NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Municipal Separate Storm Sewer System Discharge Permit

Permit Number MD0068306

Effective Date: February 12, 2014

SUBMITTED: FEBRUARY 11, 2020

FISCAL YEAR 2019

ANNUAL REPORT

Department of Public Works

2662 Riva Road

Annapolis, MD 21401

ANNE ARUNDEL COUNTY MARYLAND

Fiscal Year 2019 Annual Report for Anne Arundel County Storm Water National Pollutant Discharge Elimination System

Permit Number MD0068306

Submitted to:

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

February 2020

Submitted by:
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VERSAR
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(*Provided on the accompanying DVD)*

I. INTRODUCTION

This Annual Report describes compliance activities for the County and State Fiscal Year (FY) 2019 (July 1, 2018 – June 30, 2019), in association with Anne Arundel County's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Discharge Permit (Permit Number: 11-DP-3316, MD0068306). The current permit was issued on February 12, 2014 and, in February 2019, was administratively continued until the next permit is issued. This is the fifth Annual Report prepared under this permit.

The Annual Report describes the components of the stormwater management program and associated implementation status and 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 May 2017 document entitled *National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4), Geodatabase Design and User's Guide, Version 1.2* (MDE 2017).

II. 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 the following features:

- Storm Drain Infrastructure and Impervious Area Inventory;
- Erosion and Sediment Control Program;
- Stormwater Management Program;
- Illicit Discharge 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 believes the above programs address the major water quality interests within County watersheds. Monitoring efforts have shown that 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 described under the appropriate permit condition sections 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 FY2019 (FY19). The program coordinators during this reporting year are listed below:

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
410-222-0549
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) 222-0551
pwmark02@aacounty.org

Figure 1 shows the County's organizational chart for FY19. Information on specific positions and personnel responsible for permit compliance and stormwater program tasks follows.

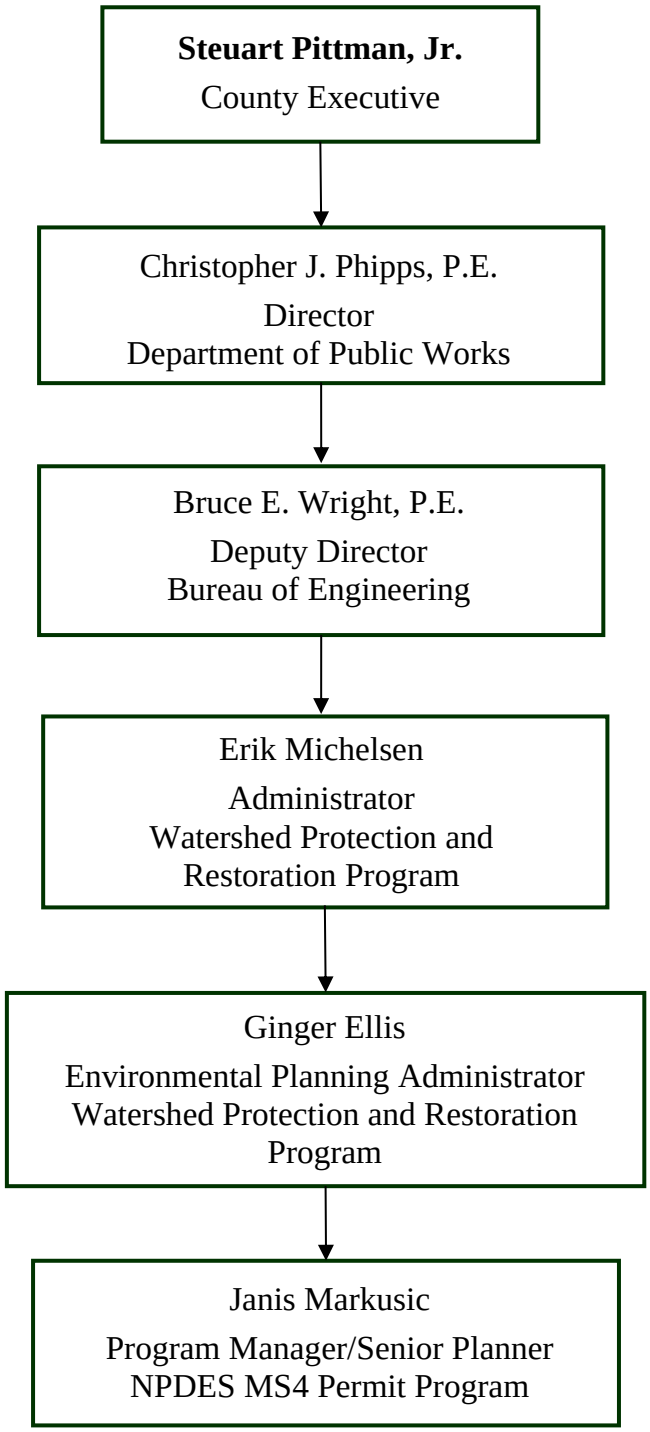

Figure 1. Organization Chart for NPDES MS4 Permit Administration (7/1/2018 through 6/30/2019)

Additional County staff responsible for components of the NPDES MS4 Permit requirements during FY19 include those listed below.

Department of Public Works (DPW)

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

- Karen Jennings, Senior Engineer, Restoration Implementation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

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

- Nasrin Dahlgren, Project Manager, Restoration Implementation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Gerry Inglesby, Project Manager, Restoration Implementation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Larry Mathena, Project Manager, Restoration Implementation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Joe Ports, Project Manager, Restoration Implementation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Jeff Ratteree, Project Manager, Restoration Implementation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Gregory LeBlanc, Project Manager, Restoration Implementation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Manages design and construction of watershed restoration projects.

- Raghu Badami, Engineer Manager, Modeling and Analysis (7/2018 – 9/2018)
- Brenda Morgan, Engineer Manager, Modeling and Analysis (acting 9/2018; effective 2/2019)
  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.

- Luc Claessens, Ph.D., Senior Engineer, TMDL Support (effective 11/2018)
  Bureau of Engineering, Watershed Protection and Restoration Program
  Administers the TMDL Support 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, TMDL Support
  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, TMDL Support
  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.

- Brenda Morgan, Program Manager, Stormwater Fee (7/2018 – 9/2018)
- Sally Szydlowski, Program Manager, Stormwater Fee (acting 9/2018; Effective 9/2019)
  Bureau of Engineering, Watershed Protection and Restoration Program
  Administers the SW Remediation Fee Support Unit, oversees fee assessment, appeals and credit processing and tracking. Assists with Historic BMP record database update and input into MS4 Geodatabase.

- Sally Szydlowski, Program Specialist II, Stormwater Fee
  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, Stormwater Fee
  Bureau of Engineering, Watershed Protection and Restoration Program
  Assists the Stormwater Remediation Fee Unit with researching and tracking fee assessment, appeals and credits.

- Chris Victoria, Water Quality Compliance Specialist, Ecological Assessment and Evaluation
  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.

- Douglas Griffith, Planner II, Ecological Assessment and Evaluation
  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 IV. F of this permit. Assists Program Manager with implementation of the Illicit Discharge Detection and Elimination (IDDE) Program as identified in Part IV.D.3 of this permit, and assists in the development of TMDL Restoration Plans and plan implementation.

- Bryan Perry, Program Specialist II, Ecological Assessment and Evaluation
  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.

- Rachel Denby, Program Specialist I, Ecological Assessment and Evaluation
  Bureau of Engineering, Watershed Protection and Restoration Program
  Provides technical support for surface water, stormwater, and ecological monitoring projects.

- Robb Fish, Public Education and Outreach Specialist
  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 regarding the development of watershed assessments and restoration plans, and TMDL compliance, is achieved and public input is solicited and incorporated. Administers the public outreach and support to all WPRP units.

- Katherine Hart, Grants Administrator
  Bureau of Engineering, Watershed Protection and Restoration Program
  Identifies and secures grant funding for watershed restoration projects and projects that further the mission of the Watershed Protection and Restoration Program.

