods, the program underwent a complete re-evaluation and re-design to better meet the current needs of the County. This update to the program was completed during the 2016 reporting period and the program will be re-implemented during the 2017 spring index period. Complete information on the program update can be found in the Quality Assurance Project Plan – Round 3 at http://www.aacounty.org/departments/public-works/wprp/ecological-assessment-and-evaluation/biological-monitoring/

c. Town Center Water Quality Monitoring Program

In addition to the work performed in the Church Creek watershed, the County assesses water quality in Cowhide Branch, a tributary to tidal Weems Creek and the Severn River. This stream receives runoff from the Parole Town Center drainage area. One continuous monitoring station is maintained by the County on Cowhide Branch. As part of the Parole Town Center, this site has been monitored since the late 1980s. Continuous flow data and rainfall are collected at this station, and monthly stormwater and baseflow monitoring is performed at this site. Parameters currently analyzed include:

Calcium	TKN	Hardness
Copper	NH3	Alkalinity
Lead	TP	Total Phenols
Zinc	TSS	Oil and Grease
Magnesium	PO4	*E. coli*
Iron	COD	VOC (EPA 624)
BOD5	Turbidity	
NO_3/NO_2	TOC	

During the reporting period, 12 storm events and 12 baseflow samples were collected. Cowhide Branch is slated for restoration in the near future. Because of this, the automated station will be taken out of service in fall 2016 and monitoring will restart following the completion of the restoration work efforts.

6. Water quality improvement projects: projects proposed, under construction, and completed with associated drainage areas delineated.

Status:

The NPDES MS4 Permit requires the reporting of watershed restoration/retrofit projects/activities in the design or construction phase and those projects/activities completed during the reporting year. In FY16 (July 1, 2015 through June 30, 2016), the County continued to initiate new restoration projects and work toward completing previously reported projects. For FY16, the County has reported water quality improvement projects in the *BMP* table, *RestBMP* feature class, and other associated tables and feature classes of the MS4 Geodatabase in **Appendix A**.

During the reporting period, the County completed 275 Restoration BMP and Alternative Restoration BMP projects with an impervious treatment area of 600 acres. These included load reductions of 2,281 lbs. per year of total nitrogen (TN), 962 lbs. per year of total phosphorus (TP), and 408,755 lbs. per year of suspended solids (TSS).

In addition to the completed projects, the County has 51 projects in the construction or design phase at the end of FY16. The inventory of these projects and their

locations is included in the MS4 Geodatabase (**Appendix A**). The County also initiated 135 projects during this reporting year that are expected to be in schematic design phase in the next reporting year.

The County will continue to develop its inventory of proposed, under construction, and completed restoration projects as watershed restoration implementation continues.

D. Management Programs

The following management programs shall be implemented in areas served by Anne Arundel County's MS4. These management programs are designed to control stormwater discharges to the maximum extent practicable (MEP) and shall be maintained for the term of this permit. Additionally, these programs shall be integrated with other permit requirements to promote a comprehensive adaptive approach toward solving water quality problems. The County shall modify these programs according to needed program improvements identified as a result of periodic evaluations by MDE.

1. Stormwater Management

An acceptable stormwater management program shall continue to be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing the stormwater management design policies, principles, methods, and practices found in the latest version of the 2000 Maryland Stormwater Design Manual. This includes:

- ***i. Complying with the Stormwater Management Act of 2007 (Act) by implementing environmental site design (ESD) to the MEP for new and redevelopment projects;***
- ***ii. Tracking the progress toward satisfying the requirements of the Act and identifying and reporting annually the problems and modifications necessary to implement ESD to the MEP; and***
- ***iii. Reporting annually the modifications that have been or need to be made to all ordinances, regulations, and new development plan review and approval processes to comply with the requirements of the Act.***

Status:

The 2000 Maryland Stormwater Design Manual was fully implemented by the County. However, this condition was superseded by the Maryland Stormwater Management Act of 2007. During FY16, the Office of Planning and Zoning (OPZ) continued the requirement for all proposed new stormwater management plans to

comply with the new Environmental Site Design (ESD) standards in accordance with the County Code, State Code, and the current edition of Maryland Stormwater Management Design Manual.

In prior reporting years, the County described efforts to update Chapter VI (Stormwater Management) of the Department of Public Works (DPW) Design Manual. During FY16, it was determined that the DPW Design Manual Chapter related to stormwater had become duplicative of the Maryland Stormwater Design Manual and, rather than reiterating the State manual, other avenues should be pursued.

The Office of Planning and Zoning (OPZ), as a component of permit application review for County CIP projects, desired to execute a formal Memorandum of Understanding (MOU) between DPW and OPZ that would establish the process by which County CIP Projects would receive stormwater management approval. That process would include the submission, by DPW, of an affidavit with each CIP project permit application that confirms the project design meets the State stormwater management requirements as per the Maryland Stormwater Design Manual (most recent version).

The MOU was not completed in FY16 due to reorganization of permit review staff, but should be revisited in FY17.

In addition, a comprehensive review and update to the County's Practices & Procedures Manual was begun in FY16, and is expected to be completed in FY17. The County will coordinate with MDE when a draft update of the Manual has been completed.

As of September 2011 the County has an MDE-approved Stormwater Management Code, which incorporates the current edition of the Maryland Stormwater Management Design Manual. Copies of the County legislation (Bill 74-11) and the MDE approval letter were provided in the 2011 Annual Report. During the reporting period, no modifications to the Code were required to address programmatic problems.

MDE conducted the triennial inspection of the County's stormwater management program during FY15 finding, overall, that the program is acceptable. Recommendations for improving the program were identified and the County has begun, and will continue, to take appropriate action. The County review engineers have received additional training to ensure that all plan review requirements are addressed consistently. In addition, the physical work location of the review engineers was relocated to accommodate the FY17 budget transfer of the review engineers from OPZ to I&P effective 7/1/2016. This relocation is designed to improve the communication between the review engineers and the field inspectors. The next stormwater management program triennial inspection is scheduled for September 2016 (FY17). At that time, the transfer of stormwater management plan

review responsibility, from the Office of Planning and Zoning to the Department of Inspections & Permits, will be fully implemented.

b. Maintaining programmatic and implementation information including, but not limited to:

- ***i. Number of Concept, Site Development, and Final plans received. Plans that are re-submitted as a result of a revision or in response to comments should not be considered as a separate project;***
- ***ii. Number of redevelopment projects received;***
- ***iii. Number of stormwater exemptions issued; and***
- ***iv. Number and type of waivers received and issued, including those for quantity control, quality control, or both. Multiple requests for waivers may be received for a single project and each should be counted separately, whether part of the same project or plan. The total number of waivers requested and granted for qualitative and quantitative control shall be documented.***

Stormwater program data shall be recorded on MDE's annual report database and submitted as required in PART V of this permit.

Status:

During FY16, County records indicate the following information regarding stormwater management program data (Table 2).

Table 2. Concept, Site Development, Final Development, and Redevelopment Plans Received during FY16.

Type	Number of Projects Received
Concept Plan[(a)]	103
Site Development Plan[(a)]	183
Final Development Plan[(b)]	259
Final Redevelopment Plan[(c)]	36
Stormwater Exemptions	0
Waiver Requests Received	0
Waiver Requests Approved	0

Notes:

(a) Concept Plan and Site Development Plan based on submittal date for each unique Project Number

(b) Final Plan based on unique Grading Permit No.

(c) Redevelopment data only available for Final Redevelopment Plan

c. Maintaining construction inspection information according to COMAR 26.17.02 for all ESD treatment practices and structural stormwater management facilities including the number of inspections conducted and violation notices issued by Anne Arundel County.

Status:

Stormwater construction inspections are conducted by the Erosion Control Inspectors in conjunction with the required erosion and sediment control plan inspections. All stormwater construction violations must be resolved and abated prior to the completion of the associated grading permit. For the reporting period, the following inspections were performed:

- 936 Stormwater Construction Inspections
- 45 Stormwater Correction Notices

d. Conducting preventative maintenance inspections, according to COMAR 26.17.02, of all ESD treatment systems and structural stormwater management facilities at least on a triennial basis. Documentation identifying the ESD systems and structural stormwater management facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement actions used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports.

Status:

The State and County Stormwater Management Codes require preventive maintenance inspections once during the first year of operation and every three years thereafter for all stormwater management facilities. For the reporting period the following maintenance inspections were performed:

- 5,495 Three Year Maintenance Inspections
- 582 Three Year Maintenance Correction Notices
- 7 Three Year Maintenance Violation Notices

The 5,495 Three Year Maintenance Inspections performed during FY16 more than doubled the number of maintenance inspections performed in the previous reporting period. The County is successfully increasing the number of inspections completed each fiscal year and this can be attributed to the increase in stormwater management inspection staff dedicated to this program.

The documentation of facility inspections, as well as the number of facilities inspected each fiscal year, is now housed in a central County database. The transition to using this central County database was completed in FY16. The facility inspection information found in the MS4 Geodatabase (*BMPInspections*) may not

fully represent the number of maintenance inspections reported above. This is likely due to overwriting inspection dates as staff were becoming familiar with the database. As previously noted, the County continues to review and update stormwater BMP records such that a complete representation of all stormwater BMPs, and their corresponding inspection records, will be presented in future annual reporting.

In prior reports the County has documented the inspection process, including issuance of correction notices and Phase 1, 2, and 3 violation notices. During the FY16 reporting period, all correction notices were successfully enforced at the Phase 1 level and, subsequently, there were no Phase 2 or Phase 3 violation notices required. Additional information relating to inspection and enforcement activities in FY16 is provided in the *SWM* table of the MS4 Geodatabase submittal (**Appendix A**).

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall continue to be maintained and implemented in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. Activities to be undertaken by the County shall include, but not be limited to:

a. Implementing program improvements identified in any MDE evaluation of the County's erosion and sediment control enforcement authority;

Status:

The Maryland Department of the Environment conducted their review of the County's erosion and sediment control program, as delegated by the State to the County, in 2014. During FY15, and subsequent to the State's review, County Code relevant to Erosion and Sediment Control was updated to comply with the most recent changes to the State Erosion and Sediment Control Code. A copy of County Council Bill 83-15 reflecting the required code updates was included with the County's FY15 Annual Report, and this legislation was adopted in FY16. During FY16, the County submitted an erosion and sediment delegation application for continued delegation of erosion and sediment control. Upon receipt of the signed and approved legislation, MDE continued the County's delegation of authority through June 30, 2017.

b. At least three times per year, conducting responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance;

Status:

Anne Arundel County continues to require a valid Responsible Personnel Certification be held by construction site operators and includes a place on approved construction plans for the card-holders' name and certification number. Moreover, the County checks for a designated card-holder at the project pre-construction meeting.

Responsible Personnel Certification classes are no longer conducted by County staff. Beginning in FY15, MDE assumed responsibility for this training, which is offered on-line via the MDE web site.

c. Program activity shall be recorded on MDE's annual report database and submitted as required in PART V of this permit; and

Status:

Beginning in FY15, Anne Arundel County is no longer responsible for providing Green Card Training as it is available on-line on the MDE web site. Therefore, no Green Card certification information is submitted in this narrative or with the MS4 Geodatabase.

d. Reporting quarterly, information regarding earth disturbances exceeding one acre or more. Quarters shall be based on calendar year and submittals shall be made within 30 days following each quarter. The information submitted shall cover permitting activity for the preceding three months.

Status:

Based on previous guidance from MDE, quarterly reports were not required provided the Construction General Permit Activity Database continued to be submitted with the annual report. Information regarding grading permits from the County's Construction General Permit Activity Database is provided in the *QuarterlyGradingPermits* feature class and *QuarterlyGradingPmtInfo* table of the MS4 Geodatabase submittal (**Appendix A**).

3. Illicit Discharge Detection and Elimination (IDDE)

Anne Arundel County shall continue to implement an inspection and enforcement program to ensure that all discharges to and from the MS4 that are not composed entirely of stormwater are either permitted by MDE or eliminated. Procedures shall include, but not be limited to, the following activities.

a. The County shall conduct field screening for at least 150 outfalls annually. A sample from each outfall having a discharge at the time of the inspection shall be tested using a chemical test kit. Within one year of permit issuance, an alternative program may be submitted for MDE approval that methodically identifies, investigates, and eliminates illegal connections to the County's storm drain system.

Status:

Anne Arundel County has developed and continues to maintain an extensive program designed to detect and eliminate illicit discharges into the municipal storm drain system and upland pollutant sources resulting from dumping, poor housekeeping, and other non-permitted activities. The program includes the dry-weather inspection of a minimum of 150 storm drain outfalls annually. This outfall inspection records the presence of dry-weather flow, the structural integrity of the outfall, and relevant maintenance issues.

Each year, the Anne Arundel County NPDES MS4 Permit Coordinator, or a delegated staff member, coordinates with the support consultant to identify priority assessment areas in the County that should be investigated for possible illicit discharges to the stormwater system. GIS desktop analysis is used to identify target outfalls primarily draining commercial and industrial land uses. Once per permit term, the County also revisits outfalls that had exhibited illicit discharge during previous assessments to confirm illicit discharge elimination. By assessing a different area of the County each year, and returning to sites that exhibited possible illicit discharge conditions in previous survey periods, the County achieves an area-wide review of likely sources of dry-weather discharge throughout the permit period.

During the 2016 reporting period, illicit discharge screening targeted Maryland City, Odenton, Hanover, and Severn; field crews evaluated 150 outfalls. Three complaint-driven outfall inspections were performed during this reporting period, and the outfalls assessed included a subset of major outfalls draining residential land uses between Laurel and Odenton. During the 2017 reporting period, the County is screening outfalls in the Parole and Bestgate Road area, Pasadena and Glen Burnie, and the Millersville area east of I-97. For the 2018 effort, the County will concentrate in areas south of U.S. 50 and rescreen outfalls having prior illicit discharges. In FY 2019, the County will screen areas north and northeast of Annapolis (e.g., Severna Park, Lake Shore, and Riviera Beach).

Anne Arundel County's GIS coverage of storm drains and closed storm drain utility grids provided the base data for maps to guide field activities. These maps assisted field crews in identifying the extent of the storm drain systems, the locations of outfalls, and any contributing businesses or facilities. The maps included parcels for commercial and industrial facilities and their storm drain systems for screening efforts, as per the guidance provided by MDE (MDE 1997).

Field crews recorded the physical condition of each outfall structure and conditions surrounding the outfall on field datasheets for each site visit. When crews found a dry-weather discharge, they tested the discharge using a Chemetrics color comparator test kit (tested parameters included detergents, phenols, copper, chlorine, and ammonia), an Extech single analyte tester (for fluoride), and an YSI sonde (for water temperature and pH). Physical parameters noted at each outfall included structural condition, vegetative condition, erosion, floatables, algae growth, discharge odor, and discharge clarity.

If field tests determined that an outfall's discharge had a concentration above the action criteria for any of the analytes during the first visit, the protocol stipulated that crews revisit the outfall within 24 hours, but at least four hours after the first test. The second visit helps determine if the initial result was an anomaly, or, if the outfall continues to exhibit flowing discharge, confirm the results of the chemical tests conducted on the first visit.

If both inspections revealed dry-weather flows and concentrations above the action criteria, the outfall qualified as having a possible illicit connection. Another site condition that implied possible illicit connections included any situation where an observable pollutant had been discharged through a storm drain system, but, at the time of inspection, the system was not flowing, or the discharge test did not reveal detectable levels of the pollutant.

To identify the source of any possible illicit discharge, the field crews followed the storm drain system upstream, testing flows through manholes and inlets as necessary and practical, until either the source was identified or the discharge could not reasonably be tracked further. Field crews photo-documented evidence of illicit discharges, including the probable cause(s). Staff prepared site-specific reports for each identified illicit discharge and structural issue found in the field; staff submitted the reports to the Anne Arundel County MS4 Program Manager. The potential illicit discharge reports were then forwarded to the County Department of Inspections and Permits (I&P), the County's Infrastructure Management Division, or the Anne Arundel Health Department for further investigation and enforcement.

Of the screened outfalls containing dry-weather flow during the 2016 reporting period, 17 yielded a result above the action-criteria limit for one or more of the tested contaminants. Field crews re-screened all of these outfalls and, of those, 14 had concentrations that were above at least one action level when re-tested. The County inspectors performed follow-up site visits and inspections for the outfalls with reported potential illicit discharges. Complete investigation details, including site-specific reports and detailed corrective actions, are found in the *Illicit Discharge Detection and Elimination – 2016 Annual Report* (**Appendix D**). The report also includes details regarding the resolution of previously unresolved cases described in the 2015 reporting year.

The County consultant's field teams identified six locations where physical issues significantly affected stormwater infrastructure within the targeted areas of Anne Arundel County during the 2016 reporting period. Staff reported these conditions to the County MS4 Program Manager. These site-specific reports were then forwarded to the County's Infrastructure Management Division (IMD) for distribution to the appropriate agency's personnel. Complete investigation details, including site-specific reports and corrective actions, are found in the *Illicit Discharge Detection and Elimination – 2016 Annual Report* (**Appendix D**).

b. The County shall conduct annual visual surveys of commercial and industrial facilities, as identified in PART IV.C.2 of the current MS4 Permit, for discovering, documenting, and eliminating pollutant sources. The County shall submit reports for the inspected facilities annually.

Status:

During the permitting period, field personnel perform a visual inspection of all accessible commercial and industrial sites within the target areas that have the potential to contribute significant pollutants. The inspections are designed to identify poor housekeeping, dumping, and other non-permitted discharges (e.g., vehicle wash water) that may be intercepted by the County's storm drain system.

Field crews identified 21 upland pollutant sources within the target areas during the 2016 reporting period; these sources demonstrated the potential to discharge pollutants into County storm drains or Waters of the United States. Staff reported upland pollutant sources to the County MS4 Program Manager; the Program Manager typically sent copies of the reports to I&P or the Health Department, as appropriate, to initiate plans for correction. A full report of the procedures and data collected from the illicit detection and elimination field investigations is found in the *Illicit Discharge Detection and Elimination – 2016 Annual Report* (**Appendix D**); relevant digital data are included in the *IDDE* table of the MS4 Geodatabase provided in **Appendix A**. The complete report (**Appendix D**) contains details of the findings from the 2016 reporting period, and the corrective actions associated with these sites; the report also includes details regarding the resolution of previously unresolved cases described in the 2015 reporting year.

c. The County shall maintain a program to address, and, if necessary, respond to, illegal discharges, dumping, and spills.

Status:

There are two departments within the County government that address reports of illegal dumping and spills. I&P is the County agency primarily responsible for enforcing regulations regarding spills and illegal dumping into both publicly and privately owned storm drain systems. The Anne Arundel Department of Health

addresses complaints specifically relating to food service facilities (e.g., overflowing dumpsters or waste grease containers) and documents violations during regular facility inspections.

Over forty illicit discharge, dumping, or storm drainage complaints were reported to I&P during the 2016 reporting period. These include referrals from the Department of Public Works as part of the department's IDDE Program and referrals from other sources. Illicit discharge complaints and referrals are logged into the I&P Compliance Case Database; this is used to track cases from the receipt of a complaint or referral to closure. Case numbers facilitate tracking the progress of any individual Illicit Discharge complaint or referral received by I&P.

Compliance case data pertinent to the complaints received during the 2016 reporting year are documented in Appendix F of the *Illicit Discharge Detection and Elimination – 2016 Annual Report* (**Appendix D**). All complaints and referrals were investigated and enforced as appropriate.

I&P utilizes a phased approach to eliminating and enforcing illicit storm drain discharges. Phase I Enforcement consists of a Violation Notice sent by first class and certified mail to the property owner. The Phase I Violation Notice includes an explanation of the violation, and requests a written commitment to immediately cease the illicit discharging activity. Upon written receipt of the commitment to comply, the Department monitors the site for up to 60 days; if compliance is maintained, the violation is considered abated. Should the Department fail to receive the written commitment to comply, or if further violations are observed, the Department proceeds to Phase II Enforcement.

At the Phase II level of enforcement, I&P posts a Stop Work Order on the property and issues a $1,000 civil citation to the property owners. If the civil citation is not paid and the violating activity is not abated, the civil citation will move to litigation processes in court. If a violation were to remain unabated by the court date, the Department requests the full payment of the fines and an abatement order from the District Court judge. The failure to comply with any Court-issued abatement order results in Contempt of Court charges being filed by the County Office of Law.

Significant violations are screened with the County Office of Law for possible criminal enforcement as authorized in the County Code, or for referral to MDE for enforcement under the State Code. During the 2016 reporting period, it was not necessary to issue any civil citations for failure to eliminate illicit storm drain discharges.

As part of its general activities associated with food service facilities, the Department of Health has protocols for abatement of leaking or overflowing dumpsters. Enforcement is conducted under State of Maryland Regulations dealing with Food Service Facilities (COMAR 10.15.03.19) which requires that each facility retain a sufficient number of durable refuse containers capable of holding

the facility's garbage between periods of removal; the containers must be adequately covered and not leaking. Violation of this regulation would be marked on the food facility inspection report and would require correction typically within 30 days of the investigation. Failure to comply by the second re-inspection would result in $175 re-inspection fees until compliance is achieved.

The Anne Arundel Health Department also routinely inspects food service facilities to monitor the sanitary and physical conditions of each establishment. If the County receives a complaint about a specific issue relevant to a food service facility, the Health Department conducts an investigation applicable to the issue; these inspections fall outside of the routine schedule for facility assessments. The Health Department also conducts re-inspections, as necessary, to supplement routine inspections or complaints; these ensure corrective actions and facility compliance.

For the 2016 reporting period, staff identified and reported three issues with dumpsters or waste grease bins, specifically related to food service establishments, to the Health Department for further inspection and enforcement. The Health Department also addressed eight other issues reported to the Department by County consultants during the reporting period, and three other relevant issues: two reported by citizens through USEPA and one directly reported by a citizen. Please refer to the *Illicit Discharge Detection and Elimination – 2016 Annual Report* (**Appendix D**) for details.

d. The County shall report significant illicit discharges to MDE.

Status:

For the 2016 reporting period, all illicit discharge complaints and referrals received were successfully enforced by I&P without the need for referral to MDE.

e. The County shall report illicit discharge detection and elimination activities as specified in PART V of the current MS4 Permit.

Status:

The *Illicit Discharge Detection and Elimination – 2016 Annual Report* (**Appendix D)** of this report) provides descriptions of all activities completed as part of the County's 2016 IDDE program. Additionally, the County follows the requirements in the Permit for reporting IDDE data; these are included in the *IDDE* table of the MS4 Geodatabase included in **Appendix A**. The County makes no request to modify its IDDE program at this time. The *IDDE* table includes three cases where missing values appear in the *WATER_TEMP* and *AIR_TEMP* fields due to sensor malfunction. The *IDDE* table in the MDE Geodatabase included in **Appendix A** contains information related to 146 screenings conducted during FY16. An additional 17 locations were screened during FY16 involving locations that do not fit criteria for inclusion in the geodatabase. These locations were not associated

with a county-owned outfall, but were encountered in the field and subsequently determined to be privately owned or maintained by entities other than the County, such as State Highway Administration. Additional information related to these locations can be found in the *Illicit Discharge Detection and Elimination – 2016 Annual Report* included in **Appendix D** of this report.

4. Litter and Floatables

This section of the permit requires Anne Arundel County to address problems associated with litter and floatables in waterways that adversely affect water quality. Increases in litter discharges to receiving waters have become a growing concern both nationally and within Maryland and cannot be ignored. Anne Arundel County needs to evaluate current litter control problems associated with discharges from its storm drain system and develop and implement a public outreach and education program as needed on a watershed by watershed basis.

a. As part of Anne Arundel County's watershed assessments under PART IV.E.1 of this permit, Anne Arundel County shall document all litter control programs and identify potential sources, ways of elimination, and opportunities for overall improvement.