- Mike Hrubiak, Financial Services 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.

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

- 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.

- Michele Polino, GIS Specialist, Watershed Support
  Bureau of Engineering, Technical Engineering
  Provides Quality Control services for GIS data collection for BMPs created through the grading permit process.

- Richard Beier, GIS Specialist, Watershed Support
  Bureau of Engineering, Technical Engineering
  Performs BMP GIS data capture for newly constructed BMPs created through the grading permit process. Assists with updates to GIS layers for Closed Storm Drain system piping and structures.

- Steve Britschge, Program Manager
  Bureau of Engineering, Technical Engineering
  Provides direct oversight of the Closed Storm Drain and BMP GIS layers maintenance and publishing processes.

- Darryl Hockstra, Engineer Administrator
  Bureau of Highways, Infrastructure Management Division (IMD)
  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.

- 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.

- 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, Senior Engineer
  Bureau of Highways, Infrastructure Management Division
  Administers the Stormwater Management Section that is responsible for the inspection, repair and maintenance of IMD maintained (public) stormwater management practices

- 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.

- 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

- Rick Davis, Senior Engineer
  Bureau of Highways, Infrastructure Management Division
  Administers the Culvert & Storm Drain Section that is responsible for the inspection, repair and maintenance of publicly owned storm drain/culvert systems.

- Bob Murphy, 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 (7/2018 – 5/2019)
  Bureau of Highways, Infrastructure Management Division
  Investigates storm drainage complaints and provides construction inspection services for drainage projects in the northern district

- Daniel Verrette, 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.

- Clark Rosendale, Contractual Inspector
  Bureau of Highways, Infrastructure Management Division
  Video inspection of culverts and closed storm drain systems.

- Alex Baquie, 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 seven 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; directs the County's winter weather de-icing program, conducts roadside litter

clean-up activities; and provides support for volunteer watershed and stream clean-up activities.

- David Watts, Utility Administrator, Infrastructure
  Bureau of Utility Operations
  Responsible for SWPPP development/implementation and ensuring compliance with the MDE General Permit No 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity) for the Bureau of Utility Operations Central Utility Operations Center.

- Christian Tait, Regulatory Compliance Manager, Wastewater Operations
  Bureau of Utility Operations
  Responsible for SWPPP development/implementation and ensuring compliance with the MDE General Permit No. 12-SW (General Discharge Permit for Stormwater Associated with Industrial Activity) for Bureau of Utility Operations Water Reclamation Facilities. Oversees Utility Operations compliance with individual NPDES point source permits for County Water Reclamation Facilities.

- Rhody Holthaus, Deputy 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.

- Mark Morris, 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.

<u>Department of Inspections & Permits (I&P)</u>

- Eva Kerchner, Assistant Director (7/2018 – 5/2019)
- Raghu Badami, P.E., Acting Assistant Director (effective 5/2019)
  Oversees implementation 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 Igbinovia, P.E., Acting Engineering Manager, Engineering Division (2/2018 – 9/2018)
- Raghu Badami, P.E. Engineer Manager, Engineering Division (9/2018 – 6/2019)
- Sarah Fowler, P.E. Acting Engineer Manager, Engineering Division (effective 6/2019)
  Oversees the review of stormwater management on development projects and ensures that the requirement for all proposed new stormwater management plans 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.

- John Igbinovia, P.E., Code Enforcement Administrator
  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.

- Eugene Patterson, Code Enforcement Administrator – Critical Area Program
  Supervise the County's Code Compliance Division, including investigation of non-permitted and environmental complaints, forestry program management, and building site review processes to ensure compliance with County construction code, and federal, State and local laws. Tracks standard grading plans required when disturbance is less than 5000 sq.

- Stephen Trumpler, Stormwater Inspection Supervisor, Watershed Program
  Manages stormwater inspection staff responsible for inspecting private stormwater BMPs, construction inspection of water quality restoration projects (County and private), and supervises illicit discharge enforcement.

- Stormwater Inspection Staff
  Seven (7) inspectors are dedicated to the stormwater management program. The FY19 inspection staff is listed below. Although several turnovers occurred in FY18, the County was able to fill those vacancies and the stormwater inspection group is fully staffed.

Zach Bradley	Robert Branch
Mary Ford	Dennis Gills
Daniel Hall	Andrew Hein
Veronica Robbins	

<u>Anne Arundel Soil Conservation District (SCD)</u>

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

<u>Anne Arundel Department of Health</u>

- 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.

- Sharon Pawlowski, Program Manager
  Bureau of Environmental Health
  Provides support and response for IDDE program compliance with respect to food service facilities within the County, ensuring good housekeeping for disposal of waste cooking oil/grease and trash dumpsters.

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 2009) as well as the 2007 Stormwater Management Act. Over the past decade, and as reported in previous Annual Reports, the County Code was revised to incorporate these stormwater management requirements and subsequently renumbered. The entire County Code can be found online through the County website at http://www.aacounty.org/our-county/county-code/, under the link for the County Code. There were no updates or revisions to County Code, affecting the County's legal authority pertaining to this permit, during the reporting year.

The County Stormwater Management Practices and Procedures Manual (Manual) was revised May 1, 2017. The revised Manual became effective October 30, 2017 and a copy of MDE's approval letter was submitted with the FY18 NPDES MS4 Annual Report (Annual Report). There were no updates to the Manual in FY19.

MDE conducted a triennial review of the County stormwater management program in 2015, noting that the program performance was acceptable. The next program review is anticipated in 2020.

On March 19, 2019 MDE granted Anne Arundel County's request for continued delegation of erosion and sediment control authority. This delegation of authority is effective through June 30, 2021. A copy of MDE's letter granting continued delegation is found in **Appendix B** of this report. The next Delegation Review is anticipated in FY22.

As reported in previous Annual Reports, Anne Arundel County established a Watershed Protection and Restoration Program (Program) in 2013, as mandated by Maryland Environmental Code Ann §4-202.1, 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 Watershed Implementation Plans (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 FY19, the County Council approved legislation (Bill 40-19) to provide for an increase in the stormwater remediation fee and to repeal certain obsolete provisions of Article 13 Title 7. The legislation became effective on July 1, 2019. A copy of the approved legislation is found in **Appendix B** of this report. The updated County Code can be found at the URL referenced above.

Following the State of Maryland adoption of Water Quality Trading Regulations (effective July 16, 2018), the County requested a permit modification, per Maryland Code (COMAR 26.08.04.10) to allow for the inclusion of nutrient trading as a means to achieve compliance with the restoration requirements found in Part IV.E.2.a of this NPDES MS4 Permit. Public notice of MDEs tentative determination to modify the County's permit appeared in the Maryland Register on August 31 and September 14, 2018 and in the Capital/Gazette Newspapers on September 5 and 9, 2018. MDE conducted a public hearing regarding the proposed permit modifications on October 18, 2018. Following the end of the public comment period (November 29, 2018), MDE issued a final determination to modify the County's NPDES MS4 Permit. Public notice of this final determination appeared in the December 7, 2018 Maryland Register and also in the Capital/Gazette Newspapers on December 12 and 19, 2018. Information regarding this permit modification is found on the MDE webpage: https://mde.maryland.gov/programs/water/stormwatermanagementprogram/pages/storm_gen_permit.aspx The County's permit modification became effective on December 7, 2018. The permit expiration date remains unchanged (February 11, 2019).

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 systems: all infrastructure, major outfalls, inlets, and associated drainage areas delineated;***

Status:

In 2008, Anne Arundel County completed a County-wide inventory of storm drain inlets, manholes, outfalls, culverts, and pipes for all County watersheds. This inventory is continuously updated and the information is incorporated into County storm drain maps and the County GIS.

As of June 2019, there were 38,007 storm drain inlets, 985 miles of storm drain pipes, and 6,188 storm drain outfalls, based on the County's infrastructure inventory. The major storm drain outfalls, a subset of all storm drain outfalls (see definition below), were then identified in the GIS by querying for storm drain structures with no hydraulic connection to any other downstream storm drain structure and based on outfall diameter. Next, the upstream contributing areas of these major storm drain outfalls were delineated using GIS. According to 40 CFR 122.26, a major municipal separate storm drain outfall is defined as a single outfall pipe with an internal diameter of 36 inches

or greater or its equivalent (discharge from other than circular pipe which is associated with a 50-acre or greater drainage area); or a single outfall pipe with an internal diameter of 12 inches or greater or its equivalent (discharge from other than a circular pipe associated with a 2-acre or greater drainage area) that discharges storm water from industrially zoned lands. Of the 6,188 storm drain outfalls in the FY19 County inventory, 2,311 are categorized as major outfalls.

Updates to the MS4 Geodatabase *Outfall* feature class in FY19 include the removal of five previously submitted major outfall records (Table 1) and the addition of 49 new major outfalls. For reporting purposes, an additional 18 minor outfalls are included with the major outfalls in the MS4 Geodatabase *Outfall* feature class because these minor outfalls were screened as part of the Illicit Discharge Detection and Elimination (IDDE) Program (Part IV.D.3); thus, the total number of outfalls included in this feature class is 2,329 for the current reporting year.

The major storm drain outfalls and the corresponding drainage area are included in the accompanying MS4 Geodatabase (feature classes *Outfall* and *OutfallDrainageArea*). An additional geodatabase is included in **Appendix A** of this report that contains the County's complete storm drain system, including major and minor outfalls, inlets, pipes, and other storm drain infrastructure.

Table 1. Changes to existing outfall database records in FY19

MDE_OUTFALL_ID	LOCAL_OUTFALL_ID	COMMENT
AA16OUT001999*	W16O010	Deleted. Correction made to storm drain inventory.
AA16OUT000699*	T15O032	Deleted. Correction made to storm drain inventory.
AA16OUT001493	Q06O001	Deleted. Correction made to storm drain inventory.
AA16OUT001522*	P09O007	Deleted. Correction made to storm drain inventory.
AA16OUT002007	T16O014	Deleted. Structure is an inlet.

*Outfalls also removed from the Industrial & Commercial Sources Geodatabase in **Appendix A.**

The County will continue to update the storm drain inventory and incorporate the information in the County storm drain maps and the County GIS.

2. Industrial and commercial sources: 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. Compliance with this permit requirement includes the annual submittal, in GIS format with associated tables, of the "…industrial and commercial land uses and sites that the County has determined have the potential to contribute significant pollutants." A methodology for determining these land uses and the associated outfalls is described below. These outfalls and land use data are included in Industrial

& Commercial Sources Geodatabase in **Appendix A.** The outfalls are a subset of the major outfalls found in the *Outfall* feature class of the MS4 Geodatabase of this report.

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. This memorandum lists specific objections to draft language proposed for the 4th generation NPDES MS4 Permits. Specific to the development of the above methodology, is a paragraph on Page 4 of this memorandum that addresses Industrial/Commercial Monitoring as a component of the MS4 permit. In this paragraph, EPA objects to the permit on the basis that it does not require the permittee to maintain an inventory of industrial and commercial sites having the potential to contribute pollutants to the storm drain system. EPA proposes the language (above) 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 follows:

> 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 predicated on intersecting the following GIS layers and data:

- Industrial and commercial polygons from Anne Arundel County 2017 Land Cover; and
- County closed storm drain system major outfall drainage areas.

Specifically, if a drainage area to an outfall contained commercial and/or industrial land uses, that outfall and its drainage area were included in the Industrial & Commercial Sources Geodatabase in **Appendix A**.

This was the first year that the County-developed 2017 Land Cover data set was available for this analysis. For that reason, along with evaluating the land use within the drainage areas of major

outfalls constructed or identified in FY19, all major outfalls were re-evaluated using 2017 County Land Cover GIS coverage. Four major outfalls from previous reporting years and 36 major outfalls added during FY19 were identified where more than 5% of the contributing drainage area fell under commercial and/or industrial land uses. Three outfalls that were removed from the County's MS4 Geodatabase *Outfalls* feature class were also removed from the Industrial & Commercial Sources Geodatabase (Table 1). The final updated data set, with a total of 1,269 commercial and industrial outfalls, is included in the Industrial & Commercial Sources Geodatabase in **Appendix A**.

3. Urban best management practices (BMPs): 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 FY19 NPDES MS4 Annual Report submittal (**Appendix A**).

This reporting year the County is submitting 15,007 BMP POIs (*BMPPOI* feature class); as noted in the comments of this feature class, 118 of these POIs solely represent restoration BMPs and therefore have no associated record in the BMP table. The BMP table includes records for 25,615 BMPs, including 756 BMP records added in FY19 and 191 BMPs with a status of "Removed." There are 14,713 drainage areas delineated for these BMPs (*BMPDrainageArea*), with multiple BMPs represented by a common drainage area to a single POI.

The County completed its comprehensive Urban BMP Database Historic Records Review and Update project in July 2018. For additional details on that project please refer to the FY15 Annual Report, which discussed the project's scope of work, and the FY18 Annual Report, which provided a summary of the project outcomes. Since the completion of that project, the County has continued to collect BMP data from newly completed grading permits. These data are entered from as-built plans into a database structure and geospatial framework developed to manage the County's BMP inventory. Quality assurance and quality control procedures (QA/QC) are performed, providing review and verification of BMP information, including but not limited to: BMP type, location, drainage area, water quality treatment, built date, and any modifications to a BMP resulting from subsequent land development or other changes in site condition. Additionally, these data are also reviewed in context with restoration BMPs to ensure that required adjustments to BMP POIs and drainage areas are made in cases where more than one BMP may provide stormwater management for a given area.

The County continues to work on the challenge of data formatting for loading into the MS4 Geodatabase. Particularly for older BMPs, there are mandatory data fields that will never be populated because either the data is missing from the plan drawings or the design of the BMP pre-dated the type of information required. For example, sometimes certain practices are identified on a set of as-built drawings as contributing to the stormwater management required for a site, but these practices no longer fit into a current suite of BMP practices; or BMP practices are only vaguely indicated on the plans and lack clear drainage areas. The County understands that certain

data are mandatory for crediting purposes, but the County is also required to perform triennial inspections and report on all BMPs regardless of their contribution to TMDL or managed impervious surface crediting. In our efforts to report on all BMPs and to account for these data formatting issues, this year the County continued its practice of incorporating error codes into the MS4 Geodatabase and the reader is referred to the ReadMe document in **Appendix A** for explanations of null and/or blank values and for explanation of error codes. For example, the "99999" error code represents a missing descriptive value (e.g., location, permit number). Dates coded as "1/1/1899" are used for missing or inapplicable values. For example, in the *BMP* table, projects that are proposed but not complete will not have the mandatory built-date and are coded "1/1/1899".

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:

During FY19 the County continued efforts to maintain an accurate impervious surface dataset. In the fall of 2017 the County initiated a contract with Sanborn Map Company, Inc. to update its impervious surface and land cover datasets utilizing imagery captured in early 2017 for the state of Maryland's High-Resolution Aerial Ortho-photography. This project was completed in January 2019. This FY19 report includes an analysis of the County's 2017 impervious surface and land cover datasets.

Non-Jurisdictional Land within the County

For NPDES MS4 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. Land areas that are outside the stormwater authority of Anne Arundel County include the City of Annapolis, Baltimore Washington International Thurgood Marshall Airport (BWI), Fort George G. Meade (FGGM), the Patuxent Research Refuge, State Highway and Federal Highway roads, and State and Federal facilities. Total land area and impervious cover by land ownership/jurisdiction is shown in Table 2.