Status:

As watershed assessments continue per the schedule found in **Part IV.E.1**, information on litter control programs in those watershed areas, potential litter sources, and opportunities for eliminating litter and floatables will be examined. During FY16, a watershed assessment project was initiated for the Herring Bay, Middle and Lower Patuxent watersheds. This assessment includes documentation of potential sources and opportunities for control and elimination of litter and floatables. As this watershed assessment project moves through the data collection phase, additional information will be available to better identify litter sources and opportunities for effective litter control outreach programs.

b. Within one year of permit issuance, as part of the public education program described in PART IV.D.6., Anne Arundel County shall develop and implement a public education and outreach program to reduce littering and increase recycling. This shall include:

- ***i. Educating the public on the importance of reducing, reusing, and recycling;***
- ***ii. Disseminating information by using signs, articles, and other media outlets; and***
- ***iii. Promoting educational programs in schools, businesses, community associations, etc.***

c. Evaluating annually the effectiveness of the education program.

d. Submit annually, a report which details progress toward implementing the public education and outreach program. The report shall describe the status of public outreach efforts including resources (e.g., personnel and financial) expended and the effectiveness of all program components.

Status:

Anne Arundel County has implemented public education and outreach programs addressing littler, recycling, and overall waste management. These programs are integral to the services provided by the DPW Bureau of Waste Management Services (WMS) and the DPW Bureau of Highways (BOH). Documented below are the annual results of these education and outreach programs.

In addition to these efforts, in late FY16 the County's WPRP began an in-house effort to identify ephemeral stream reaches within the Tidal and Non-Tidal Patapsco River watersheds that would be suitable for installation of trash traps. Data used to screen sites included identification of trash dumps from the previously conducted watershed assessments, as well as field investigation of current site conditions, floodplain suitability for a trash trap, site access, and property ownership (private versus public). The County applied for grant funding to support a pilot project and is awaiting the outcome of that grant application review. As this program develops, the County will provide updates via future annual reports.

Litter Cleanup, Waste Management, & Recycling

The County's Waste Management Services (WMS) developed and operates a robust public education and outreach program targeted to waste reduction and recycling, as well as household hazardous waste disposal.

WMS Recycling Division's successful recycling program is achieved through effective, consistent communication and education. Maintaining adequate program promotion and education are key to keeping customers informed and motivating them to continue and improve recycling as programs change and evolve. Lack of a comprehensive communication strategy can result in higher contamination levels in collected recyclables; less recycling by new residents; and existing customers may lose interest or become frustrated with changing program guidelines. Therefore, the Recycling Division has made communication and education its primary focus and the mechanism by which to cause a steady incremental growth in the residential recycling rate.

WMS recognizes the importance of keeping citizens educated about its programs, particularly in regards to its changes and advancements, and to encourage residents to recycle more often. Recycling Program Specialists attend fairs, festivals, HOA meetings, community outreach events, and more. WMS also provides technical assistance with recycling at larger-scale events such as the County Fair, Annapolis

Greek Festival, and more. A total of 20 fairs and festivals in FY16 were attended, and recycling assistance was provided to 15 of those events.

Anne Arundel County promotes its recycling program to the public through several methods such as:

- increasing customer base by providing services to small business and multifamily units;
- improving communication with customers by maximizing the use of various media including direct mail, broadcast media, and newspaper advertisements;
- attending civic and community meetings, workshops, displays, and special promotions;
- a specially designed program for school aged children; and
- educating customers on new programs, schedule changes and holiday collections.

This ongoing and extensive outreach effort has proven to be very successful. Since its inception of programs in 2008, the Countywide recycling rate has increased from 31% to 45%.

The WMS Recycling Division offers a Small Business Recycling Program for offices looking to recycle. This operation is an extension of the residential program with contractors servicing the businesses on the roster with weekly pick-up of containers up to 96 gallons. In FY16, 200 customers were signed up for Small Business Recycling and more than 1,400 tons of single-stream recycling was collected.

With recycling being so heavily promoted in the County, it is only fitting that the County employees lead by example and practice recycling as well. The County Office Recycling Program (CORP) was developed to assist in providing County offices and facilities with the necessary tools behind an effective recycling program (*e.g.,* containers, signage, and pick-up service); all offices/facilities have a Recycling Coordinator that directly communicates with the recycling program office. There are about 250 sites (County offices, parks, pools, etc.) that collected approximately 1,250 tons of single-stream recycling in FY16.

In FY16, there were six household hazardous waste events (two at each of the Recycling Centers), and 126 tons of hazardous waste were successfully kept out of the landfill and out of the County's waterways and roadside ditches. These events are vital in helping to keep harmful toxins out of the County landfill. Note that all hazardous waste collected at the facilities is collected during household hazardous waste events and is packaged, transported and disposed of by a licensed hazardous

waste TSD contractor. The County does not accept hazardous waste for disposal at their landfill.

The County also provides 40-yard roll-off bins throughout the year for citizen groups, communities and the Watershed Protection & Restoration Program of the County to aid in community and watershed cleanup activities. WMS also assists in hauling the trash and recyclable material collected from these activities. In FY16, roll-off bins were provided for approximately 225 communities, programs and citizen groups to assist in trash removals.

Education programs are offered to students, faculty, parents, and more throughout Anne Arundel County's public and private schools, as well as day care and home schooling groups. Technical assistance with recycling is also provided upon request, as well as assistance with obtaining Green School Certification through the MAEOE program. In FY16, Recycling Program Specialists visited 65 elementary schools, 11 middle schools and 3 high schools, as well as provided 21 student tours of our County Landfill, which included visitors up to the collegiate level.

The Recycling Division also administers three contests annually for County students, including a poster contest for elementary schools, a sculpture contest for middle schools, and a fashion contest for high school students. This helps generate even more excitement about the importance of recycling.

The County utilizes a multi-media outreach approach. In addition to attendance and participation in the multiple community events, flyers and other hand-outs focusing on recycling, advertisements supporting recycling can now be heard on music streaming services. Additional information on the County's recycling and household hazardous waste programs may be found at the following websites:

- http://www.recyclemoreoften.com/
- http://www.aacounty.org/DPW/WasteManagement/householdWaste.cfm
- https://www.facebook.com/annearundelrecycling/

The County Bureau of Highways (BOH) is responsible for all maintenance activities associated with County roads. Litter is collected from County roadways on a routine basis. Additionally, BOH conducts weekend roadside litter and trash removal throughout the year, using supervised inmate labor, in partnership with the County Department of Detention Facilities. The program was first started in 2007 with a focus on high litter count road segments, dump sites and illegal roadside signs that were proliferating across the County. The goal of the weekend program is to realize an improvement in the condition of roadsides in Anne Arundel County without a reduction to other Highways services. Weekend litter removal activities follow a programmed frequency throughout the year.

A total of 12,549 thirty-gallon bags of litter were removed from roadsides from July 1, 2015 to June 30, 2016, with 8,619 bags collected during the routine work week and 3,930 bags collected by the weekend litter removal program. This represents a 44% increase from the last reporting period in which 8,733 bags of litter were removed.

Stream Cleanups

The BOH has supported several stream cleanup initiatives during the reporting period. This includes Project CleanStream during April 2016, sponsored by the Alliance for the Chesapeake Bay. Significant support was also provided to The Friends of the Patapsco Valley & Heritage Greenway who sponsored several watershed clean-ups in Patapsco State Park off Race Road in Hanover, Maryland. Support was also provided to the United States Naval Academy who sponsored the Broadneck Elementary School clean-up effort. In partnership with these efforts, BOH hauled away more than 25,000 lbs. of material for proper disposal. In addition to planned clean-up efforts, the Bureau of Highways removed more than 25 loads of trash, tires, chemicals, metal, and glass dumped illicitly and reported by these and other volunteer organizations.

Some examples of specific trash, debris, and litter clean—up events supported by the County are listed here:

April 2, 2016 – Alliance for the Chesapeake Bay, Project Clean Stream Locations 1 -9, 3,090 lbs. removed.

April 7, 2016 – Patapsco Heritage Greenway, Hammonds Ferry Road N, 1,100 lbs. removed.

April 16, 2016 – USNA Midshipman Action Group, Broadneck Elementary School, 9,700 lbs. removed.

May 2, 2016 – Patapsco Heritage Greenway, Hammonds Ferry Road N, 1,000 lbs. removed.

May 4, 2016 – Patapsco Heritage Greenway, Hammonds Ferry Road N, 10,620 lbs. removed.

5. Property Management and Maintenance

a. Anne Arundel County shall ensure that a Notice of Intent (NOI) has been submitted to MDE and a pollution prevention plan developed for each County-owned municipal facility requiring NPDES stormwater general permit coverage. The status of pollution prevention plan development and implementation for each County-owned municipal facility shall be reviewed, documented, and submitted to MDE annually.

Status:

Anne Arundel County's Water Reclamation Facilities (WRFs) NPDES discharge permits are current or continue in force pending MDE issuance of a revised permit. The County-owned WRFs with NPDES discharge permits are:

Annapolis WRF, permit number 12-DP-0838, effective October 1, 2015 to September 31, 2020.

Broadneck WRF, permit number 06-DP-0677, effective June 1, 2010 to May 31, 2015. A renewal package was submitted as per the permit requirement.

Broadwater WRF, permit number 06-DP-0813, effective March 1, 2010 to February 28, 2015. A renewal package was submitted as per the permit requirement.

Cox Creek WRF, permit number 07-DP-0698, effective January 1, 2010 to December 31, 2014. A renewal package was submitted as per the permit requirement.

Maryland City WRF, permit number 11-DP-2393, effective April 1, 2015 to March 31, 2020.

Mayo Large Communal WRF, permit number 02-DP-2291, effective October 1, 2013 to September 30, 2018.

Patuxent WRF, permit number 11-DP-0132, effective April 1, 2015 to March 31, 2020.

The State's General Discharge Permit for Stormwater Associated with Industrial Activities, Permit 12-SW, became effective January 2014. County-owned facilities requiring general discharge permit coverage have submitted NOIs to MDE.

During this reporting period, Anne Arundel County's Bureau of Utilities developed and submitted the required compliance information for the WRFs and the Utility Operations Center facilities listed below. Training sessions reported in this FY16 report occurred on August 11, 2016 and December 1, 2016 at the Broadneck and Annapolis WRFs. Thirty (30) staff attended stormwater management training on these two dates. Additionally, the Bureau of Utilities reports 49 staff were trained (formally and informally) in SWPPP implementation during FY16.

SWPPPs for each of the County's WRF facilities were updated as required by the permit. In support of the NOI and in compliance with the SWPPP, WRF staff perform monthly inspections, quarterly dry weather inspections, quarterly wet weather inspections, annual comprehensive site inspections, annual record review, and annual training. These records are maintained at each facility.

The State's General Discharge Permit 12-SW also applies to the three County-owned facilities managed by Waste Management Services (WMS) noted below. During this reporting period, facilities developed and submitted the required compliance documentation to MDE:

- Northern Recycling Center (formerly known as Glen Burnie Convenience Center) and closed Landfill, permit number 12-SW-0298: Notice of Intent submitted on June 17, 2014, coverage effective August 15, 2014 to December 31, 2018.
- Millersville Landfill and Resource Recovery Center, permit number 12-SW-1304: Notice of Intent to renew submitted on June 17, 2014, coverage effective August 15, 2014 to December 31, 2018; and
- Southern Recycling Center (formerly known as Sudley Convenience Center) and closed Landfill, permit number 12-SW-0297: Notice of Intent submitted June 17, 2014, coverage effective August 18, 2014 to December 31, 2018.

Annual Comprehensive SWPPP Compliance Evaluation Inspection Reports were completed for these facilities in November 2015 (FY2016) and documentation is available upon request. At these facilities, the stormwater management facilities (SWMFs) are inspected routinely and quarterly, and all necessary repairs are undertaken immediately. WMS employs two technicians who are tasked with the responsibility of inspecting and managing the SWMFs. No herbicides are used at these facilities; encroaching vegetation is removed entirely by physical and mechanical means.

County-owned facilities operated by DPW, Bureau of Highways, that require NPDES storm water general discharge permit coverage are listed in Table 3. Each of these facilities maintains compliance documentation required by the new General Permit 12-SW, for submittal to MDE.

Table 3. Bureau of Highways Facilities

Facility	Permit Number	NOI & SWPPP Submission	Permit Coverage Period
Northern District Roads			
200 Dover Rd	12-SW-1176	June 30, 2014	Sept. 12, 2014 – Dec. 31, 2018
318 Mountain Rd	12-SW-1181	June 30, 2014	Aug. 21, 2014 – Dec. 31, 2018
Central District Roads			
1427 Duckens St	12-SW-1177	June 30, 2014	Aug. 21, 2014 – Dec. 31, 2018
1847 Crownsville Rd	12-SW-1179	June 30, 2014	Aug. 21, 2014 – Dec. 31, 2018
415 Broadneck Rd	12-SW-1182	June 30, 2014	Aug. 21, 2014 – Dec. 31, 2018
Southern District Roads			
350 West Central Ave	12-SW-2298	June 30, 2014	Aug. 21, 2014 – Dec. 31, 2018
6657 Old Solomons Island Rd	12-SW-1180	June 30, 2014	Aug. 21, 2014 – Dec. 31, 2018

Bureau of Highways Stormwater Pollution Prevention Plan Development and Implementation

During the period July 1, 2015, through June 30, 2016, the following items related to implementation of 12-SW were completed:

- Implemented each SWPPP, including:
  - Performed routine facility inspections of each facility, at least quarterly.
  - Completed quarterly outfall visual assessments of each facility.
  - Completed comprehensive annual inspections of each facility in June 2016.
  - Provided training to Road District personnel during the reporting period to support SWPPP implementation.
  - Completed an internal document review during comprehensive annual inspections of each facility. These records are maintained at each facility.
  - Continuation of maintenance improvements to further prevent stormwater impacts, including:
    - Use of coir log wattles and/or straw bales to protect inlets.
    - Use of asphalt curbing to contain bulk road maintenance materials.
- Completed underground storage tank testing using Maryland Department of the Environment Certified UST Inspectors for:
  - Annual testing of spill buckets (catchment basins) at all facilities in March 2016.
  - Third Party Inspections completed on a rolling basis upon MDE notification.
  - Five-year tank tightness testing completed at all facilities during August 2013.
  - Five-year containment sump testing completed at select facilities during August 2013.
- Completed capital improvements to Salt Barn storage infrastructure at the following District Yards:
  - Northern District, Mountain Road, salt barn repairs, October 2015
  - Central District, Crownsville Yard, salt barn repairs, September 2015
  - Central District, Odenton Yard, salt barn repairs, November 2015
  - Southern District, Friendship Yard, salt barn repairs, August 2015

b. The County shall continue to implement a program to reduce pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. The maintenance program shall include these or MDE-approved alternative activities:

i. Street sweeping;

Status:

Anne Arundel County's street sweeping program is intended to provide a continuous level of street cleanliness while keeping debris (including litter and floatables) and pollutants out of storm drains, our creeks, rivers and ultimately the Chesapeake Bay.

FY16 Sweeping Schedule

The County's neighborhood streets are relatively clean because of the work of conscientious residents who assist us by keeping the areas in front of their homes free of litter and debris. Residential streets were not included in our program for routine street sweeping during this reporting period. Main thoroughfares, business parks and industrial areas, NPDES priority areas, and facility parking lots subject to SWPPP implementation were scheduled for twice monthly street sweeping.

The County has completed the transition from in-house to contracted street sweeping and significantly increased the number of miles swept. Roads with higher traffic volumes are prioritized to maximize collection. The County swept 4,908 curb miles from July 1, 2015 to June 30, 2016, which equates to 409 curb miles/month - a 70% increase from the last reporting period. This program collected more than 300 tons of material from County maintained streets.

ii. Inlet inspection and cleaning;

Status:

The County manually cleaned and removed debris from catch basins, inlets and outlets of pipes to maintain proper drainage for 12,329 structures during the reporting period. This is a 28% decrease from the last reporting period in which 17,167 structures were cleaned by hand.

In addition, the County inspects catch basins, manholes, and associated pipes to identify structures for cleaning with a sewer vacuum or power rodder. A total of 987 structures required cleaning with a sewer vacuum, a decrease of 38% from the last reporting period in which 1,591 were cleaned with a sewer vacuum. A total of 18,623 feet of pipe were cleaned, a decrease of 38% from the last reporting period in which 30,220 feet were cleaned.

Ditch & Curbline Cleaning

During the reporting period, the County cleaned and removed debris from roadside inlet and outlet ditches and concrete swales, removed leaves from ditch lines and curbs using a leaf vacuum, and cleaned and reshaped roadside ditches by machine for a total of 141,265 feet during the reporting period. This is an 18% decrease from the last reporting period in which the County cleaned 172,963 feet.

Year to year variability in the number of closed storm drain structures and linear feet of pipe and curbline cleaning is often around 30%. With added emphasis on infrastructure cleaning and maintenance over the past several years, specific maintenance requests decreased in FY16.

iii. Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with vegetation management through increased use of integrated pest management;

Status:

Pesticides & Herbicides

Anne Arundel County makes a financial contribution annually to support Maryland Department of Agriculture (MDA) programs for Gypsy Moth control (http://mda.maryland.gov/plants-pests/Pages/gypsy_moth_program.aspx) and Mosquito control (http://mda.maryland.gov/plants-pests/Pages/mosquito_control.aspx). Some of this work occurs along County-maintained roadways. No data regarding the quantity of these pesticides applied along roadways is recorded by the Bureau of Highways.

Herbicide use associated with road maintenance performed by the Bureau of Highways is limited to the application of Glyphosate (e.g., Roundup ™) on County rights-of-way to control vegetative growth around guardrails, concrete structures and prior to crack sealing operations in the traveled portion of the roadway. A total of 80 gallons of Glyphosate were used during the reporting period. This is a 30% decrease over the previous reporting period in which 115 gallons were applied. The reduction can be largely attributed to the total number of application cycles scheduled during the reporting period. The Bureau of Highways recorded no other herbicide, pesticide or fertilizer application.

The Bureau of Highways employs a contractor who holds a Pest Control Applicator Certificate. The applicator categories are 3A - Ornamental, 3C - Turf, and 6 - Right-of-Way. The contractor is required to attend re-certification training per the guidelines of MDA to include Integrated Pest Management and pesticide safety. Each time there is chemical use, a pesticide report is completed and filed, which is available to be reviewed during MDA's biennial inspection.

Please note, however, that other pesticides, herbicides, and fertilizers may be used along the County roadside rights-of-way as part of CIP projects, developer projects, projects by citizens, or contractors working on behalf of other agencies of County Government. Special care of median landscaping along certain County and State roads in Anne Arundel County is completed under the direction of The Department of Central Services Facilities Management Division. The Bureau of Highways does not record pesticide, herbicide, and fertilizer use that occurs outside of the Bureau of Highways.

Anne Arundel County Recreation and Parks (AACRP) is committed to providing parks with pest-free environments through the implementation of preventive methods and chemical strategies when necessary. This year (FY16) is the first year Anne Arundel County is including chemical application data from AACRP in its annual reporting, thus the reported amount of chemicals used Countywide in FY16 is greater than previous years.

AACRP has reported using the following compounds at certain AACRP properties during FY16:

- Quiet Waters Park
  - 320 pounds of Holly-tone fertilizer
  - 55 pounds of 10-6-4 SR fertilizer
  - 41 gallons of Glyphosate
  - 124.5 gallons of S-metolachlor
  - 5 gallons of 2,4- Dichlorophenoxyacetic acid
  - 48 pounds of Triflurain & Isoxaben
  - 2 aerosol cans of Propoxur, Piperonyl butoxide & Pyrethrins

- AACRP Headquarters
  - 1.1 pound of Triflurain & Isoxaben
  - 4.5 gallons of 2,4- Dichlorophenoxyacetic acid
  - 3 gallons of Glyphosate

Likewise, FY16 is the first year the County is including chemical application data from the Facilities Management Division in its annual reporting. County landscape crews apply insecticides and herbicides on County properties including all Administrative Buildings, Libraries, Police and Fire Stations, Senior Centers, and Health Centers throughout the County. The chemicals used at these facilities include:

- 540 gallons of Glyphosate
- 4 aerosol cans of Propoxur, Piperonyl butoxide & Pyrethrins
- 400 gallons of Imidacloprid

Landfills and recycling centers managed by WMS do not use herbicides to control the unwanted woody vegetation and encroaching vegetation. Weeds and

other problematic vegetation at these facilities are removed entirely by physical and mechanical means.

Integrated Pest Management (IPM)

The maintenance plan for all Facilities Maintenance Division (FMD) properties and right-of ways include Integrated Pest Management (IPM). Key elements include:

- use of herbicides only when pulling or cutting weeds have not proven effective;
- use of insecticides only when natural methods have not proven effective;
- elimination of fertilizer use, proper use of hand weeding and mulching, and sparing use of herbicides on roadway medians;
- limiting fertilizer use on FMD properties, and only using when grass needs nutrients to encourage proper growth that helps with the prevention of soil erosion and limits runoff;
- selecting disease- and insect-resistant plants for new plantings; and
- selecting the least toxic product available, using appropriate storage facilities and techniques, and compliance with all applicable laws and regulations.

During the reporting period, the Department of Recreation and Parks (R&P) continued implementation of an IPM program for County parks and athletic facilities. The IPM plan is required pursuant to County legislation that became effective July 1, 2013 and that modified Article 14 of the County Code by adding §14-1-105 (Integrated Pest Management Plan). The updated Article 14 of the County Code can be found online at http://www.aacounty.org/our-county/county-code/index.html. Pursuant to this legislative requirement, the public is provided prior notification of pesticide application at R&P public facilities.

Documentation for the R&P IPM program is available in **Appendix G**. Program objectives are to:

- minimize the amount and toxicity of pesticides used in the park facilities;
- eliminate unnecessary pesticide applications;
- provide IPM education to the public, park users and park staff;
- improve landscape and grounds cleanliness;
- utilize only Licensed, Certified and Registered Technician pesticide applicators;
- reduce or eliminate exposure of children, vulnerable adults, nursing mothers with infants and pets to pesticide applications; and
- provide universal public and staff notification.

iv. Reducing the use of winter weather deicing materials through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making; and

Status:

Snow and Ice Control

The amounts of de-icing chemicals used by the County Bureau of Highways from July 1, 2015 to June 30, 2016 are found in Table 4. De-icing chemical data for the 2013-2014 and 2014-2015 reporting period are provided as a comparison. The quantity of deicing chemicals used each year is highly variable because it is based on actual winter weather conditions including precipitation type, and factors such as road surface temperature.

Table 4. Deicing Material Applied

Material	2013-2014	2014- 2015	2015 – 2016
Salt	50,996 tons	32,250 tons	11,318 tons
Sand/ Salt mix	0 tons	0 tons	0 tons
Liquid Salt Brine	0 gal.	0 gal.	22,203 gal.
Total Salt Tons	50,996 tons	32,250 tons	11,340 tons [(c)]
Liquid Calcium Chloride	13,355 gal. [(a)]	11,925 gal. [(a)]	6,578 gal. [(a)]
NWS Snow Totals (BWI)	39 inches [(b)]	28.7 inches [(b)]	35.1 inches [(b)]

[(a)] Average winter temperature at BWI Thurgood Marshall Airport is 35.1 degrees according to the National Weather Service (NWS). Winter 2014 average temperature was 33.3, Winter 2015 average temperature was 32.0, Winter 2016 average temperature was 39.4. Calcium Chloride depresses the freezing-point and is used more extensively during colder periods to prevent ice formation and to deice road surfaces. Use is likely when average temperature is near or below freezing or in cases of heavy snowfall.