Controlled Impervious Areas

The County submitted to MDE its impervious surface area assessment in 2015 (Establishing Baseline – Impervious Area Assessment; Anne Arundel County, May 2015). After a major effort undertaken by the County to review historical records and improve the quality of its urban BMP inventory and dataset, the County included in its FY18 Annual Report revisions to this assessment and the previously established restoration baseline (Revision of Anne Arundel County's 2014 Baseline & Impervious Surfaces Treated to the MEP, February 2019). The revised assessment identified 5,970 acres of impervious area, from which runoff is controlled by urban BMPs that were installed prior to February 2014. The County continues to track the control of stormwater runoff from impervious surfaces through the maintenance and update of its urban BMP inventory

and its inventory of restoration projects, provided in **Appendix A**, within the following feature classes of the FY19 MS4 Geodatabase:

BMPPOI	*RestBMP*	*AltBMPPoint*
BMPDrainage Area	*AltBMPLine*	*AltBMPPoly*

Analysis of Land Cover over Time

When the County analyzed the 2017 land cover dataset for the FY19 Annual Report, it recognized that comparisons to previously reported data were complicated by various factors. In the past decade the County has produced impervious and land cover datasets in 2011, 2014 and 2017, each time relying on imagery as the primary source data. With each successive iteration, the resolution of the aerial ortho-photography had improved due to the advancement of image capture technology and post-processing tools. In addition, the land classification schema was improved, with new categories being added ('Mining'), and other categories being broken down into more refined categories, with the 'Woods' category replaced by three categories, 'Woods – Coniferous', 'Woods – Deciduous', and 'Woods – Mixed'. In addition, in 2014, the County felt that the advances in various data development tools merited a Countywide update of the impervious surface and land cover datasets, rather than relying on change detection to identify selected areas for update.

To provide greater consistency with other sections of the MS4 Annual Report, the County watershed boundaries were chosen as the framing dataset for the land use and impervious cover analyses. This allowed for greater consistency with the detailed and comprehensive watershed assessments required under this Permit (**Part IV.E.1**). As the watershed boundaries are a slightly different frame than what was used for the development of the land cover dataset, the result was a few areas in this analysis where small slivers of land along the outer edges of the County watershed boundaries lacked a land use classification. Because these slivers amounted to an insignificant amount of acreage (less than 1% of the County's total land area), they were lumped into a single category in past years.

Thanks to the increase in WPRP staff capacity, the County was able to revisit previous years' data, classify all unclassified land using aerial imagery, and run a summary analysis Table 3. While this summary analysis cannot account for improvements in the imagery data or changes to the classification schema, it does allow for a better comparison of data across years.

Analysis of Impervious Surface over Time

While the impervious surface and land cover datasets are developed in tandem, and some of the changes in the impervious surface data over time arise for similar reasons (e.g., improvements in technology), there are other sources of change to impervious data that are unique.

The development of an impervious surface dataset is highly automated, but also involves a significant level of best professional judgement. Impervious surface data development attempts to define specific edges of features through interpretation of a 2-dimensional image of a 3-

dimensional surface, rather than the more generalized characterization performed during land cover data development. Common issues that impact ortho-photography, such as shadows and camera tilt, are corrected during image post-processing. This improves the final imagery product, but cannot eliminate all distortions from the final products. During the impervious data creation care is taken to minimize the impacts of shadows on ortho-photo interpretation, however shadows may be present in the imagery for a particular area one year that leads to an under or overestimation of the footprints of houses, that are then corrected in a future year. Other areas may be incorrectly identified as impervious where there was a seasonal die off of grass and vegetation that leaves a large area of soil bare, which, when very dry had a reflectance similar to concrete. These sorts of errors are often discovered in a future year due to the re-emergence of vegetation that allows for correct assessment of the surface type in the imagery.

As shown in Table 3, the initial analysis of the impervious surface datasets shows an increase of 290 acres of impervious surface in the County between 2014 and 2017. The County recognizes that this is likely not an accurate accounting of growth and development throughout the County for that time period. Subsequent comparison of the 2014 and 2017 datasets determined there were approximately:

(1) 40,780 acres in common between the 2014 and 2017 datasets;
(2) 1,531 acres that were in the 2014 dataset, but not included in the 2017 dataset; and
(3) 1,821 acres that were not present in the 2014 dataset, but were added to the 2017 dataset.

The challenge is to identify which changes to impervious surface made between 2014 and 2017 were corrections removing impervious that never really existed, minor adjustments to more accurately define an impervious feature, and true additions of impervious surface. The County intends to develop a procedure for evaluating changes between the two datasets, relying on other available data, including grading permit locations and subdivision activity. Through such an evaluation process, the County hopes to more accurately account for the true increase in impervious surface between 2014 and 2017, and establish a method that would be applicable to future impervious datasets, as well.

Table 2. Land Cover and Impervious Distribution by Land Ownership/Jurisdiction (Source: Maryland's 2017 High-Resolution Aerial Ortho-photography)

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	1,077	0	69	111	0	914	0	47	75	0%	85%	0%	69%	68%
Commercial	904	824	1,741	2,062	9,002	642	430	999	1,209	5,837	71%	52%	57%	59%	65%
Industrial	65	135	261	346	3,284	34	80	148	151	2,240	52%	59%	57%	44%	68%
Transportation	146	3,980	593	3,722	1,389	118	3,012	341	2,593	410	81%	76%	57%	70%	30%
Pasture/Hay	0	113	298	304	7,822	0	2	6	15	114	0%	2%	2%	5%	1%
Row Crops	0	62	507	231	10,304	0	2	1	11	107	0%	3%	0%	5%	1%
Mining	0	0	0	85	625	0	0	0	10	94	0%	0%	0%	11%	15%
Residential 1/8-acre	710	84	673	2,054	12,070	329	12	220	1,144	4,260	46%	14%	33%	56%	35%
Residential 1/4-acre	1,839	126	119	3,488	18,811	712	12	30	2,038	4,798	39%	9%	25%	58%	26%
Residential 1/2-acre	48	42	44	1,319	10,723	10	5	10	675	2,084	21%	12%	24%	51%	19%
Residential 1-acre	47	75	9	921	11,379	8	7	0	374	1,620	17%	0%	2%	41%	14%
Residential 2-acre	19	176	18	997	26,274	2	17	1	324	2,813	10%	9%	4%	32%	11%
Open Space	233	2,477	2,546	2,978	7,594	14	83	82	176	351	6%	3%	3%	6%	5%
Water	26	207	209	476	1,892	1	0	0	1	19	2%	0%	0%	0%	1%
Open Wetland	23	570	149	767	2,337	0	1	0	2	6	0%	0%	0%	0%	0%
Forested Wetland	142	594	561	1,554	5,651	0	1	1	2	7	0%	0%	0%	0%	0%
Woods-Coniferous	6	754	1,177	428	1,751	0	2	4	2	9	0%	0%	0%	1%	1%
Woods-Deciduous	0	38	330	210	464	0	0	1	2	4	0%	0%	0%	1%	1%
Woods-Mixed	611	7,164	8,832	10,603	57,677	6	50	45	176	315	1%	1%	1%	2%	1%
Utility	0	42	225	57	1,784	0	1	6	8	76	0%	2%	3%	14%	4%
SubTotal	**4,818**	**18,539**	**18,292**	**32,669**	**190,945**	**1,876**	**4,631**	**1,895**	**8,960**	**25,239**	**39%**	**25%**	**10%**	**27%**	**13%**
SubTotal (%)	**2%**	**7%**	**7%**	**12%**	**72%**	**4%**	**11%**	**4%**	**21%**	**59%**					
Total	**265,263**					**42,601**					**16%**				

Table 3. Anne Arundel County Land Cover and Impervious Analysis for 2011, 2014, and 2017

Anne Arundel County Land Cover Categories[1]	2011	2014	2017	2011	2014	2017	2011	2014	2017
	Land Acres			Impervious Acres[3]			Percent Impervious		
Airport	1,205	1,262	1,257	965	1,006	1,036	80%	80%	82%
Commercial	12,558	14,363	14,533	7,784	9,191	9,117	62%	64%	63%
Industrial	5,241	4,225	4,091	3,077	2,756	2,654	59%	65%	65%
Transportation	9,638	9,682	9,830	5,933	6,312	6,474	62%	65%	66%
Pasture/Hay	6,013	8,820	8,537	28	119	137	0%	1%	2%
Row Crops	12,072	10,981	11,104	49	93	121	0%	1%	1%
Mining[2]	N/A	792	711	N/A	117	104	N/A	15%	15%
Residential 1/8-acre	20,082	16,383	15,592	6,980	6,263	5,966	35%	38%	38%
Residential 1/4-acre	19,491	22,409	24,383	5,684	6,882	7,590	29%	31%	31%
Residential 1/2-acre	10,864	12,017	12,176	2,406	2,741	2,785	22%	23%	23%
Residential 1-acre	11,595	12,397	12,430	1,882	2,003	2,009	16%	16%	16%
Residential 2-acre	23,710	27,191	27,484	2,950	3,120	3,156	12%	11%	11%
Open Space	20,846	15,946	15,827	651	943	706	3%	6%	4%
Water	2,554	2,766	2,809	11	15	21	0%	1%	1%
Open Wetland[4]	1,590	3,708	3,846	1	7	9	0%	0%	0%
Forested Wetland[4]	293	8,340	8,502	0	11	11	0%	0%	0%
Woods-Coniferous	105,578	3,372	4,116	598	17	17	1%	1%	0%
Woods-Deciduous		1,124	1,042		6	7		1%	1%
Woods-Mixed		87,389	84,887		617	591		1%	1%
Utility	1,931	2,095	2,107	38	94	90	2%	4%	4%
Total	**265,263**	**265,263**	**265,263**	**39,037**	**42,311**	**42,601**	**15%**	**16%**	**16%**

[1]2011, 2014 and 2017 data: For areas missing land cover data, each area was reviewed individually and a land cover type was assigned based on the surrounding land cover types and the aerial imagery.

[2]Category was not part of classification schema in 2011.

[3]The County intends to perform additional analyses to more accurately account for the true increase in impervious surface between 2014 and 2017.

[4]Dramatic increases to the total acres of Open Wetland and Forested Wetland, between 2011 and 2014, were due to improvements in land cover classification. Beginning in 2014 the County used additional datasets, such as State wetlands and County bogs, which allowed the County to more accurately classify Open Space, Woods, and Water as either Open Wetland or Forested Wetland. Additionally, in 2014 the County decreased its minimum mapping unit from 1 acre to 0.5 acres. Areas of wetland less than 1 acre in size in 2011 would have been included in other nearby land cover.

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

Status:

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 FY19 monitoring efforts at these sites is found in **Part IV.F**, and the complete monitoring reports for the reporting year are included in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2018-2019*) and **Appendix D** (*Biological and Geomorphological Condition in the Picture Spring Branch Subwatershed, Severn River Watershed, Anne Arundel County, Maryland: 2018-2019*.

The *MonitoringSite* feature class contained in the MS4 Geodatabase represents the locations of the Parole Plaza, Church Creek, and Picture Spring Branch monitoring sites. The *ChemicalMonitoring* table contains results from FY19 and is included in the MS4 Geodatabase provided in **Appendix A**.

County-wide Biological Monitoring Program

Since 2004, the County has implemented a County-wide 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.

In 2017, the County re-launched its County-wide Biological Monitoring Program (Program) following an extensive reevaluation and update, which was completed during the 2016 reporting period. Complete information on the Program update can be found in the Quality Assurance Project Plan – Round 3 at https://www.aacounty.org/departments/public-works/wprp/ecological-assessment-and-evaluation/biological-monitoring/index.html . In summary, fish and water quality sampling have been added to the benthic macroinvertebrate sampling already conducted under the Program. In addition, a second set of random sites was established using a finer scale stream coverage to supplement sample sites established on the coverage used in Rounds 1 and 2. This was done in an effort to better evaluate small streams in the County.

The complete collection of biological monitoring reports for Rounds 1 and 2, and the Round 3 reports completed to date, are available for download at https://www.aacounty.org/departments/public-works/wprp/ecological-assessment-and-evaluation/biological-monitoring/biological-monitoring-reports/index.html .

Surface Water Quality Monitoring Program

In addition to the work performed in the Church Creek watershed, the County assesses water quality in two other locations: Cowhide Branch, a tributary to tidal Weems Creek and the Severn River; and Furnace Branch, a tributary to Curtis Bay and the Patapsco River. Continuous flow and rainfall data are collected at both stations, and monthly stormwater and baseflow monitoring are performed at these sites. Parameters currently analyzed include the following:

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	TPH
NO_3/NO_2	TOC	

Cowhide Branch: 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. The automated station was taken out of service in September 2016 prior to stream restoration work. The station remained out of service until March 2019 when post-restoration monitoring was initiated.

Furnace Branch: This stream receives discharge from a highly developed drainage area, most of which is routed through a closed storm drain system before discharging into a concrete flood channel which finally discharges to a natural channel reach. The County is currently restoring the concrete channel and downstream area to a more natural stream and wetland system. Prior to construction, a monitoring station was established to characterize pre-restoration water quality, and geomorphic and biological conditions were assessed. During the reporting period, benthic macroinvertebrate samples were collected at two locations and a total of ten storm samples and nine baseflow samples were collected. The station was taken out of service in June 2018, prior to the start of restoration construction. The County anticipates re-siting this station and initiating post-restoration monitoring no sooner than fall 2020 (FY21).

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 projects that are under design, under construction and completed during the reporting year. The County continuously updates the inventory of watershed restoration projects as new projects are planned or completed. These projects are documented in the MS4 Geodatabase (**Appendix A**) across four feature classes: *RestBMP*, *AltBMPLine*, *AltBMPPoint*, and *AltBMPoly*.

This report section summarizes the inventory of the watershed restoration projects. **Part IV.E.2** (Restoration Plans) describes the corresponding water quality improvements. The FY18 Annual Report included a partial inventory of FY19 projects completed through December 2018 (i.e., all projects in the inventory through the first half of FY19), to document compliance with the County 20% Impervious Surface Restoration (ISR) goal at the end of the MS4 Permit term (February 11, 2019). Because the current permit has been administratively continued pending issuance of the next generation MS4 permit, this section will include the inventory of all restoration projects for the entire FY19 reporting period, including those projects that were already submitted with the FY18 Annual Report.

All new watershed restoration projects that have progressed to the schematic (30%) design phase or beyond in FY19 were added to the appropriate feature classes in the MS4 Geodatabase. During the FY19 restoration project and data review, the County identified existing restoration projects and data pertaining to programmatic implementation that were either not previously accounted for or reported. These projects were added or updated as follows:

- Addition of 100 enhanced septic denitrification systems that were installed during previous reporting periods, but newly identified in FY19 during a data review by the Anne Arundel County Department of Health.
- Update of previously reported septic pumping data for FY16 through FY18. The County unintentionally omitted septage delivered to the Annapolis and Mayo Water Reclamation Facilities (WRF) and only submitted data for the Cox Creek WRF in prior year reports. The County has resubmitted records for those years, along with supporting documentation in **Appendix A**.

Table 4 provides a summary of the FY19 project inventory. In FY19 a total of 277 new restoration projects were completed, with a cumulative total of 1,594 projects completed from FY14 through FY19, and an additional 89 projects under design and under construction.