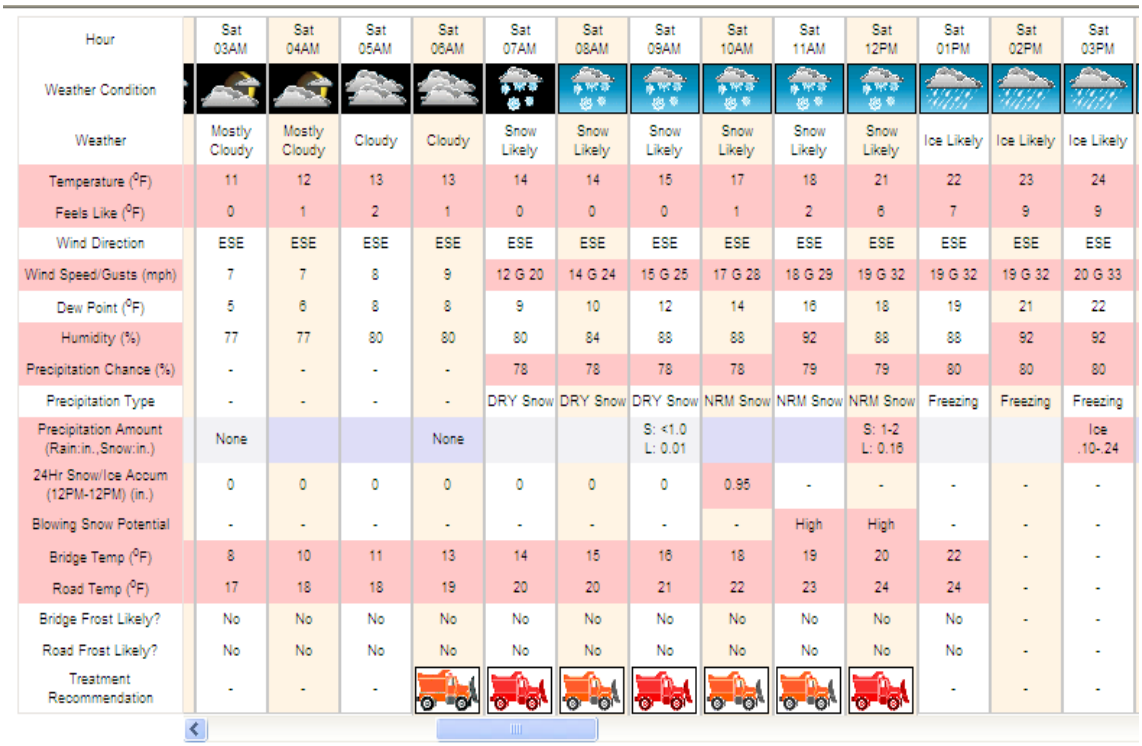
[(b)] Average annual snowfall total at BWI Thurgood Marshall Airport is 20.1 inches according to the National Weather Service (NWS). Winter 2015-2016 snowfall total was 35.1 inches, 75% higher than average but coupled with moderate temperatures, the introduction of anti-icing and sensible salting practices, resulted in less overall salt use.

[(c)] Two pounds of rock salt yields one gallon of salt brine. One ton of rock salt produces 1,000 gallons.

In 2015-2016, the Bureau continued its efforts to reduce the use of winter weather deicing through research, continual testing and improvement of materials, equipment calibration, employee training, and effective decision making. The County procured additional infrastructure to support the full-scale roll-out of an anti-icing program during the 2016-2017 season, procured additional heavy duty dump trucks equipped with the latest spreader controller technology and on-board liquid application capability, and continued to equip

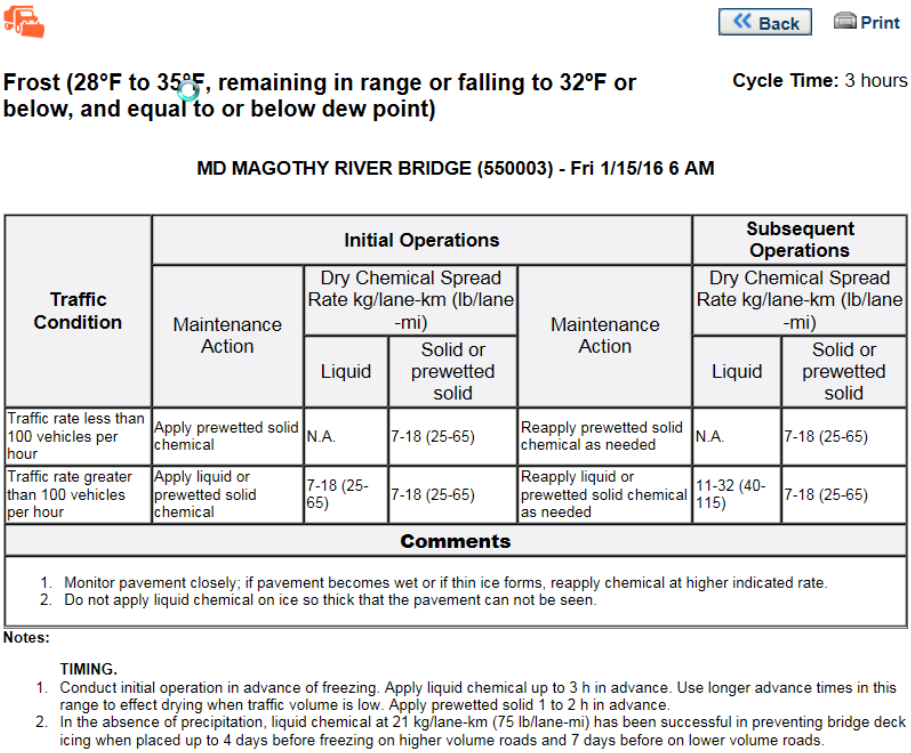
its plow fleet with AVL tracking hardware to monitor and optimize snow removal operations.

The Bureau continued its use of a maintenance decision support system (MDSS) which uses real-time data from our Road Weather Information System (RWIS). The RWIS system is a series of pavement and bridge deck sensors and other instruments installed along certain County-owned bridges and roadways. The integration of RWIS data into a MDSS allows the management team to select the most appropriate winter treatment for actual weather conditions in each area of the County during a winter storm event. Studies have shown use of an MDSS can help reduce the use of deicing chemicals. Screen shots from the MDSS shown below (Figures 2 and 3) are from our subscription weather service, MxVision WeatherSentry Online http://weather.dtn.com/dtnweather/.



Hour	Sat 03AM	Sat 04AM	Sat 05AM	Sat 06AM	Sat 07AM	Sat 08AM	Sat 09AM	Sat 10AM	Sat 11AM	Sat 12PM	Sat 01PM	Sat 02PM	Sat 03PM
Weather Condition													
Weather	Mostly Cloudy	Mostly Cloudy	Cloudy	Cloudy	Snow Likely	Snow Likely	Snow Likely	Snow Likely	Snow Likely	Snow Likely	Ice Likely	Ice Likely	Ice Likely
Temperature (°F)	11	12	13	13	14	14	15	17	18	21	22	23	24
Feels Like (°F)	0	1	2	1	0	0	0	1	2	6	7	9	9
Wind Direction	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE	ESE
Wind Speed/Gusts (mph)	7	7	8	9	12 G 20	14 G 24	15 G 25	17 G 28	18 G 29	19 G 32	19 G 32	19 G 32	20 G 33
Dew Point (°F)	5	6	8	8	9	10	12	14	16	18	19	21	22
Humidity (%)	77	77	80	80	80	84	88	88	92	88	88	92	92
Precipitation Chance (%)	-	-	-	-	78	78	78	78	79	79	80	80	80
Precipitation Type	-	-	-	-	DRY Snow	DRY Snow	DRY Snow	NRM Snow	NRM Snow	NRM Snow	Freezing	Freezing	Freezing
Precipitation Amount (Rain:in.,Snow:in.)	None			None			S: <1.0 L: 0.01			S: 1-2 L: 0.16			Ice .10-.24
24Hr Snow/Ice Accum (12PM-12PM) (in.)	0	0	0	0	0	0	0	0.95	-	-	-	-	-
Blowing Snow Potential	-	-	-	-	-	-	-	-	High	High	-	-	-
Bridge Temp (°F)	8	10	11	13	14	15	16	18	19	20	22	-	-
Road Temp (°F)	17	18	18	19	20	20	21	22	23	24	24	-	-
Bridge Frost Likely?	No	No	No	No	No	No	No	No	No	No	No	-	-
Road Frost Likely?	No	No	No	No	No	No	No	No	No	No	No	-	-
Treatment Recommendation	-	-	-								-	-	-

Figure 2. MDSS Hourly Weather Forecast With Treatment Recommendations



« Back Print

Frost (28°F to 35°F, remaining in range or falling to 32°F or below, and equal to or below dew point)

Cycle Time: 3 hours

MD MAGOTHY RIVER BRIDGE (550003) - Fri 1/15/16 6 AM

Traffic Condition	Initial Operations				Subsequent Operations	
	Maintenance Action	Dry Chemical Spread Rate kg/lane-km (lb/lane-mi)		Maintenance Action	Dry Chemical Spread Rate kg/lane-km (lb/lane-mi)	
		Liquid	Solid or prewetted solid		Liquid	Solid or prewetted solid
Traffic rate less than 100 vehicles per hour	Apply prewetted solid chemical	N.A.	7-18 (25-65)	Reapply prewetted solid chemical as needed	N.A.	7-18 (25-65)
Traffic rate greater than 100 vehicles per hour	Apply liquid or prewetted solid chemical	7-18 (25-65)	7-18 (25-65)	Reapply liquid or prewetted solid chemical as needed	11-32 (40-115)	7-18 (25-65)

Comments

1. Monitor pavement closely; if pavement becomes wet or if thin ice forms, reapply chemical at higher indicated rate.
2. Do not apply liquid chemical on ice so thick that the pavement can not be seen.

Notes:

TIMING.

1. Conduct initial operation in advance of freezing. Apply liquid chemical up to 3 h in advance. Use longer advance times in this range to effect drying when traffic volume is low. Apply prewetted solid 1 to 2 h in advance.
2. In the absence of precipitation, liquid chemical at 21 kg/lane-km (75 lb/lane-mi) has been successful in preventing bridge deck icing when placed up to 4 days before freezing on higher volume roads and 7 days before on lower volume roads.

Figure 3. MDSS Treatment Recommendation

Annual training on proper snow plowing techniques is also offered to both County and contractor personnel responsible for maintaining the County's roadways during inclement winter weather. It includes information on the application of deicing products and proper application rates. Training sessions are held in October and November each year. Approximately 150 County personnel and 100 contractors attended the training sessions.

Activities at WMS facilities also require the use of salt de-icing. The salt usage at each facility, in FY16, is as follows:

- Millersville Landfill and Resource Recovery Facility & Central Recycling Center – 30 tons
- Northern Recycling Center – 7.5 tons
- Southern Recycling Center – 6.25 tons

v. Ensuring that all County staff receive adequate training in pollution prevention and good housekeeping practices.

Status:

The three County-owned facilities managed by WMS that fall under the State's General Discharge Permit 12-SW (Northern Recycling Center, Millersville

Landfill and Resource Recovery Center, and Southern Recycling Center) have approved SWPPPs. WMS holds trainings at least annually at each of the facilities on the following topics: Hazardous Waste Operations (Response); Good Housekeeping and Spill Prevention; Preventative Maintenance for Sediment and Erosion Control; Runoff Control; and other SWPPP-related topics. Information on the number of staff trained and the dates of training during FY16 is found below.

Permit Number	Training Date	# Personnel Trained
12SW0298	11/20/2015	9
12SW1304	12/9/2015	25
12SW0297	12/17/2015	6

The Bureau of Utilities held staff training sessions at the WRFs and Utility Operations Center facilities, as listed in **Part IV.D.5.a**.

The Bureau of Highways held staff training sessions that have been administered to Road District personnel during the reporting period to support SWPPP implementation, as summarized in Table 5.

Table 5. SWPPP Training Summary for Bureau of Highways Facilities

Training Number	Training Location	Training Date	# Attendees	Training Session Topic
15166922	1310NM	08/20/2015	2	WORKSHOP: MS4 MAINTENANCE PRACTICES, CITY OF LYNCHBURG, VA, APWA MID-ATLANTIC CHAPTER
15166923	1310ND	08/20/2015	1	WORKSHOP: MS4 MAINTENANCE PRACTICES, CITY OF LYNCHBURG, VA, APWA MID-ATLANTIC CHAPTER
15179291	1310ND	11/16/2015	16	SESSION #2: OUR SWPPP-PART I
15179349	1312SD	11/17/2015	20	SESSION #4: SECONDARY CONTAINMENT & POLLUTION PREVENTION TEAM
15179339	1311CC	11/18/2015	15	SESSION #1: WHEN IT RAINS, IT DRAINS & WHAT IS A SWPPP?
15179343	1311CS	11/18/2015	7	SESSION #1: WHEN IT RAINS, IT DRAINS & WHAT IS A SWPPP?
15179336	1310NM	11/19/2015	20	SESSION #2/#3: OUR SWPPP; SPILLS & OUTFALL INSPECTIONS
15179338	1311CO	11/23/2015	11	SESSION #1: WHEN IT RAINS, IT DRAINS & WHAT IS A SWPPP?
15179360	1312SD	02/03/2016	21	SESSION #1: WHEN IT RAINS, IT DRAINS & WHAT IS A SWPPP?
15179357	1311CC	02/10/2016	12	SESSION #2: OUR SWPPP-PART I, CONTROL MEASURES/MINIMIZE EXPOSURES
15179354	1311CO	02/22/2016	9	SESSION #2: OUR SWPPP-PART I, CONTROL MEASURES/MINIMIZE EXPOSURES. SECTION 3.0 AND 3.1
15179351	1310ND	02/24/2016	16	SESSION #2: OUR SWPPP-PART I, SPILLS
15179352	1310NM	02/24/2016	18	SESSION #1: WHEN IT RAINS, IT DRAINS & WHAT IS A SWPPP?
15179359	1311CS	03/08/2016	7	SESSION #2: OUR SWPPP-PART I, CONTROL MEASURES/MINIMIZE EXPOSURES. SECTION 3.0 AND 3.1
15179411	1311CO	04/22/2016	7	SESSION #2: OUR SWPPP-PART I, GOOD HOUSEKEEPING
15179409	1310NM	05/13/2016	6	SESSION #2: OUR SWPPP-PART I
15179419	1312SD	05/13/2016	19	SESSION #2: OUR SWPPP-PART I
16209976	1310ND	05/13/2016	14	SESSION #2: OUR SWPPP-PART I, SPILL RESPONSE
16210574	1310NM	05/13/2016	19	SESSION #2: OUR SWPPP-PART I
15179415	1311CC	05/19/2016	10	SESSION #3: OUR SWPPP-PART II
16211974	1310NM	05/24/2016	2	NATIONAL STORMWATER CENTER CERTIFIED STORMWATER INSPECTOR TRAINING
15179418	1311CS	05/27/2016	4	SESSION #1: WHEN IT RAINS, IT DRAINS & WHAT IS A SWPPP?
16215045 16215049	1310NM	06/08/2016	2	CWEA 2016 SPRING SEMINAR: Beyond Nutrients: Case Studies and Tools for Addressing TMDLs
15179407	1310ND	06/23/2016	19	SESSION #2: OUR SWPPP-PART I

6. Public Education

Anne Arundel County shall continue to implement a public education and outreach program to reduce stormwater pollutants. Outreach efforts may be integrated with other aspects of the County's activities. These efforts are to be documented and summarized in each annual report. The County shall continue to implement a public outreach and education campaign with specific performance goals and deadlines to:

a. Maintain a compliance hotline or similar mechanism for public reporting of water quality complaints, including suspected illicit discharges, illegal dumping, and spills.

Status:

The Department of Inspections & Permits maintains a 24-Hour Environmental Hotline for citizens to report environmentally related complaints including spills and illegal dumping into the County storm drain system. The Hotline has been in existence since 1988 and has been advertised in numerous ways including the County webpage: http://www.aacounty.org/departments/inspections-and-permits/environmental-programs/ The recently updated County webpage also provides a link for citizens to submit an on-line request for investigation http://www.aacounty.org/services-and-programs/building-and-grading-violations.

For the reporting period, 656 environmentally related complaints were investigated by the Department, including 529 complaints related to Erosion and Sediment Control. The complaints received typically involve potential Critical Area violations, sediment control issues, tree removal without appropriate approvals, or illegal grading activities. All complaints, including their compliance status, inspection results, enforcement and completion dates are viewable on the Department's Code Compliance Database which is also available through the web site. The County acknowledges that this database is not easily filtered, therefore making it difficult to summarize for reporting purposes. The County is currently accepting bids for a new permitting system that will be designed to enable filtering, allowing for an improved reporting process. The County anticipates the launch of this system in 2018.

b. Provide information to inform the general public about the benefits of:

- ***i. Increasing water conservation;***
- ***ii. Residential and community stormwater management implementation and facility maintenance;***
- ***iii. Proper erosion and sediment control practices;***
- ***iv. Increasing proper disposal of household hazardous waste;***

v. Improving lawn care and landscape management (e.g., the proper use of herbicides, pesticides, and fertilizers, ice control and snow removal, cash for clippers, etc.);
vi. Residential car care and washing; and
vii. Proper pet waste management.

Status:

The County continues to provide residents with information necessary to make informed decisions regarding water quality issues and environmental stewardship. Several County departments have public outreach programs tailored to their specific discipline. Examples of some of the outreach activities are described below.

Anne Arundel County DPW webpage provides water quality-related information associated with County-provided services (http://www.aacounty.org/departments/public-works/). In FY16, information available through this website included the County's Annual Drinking Water Quality Report.

In addition, relevant information to help residents reduce stormwater pollution is provided on the County's Watershed Protection and Restoration Program website (www.aacounty.org/departments/public-works/wprp/) and its "Think Bay" webpage (www.aacounty.org/departments/public-works/wprp/think-bay/index.html). Topics include rainwater reuse, rain gardens, permeable paving materials, car maintenance, household hazardous waste, pesticide and fertilizer use, litter and recycling, pet waste cleanup, septic system maintenance, boating, and deicing.

During the reporting period, the DPW Bureau of Utilities attended numerous community events to promote water conservation and conducted tours of various County-operated water treatment plants and wastewater reclamation facilities (Table 6).

Table 6. Bureau of Utilities Community Events and Tours

8/5/2015	National Night Out - Earleigh Heights	Outreach Event
8/26/2015	AACPS Office of Environmental Literacy	Tour of Water Reclamation Facility
9/12/2015	Public Safety Expo	Outreach Event
9/16/2015	Anne Arundel County Fair	Outreach Event
9/19/2015	Girl Scouts	Tour of Water Treatment Facility
10/15/2015	Anne Arundel Community College - Env. Studies	Tour of Water Treatment Facility
10/23/2015	Crofton Meadows Elementary School	Water Conservation Presentation
10/21/2015	Arundel Garden Community Association	Outreach Event
11/5/2015	Anne Arundel Community College - Env. Studies	Tour of Water Treatment Facility
2/2/2016	Russett Community Association	Tour of Water Reclamation Facility
3/14/2016	Fix-A-Leak Event	Outreach Event
3/15/2016	Community Connections Day	Outreach Event
3/19/2016	Boy Scouts & Girl Scouts	Tour of Water Reclamation Facility
4/22/2016	BWMC Earth Day	Outreach Event
4/30/2016	Elizabeth Landing Community Day	Outreach Event
5/14/2016	North Linthicum Day	Outreach Event

The DPW Bureau of Highways (BOH) developed a web site and authored material to act as a Resident's Guide to Raingardens in Anne Arundel County at www.aacounty.org/services-and-programs/rain-gardens. It explains relevant County requirements, and outlines opportunities for homeowners to use rain gardens to provide flood control, groundwater recharge, and water-cooling benefits, while removing many types of pollutants and other contaminants from stormwater runoff.

BOH has also authored and published a Leaf Brochure that explains relevant County services, and suggested opportunities for homeowners to manage leaves most responsibly. This brochure is currently being revised and it will be posted to the County's website in 2017.

Relating to sediment and erosion control practices, the I&P webpage contains general information available to the public regarding this topic including buffer management, grading and permits, the Chesapeake Bay Critical Area, invasive species, and sensitive areas. This information can be found at www.aacounty.org/departments/inspections-and-permits/environmental-programs/frequently-asked-questions/.

The Watershed Stewards Academy provides information about maintenance of residential septic systems (http://aawsa.org/), as does the County's Department of Health (www.aahealth.org).

Outreach pertinent to household hazardous waste disposal has been reported in prior annual reports. The DPW, Bureau of Waste Management Services (WMS)

manages an extensive outreach campaign geared toward residential recycling. Additionally, Household Hazardous Waste drop-off events are vital in helping to keep harmful toxins out of the County landfill. In FY16, the County advertised and conducted six Household Hazardous Waste drop-off events, holding two events at each of the three Recycling Centers during this reporting period. These events attracted 2,742 customers and successfully kept 252,018 pounds (126 tons) of household hazardous waste out of the landfill. All hazardous waste collected at the facilities during these events is packaged, transported, and disposed of by a licensed hazardous waste contractor. The County does not accept hazardous waste for disposal at its landfill. Additional information is available on the County's website at: http://www.aacounty.org/departments/public-works/waste-management/. WPRP has also developed a 'tip card' distributed to residents regarding proper household hazardous waste management.

Literature outlining alternatives to hazardous household chemicals, and safe disposal of such chemicals, is provided to the public through many different venues, including the Watershed Stewards Academy website (http://aawsa.org/choose-non-toxic-products). DPW WMS also provides information such as what can be recycled; ways to get recycling and composting bins; dealing with yard waste and grass cycling; amounts recycled in different areas of the County; local events that promote recycling; and question-and-answer forums at outreach events, in County offices, through the County website, on the "Recycle. More. Often." website (www.recyclemoreoften.com), and on the Anne Arundel County Recycling Division Facebook page (https://www.facebook.com/annearundelrecycling/). Since the program's inception in 2008, the Countywide recycling rate has increased from 31% to 45%. See **Appendix E**.

Lawns make up a significant portion of individual properties and have been shown to produce more runoff than their forested counterparts. As such, in addition to the information provided on the WPRP website, the Watershed Stewards Academy promotes the use of "Bay Friendly" lawn care and landscaping practices both on their website (http://aawsa.org/) and through community outreach. WPRP has also developed a 'tip card' distributed to residents regrading proper lawn management.

The County's winter deicing strategy and resources are well-explained on the County webpage at www.aacounty.org/departments/public-works/highways/snow-information/index.html. The County is dedicated to ensuring the safety of the traveling public while also providing timely service to County residents and businesses during inclement weather. This webpage succinctly explains the County's efforts toward winter preparations, what citizens and business should expect during snow storms, what County citizens can do to help during inclement weather events, and general winter weather tips. Some excerpts from this webpage include:

"The dedicated staff of the Bureau of Highways (BOHs) is busy preparing for winter snow and ice control activities long before the first hint of snowfall. During the summer months, we first evaluate our fleet and staffing needs for the upcoming season. Our fleet of vehicles and equipment are then serviced and maintained to meet the demands of the winter season.

Winter operations activities related to snow and ice control include plowing snow from the roadway and shoulders, and responsibly applying deicing chemicals to arterial and collector roads and isolated icy spots to facilitate snow plowing.

Snow and ice removal activities and the expense of our operations are reviewed each year. One cost control effort employed by the BOHs is the use of private contractors. The process of securing snow removal contractors begins in July. Similar to the County fleet, contractor equipment is inspected and prepared for winter service. Information to educate our citizens and businesses is also developed and prepared in the fall. During the spring months, a thorough review of the previous year's snow removal outreach activities is conducted. Necessary changes are documented for implementation in the upcoming snow season.

Anne Arundel County uses covered storage facilities for its road salt and stores a total of approximately 11,650 tons of salt at the following locations: Dover Road (Glen Burnie), Mountain Road (Pasadena), Crownsville Road (Annapolis), Broadneck Road (St. Margarets), Duckins Street (Odenton), West Central Avenue (Davidsonville), and at a storage yard in Friendship, MD. At the present time, a small portion of Anne Arundel County's fleet is equipped with liquid calcium chloride pre-wetting equipment. Pre-wetting dry salt during its application helps the salt to adhere to the roadway. In contrast, dry salt can "bounce" and blow off the roadway and be less effective.

Deicing materials are an effective tool for maintaining safe winter road conditions. However, Anne Arundel County is aware that excessive use can have negative impacts on the environment. We strive to only apply as much salt as necessary to achieve safe driving conditions. So, what are some of the environmental concerns associated with road salts? Heavy use of road salts has been assessed to cause damage to vegetation, organisms in soil, birds and to other wildlife. Chloride ions from road salts find their way eventually into waterways, whether by direct runoff into surface water or by moving through the soil and groundwater. In surface water, road salts can harm freshwater plants, fish and other organisms that are not adapted to living in saline waters.

In winter months, as soon as snow begins to accumulate, equipment is dispatched to service arterial and collector roadways. Our next priority will be insuring each community road is passable. Passable means that although the road may be snow-covered or snow-packed, at least one travel lane will be

accessible with a front-wheel drive car. All-weather tires are a must. If our snowplow driver determines that your street meets our definition of passable, no further service will be provided."

Residential car care and residential car washing can readily contribute pollutants to the storm drain system as can improper boat cleaning and maintenance actions. Information on proper maintenance and cleaning of these vehicles is provided on both the County WPRP web page (www.aarivers.org) and through the County's Watershed Stewards Academy (WSA). In addition to outreach by individual stewards, information on proper car and boat repair is found on the WSA webpage (www.aawsa.org/maintain-cars-and-boats/). The WPRP has developed a 'tip card' distributed to residents regarding proper car washing techniques.

In FY16, the WPRP introduced its "Responsible Boating" webpage in order to provide boaters with information on the impacts boating can have on water quality. Water pollution problems associated with boating include discharges of oil, fuel, sewage, trash, fishing line, toxic cleaning and maintenance products, bottom paints, and invasive aquatic species. In addition, Anne Arundel County has over 40 certified Maryland Clean Marinas. These marinas meet the rigorous pollution prevention standards established by the Maryland Clean Marina Committee and the Department of Natural Resources. The operators have voluntarily adopted measures to control pollution associated with marina operations and stand as notable examples of the conservation ethic: individual responsibility for healthy land and water. A new interactive mapping application has been added to the WPRP website that maps the locations of certified Maryland Clean Marinas in Anne Arundel County (http://www.aacounty.org/departments/public-works/wprp/clean-boating/index.html).

The Public Safety article of the Anne Arundel County Code includes regulations governing animal control. Code section §12-4-909 is specific to the removal of animal excreta and requires that "A person shall remove excreta deposited by an animal owned by that person on public walks, recreation areas, or private property other than the owner's." DPW WMS advises residents on the proper disposal methods for a variety of problematic household waste products, including pet waste. Additionally, education regarding pet waste management is included on the "Think Bay" section of the WPRP webpage (www.aarivers.org) as well as the "Take Action" section of the WSA webpage (www.aawsa.org - choose "Habits that Help", then "Pick Up Pet Waste"). These webpages include links to information regarding pet waste removal stations as well as local services that will clean up pet waste. WPRP has also developed a 'tip card' distributed to residents regrading proper pet waste management.

During this reporting year, Anne Arundel County DPW, the County Board of Education's Arlington Echo Outdoor Education Center, The Keith Campbell Foundation, the Chesapeake Bay Trust and National Fish and Wildlife

Foundation continued to provide leadership and funding to the Watershed Stewards Academy[1] (WSA), which was established in 2008 as an organized framework to educate community leaders to become "Master Watershed Stewards".

WSA trains citizens in Anne Arundel County to help neighbors reduce pollution in local creeks and rivers. WSA's hands-on training course gives Stewards the tools to bring change to their communities, by turning knowledge and good intentions into action. Stewards work with communities to install projects such as rain gardens or conservation landscapes that capture polluted runoff.

During this reporting period, WSA completed certification of 25 Master Watershed Stewards, including the completion of capstone projects. Capstone projects include a comprehensive community assessment; outreach and education to the community on how to reduce pollution sources and employ rainscaping to reduce runoff; and either one in-the-ground rainscaping project per person or one behavior change program per group.

Since 2009, WSA has certified over 160 Master Watershed Stewards. Each year, these Stewards collaborate with neighbors, businesses, schools and each other to install hundreds of projects that reduce pollution in our rivers and streams. 2015 stewards' successes included:

- 12,700 native trees and plants installed
- 130 rain barrels and cisterns installed
- 350,500 s.f. of invasive plants removed
- 350 projects covering an area nearly 201,600 square feet installed
- 14,000 Anne Arundel County residents received environmental education and technical assistance

The RiverWise Congregations Program — a partnership of WSA, Alliance for the Chesapeake Bay and Interfaith Partners for the Chesapeake — continued to attract strong interest from the faith-based community. Recognizing that faith organizations own significant swaths of impervious surface in Anne Arundel County and that their members are sometimes under-represented in traditional watershed restoration organizations, the RiverWise partners set out to change both the landscape and the language within faith congregations across Anne Arundel County. This year, 23 Master Watershed Stewards representing 17 faith congregations were trained to care for stormwater projects and establish environmental ministries in their congregations to engage fellow congregants in caring for creation. In addition, 30 projects such as rain gardens, bio-retention and pervious pavement were installed on congregation property treating acres of impervious surface that would otherwise be unaddressed.

[1] WSA reports successes on a calendar year basis, thus calendar year 2015 data are shown.

Once certified, Master Watershed Stewards complete about 40 hours per year in volunteer community watershed restoration, and have networking opportunities through five continuing education classes and three networking sessions annually. All certification and continuing education courses were instructed by stormwater professionals or Master Watershed Stewards and consisted of 50+ volunteer instructors logging over 120 hours of volunteer time spent on instruction.

The WSA continued to support and engage Certified Master Watershed Stewards through the following activities:

- Conducted networking meetings designed to allow Stewards to share their successes and learn new techniques for engaging communities.
- Offered continuing education classes for Certified Stewards.
- Held the annual "Spring into Action" conference. This day-long conference offered additional training and networking opportunities to foster collaboration and action.
- Coordinated the use of training and outreach materials.
- Coordinated plant orders to give Stewards wholesale rates for additional rainscaping projects in their communities.
- Connected interested communities with their closest Master Watershed Steward for consultation and presentations.
- Coordinated the Backyard Buffer program, in collaboration with Maryland Department of Natural Resources (DNR), in which 2,500 tree seedlings were planted in areas adjacent to stormwater flow. An educational workshop for participants was held to instruct homeowners on how to plan, install and care for trees.
- Promoted several web-based tools to assist Stewards and communities in the installation of RainScaping projects including; Runoff Calculator, designed to simulate the runoff reduced of projects; Conservation Landscape Design Tool; and WSA Rainscaping Guidebook for residents and contractors.

As a group, Certified Steward and Steward Candidates reached over 14,000 people in one-on-one outreach and education on stormwater topics and solicited over $852,000 in in-kind and cash matching funds to build local projects.

As noted in prior Annual Reports, the WSA developed and refined training and resources for stewards to employ community-based social marketing to affect pollutant reducing behavior changes such as pet waste disposal, removal of leaves from impervious surfaces, and reduction in fertilizer use. Using face-to-face surveys, Stewards are taught to measure a baseline of behavior and

measure a behavior change. They are also supported with template tools and sample behavior change campaigns for use in their own community.

The WSA continued to facilitate the networking of Anne Arundel County restoration resources via involvement of watershed organizations, the WSA Consortium of Support Professionals, County restoration projects, and private communities to avoid duplication and further common goals.

From stormwater design and land-use planning, to public opinion research and engineering, the WSA Board members bring a diverse set of skills to lead the organization. The Board is united in their passion to support the mission of WSA; each member contributes in a unique and significant way. The Board roles include strategic planning, partnership building and fund-raising. In addition, board members led several Stormwater Tours designed to raise awareness of WSA and educate citizens of Anne Arundel County about the stormwater issues facing our County and successful solutions to those issues.

In an effort to increase stormwater pollution awareness throughout Anne Arundel County, the WPRP has developed a compressive web-based informational program. A major component of this initiative was the development of the WPRP's webpage (www.aarivers.org) to provide residents with an overview of the WPRP program and stormwater fee, environmental restoration plans, watershed assessments and information about stormwater pollution in general. The webpage also provides links to other County departments such as Utilities for water conservation tips and Inspections and Permits for stormwater management and Chesapeake Bay Critical Area information.

Since the development of the WPRP webpage, several enhancements have been integrated. Residents are provided with educational resources to reduce stormwater pollution from their property. Residents learn how their everyday actions can have an impact on our local waterways and provide recommendations on how they can minimize these impacts. The following topics are addressed:

- Rain barrel benefits and installation
- Rain garden benefits and installation
- Permeable pavement and paver benefits and installation
- Bay-friendly car maintenance tips
- Household Hazardous Waste disposal tips
- Fertilizer and pesticide application tips
- Recycling, litter reduction and source reduction tips
- Pet waste management tips
- Onsite septic tank maintenance tips

- Green boating tips
- Bay-friendly de-icing tips
- Effects of various types of pollutants on water quality
- Real-time tracking of restoration project goals and impervious surface treatment goals.

In the coming months, several additional enhancements are planned for the webpage. The goal is to provide residents with the most up to date information regarding the WPRP in the most convenient way.

In addition to the WPRP webpage, several social media outlets including Facebook (https://www.facebook.com/aawprp) and Twitter (https://twitter.com/AAWPRP), were also introduced to help educate residents about water quality issues and to provide an avenue for timely updates of restoration projects, educational materials, links to local watershed groups and newspaper articles. These social media sites are updated on a daily basis and provide residents with an outlet to discuss local stormwater issues and allow the WPRP to continually educate residents about the program.

The Arlington Echo Outdoor Education Center is operated by the Office of Environmental Literacy and Outdoor Education Program of Anne Arundel County Public Schools. Arlington Echo Outdoor Education Center offers Anne Arundel County students year-round opportunities to experience the natural environment. The Outdoor Education programs at Arlington Echo use environmental and outdoor learning to enhance, extend and enrich classroom curriculum. Arlington Echo mainly hosts fourth grade elementary students on day and overnight trips, but also hosts middle, and high school groups.

While developing a positive environmental ethic and sense of stewardship, students learn the meaning of respecting each other as well as respecting the environment. By the end of their residential experience, students are given the tools necessary to become Chesapeake Stewards, and have gained the knowledge to protect and preserve the Chesapeake Bay and its watershed at home, school, and on their own.

Chesapeake Connections is the Outdoor Education outreach program of Arlington Echo which connects classroom instruction with a series of relevant hands-on experiences that lead to environmental stewardship. The staff at Arlington Echo Outdoor Education Center provides support and expertise to complete yearlong environmental service-learning projects as part of Chesapeake Connections with many Anne Arundel middle and elementary schools. The service-learning projects are infused into each school's curricula and involve using community areas or school grounds for environmental restoration activities. The program works to restore and/or create bogs, gardens,

and runoff areas on school grounds or in the community. These projects meet growing environmental needs in our area and help protect the Chesapeake Bay.

The WPRP has partnered with the Chesapeake Connections program to provide hands-on experiences for Anne Arundel County students through the planting of native trees and other vegetation at several restoration projects. Below is a listing of those opportunities that occurred during the reporting period:

- Buttonwood Trail Outfall Repair –300 6th grade students from Marley Middle School
- Music Lane Pond Retrofits –200 6th grade students from Corkran Middle School AND 100 STEM students from Lindale Middle School
- Finnegan Drive Pond Retrofit –70 students from Severna Park Middle School Green Club
- Dividing Creek Stream Restoration Phase I –450 6th grade students from Severna Park Middle School
- Dividing Creek Stream Restoration Phase II –330 6th grade students from Crofton Middle School AND 10 students from Broadneck High School.
- Picture Spring Branch Outfall Repair –340 6th grade students from Old Mill Middle South
- Cinnamon Lane Outfall Repair –100 STEM students from Central Middle School
- Hospital Drive Pond Retrofit –320 6th grade students from MacArthur Middle School

Successful conservation and preservation of Anne Arundel County's watersheds takes teamwork. To that end, in FY16 the Anne Arundel County Department of Public Works, in partnership with the Chesapeake Bay Trust, continued the Anne Arundel County Watershed Restoration Grant Program, a community grant program to support watershed restoration activities throughout the County in order to improve water quality in local streams and rivers.

The grant program was created to engage local nonprofit organizations, landowners, and communities in efforts to restore the County's waterways; to provide resources to these groups to enable them to implement greening and water quality projects; and to assist Anne Arundel County's efforts to meet the requirements of its state and federal stormwater pollution permit and local waterway cleanup plan. This program encourages on-the-ground restoration activities that reduce stormwater flow and pollutants and engage Anne Arundel County residents in these activities. A total of $970,000 was awarded to our partner organization for completion of eight stormwater management projects.

A list of organizations that were awarded funding from Anne Arundel County for water quality restoration projects in FY16 is provided in Table 7, below.

Table 7. Organizations Receiving Funding from Anne Arundel County for Water Quality Restoration Projects during FY16.

Organization	Project Description	Funding Amount	Match Amount	Impervious Acres Treated
South River Federation	St. Anne's School of Annapolis Rain Garden	$15,000	$80,255	0.37
Alliance for the Chesapeake Bay, Inc.	RiverWise Congregations/Empowering Believers	$43,080	$42,595	0.96
South River Federation	Fairfield Parking Lot Bioretention and Courtyard Rain Garden	$46,617	$5,120	2.25
South River Federation	Broad Creek - Health Department Stream Restoration	$100,000	$566,751	11.3
Chesapeake Rivers Association	Coventry Court Dry Channel RSC- Category 2	$102,390	$0	1.49
South River Federation	TriState Marine Stormwater Retrofit System	$164,010	$201,000	14.45
South River Federation	Killarney House & Neighbors Beards Creek Community BMPs	$198,950	$236,800	5
Chesapeake Rivers Association	Winchester on the Severn Dry Channel RSC	$299,953	$3,500	3.13
	TOTAL	**$970,000**	**$1,136,021**	**38.95**

The WPRP strives to keep residents apprised of current accomplishments of the program. One of the most effective ways to communicate those milestones is through the local media. Below are select articles about the WPRP that were published during the reporting period:

- "*Saving Cat Hole Creek: Stream bed rebuilt in Annapolis Roads*" – July 24, 2015, Capital Gazette, http://bit.ly/2dDil5I.
- "*Our say: Bay will be saved creek by local creek*" – July 28, 2015, Capital Gazette, http://bit.ly/2dDgEVJ.
- "*Tracking The Impact of the Stormwater Fee*" – April 7, 2016, Severna Park Voice, http://bit.ly/2dDjQ3S

The following is a list of informational presentations and events in which the WPRP participated during the reporting period:

- 8/4/2015 – National Night Out – Earleigh Heights Fire
- 9/10/2015 – Anne Arundel County Fair (5 day event)

- 10/5/2015 – WSA Grants Workshop
- 10/8/2015 – Annual District Conservation of the Year
- 10/13/2015 – Sierra Club Tour
- 10/29/2015 – Old Mill Middle School
- 11/3/2015 – Mill Creek Community
- 11/4/2015 – Restore Rock Creek
- 11/12/2015 – Broadneck Community
- 11/18/2015 – Magothy River Association
- 12/1/2015 – WSA
- 1/13/2016 – Anne Arundel Patapsco River Alliance
- 1/13/2016 – Point Pleasant Community
- 3/10/2016 – South River Colony
- 3/11/2016 – Shipley's Choice
- 3/12/2016 – Davidsonville Green Expo
- 3/15/2016 – Community Connections
- 3/29/2016 – Severn River Association Stewards
- 3/30/2016 – South River Colony
- 4/2/2016 – Future of Stream Restoration Conference
- 4/6/2016 – Annapolis Neck Peninsula Federation
- 4/16/2016 – Quiet Waters Park Earth Day
- 4/22/2016 – BWMC Earth Day
- 4/25/2016 – Bates Middle School
- 4/28/2016 – Career & Internship Fair – Arundel High
- 4/28/2016 – County Engineers Assoc of MD
- 5/10/2016 – Parole Rotary
- 5/10/2016 – Four Seasons HOA
- 5/12/2016 – Leadership Anne Arundel
- 5/17/2016 – Severn River Association
- 5/26/2016 – Southern High School AP Environmental Science
- 6/3/2016 – Lothian Elementary/Arlington Echo
- 6/16/2016 – MD State Bar Assoc

In addition to the above public outreach events and meetings, WPRP Project Managers provide continuous updates to members in the communities where our restoration projects occur. In some cases, feedback from the local community is taken into account from the design process through construction.

The Anne Arundel County Department of Health has published a fact sheet series entitled "Health Matters" (see examples in 2014 Annual Report). These fact sheets are distributed at events run by the Department of Health. Information can also be found on their website (www.aahealth.org). Some of the subjects covered include:

- Water quality and swimming or fishing in Anne Arundel County rivers and creeks;
- On-site sewage disposal systems and private water wells;
- Bay Restoration Fund (BRF) Program, for nitrogen-reducing pretreatment units for septic systems to be installed within the Chesapeake Bay Critical Area;
- Collapsed septic tanks, overflowing septic systems and failing septic systems interim health and safety requirements; and
- Application procedures for property improvements where well or on-site septic systems are utilized.

The Anne Arundel County Department of Health continues to publicize a seasonal water quality information line (410-222-7999) on the Department of Health's website (www.aahealth.org). The water quality information line alerts the public to current advisories and closures of recreational water as the result of sewage spills and bacterial exceedances from over 80 bathing beaches that the department monitors from Memorial Day through Labor Day. The Department also promotes an e-alert system so an individual can be notified by e-mail when the Department has an advisory or closure of recreational waters. Individuals can sign up for the e-alert system on the Department of Health's website. In addition, water quality advisories are communicated via the Department's Facebook and Twitter pages. The Department continued to recommend no direct water contact for 48 hours after a significant rain event due to predicted elevated bacteria levels.

The Department of Health, in conjunction with MDE and the Maryland Department of Health and Mental Hygiene, promotes the Maryland Healthy Beaches campaign (www.marylandhealthybeaches.com). The campaign makes people aware of everyone's impact to the waterways in the State of Maryland. One of the campaigns major focus is the importance of picking up pet waste. In 2013, the Department of Health created a 'Beach Swimming Guide' on its website to keep the public abreast of recreational water quality in the County.

The Department of Health also publicizes information about on-site sewage disposal systems and private water wells. The Department also provides a DVD on the maintenance and care of an on-site sewage disposal system to each individual homeowner at the time of installation for each newly installed system. The DVD's are also available to view on the department's web-site.

The Department of Health promotes the Bay Restoration Program. This program is a grant that plans to use grant funds to help qualified applicants connect to existing public sewer and continues to pay for nitrogen reducing pretreatment units that must be installed in conjunction with an onsite sewage disposal system that is in the Chesapeake Bay Critical Area. The grant funds the entire cost off the treatment unit and a five-year service and maintenance

program for repairs of failing systems in the Critical Area. The Department of Health administers this grant, awarded by MDE. In FY16, the Department of Health used the Fund to subsidize the installation of 225 pretreatment units. These treatment units reduce the nitrogen load from an on-site sewage disposal system by at least 50 percent. This is a direct reduction to the nitrogen load that is reaching the Chesapeake Bay. In addition, the Bay Restoration Fund Program has been expanded to include public sewer connections of existing dwellings currently served by a septic system where public sewer is available and immediately abuts a property. During the reporting period 2 new connections were made to the public sewer system and an additional 86 BAT units were approved for installation in the County.

There are many other environmental health information topics located on the Department's website, under Environmental Health, including:

- The Bay Restoration Fund,
- Environmental Assistance Programs,
- Environmental Health Fees,
- Public Pool and Spa Discharge requirements,
- Recreational water quality, and
- Well and Septic Systems.

Anne Arundel County Recreation and Parks (AACRP) is committed to providing parks with pest-free environments through the implementation of preventive methods and chemical strategies when necessary.

Beginning in 2013**,** AACRP adopted a pest prevention program known as Integrated Pest Management (IPM) for park grounds and athletic fields. The goal is to provide a safe and healthy recreational environment which is conducive to effective staff productivity, public enjoyment, and progressive resource conservation by managing pests and their environments while balancing costs and benefits with human health and environmental quality.

Since AACRP properties, facilities and programs are often contiguous physically, programmatically, geographically and operationally to Anne Arundel County Public School properties it was deemed imperative that there be a high degree of standardization, commonality and uniformity in pest management philosophy.

c. Provide information regarding the following water quality issues to the regulated community when requested:

i. NPDES Permitting requirements;
ii. Pollution prevention plan development;
iii. Proper housekeeping; and
iv. Spill prevention and response.

Status:

Managers at each of the County-owned facilities subject to the stormwater general discharge permit (Permit 12-SW) have updated their SWPPPs following the issuance of the new General Permit by MDE in January 2014 and perform pollution prevention training as set forth in their SWPPP. Training is performed yearly at a minimum, which is critical to ensure staff are fully knowledgeable of the potential pollutant sources at each facility, how to properly store and handle these sources, and the procedures for responding to a spill or emergency. Refresher trainings are provided when necessary.

The County provides training for staff working at County facilities with stormwater discharge permits as discussed in **Part IV.D.5.v.** The Bureau of Highways has developed a comprehensive training document consisting of a series of four modules intended to educate staff on pollutant sources, the importance of storm water pollution prevention, what components constitute a storm water pollution prevention plan, implementation of a storm water pollution prevention plan, secondary containment concepts, and an effective pollution prevention team. These modules are presented on an annual, rotating basis.

In demonstration of compliance, SWPPP Evaluation Reports for the County's Waste Management Services facilities are completed on a regular basis, including training outlines for each. Pollution prevention plans and spill prevention, control, and countermeasure plans are kept at these facilities and updated regularly.

E. Restoration Plans and Total Maximum Daily Loads

Anne Arundel County shall annually provide watershed assessments, restoration plans, opportunities for public participation, and TMDL compliance status to MDE. A systematic assessment shall be conducted and a detailed restoration plan developed for all watersheds within Anne Arundel County. As required below, watershed assessments and restoration plans shall include a thorough water quality analysis, identification of water quality improvement opportunities, and a schedule for BMP and programmatic implementation to meet stormwater WLAs included in EPA approved TMDLs.

1. Watershed Assessments

a. By the end of the permit term, Anne Arundel County shall complete detailed watershed assessments for the entire County. Watershed assessments conducted during previous permit cycles may be used to comply with this requirement provided the assessments include all of the items listed in PART IV.E.1.b below. Assessments shall be performed at an appropriate watershed scale (e.g., Maryland's hierarchical eight or twelve-digit sub-basins) and be based on MDE's TMDL analysis or an equivalent and comparable County water quality analysis;

b. Watershed assessments by the County shall;

i. Determine current water quality conditions;
ii. Include the results of a visual watershed inspection;
iii. Identify and rank water quality problems;
iv. Prioritize all structural and nonstructural water quality improvement projects; and
v. Specify pollutant load reduction benchmarks and deadlines that demonstrate progress toward meeting all applicable stormwater WLAs.

Status:

Anne Arundel County developed a TMDL Support group within the Watershed Protection and Restoration Program (WPRP) to comply with the conditions outlined in the NPDES MS4 permit. One component of the program is to perform watershed assessments, as stipulated by the permit requirements (**Part IV.E.1.b**), for each of the County's 12 watersheds. The watershed studies involve a partnership between the County, various consultants, and citizen stakeholders. The field data collection is performed primarily by consultants specifically for each watershed study effort. All modeling, analysis, and reporting are performed in-house by County staff. Once the data are collected and analyzed for a watershed, the TMDL support staff collaborates with the consultants and other citizen stakeholders in a series of professional management team meetings to thoroughly review the information and reach consensus pertaining to assumptions and data interpretations. Once consensus is reached, the County publishes the study, including recommended restoration/preservation actions and desired implementation strategies. Additionally, environmental concerns and recommendations are portrayed in GIS files published on the County website on the interactive WERS mapping application found at the following website address: http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=WPRP

Recommendations developed during watershed studies are used to advise and prioritize land use decisions and Capital Improvement Program expenditures relating to environmental restoration and preservation. To expedite implementation, preliminary restoration designs are developed as part of the watershed assessment and planning effort for some of the highest priority recommendations.

The County completed watershed assessments on eight of its 12 eight-digit subbasins (Bodkin Creek, Magothy River, Patapsco Non-Tidal, Patapsco Tidal, Severn River, South River, Little Patuxent, and Upper Patuxent). Completed watershed assessments can be found on the County's website: http://www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/watershed-studies/

Table 8 shows the current schedule established to complete the remaining watershed studies. The remaining watershed assessments are on schedule to be completed by the end of the current permit term.