Table 4. FY19 Restoration BMP Project Summary

	Projects Completed in FY19	**Projects Completed – Cumulative through FY19**	**Project Under Design or Under Construction in FY19[1]**
Restoration BMPs			
- ESD	2	22	2
- Structural	23	140	49
Alternative Restoration BMPs			
- street sweeping *(annual practice)*[2]	479 tons	422 tons/yr.	-
- impervious surface elimination	0	3	0
- reforestation	2	2	0
- catch basin and storm drain cleaning *(annual practice)*[2]	289 tons	175 tons/yr.	-
- stream restoration	5 (7,226 ft.)	23 (21,744 ft.)	28 (69,150 ft.)
- outfall stabilization	24 (1,708 ft.)	49 (3,383 ft.)	1 (71 ft.)

Table 4. FY19 Restoration BMP Project Summary

	Projects Completed in FY19	Projects Completed – Cumulative through FY19	Project Under Design or Under Construction in FY19[1]
- shoreline management	3 (757 ft.)	66 (15,678 ft.)	9 (8876 ft.)
- septic pumping *(annual practice)*[2]	12,910 units	9,566 units/yr.	-
- septic denitrification	196	1,149	0
- septic connections to WWTP	22	140	0
Total number of projects (excl. annual practices)	277	1,594	89

[1]Two ESD and nine structural BMPs in the *RestBMP* feature class, as well as four stream restoration projects in the *AltBMPLine* feature class, with an implementation status of "Under Design" are actually on hold or cancelled (see comments in MS4 Geodatabase) and are not included in these tallies.
[2]For annual practices, Projects Completed – Cumulative through FY19 is the average annual quantity of materials collected (street sweeping and catch basin cleaning) or number of units serviced (septic pumping), dating from the full implementation of the programs. Averages for street sweeping and septic pumping are based on FY16-FY18, and the average for catch basin cleaning is based on FY17-FY18.

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 FY19, the Department of Inspections & Permits (I&P) continued the requirement for all proposed new stormwater management plans to comply with the Environmental Site Design (ESD) standards in accordance with the County Code, State Code, and the current edition of Maryland Stormwater Management Design Manual.

A comprehensive review and update to the County's Stormwater Management Practices & Procedures Manual was completed in FY18. A draft revision of the updated Manual was submitted to MDE in May 2017, and initial comments were received from MDE in August 2017. The final draft was provided in September 2017, and approval was received from MDE on October 30, 2017. The approval letter was submitted with the FY18 NPDES MS4 Annual Report.

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 this reporting period, no modifications to the Code were required to address programmatic concerns.

MDE conducted the triennial inspection of the County's stormwater management program during FY15 finding, overall, that the program is acceptable. The County continues to implement the recommendations from this inspection. As noted in the FY17 MS4 Annual Report, the County's development review engineers were relocated from the Office of Planning and Zoning (OPZ) to I&P, improving communication and interaction between the review engineers and the field inspectors. Based on correspondence from MDE, the next stormwater management program triennial inspection is scheduled for Calendar Year (CY) 2020.

During 2018 and 2019 I&P coordinated routine meetings with the County's Stormwater Workgroup (Workgroup), a group comprised of developers, engineers, homeowners' association and Non-governmental Organization (NGO) representatives, realtors, County agencies, and representatives of the building trades. The purpose of these meetings was to discuss issues of concern, identify recommendations, and develop an action plan for each of those recommendations. Based on these discussions, the Workgroup identified 13 primary concerns, a recommended action plan, and a lead agency for each item (see Table 5 and Table 6). The Workgroup proposed that the lead agency provide primary guidance and direction, working with stakeholders (County agencies, HOAs, development community, other stakeholders) to discuss recommendations in detail and develop a road map for the action plan implementation. The work group recommendations were finalized in March 2019. Outreach with stakeholders continues.

Table 5. Anne Arundel County Stormwater Workgroup Action Plan (March 2019)

#	Item	Action Plan	Lead Agency
1.	HOA Documents	Code Changes and Policy Changes	OPZ
2.	Turnover	Hand-off; Code changes	I&P
3.	Education	One-stop BMP portal	DPW WPRP
4.	Warranty	Code change	I&P
5.	Budget	Roll into #1	OPZ and I&P
6.	Inspections	Work flow changes	I&P
7.	Notices	Work flow changes	I&P
8.	BMP Database	Public mapping interface	DPW WPRP
9.	Inspection checklists	Roll into #3	DPW WPRP
10.	Flooding Concerns	Meet with I&P Staff	I&P
11.	New Infill lots	Coordination	I&P
12.	Public ponds	Roll into #3	DPW
13.	BMP Designs	Stormwater manual changes	I&P

OPZ – Office of Planning and Zoning
I&P – Inspections and Permits
DPW WPRP – Department of Public Works Watershed Protection and Restoration Program

Since the recommendations were made, the DPW WPRP has created a one-stop BMP portal for the public (https://www.aacounty.org/departments/public-works/wprp/bmp_maintenance/index.html), and added the locations of public and private stormwater BMPs to its public mapping interface, to make it easier for property owners to identify the number, nature, and location of the stormwater practices on their property. I&P is currently working with the Office of Law (OOL) to develop legislation that will require performance bonding for private stormwater practices associated with development, and OPZ is working with the OOL to revise HOA document requirements to better outline the location of stormwater practices and their anticipated maintenance costs before they are handed over to HOAs. This work will carry into FY20.

Table 6. Stormwater Workgroup Actions and Lead Agency

Work Group	Lead Agency	Discussion Items
#1 HOA Documents	OPZ	HOA docs, disclosures, covenants, conditions, reserve study, plat, transparency, clarity, education, budget, private/HOA infrastructure
#2 Transition	I&P	Warranty (bond similar to street tree maintenance, reforestation), surety, third party inspections, facility maps/inventory, turnover/transition, inspections, work flow, process, timing, SWMA agreement
#3 Education	DPW	One stop website, checklists, education, contractors, maintenance guidance, training, other municipality examples, education, Database
#4 Design and Construction	I&P	Maintenance costs (routine and non-routine), design issues, inspection, construction issues, details on plan, design manual updates

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 FY19, County records indicate the following information regarding stormwater management program data (Table 7).

Table 7. Concept, site development, final development, and redevelopment plans received during FY19

Type	Number of Projects Received
Concept Plan[a]	110
Site Development Plan[a]	149
Final Development Plan[b]	77
Final Redevelopment Plan[c]	5
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 (e.g., P2015-0050-00-NF)
[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 County's 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:

- 2352 Stormwater Construction Inspections
- 116 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:

- 7,045 Three Year Maintenance Inspections
- 577 Three Year Maintenance Correction Notices
- 22 Three Year Maintenance Violation Notices

There were 7,045 three-year inspections of stormwater BMPs conducted in FY19 and included in the *BMPInspections* table of the MS4 Geodatabase (**Appendix A**). In addition to these inspections, the County's dedicated stormwater management inspection staff performed numerous site visits in response to property owners requesting guidance, to obtain permission for site access in some situations, and to follow up on required maintenance activities.

The County realized an increase in correction notices issued during FY19. This is attributed to inspection staff review of previously issued (pre-FY19) and current correction notices to confirm and ensure compliance. When additional action was required to bring a facility into compliance, additional Phase I enforcement notices were issued as appropriate. 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 FY19 reporting period, all correction notices were successfully enforced at the Phase 1 and Phase 2 levels; there were no Phase 3 violation notices required. Additional information relating to inspection and enforcement activities in FY19 is provided in the *SWM* table of the MS4 Geodatabase (**Appendix A**).

Alternative BMP inspections are also documented in the MS4 Geodatabase. As part of the County's FY18 Annual Report, inspections of alternative BMPs completed through December 31, 2018 (i.e., the first half of FY19) were included to document compliance with the County's 20% ISR goal at the end of the County's permit term (February 11, 2019). This report will cover the complete set of alternative BMP inspections completed in FY19, including those noted in FY18 Report.

For FY19, the following alternative BMP inspection data are provided.