Table 8. Watershed Assessment Schedule

Watershed	MDE 8-Digit Watershed Code	Timeline for Targeted Bioassessment Completion (Calendar Year)	Timeline for Habitat Assessment Completion (Calendar Year)	Timeline for Analysis Completion (Calendar Year)
Severn	02131002	Complete	Complete	Complete
South	02131003	Complete	Complete	Complete
Upper Patuxent	02131104	Complete	Complete	Complete
Magothy	02131001	Complete	Complete	Complete
Patapsco Non-Tidal	02130906	Complete	Complete	Complete
Patapsco Tidal	02130903	Complete	Complete	Complete
Bodkin	02130902	Complete	Complete	Complete
Little Patuxent	02131105	Complete	Complete	Complete
Rhode	02131004	Complete	Complete	2016
West	02131004	Complete	Complete	2016
Herring Bay	02131005	Complete	2016	2018
Middle Patuxent	02131102	2016	2016	2018

During FY16, one watershed assessment was in progress (West and Rhode Rivers) and is expected to be finalized by the end of calendar year 2016. The draft watershed assessment report was advertised for a 30-day public comment period on 09/30/16. Updates will be provided with the FY2017 MS4 Annual Report. When completed, all study related materials will be published on the WPRP website. Currently, the draft report is available for a limited time at this web address: www.aacounty.org/departments/public-works/wprp/west-rhode-assessment/

During FY2016, the County finalized the draft Little Patuxent Watershed Assessment project report and advertised for a 30-day public comment period from February 22, 2016 thru March 23, 2016 in Capital Gazette Newspaper and the County website. The County did not receive comments during this public comment period. Little Patuxent Watershed assessment report was finalized on June 30, 2016 and final report posted to the county website on June 30, 2106: www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/watershed-studies/

The last two 8-digit County watersheds to be assessed are Herring Bay and Middle Patuxent watersheds. Notice to Proceed with these watershed assessments was issued to a consultant on 05/23/16. The project kick-off meeting occurred on 05/31/16 and, per the outreach requirements of this permit (**Part IV.E.3.a**), the first

public meeting was held on 09/27/16. The County expects this watershed assessment to be completed in fall of 2018 (FY2019).

Watershed restoration efforts are monitored through the County's Watershed Protection and Program (WPRP) Stream Monitoring program. This program funds the assessment of restoration project efficacy. At a minimum, restoration projects are monitored for stability and native vegetation survivability. During this monitoring period, any identified issues that may lead to project failure are either addressed through immediate remediation, or are put forward for re-design and construction through a stand-alone capital project.

2. <u>Restoration Plans</u>

a. Within one year of permit issuance, Anne Arundel County shall submit an impervious surface area assessment consistent with the methods described in the MDE document "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, June 2011 or subsequent versions). Upon approval by MDE, this impervious surface area assessment shall serve as the baseline for the restoration efforts required in this permit.

By the end of this permit term, Anne Arundel County shall commence and complete the implementation of restoration efforts for twenty percent of the County's impervious surface area consistent with the methodology described in the MDE document cited in PART IV.E.2.a. that has not already been restored to the MEP. Equivalent acres restored of impervious surfaces, through new retrofits or the retrofit of pre-2002 structural BMPs, shall be based upon the treatment of the WQ_v criteria and associated list of practices defined in the 2000 Maryland Stormwater Design Manual. For alternate BMPs, the basis for calculation of equivalent impervious acres restored is based upon the pollutant loads from forested cover.

Status:

Anne Arundel County's NPDES MS4 Permit (Permit), issued in February 2014, requires the County to complete implementation of restoration efforts for twenty percent (20%) of the County's impervious surface area that has not already been restored to the maximum extent practicable (MEP).

The Maryland Department of the Environment (MDE) previously approved[2] the County's impervious surface area assessment and the associated baseline for impervious area restoration. The impervious area assessment identified 1,639 acres

[2] MDE approval letter dated July 07, 2015.

as managed to the MEP[3] (i.e., the baseline of managed impervious area) and 29,311 acres as either having no stormwater management or only partial management (i.e., the baseline of unmanaged impervious area). This resulted in the 20% restoration goal of 5,862 acres, to be achieved by the County on or before February 2019.

The County previously submitted an *Impervious Area Restoration Plan* (Appendix I of the FY2015 Annual Report). This document provides a narrative description of the County's impervious area restoration completed to date, and projection of progress through the end of the permit term. Included in the County's Impervious Area Restoration Plan are County CIP restoration projects as well as alternative urban BMPs (i.e., street sweeping, septic system connections to WWTP, and septic systems upgraded to enhanced denitrification systems), County-funded restoration grant projects, and other NGO restoration projects. The County's progress toward meeting the impervious area restoration goal is illustrated below, with number of acres indicated for each type of project (Figure 4).

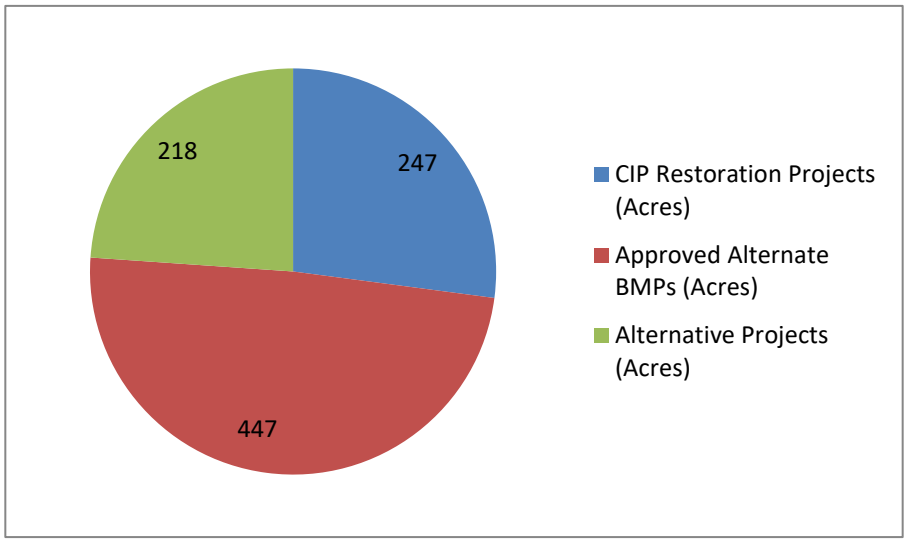


Figure 4. Anne Arundel County's progress towards meeting the impervious area restoration goal.

During the FY16 reporting year, July 1, 2015 through June 30, 2016, 275 Restoration BMP and Alternative Restoration BMP projects were completed. The equivalent restoration acreage from the CIP restoration projects to date is 247 acres. The equivalent credits from Approved Alternative BMPs included individual septic connections to the waste water treatment plant (28.5 acres), outfall stabilization (3.5 acres), individual nitrogen reduction septic conversions (138 acres), septic pump

[3] 238 out of the 10,500 existing BMPs were counted as managed, as only these met MDE's triennial inspection requirement.

outs[4] (154 acres), and street sweeping (123 acres). The equivalent credit from Alternative Projects including County grant-funded projects and NGO projects is 218 acres. During FY16, the County began migrating and formatting water quality improvement project data into the MS4 Geodatabase format. The restoration projects completed during the current permit cycle are equivalent to an impervious treatment area of 912 acres.

The County recognizes the need for adaptive management to meet the restoration goal by utilizing all available opportunities and enhancing alternative strategies, including, but not limited to the possibility of County grant expansion, nutrient trading/offset mitigation, and additional CIP projects to close the "gap" (if any) as the restoration goal is tracked annually.

The County continues to make progress toward the impervious area restoration goal. The County's efforts to meet the goal are described below:

CIP Implementation: The majority of the programmed projects in FY14 and FY15 are already under contract, in-design, or completed. Due to the nature of the restoration projects in progress (e.g., stream restoration projects), permitting timelines, and County procurement processes, a number of FY16 projects are either in contract initiation or in the design submittal stage. The County has chosen 30% design, i.e., schematic submittal stage, for "proposed" status to ensure that the project is actually feasible. Credits are tracked, verified, and reported based on the schematic design. The County currently has 63 BMP restoration projects and 72 stream and outfall restoration projects (approximately 180,000 LF of restoration) in County procurement and/or in the design submittal stage (proposed projects). Credits from these projects will be reported with future reports. In addition to the completed projects, the County has 51 projects in construction or in the design phase (e.g., in schematic design phase). The inventory of these project locations has been included in the *RestBMP* and *AltBMPLine* feature classes in the MS4 Geodatabase submitted in **Appendix A**.

Alternative Urban BMPs: The County is working to improve existing maintenance procedures to meet MDE alternative BMP credit reporting requirements. The County has recently purchased de-watering cans to deposit collected storm inlet/pipe debris, allow de-watering, and then hauling the debris to the landfill, obtaining net scale house weights. This should allow the County to document and report material from inlet cleaning for equivalent impervious area credits with future reports.

Existing BMPs Managed Impervious Area: MDE has approved the County's baseline evaluation of impervious lands which identified 30,950 impervious acres

[4] Individual pump out data not available. The credit is based on septage data from various vendors at WRF. Credit is calculated based on using 1,000 gallons as an average pump out.

under the County's MS4 jurisdiction (*Establishing Baseline – Impervious Area Assessment; Anne Arundel County, May 2015*). Of these acres, 1,639 were identified as managed to the MEP (i.e., the baseline of managed impervious area) and 29,311 acres were identified as either having no stormwater management or only partial management (i.e., the baseline of unmanaged impervious area).

As a part of the baseline impervious area analysis, 263 impervious acres associated with 238 existing BMPs were identified as managed to the MEP. This represented only 2.2% of the existing BMPs in the County's Urban BMP database. These BMPs were identified using the criteria outlined in the guidelines, Section II Establishing Baselines: Impervious Surface Area Assessment (MDE 2014). To accomplish this, BMP records were queried and selected from the County's Urban BMP database that were found to meet the requirements (i.e., having a documented WQv from either the grading permit application or sealed stormwater report and having an inspection record within the last three years).

To track and gain credit for the managed impervious acreage from existing BMP facilities, which were counted as unmanaged in the baseline analysis, the County is continuing efforts toward:

- BMP inspection and maintenance verification
- Urban BMP database clean-up for the inspected BMPs including documenting WQv.

The County has improved upon its efforts to inspect BMPs and meet MDEs triennial inspection requirement. From the beginning of this permit term through FY16, the County is reporting 5,534 inspection visits for 5,184 stormwater BMP facilities. Moreover, the number of inspections and the number of facilities inspected has increased each fiscal year as shown in Table 9 below:

Table 9. Number of Inspections and Facilities Inspected by Fiscal Year

Fiscal Year	# Inspections	# Facilities Inspected
2014 (partial year)	225	225
2015	1418	1358
2016	3891	3601
2017 (thru 11/25/2016)	1566	1511

Some of the 11,603 BMP records in the BMP database are new BMPs approved recently and are not yet ripe for triennial maintenance inspections. As the County further enhances its maintenance inspection program, ramps up field inspection efforts, and increases inspection and maintenance of additional BMPs, the impervious credit associated with these existing BMP practices will be documented toward impervious surface restoration or adjusted baseline.

The County also has also contracted the BMP database clean-up effort as described in Part IV.C.3. It is expected that the County will achieve further progress towards documenting water quality volumes for existing BMPs through the FY17 and FY18 reporting years, and that such efforts will continue in-house into the future years. This effort is tied to the ongoing Urban BMP Database improvements and the required database enhancements associated with the August 2014 guidance (MDE 2014).

Other Restoration Projects: The County is also working with local partners (e.g., Watershed Stewards Academy) on restoration and outreach opportunities. Credits for these activities will be provided as a part of the goal updates with future reports. Individual homeowner practices capture a small amount of runoff, however, implementation over a large scale will involve the implementation of numerous practices. For ease of reporting, the County plans to report these small practices over a regional or watershed scale. In this way, the aggregate acres treated by numerous discrete homeowner BMPs can be reported. The impervious area treated is based on 1 inch of treatment over the area reported. The County is continuing to work collaboratively with local partners to maintain records for individual practices and track and verify them over time in order to maintain credit toward Chesapeake Bay and local TMDL requirements.

Alternative Strategies: The County anticipates meeting the impervious area restoration goal through a combination of the strategies discussed above, and recognizes the need for adaptive management to meet the restoration goal. Adaptive management would include utilizing all available restoration opportunities and enhancing alternate strategies including, but not limited to, the possibility of County restoration grant program expansion, nutrient trading/offset mitigation (Figure 5), accounting for stormdrain and inlet cleaning equivalent impervious area managed, and identifying additional CIP projects with restoration potential or restoration components. These alternative strategies will help to close any identified "gap" as the restoration goal is tracked annually. The restoration goal tracking will be provided with each annual report and the strategies to meet the goal will be evaluated, and adjustments will be made if necessary.

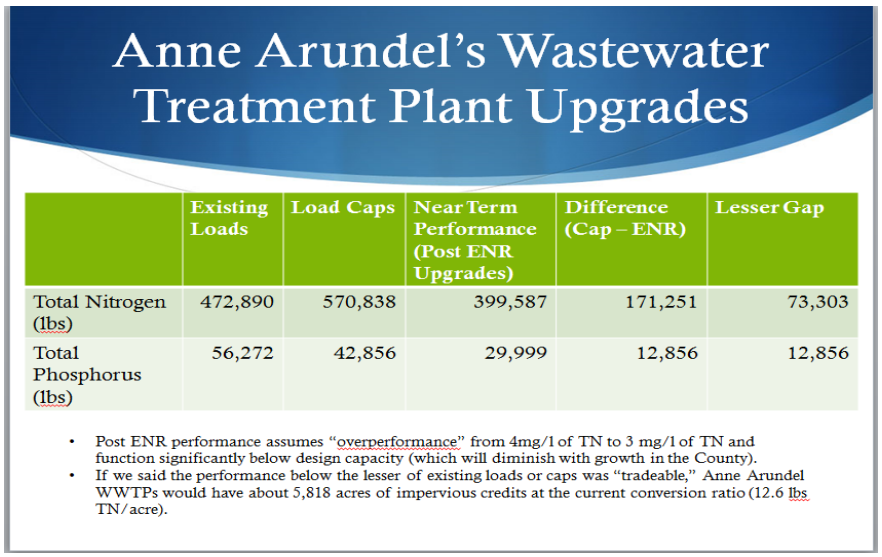


Figure 5. Alternative strategies, including nutrient trading/offset mitigation, could be utilized to meet the impervious area restoration goal.

The County is committed to improving water quality and meeting its MS4 permit requirements, using all available resources. Based on the strategies outlined above, adaptive management across all restoration project types and a strong commitment to BMP database clean-up, the County is confident it will be able to meet its impervious area restoration goal.

b. Within one year of permit issuance, Anne Arundel County shall submit to MDE for approval a restoration plan for each stormwater WLA approved by EPA prior to the effective date of the permit. The County shall submit restoration plans for subsequent TMDL WLAs within one year of EPA approval. Upon approval by MDE, these restoration plans will be enforceable under this permit. As part of the restoration plans, Anne Arundel County shall:

- ***i. Include the final date for meeting applicable WLAs and a detailed schedule for implementing all structural and nonstructural water quality projects, enhanced stormwater management programs, and alternative stormwater control initiatives necessary for meeting applicable WLAs;***
- ***ii. Provide detailed cost estimates for individual projects, programs, controls, and plan implementation;***
- ***iii. Evaluate and track the implementation of restoration plans through monitoring or modeling to document progress toward meeting established benchmarks, deadlines, and stormwater WLAs; and***
- ***iv. Develop an ongoing, iterative process that continuously implements structural and nonstructural restoration projects, program enhancements, new and additional programs, and alternative BMPs where EPA approved TMDL stormwater WLAs are not being met***

according to the benchmarks and deadlines established as part of the County's watershed assessments.

Status:

As of this reporting period TMDLs have been approved for 96 impairments within Anne Arundel County. These TMDLs have been developed and approved for waterbodies receiving stormwater runoff from Anne Arundel County MS4 permit-regulated land areas (see attached "Anne Arundel County TMDLs Summary by Impairment" Excel spreadsheet, **Appendix F**). Pursuant to its NPDES MS4 Permit requirements, Anne Arundel County is obligated to develop and submit to MDE restoration plans for every EPA approved TMDL having a stormwater wasteload allocation. These restoration plans identify a suite of structural and non-structural projects and programs necessary for meeting the WLAs identified in the Chesapeake Bay TMDL and the individual TMDLs and include cost estimates and a schedule for implementation. These restoration plans are being developed pursuant to the following MDE guidance documents:

- *"Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated – Guidance for National Pollutant Discharge Elimination System Stormwater Permits". August 2014*
- *"General Guidance for Developing a Stormwater Wasteload Allocation (SW-WLA) Implementation Plan". May 2014*
- *"Guidance for Developing a Stormwater Wasteload Allocation Implementation Plan for Bacteria Total Maximum Daily Loads". May 2014*
- *"Guidance for Developing a Stormwater Wasteload Allocation Implementation Plan for Nutrient and Sediment Total Maximum Daily Loads". November 2014*
- *"MDE Recommendations for Addressing the PCB SW-WLA". 2015*

Described below are EPA-approved TMDLs for Anne Arundel County that have a stormwater WLA, and the status of the restoration plans associated with them. **Appendix F** contains the completed draft individual TMDL Restoration Plans.

EPA has set 2025 as the final date for meeting the applicable WLA set forth in the Chesapeake Bay TMDL. For consistency purposes, Anne Arundel County has set 2025 as the final date for meeting the Stormwater WLAs for all other impairments with the exception of PCBs for which TMDLs were approved prior to the issuance of the County's current NPDES MS4 Permit (February 12, 2014). Further, Anne Arundel County has aligned its interim benchmarks with the Chesapeake Bay TMDL 2-Year Milestones.

Nitrogen, Phosphorus, and Sediment TMDLs

The Chesapeake Bay TMDL, as noted in Table 10, was approved on 29 December 2010 and applies to all of Anne Arundel County.

Table 10. Chesapeake Bay Nitrogen, Phosphorus, and Sediment TMDL

Location	Approval Date
Countywide	December 29, 2010

Sixty-six (66) of the ninety-six (96) individual impairments associated with nitrogen, phosphorus and total suspended solids are included in the *Chesapeake Bay TMDL for Nitrogen, Phosphorus and Sediment, December 29, 2010*. Anne Arundel County's Phase II Watershed Implementation Plan (WIP) serves as the restoration plan for the Stormwater WLAs for these impairments. Anne Arundel County's Phase II WIP can be found at:
http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/FINAL_PhaseII_Report_Docs/Final_County_WIP_Narratives/Anne_Arundel_WIPII_2012.pdf

On September 15, 2011 MDE finalized its Phase II Load Allocations. Anne Arundel County's Phase I MS4 load allocations are set forth in Table 11.

Table 11. Anne Arundel County (Non-Federal) Stormwater Wasteload Allocation

	Nitrogen (TN)	Phosphorus (TP)
2009 Baseline	657,383	56,531
2017 Interim Target	511,963	38,062
2025 Final Target	449,641	30,147

*Per Maryland's Phase II WIP, if TP is met, TSS target will be met.

Status of Restoration Plan:

Anne Arundel County submitted final progress reports to MDE on January 29, 2016 for its 2014-2015 Implementation and Programmatic 2-Year Milestones. These progress reports can be found at:
http://www.mde.state.md.us/programs/Water/TMDL/TMDLImplementation/Documents/Milestones/2014-2015/Local/Final/2014-2015_Final_Milestones_Anne_Arundel_County.pdf

On January 29, 2016 Anne Arundel County also submitted new 2016-2017 Implementation and Programmatic 2-Year Milestones.

The County's progress toward meeting its goals under the Bay TMDL is summarized below (Table 12, Figure 6). The pollutant load reductions are determined using an in-house spreadsheet model where the suite of implemented BMPs works in concert to determine load reduction. The County used MDE's

guidance document *Accounting for Stormwater Wasteload Allocation and Impervious Acres Treated; Guidance for National Pollutant Discharge Elimination System Stormwater Permits, August 2014* (MDE 2014), and individual expert panel reports[5] for BMPs, to calculate pollutant loads and reductions.

Table 12. Summary of Bay TMDL pollutant load reductions for TN and TP in Anne Arundel County, MD.

TMDL	2009 Baseline (lbs)	2025 Target (lbs)	Required Reduction (lbs)	Current Load (lbs)	Current Reduction (lbs)	Current % Achieved
TN	657,383	449,641	207,742	645,152	12,171	6%
TP	56,531	30,147	26,384	52,672	3,853	15%

Notes:

1. All loads are in lbs.
2. Maryland's Phase II WIP assumes that if TP reduction is met TSS reduction is met

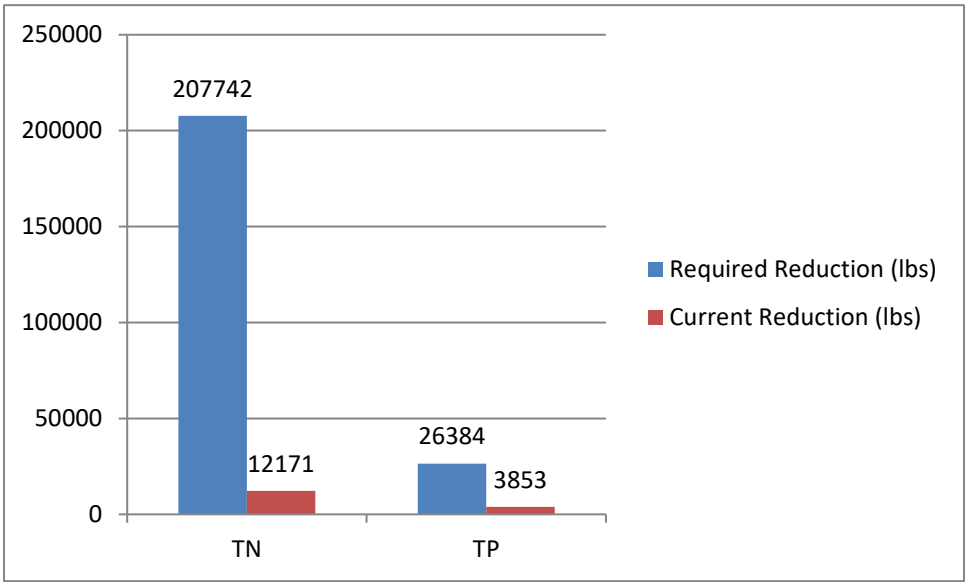


Figure 6. Summary of Bay TMDL pollutant load reductions for TN and TP in Anne Arundel County, MD.

5 For BMPs In-Design or under construction or completed prior to the final report, guidance from draft expert panel report or guidance from MDE 2014 has been used.

Individual Bacteria TMDLs

Table 13 characterizes the individual bacteria TMDLs in the County.

Table 13. Bacteria TMDLs

Location	Approval Date	% Reduction Required*
Magothy River Mainstem	February 20, 2006	12.8
Magothy River/Forked Creek	February 20, 2006	26.3
Magothy River/Tar Cove	February 20, 2006	0.0
Patapsco River/Furnace Creek	March 10, 2011	77.7
Patapsco River Lower North Branch, 8 Digit WS 02130906	December 3, 2009	20.7
Patapsco River/Marley Creek	March 10, 2011	75.7
Upper Patuxent River, Subsegment of 8 Digit WS 0213114	August 9, 2011	22.3
Rhode River/Bear Neck Creek	February 20, 2006	43.3
Rhode River/Cadle Creek	February 20, 2006	72.2
Severn River Mainstem, Subsegment of 8 Digit WS 02131002	April 10, 2008	19.0
Severn River/Mill Creek	April 10, 2008	86.0
Severn River/Whitehall & Meredith Creeks	April 10, 2008	90.0
South River/Duvall Creek	November 4, 2005	45.6
South River, Subsegment of 8 Digit WS 02131003	November 4, 2005	29.5
South River/Ramsey Lake	November 4, 2005	59.3
South River/Selby Bay	November 4, 2005	0.0
W. Chesapeake Bay/Tracy & Rockhold Creeks	February 20, 2006	81.6
West River, Subsegment of 8 Digit WS 02131004	February 20, 2006	35.3
West River/Parish Creek	February 20, 2006	53.1

*Based on the MDE published TMDL documents for bacteria impaired watersheds in Anne Arundel County and Anne Arundel County's *"Draft Total Maximum Daily Load Restoration Plan for Bacteria, February 2015" as originally submitted to MDE for review and comment with the FY14 MS4 Annual Report*. Percent reductions required for the Patapsco and Upper Patuxent are for the Anne Arundel County portion only.

There are currently nineteen (19) approved bacteria TMDLs associated with Anne Arundel County watersheds. Fecal coliform is the impairing pollutant for fifteen (15) of the TMDLs, while E. coli and Enterococci are identified as the impairing pollutant for the remaining four (4). Each of the TMDLs set forth a Stormwater WLA that is noted as a percent reduction in the above table.

MDE identified four bacteria source categories in each of the 19 TMDLs: pet waste, wildlife, humans, and livestock. During the development of the TMDLs MDE quantified the contribution for each of these source categories to the impaired waterbody. Among all 19 TMDL watersheds, the average percent contribution for each category was determined (Table 14).

Table 14. Contributions to bacteria sources

Bacteria Source Category	Average % Contribution
Pet Waste	46.0
Wildlife	34.5
Human	6.9
Livestock	12.6
TOTAL	**100**

Due to the number of bacteria TMDLs and because all of the four source categories were representative of the impaired waterbodies, Anne Arundel County chose to develop a single consolidated implementation plan to address all 19 bacteria TMDLs.

Status of Restoration Plan:
During 2014-2015 a draft Restoration Plan (Plan) was developed and submitted to MDE for review and comment as part of the 2014 NPDES MS4 Annual Report. This plan set forth proposed strategies for reducing bacteria loads that are broadly grouped into two tiers. Tier A strategies are proposed to reduce human bacteria sources and Tier B strategies are proposed to reduce non-human source (i.e., from wildlife, pet, and livestock waste). On May 19, 2015 MDE provided comments on the draft plan. Anne Arundel County addressed the comments and resubmitted the revised draft Restoration Plan with the FY15 NPDES MS4 Annual Report. Receiving no further comments from MDE, the County solicited public comments on this draft Plan between June 15, 2016 and July 14, 2016. The availability of the Plan was advertised in local newspapers and on the County webpage. Comments were received from the public and addressed by the County, and the Bacteria TMDL Restoration Plan was revised to address those comments. The Final Bacteria TMDL Restoration Plan, appended to this document (**Appendix F**), includes an Errata Page (Appendix D of the Plan) that describes the resulting changes made to the Restoration Plan and a Comment Response Document (Appendix E of the Plan). Subsequent to revising the plan to incorporate these comments, the County considers this the Final Bacterial TMDL Restoration Plan. In FY17, the Plan will be posted to the County's website.

In FY16, the County also evaluated the Plan's implementation progress. This evaluation, the 2016 Annual TMDL Assessment Report, is included in the Final Bacteria TMDL Restoration Plan (**Appendix F**) as Appendix F of that Plan. The bacteria load reductions achieved from current implementation of the proposed Tier A and two Tier B restoration strategies were quantified using the Center for Watershed Protection's Watershed Treatment Model. Existing literature was used

to evaluate load reduction progress associated with remaining Tier B strategies. Overall, the evaluation concluded that a reduction in bacteria loads was observed in all TMDL watersheds, when compared to 2015 modeling results, with the exception of Whitehall and Meredith Creeks (tributaries to the Severn River). In these TMDL watersheds, bacteria loads increased by approximately 0.6 percent. A full comparison of these modeled loads is found in Table 3 of the 2016 Annual TMDL Assessment Report.

Overall, the FY16 annual evaluation concluded that the County continues to make progress toward meeting the bacteria TMDL goals through a combination of stormwater management retrofits, elimination of illicit connections to the storm drain system, and abatement of sanitary sewer overflows. Additional implementation of a multi-media pet waste outreach program was identified as a strategy that would provide the highest bacteria load reductions among 9 of the 19 TMDL watersheds. The County intends to move forward with this outreach program, will continue to promote pump-out services associated with marinas, and will continue implementation of Tier A strategies to reduce human sources of bacteria in County waterways. The results of FY17 implementation progress will be included in the FY17 NPDES MS4 Annual Report.

Individual Nutrient TMDLs

The individual nutrient TMDL for Baltimore Harbor is characterized in Table 15.

Table 15. Nutrient TMDLs

Location	Approval Date
Baltimore Harbor	December 17, 2007 TMDL Revised August 31, 2015 (public comment period closed October 13, 2015)

Currently the *"Total Maximum Daily Loads of Nitrogen and Phosphorus for the Baltimore Harbor in Anne Arundel, Baltimore, Carroll and Howard Counties and Baltimore City, Maryland"* approved by EPA in 2007 and revised by MDE in August 2015 is the only individual nutrient TMDL in Anne Arundel County. All other waterbodies listed as impaired for nitrogen and phosphorus are included in the 2010 Chesapeake Bay TMDL. Reductions in nitrogen and phosphorus loads for those waterbodies are addressed by Anne Arundel County's Phase II WIP, July 2012.

The Baltimore Harbor TMDL covers 46,223 acres of the Patapsco tidal and Patapsco non-tidal watersheds within Anne Arundel County. To assure that critical conditions are addressed, the TMDL establishes a growing season allocation (May 1 through October 31) as well as an average annual allocation. The water quality goal of these TMDLs is to reduce excessive algal blooms that result in high chlorophyll *a* concentrations, and maintain the dissolved oxygen concentrations at levels above the water quality criteria for the specific designated uses of the

Baltimore Harbor. The Baltimore Harbor TMDL sets forth Anne Arundel County's stormwater WLAs as listed in Table 16.

Table 16. Baseline loads and stormwater WLAs for the Baltimore Harbor TMDL

	Baseline Load	Load Allocation	Units	% Load Reduction
	Nitrogen			
Average Annual	187,433	159,318	lb/yr	15%
Growing Season	14,433	12,277	lb/ month	15%
	Phosphorus			
Average Annual	20,288	17,245	lb/yr	15%
Growing Season	1,434	1,219	lb/month	15%

Status of Restoration Plan:

Anne Arundel County initiated the development of a restoration plan to address the Baltimore Harbor Nutrient TMDL in response to comments received in MDE's letter dated May 19, 2015. The draft Restoration Plan was completed on September 7, 2016. The draft plan was advertised in local newspapers and posted on the County's web page from September 28 through October 28 to solicit input from the public. No public comments were received during the public comment period. An Addendum has been added to the final plan that addresses the public comment process. The final plan with this addendum is being submitted to MDE in **Appendix F** of Anne Arundel County's FY16 NPDES MS4 Report.

Individual PCB TMDLs

There are currently five (5) EPA approved PCB TMDLs in Anne Arundel County. The location of the TMDL and the approval dates are noted in Table 17.

Table 17. PCB TMDLs

Location	Approval Date
Subsegment of 8 Digit WS 0230903/ Baltimore Harbor and Curtis Creek/Bay	October 1, 2012
Magothy River	March 16, 2015
Severn River	July 19, 2016
South River	April 27, 2015
West and Rhode Rivers	January 8, 2016

Sub Segment of 8 Digit WS 0230903/Baltimore Harbor and Curtis Creek

The Maryland Department of Environment identified the Baltimore Harbor portion of the Patapsco River Mesohaline Tidal Chesapeake Bay Segment that includes Curtis Creek/Bay as individually impaired by PCBs in fish tissue. In addition, the

Curtis Creek/Bay portion of the Patapsco River Mesohaline Tidal Chesapeake Bay Segment has been identified as individually impaired by PCBs in sediment as well as fish tissue. Both of these individual PCB impairments are addressed in the *"Total Maximum Daily Loads of Polychlorinated Biphenyls in Baltimore Harbor, Curtis Creek/Bay, and Bear Creek Portions of Patapsco River Mesohaline Tidal Chesapeake Bay Segment, Maryland"* which was approved by EPA on October 1, 2012. The Baltimore Harbor portion of the Patapsco River Mesohaline Tidal Chesapeake Bay Segment encompasses Curtis Creek/Bay. Because the Curtis Creek/Bay segment was individually identified as impaired for PCBs due to sediment data, in addition to the impairment listing for the entire Baltimore Harbor portion of the Bay Segment based on PCB fish tissue concentrations, there is spatial overlap between the PCB listings for this Bay Segment. As a result, the baseline and TMDL loads for the Baltimore Harbor portion of the Bay Segment include the baseline and TMDL loads for the Curtis Creek/Bay segment.

Both nonpoint sources and point sources of PCBs were identified throughout the Baltimore Harbor embayment's watershed. Nonpoint sources include loads from direct atmospheric deposition to the embayment, identified contaminated sites, resuspension and diffusion from bottom sediments, tidal influence from the Chesapeake Bay mainstem, tributaries outside of the embayment's direct drainage, and runoff from non-regulated watershed areas within the embayment's direct drainage. Point sources include loads from municipal wastewater treatment plants, industrial process water facilities, dredge material containment facilities and National Pollutant Discharge Elimination System (NPDES) regulated stormwater runoff from watershed areas within the embayment's direct drainage.

Although the transport of PCBs to the embayment from bottom sediments via resuspension and diffusion is estimated to be a major source of PCBs to the embayment this load contribution results from other point and nonpoint source inputs within the embayment's watershed and is not considered for reduction in the TMDL. Further, transport of PCBs into the embayment due to tidal influxes from the Chesapeake Bay mainstem could be a major source to the system; however due to the high water column concentration of PCBs within the embayment, modeling results indicate a net transport of PCBs out of the embayment into the Bay's mainstem. The baseline loads and TMDL allocations only consider current sources of PCBs to the embayment and Curtis Creek/Bay that are considered directly controllable, and therefore do not include resuspension and diffusion from bottom sediments or tidal influence of the Chesapeake Bay mainstem.

The modeling scenario used to develop the load reductions, wasteload allocations and load allocations for the tributary, nonregulated watershed runoff, NPDES regulated stormwater, and atmospheric deposition results in a required reduction of 91.5% for all watershed sources (e.g. tributaries, non-regulated watershed runoff, and NPDES regulated stormwater), with slight variations in the regulated stormwater sector due to the locations of contaminated sites, and a 57.6% reduction for atmospheric deposition in order to achieve the sediment and water column

TMDL endpoint tPCB concentrations " (*Total Maximum Daily Load of Polychlorinated Biphenyls in the BALTIMORE Harbor, Curtis Creek/Bay, and Bear Creek Portions of Patapsco River Mesohaline Tidal Chesapeake Bay Segment, Maryland. MDE. Document version: September 28, 2011. EPA Approval Date: October 12, 2012. Pg. xv).* Further, based on the modeling used in this TMDL a 92.1% reduction in regulated stormwater PCB loads is required for Anne Arundel County's portion of the Baltimore Harbor embayment and a 93.5% reduction in regulated stormwater PCB loads is required for Curtis Creek/Bay. Therefore, a TMDL Restoration Plan must be developed for Anne Arundel County's portion of these waterbodies and associated watersheds.

A summary of the tPCB baseline loads, TMDL allocations, load reductions, and maximum daily loads for the Baltimore Harbor and Curtis Creek/Bay is presented in Tables 18 and 19.

Table 18. tPCB Baseline Loads and Load Reductions for the Baltimore Harbor Embayment

Source	Baseline Load (g/year)	Baseline Load (%)	TMDL (g/year)	Load Reduction (%)	Maximum Daily Load (g/day)
Direct Atm. Deposition (to surface of embayment)	1,360.88	22.0	576.47	57.6	5.30
Tributaries[a]					
Jones Falls	299.34	4.8	25.59	91.5	0.24
Gwynns Falls	541.42	8.7	46.29	91.5	0.43
Patapsco LN Branch	688.85	11.1	58.90	91.5	0.54
Non-regulated Watershed Runoff[b]	362.49	5.9	30.99	91.5	0.29
Contaminated Sites	14.51	0.2	14.51	0.0	0.13
Nonpoint Sources	**3,267.49**	**52.7**	**752.75**	**77.0**	**6.93**
Industrial Process Water[c]	859.38	13.9	498.60	42.0	4.24
WWTPs (Patapsco and Cox Creek)	366.81	5.9	32.83	91.1	0.28
DMCFs (Dredge Material Sites)	77.6	1.3	77.60	0.0	0.66
NPDES Regulated Stormwater[b,d]					
Anne Arundel County	850.74	13.7	66.97	92.1	0.62
Baltimore County	338.50	5.5	28.94	91.5	0.27
Baltimore City	435.27	7.0	30.44	93.0	0.28
Point Sources/WLAs	**2,928.31**	**47.3**	**735.22**	**74.9**	**6.34**
MOS (5%)	**-**	**-**	**78.31**	**-**	**0.70**
Total	**6,195.79**	**100.0**	**1,566.29**	**74.7**	**13.96**

Table 18. tPCB Baseline Loads and Load Reductions for the Baltimore Harbor Embayment

Source	Baseline Load (g/year)	Baseline Load (%)	TMDL (g/year)	Load Reduction (%)	Maximum Daily Load (g/day)

Notes:

[a] Although the tributary loads are reported here as a single nonpoint source value, they could include both point and nonpoint source loads.

[b] Load applies to the direct drainage portion of the applicable watershed only.

[c] 18.66 g/year of the 498.6 g/year allocated to industrial process water point sources is assigned to the Back River WWTP Outfall 002, since the effluent from the outfall is routed to RG Steel for use in their industrial processes. The allocation to the Back River WWTP Outfall 002 is calculated as the part of the WWTP design flow allocated to the outfall, which is 50 Million Gallons per Day (MGD), multiplied by the water column TMDL endpoint, which is 0.27 ng/L.

[d] Load per jurisdiction applies to all NPDES stormwater dischargers within the direct drainage area of the jurisdiction to the Baltimore Harbor embayment.

Table 19. tPCB Baseline Loads and Load Reductions for Curtis Creek/Bay

Source[a]	Baseline Load (g/year)	Baseline Load (%)	TMDL	Load Reduction (%)	Maximum Daily Load (g/day)
Direct Atm. Deposition (to surface of embayment)	121.26	20.5	51.37	57.6	0.47
Non-regulated Watershed Runoff[b]	771.19	13.1	6.60	91.5	0.06
Contaminated Sites	7.84	1.3	7.84	0.0	0.07
Nonpoint Sources	**206.29**	**35.0**	**65.81**	**68.1**	**0.61**
Industrial Process Water[c]	-	-	-	-	-
WWTPs[c]	-	-	-	-	-
DMCFs[c] (Dredge Material Sites)	-	-	-	-	-
NPDES Regulated Stormwater[b,d]					
Anne Arundel County	357.68	60.6	23.13	93.5	0.21
Baltimore City	26.22	4.4	2.91	88.9	0.03
Point Sources (WLAs	***383.89***	***65.0***	***26.05***	***93.2***	***0.24***
MOS (5%)	-	-	***4.83***	-	***0.04***
Total	**590.18**	**100.0**	**96.68**	**83.6**	**0.89**

Notes:

[a] None of the Baltimore Harbor upstream tributaries (i.e., Jones Falls, Gwynns Falls, and the Patapsco River Lower North Branch) drain directly into the Curtis Creek/Bay portion of the embayment.

[b] Load applies to the direct drainage portion of the applicable watershed only.

[c] No industrial process water facilities, WWTPs, or DMCFs have been identified in the applicable watershed.

[d] Load per jurisdiction applies to all NPDES stormwater dischargers within the direct drainage area of the jurisdiction to Curtis Creek/Bay.

Source: Total Maximum Daily Load of Polychlorinated Biphenyls in the Baltimore Harbor, Curtis Creek/Bay, and Bear Creek Portions of Patapsco River Mesohaline Tidal Chesapeake Bay Segment, Maryland, Document Version: September 28, 2011, EPA Approval Date: October 1, 2012.

Status of Restoration Plan

Anne Arundel County initiated the development of a restoration plan to address the Baltimore Harbor and Curtis Creek/Bay PCB TMDL in response to comments received in MDE's letter dated May 19, 2015. A copy of the draft Restoration Plan was submitted to MDE in February 2016 as an appendix to the County's FY2015 NPDES MS4 Report. MDE's April 29, 2016 comments on the County's 2015 Report were mute on the PCB plan. The County advertised the draft plan for public comment from July 9, 2016 to August 9, 2016. No public comments were received during the public comment period. An Addendum has been added to the final plan that addresses the public comment process. Having received no public comments, the plan is now considered final and is being submitted as **Appendix F** to the County's FY2016 NPDES MS4 Report to MDE for final approval. Once approved, the final approved plan will be posted on the County's web page.

Magothy River

The *"Total Maximum Daily Load of Polychlorinated Biphenyls in the Magothy River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland"* was approved by EPA on March 16, 2105. Because the Magothy River is identified as impaired for PCBs in fish tissue, the overall objective of the PCB TMDL for the Magothy River is to ensure that the "fishing" designated use, which is protective of human health related to the consumption of fish in the river, is supported. This TMDL, however, also ensures the protection of all other applicable designated uses within the river. More specifically, the objective of this TMDL is to reduce the current total PCB (tPCB) loads to the Magothy River so that the water column and sediment TMDL endpoint tPCB concentrations are achieved.

Both nonpoint sources and point sources of PCBs were identified in the watershed. Nonpoint sources identified include direct atmospheric deposition to the river, contaminated sites, runoff from non-regulated watershed areas and tidal influence from the Chesapeake Bay main stem. Point sources identified include only NPDES regulated stormwater runoff in the watershed. Although transport of PCBs from bottom sediments to the water column can be a source, under the framework of the approved TMDL it is not considered a source. The water quality model developed for this TMDL simulates conditions within the water column and sediment as a single system therefore exchanges between the sediment and water column are considered an internal loading. Only external sources to the system were assigned a baseline load or allocation.

The water quality model developed for simulating the ambient sediment and water column tPCB concentrations within the Magothy River was used to determine the specific load reductions that would result in simulated tPCB concentrations in the sediment and water column that meet the TMDL endpoints. The model assumes that the tPCB concentrations in the Chesapeake Bay main stem are decreasing at a rate of 5% per year. Given this rate of decline, the tPCB TMDL endpoints in both

the water column and sediments in the Magothy River embayment will be met in approximately 43.4 years with the natural attenuation of tPCB concentration in the Chesapeake Bay main stem. Loads from the watershed, including non-point and point sources, and atmospheric deposition only account for 1.3% of the total tPCB baseline load. If these loads were reduced by 100% it would only reduce the time necessary to achieve the water column and sediment tPCB TMDL endpoints by 579 days (1.6 years). Therefore, the TMDL states that "no reductions to these loads are necessary in order to achieve the TMDL" (*Total Maximum Daily Load of Polychlorinated Biphenyls in the Magothy River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. MDE. Document version: February 12, 2015. EPA Approval Date: March 16, 2015. Pg. 28).* When the TMDL endpoints are met, the tPCB load from the Chesapeake Bay main stem will be reduced by about 92.3% including an explicit 5% Margin of Safety. At that time, the total load to the waterbody will be reduced by 90.6% from its baseline.

A summary of the tPCB baseline loads, TMDL allocations, load reductions, and maximum daily loads for the Magothy is presented in Table 20.

Table 20. tPCB Baseline Loads and Load Reductions for Magothy River

Source	Baseline Load (g/year)	Baseline Load (%)	TMDL (g/year)	Load Reduction (%)	Maximum Daily Load (g/day)
Ches. Bay Mainstem Tidal Influence	3,759.0	98.7	289.4	92.3	1.139
Direct Atmospheric Deposition	35.9	0.9	35.9	0.0	0.141
Maryland Non-regulated Watershed Runoff	3.3	0.1	3.3	0.0	0.013
Contaminated Sites	1.8	0.05	1.8	0.0	0.007
Nonpoint Sources	3,800.0	99.8	330.4	91.3	1.300
NPDES MS4 Regulated Stormwater	7.9	0.2	7.9	0.0	0.031
Point Sources	7.9	0.2	7.9	0.0	0.031
Margin of Safety	-	-	17.8	-	0.070
TOTAL	3,807.9	100.0	356.1	90.6	1.402

Source: Total Maximum Daily Load of Polychlorinated Biphenyls in the Magothy River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland, Document Version: February 12, 2015, EPA Approval Date: March 16, 2015

Status of Restoration Plan:

Per MDE, the PCB TMDL for the Magothy River is achieved through the decline in PCB concentrations in the Bay and natural attenuation in sediments. Therefore, no reduction in PCB loads is required to achieve the TMDL. The County understands the need to ensure that PCB loads from stormwater runoff will not increase over the baseline load. Although an increase in the baseline load is unlikely because the manufacture of PCBs has been banned since 1979, Anne Arundel

County is prepared to investigate and identify remediation actions for any new sources of PCBs that may be identified in the future.

Severn River

The *Total Maximum Daily Load of Polychlorinated Biphenyls in the Severn River, Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland* was approved by EPA on July 19, 2016. Because the Severn River is identified as impaired for PCBs in fish tissue, the overall objective of the tPCB TMDL for the Severn River Mesohaline is to ensure that the "fishing" designated use, which is protective of human health related to the consumption of fish, in the river is supported. This TMDL, however, ensures the protection of all other applicable designated uses within the river. More specifically, the objective of this TMDL is to reduce current tPCB loads to the Severn River so that the water column and sediment TMDL endpoint tPCB concentrations are achieved.

PCB sources in the Severn River, resulting primarily from historical uses of PCBs and potential releases, include point sources and nonpoint sources. Nonpoint sources identified include: direct atmospheric deposition to the river, runoff from non-regulated watershed areas and tidal influence from the Chesapeake Bay main stem. Point sources include NPDES regulated stormwater and two WWTPs (Annapolis Water Reclamation Facility and the Naval Support Activity Annapolis WWTP). The transport of PCBs from bottom sediments to the water column through resuspension and diffusion can be a major source of PCBs in estuarine systems; however, under the framework of this TMDL it is not considered a source.

The water quality model developed for simulating ambient sediment and water column tPCB concentrations with in the Severn River were used to determine the specific load reductions that would result in simulated tPCB concentration in the sediment and water column that meet the TMDL endpoints. The model assumes that the tPCB concentrations in the Chesapeake Bay mainstem are decreasing at a rate of 5% per year. Given this rate of decline, the tPCB targets in both the water column and sediments of the Severn River embayment will be met in approximately 46.2 years with the natural attenuation of tPCB concentration in the Chesapeake Bay mainstem. Loads from the watershed, including non-point and point sources, and atmospheric deposition only account for 1.83% of the total tPCB baseline load. The TMDL states "because the watershed's load was estimated as being only 1.08% of the total PCB baseline load, the Anne Arundel County Phase I MS4 permit was not assigned a reduction and therefore no PCB implementation plan will be required." *(Total Maximum Daily Load of Polychlorinated Biphenyls in the Severn River, Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. MDE. Document version: July 2016. EPA Approval Date: July 19, 2016. Pg.27.*

A summary of the tPCB loads, TMDL allocations, load reductions, and maximum daily loads for the Severn is presented in Table 21.

Table 21. tPCB Baseline Loads and Load Reductions for Severn River

Source	Baseline Load (g/year)	Baseline Load (%)	TMDL (g/year)	Load Reduction (%)	Maximum Daily Load (g/day)
Ches.Bay Mainstem Tidal Influence	6,155	98.17	574.4	90.7	3.389
Direct Atmospheric Deposition	47.0	0.75	47.0	0	0.277
Maryland Non-regulated Watershed Runoff	29.0	0.46	29.0	0	0.171
Nonpoint Sources	6,231.7	99.38	650.4	89.6	3.838
WWTP	17.1	0.273	17.1	0	0.145
NPDES MS4 Regulated Stormwater	21.5	0.343	21.5	0	0.127
Point Sources	38.6	0.62	38.6	0	0.272
Margin of Safety	-	-	36.3	-	0.216
TOTAL	6,270.3	100.00	725.3	88.4	4.326

Source: Total Maximum Daily Load of Polychlorinated Biphenyls in the Severn River, Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. Document Version: July 2016. EPA Approval Date: July 19, 2016.

Status of Restoration Plan:

Per, MDE the tPCB TMDL for the Severn River is achieved through the decline in PCB concentrations in the Chesapeake Bay mainstem. Therefore, no reduction in PCB loads is required to achieve the TMDL. The County understands the need to ensure that PCB loads from stormwater runoff will not increase over the baseline load. Although an increase in the baseline load is unlikely because the manufacture of PCBs has been banned since 1979, Anne Arundel County is prepared to investigate and identify remediation actions for any new sources of PCBs that may be identified in the future.

South River

The *"Total Maximum Daily Load of Polychlorinated Biphenyls in the South River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland"* was approved by EPA on April 27, 2015. Because the South River is identified as impaired for PCBs in fish tissue, the overall objective of the PCB TMDL for the South River is to ensure that the "fishing" designated use, which is protective of human health related to the consumption of fish in the river, is supported. This TMDL, however, also ensures the protection of all other applicable designated uses within the river.