- The FY19 *AltBMPPointInspections* table contains 347 records associated with inspections of alternative BMPs such as septic system upgrades, connections to Water Reclamation Facilities (WRF), and septic pumpouts. Septic system upgrade (SEPD) inspections are conducted via a service provider visit from MDE's Best Available Technology Management Network (BATMN); inspection results are housed in MDEs BATMN database. It should be noted that 21 of the SEPD inspection records are annotated with an error code in the inspection date field to indicate SEPD BMPs that were due for inspection this year, but for which the MDE inspection record is incomplete and should be revisited by MDE. An additional 117 records are for inspections that occurred outside of the FY19 reporting period. These are the most recent inspections available in BATMN for SEPD BMPs that were due for inspection in FY19.

- The FY19 *AltBMPPolyInspections* table contains 991 inspection records associated with vacuum street sweeping, inlet and catch basin cleaning and other associated alternative BMPs.
- The FY19 *AltBMPLineInspections* table contains 43 inspection records associated with stream restoration and shoreline stabilization projects.

Lastly, restoration stormwater BMPs are also subject to maintenance inspection to ensure their efficacy within the landscape. The FY19 *RestBMPInspections* table contains 49 restoration BMP inspection records; 24 of these inspections occurred in previous reporting years, but are included this year to demonstrate triennial inspection compliance of BMPs constructed in FY16.

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:

On December 11, 2018, MDE completed a review of County's application for continued delegation of erosion and sediment (E&S) control enforcement authority. As a part of this evaluation, MDE conducted field inspections and a review of E&S control enforcement procedures in accordance with the County's approved ordinance. During this review, MDE noted concern regarding the recurring need for timely stabilization and re-stabilization. In FY19, the County continued to address and implement the identified issues documented in the December 11, 2018 Delegation Review. The current MDE delegation of authority continues through June 30, 2021 (see **Appendix B**). The next Delegation Review is anticipated in FY22.

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 the approved construction plans for the cardholders' 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

website. The optional MS4 Geodatabase table *RespPersonnelCertInfo* is not submitted with the FY19 Annual Report.

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

Status:

As noted above Anne Arundel County is no longer responsible for providing Responsible Personnel Certification training as it is available on-line on the MDE website. Therefore, no certification information is submitted in this narrative or with the MS4 Geodatabase. Other relevant program information is found in the *ErosionSedimentControl* table within 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, submission of quarterly reports is not required provided that the Construction General Permit Activity Database continues 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, industrial, and residential land uses. As deemed appropriate, 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 incorporating the option of 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.

The areas targeted for the 2019 field effort included areas east of Route 2, generally, between I-695 and U.S. Route 50. Field crews successfully inspected 154 outfalls draining commercial, industrial, and residential land uses. For the 2020 effort, the County will screen outfalls in the southern portion of the county (south of Route 214) and areas west of Route 175 in the western portion of the county. In addition, the County will revisit all locations that have shown positive evidence of illicit discharge dating back to the 2013 screening year.

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, 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), a Hanna Instruments 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 is 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 systematically investigated access points in the storm drain system upstream of the outfall, 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 potential 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 (IMD), or the Anne Arundel County Department of Health (Health Department), as appropriate, for further investigation and enforcement.

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 – 2019 Annual Report (**Appendix E**); relevant digital data are included in the IDDE table of the MS4 Geodatabase provided in **Appendix A**. The complete report (**Appendix E**) contains details of the findings from the 2019 reporting period, and the corrective actions associated with these sites.

Of the screened outfalls containing dry-weather flow during the 2019 reporting period, seven yielded a result above the action-criteria limit for one or more of the tested contaminants. Field crews re-screened each of the seven outfalls and, of those, five 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, agency responses, and detailed corrective actions, are found **Appendix E**. The full report also includes details regarding the resolution of previously unresolved cases described in the 2017 and 2018 reporting years.

The County consultant's field teams identified eight locations where physical issues significantly affected stormwater infrastructure within the targeted areas of Anne Arundel County during the 2019 reporting period. The site-specific reports were then forwarded to IMD for appropriate corrective action. Complete investigation details, including site-specific reports, agency responses, and corrective actions, are found in **Appendix E**.

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 accessible commercial and industrial sites within the target screening areas that have the potential to contribute significant pollutants (a.k.a. potential upland pollutant sources). 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 nine upland pollutant sources within the target areas during the 2019 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 Permit Coordinator; the Permit Coordinator or designee sent copies of the reports to I&P or the Health Department, as appropriate, to initiate corrective action. Complete investigation details, including site-specific reports, agency responses, and corrective actions, are found in **Appendix E**. The full report also includes details regarding one case from the 2020 reporting year, at the request of the County.

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

Twenty illicit discharge, dumping, or storm drainage complaints were reported to I&P during the 2019 reporting period; these cases were supplemental to the survey results of the commercial and industrial facilities, as described in Part b, above. The complaints included 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 2019 reporting year are documented in **Appendix E**. All complaints and referrals were investigated and enforced as appropriate.

The I&P department 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. The civil citation must be paid, and the violation abated, or the civil citations are litigated 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 2019 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 Health Department 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 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 augment those conducted under 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 2019 reporting period, issues with dumpsters or waste grease bins specifically related to food service establishments were sent to the Health Department for further inspection and enforcement. The Health Department addressed seven issues reported to the Department by County consultants during the reporting period. Details regarding the reported conditions, agency responses, and corrective actions are in **Appendix E**.

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

Status:

During the 2019 reporting period, no illicit discharge complaints were referred to MDE. Six illicit discharge complaints and referrals received during the period were successfully enforced by I&P. One site requires additional monitoring into the following period to continue to obtain evidence to better understand the nature of the discharge conditions and activities causing them; field crews have observed unusual discharges and activities at this location on more than one occasion. I&P also resolved five compliance cases that were initiated in previous reporting periods. Details regarding these cases are in **Appendix E**.

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

Status:

The report in **Appendix E** provides descriptions of all procedures undertaken and activities completed, findings from follow-up investigations, and data collected as part of the County's 2019 IDDE program. Additionally, the County follows the requirements in the Permit for reporting IDDE data. The *IDDE* table in the MDE Geodatabase included in **Appendix A** contains the required information related to screenings of 154 outfalls conducted during the 2019 reporting period.

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:

All comprehensive watershed assessments for the County, as required under Part IV.E.1, were completed in FY18. Those watershed studies completed during this permit term included a summary of potential litter sources, and the observed locations of riparian area dump sites and upland areas where trash and litter were observed. As reported in the FY18 Annual Report, please see Section 5 of the final Herring Bay, Middle Patuxent, and Lower Patuxent Watershed Assessment Report (found at www.aacounty.org/departments/public-works/wprp/herring-bay-middle-patuxent/index.html) for detailed information related to this permit requirement and a map of the dump site locations within the study areas. The County's programs for addressing trash and litter are also documented in the County's FY19 Litter and Floatables Comprehensive Plan Annual Update **(Appendix F)**.

The County continues to identify and eliminate sources of litter through screening for upland pollutant sources as part of the County's Illicit Discharge Detection and Elimination program (Part IV.D.3). Under this program, observed sources of litter such as inadequately covered or overflowing dumpsters, improper trash disposal, and illicit dumping are reported to the appropriate County agencies, which can compel the tenant and/or landowner to properly dispose of trash and make the necessary corrections.

The County's Bureau of Waste Management Services (WMS) continued to employ an effective education and outreach program targeting both homeowners and businesses with an emphasis on recycling and waste reduction. Together with the County's Bureau of Highways, WMS supported numerous community cleanup and watershed cleanup events in FY19. The County's full efforts in reducing and eliminating sources of litter are detailed in the County's FY19 Litter and Floatables Comprehensive Plan Annual Update (**Appendix F**).

During the reporting period, the County continued to explore additional methods of eliminating or reducing certain types of trash and litter on a County-wide basis, such as catch basin inserts and trash traps. The County has coordinated with NGOs that are actively managing trash trap programs (e.g., South River Federation, Anacostia Watershed Society) to gain insight into locating, building, and maintaining these facilities. The County has yet to identify a suitable location for trash trap installation. Due to cost and maintenance concerns, the County has decided not to pursue the use of catch basin inserts as a litter reduction strategy at this time.