Both nonpoint sources and point sources of PCBs were identified in the watershed. Nonpoint sources identified include direct atmospheric deposition to the river,

runoff from non-regulated watershed areas, re-suspension and diffusion from bottom sediments, and tidal influence from the Chesapeake Bay main stem. Point sources identified include National Pollutant Discharge Elimination System (NPDES) permitted wastewater treatment plants (WWTPs) and NPDES regulated stormwater runoff within the watershed. Model estimated tPCB loads from these point and nonpoint sources represent the baseline conditions for the South River. The transport of PCBs to the river from the Chesapeake Bay main stem and from bottom sediment via re-suspension and diffusion are not considered to be directly controllable sources. Within the modeling framework of the TMDL, these loads are considered as internal loads and not included in the tPCB baseline load and TMDL allocation.

The water quality model developed for simulating the ambient sediment and water column tPCB concentrations within the South River was used to determine the specific load reductions that would result in simulated tPCB concentrations in the sediment and water column that meet the TMDL endpoints. The model assumes that the tPCB concentrations in the Chesapeake Bay main stem are decreasing at a rate of 5% per year. Given this rate of decline, the tPCB TMDL endpoints in both the water column and sediments in the South River embayment will be met in approximately 12.3 years with the natural attenuation of tPCB concentration in the Chesapeake Bay main stem. Therefore, the TMDL states that "no reductions to these loads are necessary in order to achieve the TMDL" (*Total Maximum Daily Load of Polychlorinated Biphenyls in the South River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland. MDE. Document Version December 2014. EPA Approval Date: April 27, 2015. Pg. 24)* When the targets are met, the PCB load from the Chesapeake Bay mainstem will be reduced by approximately 50% including an explicit 5% Margin of Safety. At that time, the total load to the waterbody will be reduced by 46% from its baseline.

A summary of the tPCB baseline loads, TMDL allocations, load reductions, and maximum daily loads for the South River is presented in Table 22.

Table 22. tPCB Baseline Loads and Load Reductions for South River

Source	Baseline Load (g/year)	Baseline Load (%)	TMDL (g/year)	Load Reduction (%)	Maximum Daily Load (g/day)
Ches. Bay Mainstem Tidal Influence	2,227.0	98.7	1,124.0	49.5	4.62
Direct Atmospheric Deposition	38.4	1.7	38.4	0.0	0.16
Maryland Non-regulated Watershed Runoff	8.2	0.4	8.2	0.0	0.03
Nonpoint Sources	2,273.6	99.8	1,171	48.5	4.81
WWTP	0.024	0.001	0.024	0.0	0.0
NPDES MS4 Regulated Stormwater	3.9	0.2	3.9	0.0	0.02
Point Sources	3.92	0.2	3.92	0.0	0.02
Margin of Safety	-	-	62	-	0.25
TOTAL	2,278	100.0	1,237	45.7	5.08

Source: Total Maximum Daily Load of Polychlorinated Biphenyls in the South River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland, Document Version December, 2014, EPA Approval Date: April 27, 2015

Status of Restoration Plan:

Per MDE, the PCB TMDL for the South River is achieved through the decline in PCB concentrations in the Bay and natural attenuation in sediments. Therefore, no reduction in PCB loads is required to achieve the TMDL. The County understands the need to ensure that PCB loads from stormwater runoff will not increase over the baseline load. Although an increase in the baseline load is unlikely because the manufacture of PCBs has been banned since 1979, Anne Arundel County is prepared to investigate and identify remediation actions for any new sources of PCBs that may be identified in the future.

West and Rhode Rivers

The *Total Maximum Daily Load of Polychlorinated Biphenyls in the West and Rhode River, Mesohaline Segments, Anne Arundel County, Maryland* was approved by EPA on January 8, 2016. Because the West and Rhode Rivers are identified as impaired for PCBs in fish tissue, the overall objective of the tPCB TMDL is to ensure that the "fishing" designated use, which is protective of human health related to the consumption of fish in the rivers is supported. The TMDL also ensures the protection of all other applicable designated uses within the rivers.

Both nonpoint sources and point sources of PCBx were identified in the watershed. Nonpoint sources identified include: Chesapeake Bay mainstem influence, direct atmospheric deposition to the river and runoff from non-regulated watershed areas within the West and Rhode Rivers' drainage areas. No contaminated sites with the potential to contribute PCBs were identified in the West and Rhode Rivers

watershed. Although transport of PCBs from bottom sediments to the water column through resuspension and diffusion can be a major source of PCBs in estuarine systems it was not considered a source in this TMDL. Point sources of PCBs identified include: one waste water treatment plant, the Mayo Water Reclamation Facility, and NPDES regulated stormwater runoff within the watersheds. Estimated tPCB loads from these point and nonpoint sources represent the baseline conditions for the watersheds.

The water quality model developed for simulating ambient sediment and water column tPCB concentration within the West and Rhode Rivers were used to determine the specific load reductions that would result in simulated tPCB concentrations in the sediment and water column that meet the TMDL endpoints. The model assumes that the tPCB concentrations in the Chesapeake Bay mainstem are decreasing at a rate of 5% per year. Given this rate of decline, the tPCB targets in both the water column and sediment of the West and Rhode Rivers embayment will be met in about 16.8 years with the natural attenuation of tPCB concentration in the Chesapeake Bay mainstem. Loads from the watershed, including non-point sources, and point sources, and atmospheric deposition only account for 3.2% of the total tPCB baseline load. Therefore, "no reduction to these loads is necessary in order to achieve the TMDL." *Total Maximum Daily Load of Polychlorinated Biphenyls in the West River and Rhode River, Mesohaline Segments, Anne Arundel County, Maryland. MDE. Document Version December 2015. EPA Approval Date: January 8, 2016. Pg.23).* When the targets are met, the TPCB load from the Chesapeake Bay mainstem will be reduced by approximately 57.8% from its baseline load including an explicit 5% Margin of Safety.

A summary of the tPCB baseline loads, TMDL allocations, load reductions, and maximum daily loads for the West and Rhode Rivers is presented in Table 23.

Table 23. tPCB Loads and Load Reductions for West and Rhode Rivers

Source	Baseline Load (g/year)	Baseline Load (%)	TMDL (g/year)	Load Reduction (%)	Maximum Daily Load (g/day)
Chesa.Bay Mainstem Tidal Influence	**1081.5**	**96.83**	**456.5**	**57.8**	**2.009**
Direct Atmospheric Deposition	**22.6**	**2.03**	**22.6**	**0**	**0.099**
Maryland Non-regulated Watershed Runoff	**11.0**	**0.99**	**11.0**	**0**	**0.048**
Nonpoint Sources	***1115.2***	***99.85***	***490.1***	***56.1***	***2.156***
WWTP	**0.2**	**0.01**	**0.2**	**0**	**0.001**
NPDES MS4 Regulated Stormwater	**1.6**	**0.14**	**1.6**	**0**	**0.007**
Point Sources	***1.7***	***0.15***	***1.7***	***0***	***0.008***
Margin of Safety	**-**	**-**	**25.9**	**-**	**0.114**
TOTAL	**1116.9**	**100.0**	**517.7**	**53.6**	**2.279**

Source: Total Maximum Daily Load of Polychlorinated Biphenyls in the West and Rhode River Mesohaline Chesapeake Bay Tidal Segment, Anne Arundel County, Maryland, Document Version December, 2015 EPA Approval Date: January 8, 2016.

Status of Restoration Plan:

Per MDE, the PCB TMDL for the West and Rhode Rivers is achieved through the decline in PCB concentrations in the Bay and natural attenuation in sediments. Therefore, no reduction in PCB loads is required to achieve the TMDL. The County understands the need to ensure that PCB loads from stormwater runoff will not increase over the baseline load. Although an increase in the baseline load is unlikely because the manufacture of PCBs has been banned since 1979, Anne Arundel County is prepared to investigate and identify remediation actions for any new sources of PCBs that may be identified in the future.

Sediment TMDLs

There are currently three (3) EPA approved sediment TMDLs in Anne Arundel County, as listed in Table 24.

Table 24. Sediment TMDLs in Anne Arundel County

Location	Approval Date
Little Patuxent River, 8 Digit WS 02131105	September 30, 2011
Upper Patuxent River, 8 Digit WS 02131104	September 30, 2011
Patapsco River Lower North Branch, 8 Digit WS 02130906	September 30, 2011

Little Patuxent River

The *Total Maximum Daily Load of Sediment in the Little Patuxent River Watershed, Howard, and Anne Arundel Counties, Maryland, September 30, 2011* presents the TMDL for sediment in the Little Patuxent watershed as an average annual load to ensure the support of aquatic life. WLAs were calculated for NPDES regulated individual industrial, individual municipal, individual municipal separate storm sewer systems, general mineral mining, general industrial stormwater, and general MS4 permits in the Little Patuxent River watershed. In order to attain the TMDL loading cap, reductions were only applied to the urban sediment sources, since urban land was identified as the only predominant controllable sediment source in the watershed. The overall Little Patuxent WLA and the Anne Arundel County stormwater WLA, and the required percent reduction are presented in Table 25.

Table 25. Sediment Baseline Loads and Load Reductions, Little Patuxent River

NPDES MS4 Regulated SW Point Source	Baseline Load (tons/year)	SW WLA (tons/year)	% Reduction
Anne Arundel County	3,310.8	2,632.3	20.5
Total Little Patuxent	17,092.5	11,225.8	34.3

Status of Restoration Plan:

A draft Sediment TMDL restoration plan for the Little Patuxent River was submitted to MDE with Anne Arundel County's 2014 NPDES MS4 Permit Annual Report. On May 19, 2015 MDE provided comments to Anne Arundel County on the draft plan. Anne Arundel County submitted a revised draft plan that addressed MDE's comments with the County's FY15 NPDES MS4 Report. MDE provided further comments to the County on the revised draft plan on April 29, 2016. The County completed a second revision to the plan that addressed MDE's new comments. The revised draft plan was advertised in local newspapers and on the County's web site for a 30-day public comment period from September 28 through October 28, 2016. No public comments were received. An Addendum has been added to the plan that addresses the public comment process. The plan with this addendum is being submitted to MDE as **Appendix F** with Anne Arundel County's FY16 NPDES MS4 Report. Once MDE has approved the plan and the plan is considered final it will be posted on the County's website.

In addition to submitting the revised plan with the FY16 NPDES MS4 Report, Anne Arundel County is submitting a separate "Response to MDE's April 26, 2016 Comments" document which addresses MDE's comments on all three sediment TMDL restoration plans in **Appendix F.**

Upper Patuxent River

The *Total Maximum Daily Load of Sediment in the Upper Patuxent River Watershed, Anne Arundel, Howard and Prince George's Counties, Maryland, September 30, 2011* presents the TMDL for sediment in the Upper Patuxent watershed as an average annual load to ensure the support of aquatic life. In order to attain the TMDL loading cap calculated for the watershed, reductions were applied equally to the predominant controllable sediment sources, which were identified as urban land, high till crops, low till crops, and hay. Since all urban land use in the Upper Patuxent watershed is considered to be representative of all regulated stormwater sources, the NPDES stormwater WLA is equivalent to the urban land use loads resultant from applying reductions to all of the predominant land uses. The overall Upper Patuxent WLA and the Anne Arundel County stormwater WLA, and the required percent reduction are presented in Table 26.

Table 26. Sediment Baseline Loads and Load Reductions, Upper Patuxent River

NPDES MS4 Regulated SW Point Source	Baseline Load (tons/year)	SW WLA (tons/year)	% Reduction
Anne Arundel County	1,029.7	912.4	11.4
Total Upper Patuxent	9,102.0	8,064.6	11.4

Status of Restoration Plan:

A draft Sediment TMDL restoration plan for the Upper Patuxent River was submitted to MDE with Anne Arundel County's 2014 NPDES MS4 Permit Annual Report. On May 19, 2015 MDE provided comments to Anne Arundel County on the draft plan. Anne Arundel County submitted a revised draft plan that addressed MDE's comments with the County's FY15 NPDES MS4 Report. MDE provided further comments to the County on the revised draft plan on April 29, 2016. The County completed a second revision to the plan that addresses MDE's new comments. The revised draft plan was advertised in local newspapers and on the County's web site for a 30-day public comment period from September 28 through October 28, 2016. No public comments were received. An Addendum has been added to the plan that addresses the public comment process. The plan with this addendum is being submitted to MDE as **Appendix F** with Anne Arundel County's FY16 NPDES MS4 Report. Once MDE has approved the plan and the plan is considered final it will be posted on the County's website.

In addition to submitting the revised plan with the FY16 NPDES MS4 Report, Anne Arundel County is submitting a separate "Response to MDE's April 26, 2016 Comments" document which addresses MDE's comments on all three sediment TMDL restoration plans in **Appendix F.**

Patapsco River Lower North Branch

The *Total Maximum Daily Load of Sediment in the Patapsco River Lower North Branch Watershed, Baltimore City and Baltimore County, Howard, Carroll and Anne Arundel Counties*, Technical *Memorandum: Significant Sediment Point Sources in the Patapsco River Lower North Branch, September 30, 2011 p*resents the TMDL for the Lower North Branch as an average annual load to ensure that there will be no sediment impacts affecting aquatic health. The overall Patapsco Lower North Branch and the Anne Arundel County stormwater WLAs, and the required percent reduction are presented in Table 27.

Table 27. Sediment Baseline Loads and Load Reductions, Patapsco Lower North Branch

NPDES MS4 Regulated SW Point Source	Baseline Load (tons/year)	SW WLA (tons/year)	% Reduction
Anne Arundel County	1,915.1	1,490.0	22.2
Total LNB	15,536.8	13,052.9	16.0

Status of Restoration Plan:

A draft Sediment TMDL restoration plan for the Patapsco River Lower North Branch was submitted to MDE with Anne Arundel County's 2014 NPDES MS4 Permit Annual Report. On May 19, 2015 MDE provided comments to Anne Arundel County on the draft plan. Anne Arundel County submitted a revised draft plan that addressed MDE's comments with its FY15 NPDES MS4 Report. MDE provided further comments to the County on the revised draft plan on April 29, 2016. The County completed a second revision to the plan that addresses MDE's new comments. The revised draft plan was advertised in local newspapers and on the County's web site for a 30-day public comment period from September 28 through October 28, 2016. No public comments were received. An Addendum has been added to the plan that addresses the public comment process. The plan with this addendum is being submitted to MDE as **Appendix F** with Anne Arundel County's FY16 NPDES MS4 Report. Once MDE has approved the plan and the plan is considered final it will be posted on the County's website.

In addition to submitting the revised plan with the FY16 NPDES MS4 Report, Anne Arundel County is submitting a separate "Response to MDE's April 26, 2016 Comments" document which addresses MDE's comments on all three sediment TMDL restoration plans in **Appendix F.**

3. Public Participation

Anne Arundel County shall provide continual outreach to the public regarding the development of its watershed assessments and restoration plans. Additionally, the County shall allow for public participation in

the TMDL process, solicit input, and incorporate any relevant ideas and program improvements that can aid in achieving TMDLs and water quality standards. Anne Arundel County shall provide:

a. Notice in a local newspaper and the County's web site outlining how the public may obtain information on the development of watershed assessments and stormwater watershed restoration plans and opportunities for comment;

b. Procedures for providing copies of watershed assessments and stormwater watershed restoration plans to interested parties upon request;

c. A minimum 30 day comment period before finalizing watershed assessments and stormwater watershed restoration plans; and

d. A summary in each annual report of how the County addressed or will address any material comment received from the public.

Status:

The County provides information on watershed assessment and restoration via the County website (www.aarivers.org) as well as through our interactive online mapping application. As watershed assessments are completed, the associated study reports are published on the WPRP webpage as noted in **Part IV.E.1**. Additionally, restoration projects are highlighted on the WPRP webpage.

As originally reported in the 2010 Annual Report, the County developed an interactive online mapping application to track restoration projects undertaken by non-County organizations such as the Watershed Stewards Academy, grassroots environmental preservation groups, and local Riverkeepers. The mapping application also allows these organizations, and anyone with internet access and interest, to open the mapping application and view the many data layers that have resulted from the County's watershed assessments. Since 2010, the County has provided additional functionality to this mapping application by making changes to the overall look and feel of the application. Most recently, the viewer was changed to a more robust Geocortex viewer. This required a change in the URL of the mapping application, the new address is
http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=WPRP .

During FY16, the County finalized the draft Little Patuxent Watershed Assessment report. The draft report was posted for 30 days for public comment period from February 22, 2016 thru March 23, 2016 in The Capital and Maryland Gazette Newspaper. The draft report was also posted on the County website. The County did not receive comments during this public comment period. The Little Patuxent

Watershed Assessment Report was finalized on June 30, 2016 and final report posted to the County website on June 30, 2106.

Six individual TMDL restoration plans were advertised by the County in FY16 for public comment as noted in Table 28:

Table 28. TMDL restoration plans with comment periods in FY2016

Restoration Plan	Public Comment Period	Comment Status
Bacteria – 19 Segments	June 15 – July 14, 2016	Plan revised & Comment Response Document Drafted
Nutrient – Baltimore Harbor	Sept 28 – Oct 28, 2016	No Comments
PCB - Baltimore Harbor and Curtis Cr/Bay	July 9 – Aug 9, 2016	No Comments
Sediment – Upper Patuxent	Sept 28 – Oct 28, 2016	No Comments
Sediment – Little Patuxent	Sept 28 – Oct 28, 2016	No Comments
Sediment – Patapsco River LNB	Sept 28 – Oct 28, 2016	No Comments

All six plans were posted on the County's web page and advertised in The Capital and Maryland Gazette newspapers. Copies of the advertisements and the Notice of Availability are incorporated as Appendices in each of the respective TMDL Restoration Plans. Public comments were only received on the Bacteria TMDL Restoration Plan. Comments received were addressed in the final plan. A comment response document was also developed and was been submitted as an appendix to the Final Bacteria TMDL Restoration Plan (**Appendix F**).

The County recognizes the importance of public input into these studies and plans and will provide a minimum of 30 days for public comment on draft TMDL implementation plans as well as watershed assessment reports as they are developed. Draft documents will be made available for review and/or download through the County webpage, and a minimum number of hard copy reports will also be made available on request. Prior to final acceptance, a summary of the comments received and County response will be incorporated into each document.

4. TMDL Compliance

Anne Arundel County shall evaluate and document its progress toward meeting all applicable stormwater WLAs included in EPA approved TMDLs. An annual TMDL assessment report with tables shall be submitted to MDE. This assessment shall include complete descriptions of the analytical methodology used to evaluate the effectiveness of the County's restoration plans and how these plans are working toward achieving compliance with EPA approved TMDLs. Anne Arundel County shall further provide:

a. Estimated net change in pollutant load reductions from all completed structural and nonstructural water quality improvement projects, enhanced stormwater management programs, and alternative stormwater control initiatives;

b. A comparison of the net change in pollutant load reductions detailed above with the established benchmarks, deadlines, and applicable stormwater WLAs;

c. Itemized costs for completed projects, programs, and initiatives to meet established pollutant reduction benchmarks and deadlines;

d. Cost estimates for completing all projects, programs, and alternatives necessary for meeting applicable stormwater WLAs; and

e. A description of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.

Status:

During FY16, the County completed drafting individual TMDL restoration plans for all individual TMDLs within the County that have Stormwater Wasteload Allocations (SW-WLAs) that require reduction. The following restoration plans were advertised for public comment during FY2016: *Total Maximum Daily Load Restoration Plan for Bacteria, Baltimore Harbor Watershed Nutrient TMDL Restoration Plan, Baltimore Harbor and Curtis Creek/Bay PCB TMDL Restoration Plan, Little Patuxent River Sediment TMDL Restoration Plan, Upper Patuxent Sediment TMDL Restoration Plan and the Patapsco River Lower North Branch Sediment TMDL Restoration Plan.* The status of these plans and the results of the public comment period are presented in **Part IV.E.2b.** These restoration plans provide information on load reductions and implementation costs associated with achieving the individual TMDL SW-WLAs. The Bacteria TMDL and Sediment TMDL models have been updated to reflect implementation and progress achieved during FY2016. This progress is reported in the *CountywideStormwaterWatershedAssessment* and *LocalStormwaterWatershed*

Assessment tables of the MS4 Geodatabase (**Appendix A**). The Baltimore Harbor Nutrient TMDL Restoration Plan and the Baltimore Harbor and Curtis Creek/Bay PCB TMDL Restoration Plan were only recently completed (November 2016) therefore; the models for these restoration plans will be rerun in FY2017 to document progress achieved during the first year of implementation (FY2017).

As noted earlier, Anne Arundel County continues working collaboratively with MDE and various stakeholders within the County to implement the County's Phase II WIP in support of the Chesapeake Bay TMDL Watershed Implementation Plan (WIP) to reduce the nutrient and sediment load within Anne Arundel County's portion of three major tributary basins (Lower Western Shore, Patuxent River, and Patapsco River).

Implementation of activities associated with the Chesapeake Bay TMDL stormwater WLA for Anne Arundel County has been ongoing since FY2013. Detailed information pertaining to the County's progress toward achieving programmatic and implementation milestones associated with the County's Phase II WIP were reported to MDE on 29 January 2016 as previously documented in this section.

With respect to the net change in pollutant load reductions necessary to meet TMDL requirements, *CountywideStormwaterWatershedAssessment* and *LocalStormwater WatershedAssessment* tables of the MS4 Geodatabase (**Appendix A**) of this report list the load reduction summary for completed water quality improvement projects applicable to both the Chesapeake Bay TMDL and to the local TMDLs. For the FY2016 reporting year, the County pollutant load reduction realized through restoration project implementation is 12,171 lbs/year of Total Nitrogen, 3,853 lbs/year of Total Phosphorus, and 1,860,477 lbs/year. (930.24 tons/year) of Total Suspended Solids. Specific itemized costs for the projects completed in FY2016 are found in the *RestBMP* table of the MS4 Geodatabase. Costs associated with the individual shoreline restoration projects implemented by NGOs are not available.

The net pollutant load reductions associated with the County's cumulative stormwater management and restoration efforts, and the County's Chesapeake Bay TMDL stormwater WLA are shown below in Table 29. The remaining reductions required to meet the SW WLAs are to be achieved by 2025. The cumulative cost of these restoration efforts thus far has been $10,945,908. Project costs are documented in the County's 2016 Financial Assurance Plan (FAP), found in **Appendix H,** and also included in the *RestBMP* table of the MS4 Geodatabase (**Appendix A**).

Table 29. Pollutant Load Reductions and Waste Load Allocations (WLA)

	SW WLA Delivered	Required Reduction to Meet WLA	Load Reduction Achieved	Remaining Reduction Needed
Total Nitrogen (lbs/yr)	449,641	207,742	12,171	195,571
Total Phosphorus (lbs/yr)	30,147	26,385	3,853	22,532
Total Suspended Sediment (tons/yr)*	2,323	4,786	930	3,856

*Numbers derived from MAST scenario run spreadsheet dated July 2012.

The County continues to work toward meeting the targeted goals. Currently there are 51 projects in the construction or schematic design phase. The County also initiated 135 projects during this reporting year that are expected to be in schematic design phase in the coming reporting cycle as previously mentioned in **Part IV.C.6** of this report.

Part IV.E.4.e. of Anne Arundel County's NPDES MS4 permit requires the development of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable stormwater WLAs are not being met or when projected funding is inadequate.

During the 2012 development of *Maryland's Phase II Watershed Implementation Plan (WIP) for the Chesapeake Bay*, Anne Arundel County with the concurrence of the State of Maryland and EPA recognized the need for adaptive management in the WIP development and implementation process. As discussed in *Maryland's Phase II Watershed Implementation Plan For The Chesapeake Bay, March 20, 2012,* as implementation moves forward achievement of stormwater waste load allocation goals needs to be evaluated and watershed restoration plans modified in response to the rate of progress, additional modeling results, and resource availability.

Anne Arundel County took a conservative approach when developing the urban stormwater component of its Phase II WIP. The County's strategy was structured to achieve the Edge of Stream (EOS) final target load derived from the County's Watershed Management Tool (WMT) baseline estimate which was higher than the MAST baseline estimates. In addition, the strategy included only restoration and preservation recommendations for the seven watersheds that were assessed at the time the County's Phase II WIP was developed in July 2012. Restoration opportunities for load reduction from the Little Patuxent, West and Rhode Rivers, Herring Bay and Middle Patuxent River watersheds were not identified nor taken into account. Once these watershed assessments are complete opportunities for load reduction will be formulated into restoration projects and incorporated into the County's Capital Improvement Program (CIP) budget.

Further, Anne Arundel County adopted legislation in June 2013 to create a Watershed Protection and Restoration Program (WPRP) including a Stormwater Remediation Fee (Fee). The Stormwater Remediation Fee is structured to provide sufficient funding for projects to meet the pollutant load reduction required by the Chesapeake Bay TMDL, EPA approved individual TMDLs with a stormwater WLA, and to meet the impervious surface management requirements as well as other stormwater obligations set forth in the County's NPDES MS4 Permit. Given the basis upon which the Fee was established, at this time, funding to achieve applicable stormwater WLAs is considered to be sufficient.

Adaptive management is a critical component of achieving the WLAs required by the County's NPDES MS4 Permit. The Chesapeake Bay TMDL and individual approved TMDLs have clearly established load reduction targets. Two-Year Implementation Milestones have been established by the County to provide interim planning targets and to serve as a vehicle for assessing progress toward the load reduction targets. Progress will be measured through three approaches: tracking implementation of management measures, estimating load reductions through modeling, and tracking overall program success through long term monitoring. Planning targets will then be re-evaluated against progress and revised to ensure that Anne Arundel County is on track to meet its goals. Progress assessments are scheduled for 2017 and 2021, with 2025 set as the final date for achievement of loads reductions.

Following the adoption of its Stormwater Remediation Fee in 2013 Anne Arundel County developed a 6-year Capital Improvement Program (CIP) in FY14 that created a Watershed Protection and Restoration Program (WPRP) Class of projects to implement those restoration projects identified in the County's Phase II WIP for achieving stormwater WLAs. Funding for this class of projects averages $74 million annually. Projects in the WPRP Class were identified and prioritized through a planning level assessment and consist of restoration of ephemeral and perennial streams with a MBSS Maryland Physical Habitat Index (MPHI) score of severely degraded or degraded; implementation of stormwater/water quality treatment at currently untreated stormwater pipe outfalls (greater than 24 inches), and retrofit of stormwater management ponds built prior to 2002 (with drainage areas in excess of 10 acres) to optimize pollutant reduction and ecosystem functions for the facilities. As WPRP projects are funded, more detailed feasibility and constructability assessments are conducted. These assessments may result in identifying projects previously thought to be implementable but due to a variety of reasons are not; or identifying additional and new opportunities for load reduction. As these feasibility assessments are completed the County will incorporate these findings into its modeling, reassess anticipated load reductions and adapt its implementation program to delete or add projects.

At this time, multiple lines of evidence including results of several model runs, monitoring data, and the most recent science on BMP effectiveness and water quality response will be evaluated as part of TMDL compliance assessment. The

milestones and progress assessments will contribute to continual reassessment of management plans, and adapting responses accordingly as technologies and efficiencies change, programs mature, credit trading is enacted, and regulations are put in place.

F. Assessment of Controls

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. The County shall use chemical, biological, and physical monitoring to assess watershed restoration efforts, document BMP effectiveness, or calibrate water quality models for showing progress toward meeting any applicable WLAs developed under EPA approved TMDLs identified above. Additionally, the County shall conduct physical stream monitoring to assess the implementation of the latest version of the 2000 Maryland Stormwater Design Manual. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

The County shall continue monitoring the Parole Plaza outfall and Church Creek in-stream station in the South River watershed, or select and submit for MDE's approval a new watershed restoration project for monitoring. Monitoring activities shall occur where the cumulative effects of watershed restoration activities can be assessed. One outfall and an associated in-stream station, or other locations based on a study design approved by MDE, shall be monitored. The minimum criteria for chemical, biological, and physical monitoring are as follows:

a. Chemical Monitoring

i. Twelve storm events shall be monitored per year at each monitoring location with at least two occurring per quarter. Quarters shall be based on the calendar year. If extended dry weather periods occur, baseflow samples shall be taken at least once per month at the monitoring stations if flow is observed;

ii. Discrete samples of stormwater flow shall be collected at the monitoring stations using automated or manual sampling methods. Measurements of pH and water temperature shall be taken;

iii. At least three samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed in 40 CFR Part 136 and EMC shall be calculated for:

Biochemical Oxygen Demand (BOD_5)	***Total Lead***
Total Kjeldahl Nitrogen (TKN)	***Total Copper***
Nitrate plus Nitrite	***Total Zinc***
Total Suspended Solids	***Total Phosphorus***
Total Petroleum Hydrocarbons (TPH)	***Hardness***
E. coli or enterococcus	

iv. Continuous flow measurements shall be recorded at the in-stream monitoring station or other practical locations based on an approved study design. Data collected shall be used to estimate annual and seasonal pollutant loads and reductions, and for the calibration of watershed assessment models. Pollutant load estimates shall be reported according to any EPA approved TMDL with a stormwater WLA.

Status:

Anne Arundel County continues to conduct a long-term monitoring program to satisfy the above permit conditions. This monitoring program includes chemical, biological, and physical monitoring in the Church Creek subwatershed located in the South River Watershed. Monitoring for this permit reporting period extended from July 2015 through June 2016. The full Church Creek monitoring report can be found in **Appendix B** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2015-2016*) and the data required to support this section are also provided in the *MonitoringSite* and *MonitoringDrainageArea* feature classes and the *ChemicalMonitoring, and BiologicalMonitoring* tables of the MS4 Geodatabase included in **Appendix A** in the prescribed format.

The chemical monitoring activities take place at two monitoring stations in the Church Creek subwatershed:

- Parole Plaza Station: Outfall representing a highly impervious (87 percent) commercial land use which was redeveloped in 2007 as the Annapolis Towne Centre; the construction incorporated stormwater management into the redevelopment (i.e., a restoration station); and
- Church Creek Station: An instream station approximately 2,000 feet downstream of the Parole Plaza monitoring station.

During the 2016 reporting period, ten storm events were sampled and two baseflow samples were collected and analyzed. At least two storm events were collected each quarter. The storm event samples were collected from both stations for the rising, peak, and falling limbs of the hydrograph. Samples were analyzed for the required parameters. The FY16 dates for successful storm event sampling are provided in Table 30, below.

Table 30. Dates of Storm Event Sampling during FY16

Quarter	Date of Sampling
Summer Quarter 2015	8/20/15
	9/10/15
	9/29/15
Fall Quarter 2015	11/9/2015
	12/17/15
Winter Quarter 2015	2/16/2016
	3/14/2016
Spring Quarter 2015	4/4/16
	5/17/16
	6/16/16

Two baseflow samples were substituted in place of storm samples due to a low number of opportunities to sample qualifying events in two of the quarters of the monitoring period. During the first two months of the fall quarter, there were five storms with rain amounts greater than 0.1 inches; one of them was successfully monitored. The total rainfall recorded in October and November was 5.1". Because of the low number of eligible rain events during this quarter, baseflow samples were collected on December 10, 2015. Snow, rain, and wintry mix throughout January, February, and March produced a runoff event at least once per week, on average, which limited sampling opportunities because the 72-hour dry time requirement could not be met. Because of the limited storm runoff sampling opportunities during this quarter, baseflow samples were collected on March 24, 2016.

Continuous water level measurements were taken at the Church Creek instream station and within both the 60" corrugated metal pipe and the 54" reinforced concrete pipe at the Parole Monitoring Station. Event Mean Concentrations (EMCs) for each parameter were calculated for each storm and applied to total stormflow discharges to calculate stormflow pollutant loads for each site. An EMC is a statistical parameter used to represent the flow-weighted average concentration of a given parameter during a storm event (USEPA 2002). Total seasonal loads were calculated by multiplying the average seasonal EMC by the total volume for the season. Annual loads were calculated by summing all seasonal loads.

As in prior years, comparisons to water quality criteria continue to indicate elevated pollutant concentrations in the Church Creek watershed, primarily during wet weather conditions. In particular, copper, zinc, total phosphorous, BOD_5, nitrate-nitrite, and *E. coli* frequently exceeded criteria at both sampling stations. Additionally, the Federal water quality criteria were exceeded for total phosphorous and nitrate-nitrite during baseflow sampling at both the Church Creek and Parole Plaza Stations, with zinc and *E.coli* also being exceeded at the Church Creek station only.

Water quality criteria for the pollutants listed above were more frequently exceeded at the Church Creek monitoring station than at the Parole Plaza station for all contaminants except for copper and zinc. *E. coli* concentrations also remained high at both stations throughout the 2016 monitoring period, exceeding water quality criteria 93 percent of the time at both stations. Note that prior to site stabilization, total suspended solids concentrations had been particularly high due to construction activity at Annapolis Towne Centre. Following stabilization of the site in Fall 2008, the event mean concentrations for total suspended solids have dropped significantly. During the last five reporting years, no wet weather samples exceeded the water quality criterion for total suspended solids at either station.

When compared to the 2015 reporting year, 2016 loading rates decreased for all sampled parameters at the Parole Plaza Station with the exception of BOD_5, copper, and *E. coli*. At the Church Creek Station, 2016 reporting year loading rates decreased for all sampled parameters when compared to the 2015 reporting year except for BOD_5, TKN, *E. coli*, zinc, and lead.

Hardness was much higher in the winter at both stations due to the large amount of salt used to deice local roads. TSS was also highest in the winter at both stations, and lead was highest in winter at Church Creek. The highest loads of total phosphorus, nitrate–nitrite, and copper were recorded in the spring at both stations. The higher seasonal loads of copper, nitrate–nitrite and total phosphorus in spring were likely associated with increases in TSS, greater volumes of water passing through the watershed, and escalations of organic matter.

Further discussion of the monitoring activities at these stations and the resulting data can be found in **Appendix B** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2015-2016*) and the *ChemicalMonitoring* table of the MS4 Geodatabase included in **Appendix A**.

b. Biological Monitoring

i. Benthic macroinvertebrate samples shall be gathered each Spring between the outfall and in-stream stations or other practical locations based on an MDE approved study design; and

ii. The County shall use the EPA Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.

Status:

A total of four 75-meter biological monitoring reaches are positioned along Church Creek between the Annapolis Towne Centre outfall and the Church

Creek in-stream water quality monitoring station. Benthic macroinvertebrate samples were collected from these stations in March 2016, following the MBSS spring index period protocols. One station is located on the Parole Plaza Tributary just below Forest Drive, two stations are located along the Church Creek mainstem, on either side of Solomons Island Road (Maryland State Highway 2), and a fourth site, located just upstream of the confluence with the Parole Plaza Tributary, was added in 2007 to monitor the effects of runoff from the adjacent Annapolis Harbour Center and Festival at Riva shopping centers.

The biological condition at each station was evaluated using the BIBI developed for use in Maryland's Coastal Plain streams. Results of the 2016 sampling period indicate that biological conditions within the Church Creek study area continue to be impaired by urbanization within the surrounding watershed. Since 2006, all stations have consistently been rated as either 'Poor' or 'Very Poor.' The number of EPT taxa, the number of Ephemeroptera and the percent Ephemeroptera were low for all stations.

The physical habitat quality was evaluated using the MBSS Physical Habitat Index (PHI) and EPA's Rapid Bioassessment Protocol (RBP). The stream physical habitat remains degraded or partially degraded throughout the entire study reach and appears to have changed very little from prior years. Overall, PHI and RBP scores indicate that habitat conditions may limit the potential for healthy biological communities. The close proximity to roads and development, along with a scarcity of stable epifaunal substrate, may prohibit the stream from supporting a diverse and healthy macroinvertebrate community. Elevated conductivity and low dissolved oxygen levels indicate the presence of water quality stressors and may be factors limiting the biological conditions within Church Creek. The results of the biological monitoring work are included in **Appendix B** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2015-2016*) and the data required to support this section are also provided in the *MonitoringSite* and *MonitoringDrainageArea* feature classes and the *BiologicalMonitoring* table of the MS4 Geodatabase in the prescribed format (**Appendix A**).

c. <u>Physical Monitoring</u>

i. A geomorphologic stream assessment shall be conducted between the outfall and in-stream monitoring locations or in a reasonable area based on the approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;

ii. A stream habitat assessment shall be conducted using techniques defined by the EPA's RBP, MBSS, or other similar method approved by MDE; and

iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC-RAS, HSPF, SWMM, etc.) in the fourth year of the

permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

Status:

Due to the highly altered conditions of the drainage area and stream channel in the study area, reliable bankfull indicators were often difficult to locate in the field, thus leading to a fair amount of professional judgment used to interpret the data and categorize the stream segments. This means that categorization of some of the stream segments may change dramatically from year to year. Table 31 is a summary of each reach and its classification.

While geomorphic data collected in the Church Creek study area were generally consistent with previous measurements, significant departure from expected values, as derived from Maryland Coastal Plain regional relationships of bankfull channel geometry, were observed for cross sectional area, bankfull width, and bankfull depth dimensions. All dimensions were generally larger in the Church Creek study area, and were more similar to relationships of bankfull channel geometry derived from urban watersheds. This reflects the higher level of imperviousness in the study area, as compared to those levels in the drainage areas used to develop the regional relationship data.

Table 31. Physical Characterization Summary

Reach	2013 Classification	2014 Classification	2015 Classification	2016 Classification	Notes
XS-1	F4	F5/4	F4	F4	Channel degradation, loss of floodplain connectivity, and widening indicate this channel is not stable.
XS-2	G5c	G4c	G4	G4c	Channel is widening and scouring, unstable with increasing entrenchment ratio and low sinuosity.
XS-3	G4c	G4c	G4/3c	G4c	This section was stabilized, with modification to the channel dimensions.
XS-4	C5	C5	C5	E5/4	Channel affected by restoration just downstream. Entrenchment ratio increased, width-depth ratio decreased.
XS-5	F4/3	F3	F4/3	F4	Slight entrenchment, moderate width/depth ratio, and low sinuosity.

Additional information and data pertinent to the water quality, biological, physical and habitat assessments of Church Creek are included in the full report included in **Appendix B** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2015-2016*).

d. Annual Data Submittal

The County shall describe in detail its monitoring activities for the previous year and include the following:

i. EMCs submitted on MDE's long-term monitoring database as specified in Part V below;
ii. Chemical, biological, and physical monitoring results and a combined analysis for the approved monitoring locations; and
iii. Any requests and accompanying justifications for proposed modifications to the monitoring program.

Status:

The required chemical monitoring results are found in the *ChemicalMonitoring* table of the MS4 Geodatabase in the prescribed format (**Appendix A**). Also included in **Appendix B** is the report entitled *Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2015-2016,* which provides greater detail on the work performed in this watershed.

During the 2016 reporting year, the County continued the monitoring program at the Church Creek and Picture Spring Branch Stations. The County worked with the South River Federation to implement the Annapolis Harbor Center stream restoration project on Church Creek, upstream of the existing Church Creek water chemistry monitoring station. This work began in late January 2016, and consisted of 1,500 linear feet of stream restoration and implementation of step-pool storm conveyance, riffle weirs, and grade control structures to improve habitat and increase floodplain connectivity. The County's ongoing, long-term monitoring will continue at this same location and will be well-positioned to assess the effect of the stream restoration project. Biological and physical monitoring will also continue in the Church Creek watershed in 2017.

2. Stormwater Management Assessment

The County shall continue monitoring the Picture Spring Branch in the Severn River watershed, or select and submit for MDE's approval a new watershed restoration project for determining the effectiveness of stormwater management practices for stream channel protection. Physical stream monitoring protocols shall include:

i. An annual stream profile and survey of permanently monumented cross-sections in Picture Spring Branch to evaluate channel stability;

ii. A comparison of the annual stream profile and survey of the permanently monumented cross-sections with baseline conditions for assessing areas of aggradation and degradation; and

iii. A hydrologic and/or hydraulic model shall be used (e.g., TR-20, HEC-2, HEC- RAS, HSPF, SWMM, etc.) in the fourth year of the permit to analyze the effects of rainfall; discharge rates; stage; and, if necessary, continuous flow on channel geometry.

Status:

Physical condition and habitat monitoring for Picture Spring Branch, in the vicinity of the West County Library site, began in 2003 and is conducted annually. Five permanent cross-sections were established throughout the study area to evaluate channel stability over time (see full report in **Appendix C** for a location map). Three cross-sections are located on the North Tributary, as well as one downstream of Maryland State Highway 170, and one on the South Tributary. It should be noted that the South Tributary does not receive significant stormwater runoff from the West County Library site. Most of the runoff from this site drains to the North Tributary.

In 2016, these cross sections were re-measured and longitudinal profile surveys were conducted along both the North Tributary (totaling 1,968 linear feet) and South Tributary (totaling 356 linear feet). Channel dimensions along the North Tributary have not changed substantially from baseline conditions, although some aggradation has occurred in the past three years. Channel dimensions appear relatively constant for three out of the five cross sections in 2016, compared to baseline conditions. Only very minor changes were observed from baseline conditions in cross section XS-2, deepening slightly on the right side of the channel in this over widened reach. On the other hand, cross sections XS-1 and XS-4 have experienced a 53.1 percent and 26.3% percent increase over baseline conditions, respectively. These are the only two sections not located in an engineered or partially-armored channel. Although cross section XS-4 has filled in slightly between 2013 and 2016, notable stream bed erosion is apparent. Cross sections XS-3 and XS-5 decreased in cross-section areas between the baseline assessment and the 2016 survey by 10.8 percent and 6.5 percent, respectively.

Overall, it appears that the BMPs installed as part of the development of the West County Library site have been effective in reducing the geophysical impacts of stormwater runoff. As noted previously, the South Tributary does not receive significant amounts of drainage from the West County Library site.

In March 2016, a benthic macroinvertebrate biological assessment was conducted at three previously established 75-meter reaches within the study area. From 2006 to 2008, biological condition in these reaches appeared to remain steady with ratings of ‘Fair’ to ‘Poor’; however, during 2009 scores

declined at all three sites with two of the sites rating 'Poor' and one rating 'Very Poor'. Between 2010 and 2015, BIBI scores were somewhat variable, fluctuating between the 'Poor' and 'Fair' categories. Each site sampled in 2016 received ratings of 'Fair' with each location exhibiting improvement in benthic biological condition from the previous two years of monitoring. Overall, taxa diversity was increased in 2016 at all three sites. The full biological and geomorphological conditions report is included in **Appendix C** *(Biological and Geomorphological Conditions in the Picture Spring Branch Subwatershed: 2015-2016).*

G. Program Funding

1. Annually, a fiscal analysis of the capital, operation, and maintenance expenditures necessary to comply with all conditions of this permit shall be submitted as required in Part IV.

Status:

The 2016 Annual Report covers the reporting period of July 2015 through June 2016, and corresponds to the County's 2016 Fiscal Year (FY2016). The summary of the funding is shown in this section (Table 32). The funding period reflects the third year of the revenue change from general obligation bonds and County pay-go funding to the dedicated special revenue from the WPRP. The WPRP Fund was implemented July 1, 2013 in response to State legislated requirements found in HB987. This Fund will provide the primary fiscal support for all eligible components of the NPDES MS4 Permit program. Those permit-requirement elements not eligible for WPRP funding will continue to be supported by the County's annual budget process (general revenue funds).

Table 32. Fiscal Analysis

Permit Condition	Fiscal Year 2016
Legal Authority	$79,300
Source ID	$2,566,836
SW Management	$1,205,221
Erosion and Sediment Control	$51,821
Illicit Discharge Detection and Elimination	$121,706
Trash and Litter Control	$800,179
Property Management	$7,533,600
Inlet Cleaning	$474,499
Street Sweeping	$305,065
Other Road Maintenance	$ 0
Public Education	$437,472
Watershed Assessment	$629,957
Watershed Restoration	$73,723,880
Chemical Monitoring Assessment	$189,472

Table 32. Fiscal Analysis

Permit Condition	Fiscal Year 2016
Biological Monitoring Assessment	$240,740
Physical Stream Assessment	$142,433
Stormwater Design Manual Monitoring	$0
TMDL Assessment	$751,839
Annual Report Preparation	$111,501
Total Annual Cost for NPDES MS4 Program	**$89,365,521**

During the reporting period, funding for NPDES MS4 Permit compliance was addressed through the County CIP and operating budgets. CIP funding for the current County fiscal year and the next five fiscal years is allocated to the "Stormwater Runoff Controls," "Water Quality Improvements" and "Watershed Protection and Restoration" CIP project classes. Specific line items funded through the CIP include stormwater permit compliance program, storm drain rehabilitation, closed storm drain repairs and replacement, stormwater infrastructure inspection and maintenance, stormwater facility retrofits, outfall repairs, and stream and ecological restoration projects. The budgets for the "Stormwater Runoff Controls" and "Water Quality Improvements" have been incorporated into the Watershed Protection and Restoration CIP and operating budget items in future years. The Watershed Protection and Restoration CIP budgets for FY2017 through FY2022 total $61,806,500.

The projected CIP budget for FY2017 through FY2022 has decreased from prior reports. In order to meet the terms of the impervious surface reduction plan required by the NPDES MS4 permit, the budgets for restoration projects were phased in over the terms of the permit. These costs were submitted to MDE in the Financial Assurance Plan, which was approved by the County Executive on July 11, 2016, and approved by MDE on October 17, 2016. This approval from MDE indicates that the County has sufficient funding to meet the terms of the impervious surface reduction plan required by the NPDES MS4 permit.

The County's Financial Assurance Plan (FAP; **Appendix H**) includes revenues and expenses as of the end of FY2015. These figures will differ from the totals reported in the NPDES MS4 Annual Report for FY2016. Actual cost totals for projects completed in previous fiscal years are updated to reflect any changes that may have occurred in FY2016, including receiving additional invoices and overhead associated with processing those invoices, liquidation of remaining purchase order balances, and repairs or other miscellaneous costs that were incurred after completion of the restoration. Additional costs may be incurred throughout the performance period of the construction contract. Costs for projects that were not completed as of the end of FY2015 used budgetary estimates, which will be revised periodically as the projects progress.

The Anne Arundel County operating budget for FY2016 also provides permit compliance support through funding of personnel associated with permit compliance. Such support is derived primarily from the County's OPZ, I&P, SCD, DPW, Office of Law, and the County Health Department. Each of these agencies has responsibility or provides support for certain permit requirements and all must work collaboratively to achieve County compliance with permit terms. Additional funding for permit compliance has been included in the operating budgets for the WPRP Fund. Specific line items funded through the operating budget include chemical, biological, and physical assessments, public education, grants, and restoration projects.

With the implementation of the WPRP Fund, a dedicated revenue source has been created. These revenues for FY2016 totaled $21,058,000. A total of 212,980 properties in Anne Arundel County were assessed the fee in FY2016, which was the first year of the full implementation of the fee after the phase-in periods. Estimated projections of revenue for FY2017 are $21,860,400. These revenues fund the operating budget directly, and the CIP budget indirectly through debt repayment.

The complete FY2016 approved County budget is available for review and download at www.aacounty.org/Budget/index.cfm.

2. Adequate program funding to comply with all conditions of this permit shall be maintained.

Status:

Table 28 (above, **Part IV.G.1**) denotes the distribution of funding from the County's FY2016 Capital and Operating Budgets. Additional information is included in the *FiscalAnalyses* table of the MS4 Geodatabase (**Appendix A**).

With the funding provided by the WPRP, increased staffing began in FY14. Delays due to proposed legislation changes slowed the implementation of the program initially. At the end of FY2016, staffing levels were at 80%. Additional hiring will be completed in FY17, and we anticipate being fully staffed by the middle of the fiscal year. These staffing levels will improve the commitment of the County in achieving MS4 permit compliance and maintaining adequate funding to meet permit obligations.

H. References

Anne Arundel County DPW. 2015. Establishing Baseline – Impervious Area Assessment; Impervious Surfaces Treated to the MEP. Submitted to MDE as an addendum to the 2014 Annual Report. May 26, 2015.

Maryland Department of the Environment (MDE). 1997. Dry Weather Flow and Illicit Discharges in Maryland Storm Drain Systems.

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Maryland Department of the Environment (MDE). 2014. Accounting For Stormwater Wasteload Allocations and Impervious Acres Treated: Guidance for National Pollutant Discharge Elimination System Stormwater Permits. Baltimore, MD.

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USEPA. United States Environmental Protection Agency. 2002. *Urban Stormwater BMP Performance Monitoring: A Guidance Manual for Meeting the National Stormwater BMP Database Requirements*. EPA-821-B-02-001.