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 litter, 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). In FY19, the County reviewed and updated the Litter and Floatables Comprehensive Plan. This Plan details existing conditions in the County, highlights all County and County-supported programs pertaining to reduction of litter and floatables, and describes future actions the County may take towards preventing litter from entering waterways. A copy of this plan is found in **Appendix F**.

Documented below is a summary of the County's litter and recycling education and outreach programs for FY19.

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 regard to its changes and advancements, and to encourage residents to recycle more often. Recycling Program Specialists attend fairs, festivals, homeowners' association (HOA) meetings, community outreach events, and more. WMS also provides technical assistance with recycling at larger-scale events such as the County Fair, the Annapolis Greek Festival, and more. A total of 22 fairs and festivals were attended in FY19, and recycling assistance was provided to 14 events in the County. Anne Arundel County promotes its recycling program to the public through several methods including:

- Providing technical assistances, and services when possible, to small business and multi-family units;
- Improving communication with customers by maximizing the use of various media including direct mail, broadcast media, social media, newspaper advertisements, and its websites (http://www.recyclemoreoften.com/ and http://www.aacounty.org/departments/public-works/waste-management/);
- Attending civic and community meetings and events, workshops, displays, and special promotions;
- Specially designed programs and contests for school aged children; and
- Educating customers on new programs, changes to existing programs, source reduction, schedule updates, and holiday collections.

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 Maryland Association for Environmental and Outdoor Education (MAEOE) program. In FY19, Recycling Program Specialists provided information to 34 elementary school programs, 14 middle school programs, 6 high school programs, and 13 summer camps, as well as providing 27 tours of the County Landfill. 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, recycling-themed mailers and brochures are distributed and 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:

- www.recyclemoreoften.com/
- www.aacounty.org/services-and-programs/household-hazardous-waste-drop-off-days
- www.facebook.com/annearundelrecycling/

This ongoing and extensive outreach effort has proven to be very successful. Since the inception of the education and outreach program in 2008, the County-wide recycling rate has increased from 31% to 40%. Increases in recycling indicate less material being contributed to the landfill stream and, thus, less material (e.g., potential litter) that could be distributed by wind at pick-up locations or blown out of private vehicles traveling to a landfill for disposal.

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 FY19, over 200 small businesses were signed up for Small Business Recycling and more than 1,300 tons of single-stream recycling was collected. WMS Recycling Division staff is available for presentations, technical support, and Maryland Recycling Act (MRA) assistance regardless of whether a business elects to use the County for collection of recyclables. Currently there are 269 County-based businesses that report to the County for MRA purposes and thus are known to be actively participating in a recycling program, an increase of 64 businesses from the last reporting period.

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 and facilities have a Recycling Coordinator that directly communicates with the recycling program office. Approximately 1,100 tons of single-stream recycling was collected at 121 County sites (offices, parks, pools, etc.) in FY19.

In FY19, there were six household hazardous waste events (two at each of the three Recycling Centers). These successful events kept 161 tons of household hazardous waste materials out of the landfills, roadside ditches, and County waterways. These events also discourage illegal dumping of hazardous materials. 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 their landfill.

The County also provides 40 cubic-yard roll-off bins throughout the year for citizen groups, communities, and the County WPRP to aid in community and watershed cleanup activities. WMS assists in hauling the trash and recyclable material collected from these activities. In FY19, WMS assisted in 154 community cleanups by providing dumpsters and/or hauling services.

In support of activities designed to capture and eliminate litter before it enters County waterways, in 2018 the County purchased custom designed storm drain stencils for loan to NGOs, schools, and other organizations. The stencils can be used to mark County-owned storm drain structures. In FY19, two public schools and one community association utilized the stencils.

The County Bureau of Highways (BOH) is responsible for all maintenance activities associated with County-maintained roads. Litter is collected from County roadways on a routine basis. In addition, BOH conducts weekday and 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. Since the inception of the program, BOH has constructed a list of high-litter areas based on staff and citizen observations.

Weekend roadside litter pickup occurs every other weekend throughout the year, dependent on weather. The overall effectiveness of the program ultimately depends on the number of inmates eligible for the program. The goal of the weekend pickup 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. Litter removal crews bag recyclables and other trash items separately, and crews are asked to empty the recyclable items out of their collection bags into containers provided by the WMS Recycling Division.

A total of 9,662 thirty-gallon bags of litter were removed from roadsides from July 1, 2018 to June 30, 2019, with 7,319 bags collected during the routine work week and 2,343 bags collected by the weekend litter removal program. The County removed 22 thirty-gallon bags more in FY19 as compared to FY18; an increase of 0.2% from the last reporting period in which 9,640 bags of litter were removed. Since FY10, the County's roadside litter cleanup program has removed an average of 10,533 thirty-gallon bags of litter from roadsides each fiscal year.

The County BOH also collects large debris from roadside rights-of-way (e.g., discarded appliances, tires, furniture, tree limbs). In FY19, over 776 tons of roadside debris was collected.

The Anne Arundel County Local Development Council (LDC) works with and provides grant funds to the BWI Business Partnership to facilitate an LDC Beautification Project in the Arundel Mills Commercial District. This project focuses on combating trash accumulation on the roads surrounding Arundel Mills and Live! Casino & Hotel. Through the funding provided by LDC, the BWI Business Partnership oversees a landscape team that maintains the aesthetics of roads, median strips, and exit ramps surrounding Arundel Mills Mall and the hotel/casino. This team clears litter; mows grass, removes weeds, plants perennials and annuals, and trims trees and shrubs. This Beautification Project also allows the partnership to identify unusual accumulations of trash that can indicate a larger problem to be addressed and to also alert the police if issues, altercations, or suspicious activity is observed. Between July 2018 and June 2019 (FY19), this project removed more than 79 tons of litter, trash, and debris from the designated areas. The LDC Beautification Project at Arundel Mills is anticipated to continue for FY2020, funded through a local impact grant to BWI Business Partnership from the LDC and Live! Casino & Hotel.

Stream Cleanups

BOH and WMS supported several watershed cleanup initiatives during the reporting period. In partnership with these efforts, the County supported three events and hauled away more than 9,300 pounds (4.7) tons of material for proper disposal. Specific examples of clean-up events supported by the County are listed in Table 8.

Table 8. Community clean-up activities supported by the County in FY19

Date	Organization/Location	Location	Amount of Trash Removed
3/30/2019	South River Federation	Church Creek – 55 Forest Plaza, Annapolis	0.31 tons
4/13/2019	Restore Rock Creek	Fort Smallwood Park - Pasadena	0.65 tons
5/4/2019	Patuxent Preserve	Patuxent River – Patuxent River Road, Gambrills	3.72 tons

In addition to the stream cleanup activities supported by BOH and WMS, the Anne Arundel Watershed Stewards Academy (WSA) organized watershed and stream cleanup initiatives during 2019. Stewards, and Stewards-in-Training, removed 5.5 tons of trash from County streams and watersheds.

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 listed in Table 9 below.

Table 9. County Water Reclamation Facility discharge permits

Facility	Permit	Permit Coverage Period
Annapolis WRF	12DP0838	Oct. 1, 2015 – Sept. 30, 2020
Broadneck WRF	14DP0677	Nov. 1, 2017 – Oct. 31, 2022
Broadwater WRF	14DP0813	Nov. 1,2017 – Oct. 31, 2022
Cox Creek WRF	07DP0698	Jan. 1, 2010 – Dec. 31, 2014
Maryland City WRF	11DP2393	April 1, 2015 – Mar 31, 2020
Patuxent WRF	11DP0132	April 1, 2015 – Mar 31, 2020
Mayo Large Communal WRF	02DP2291	Oct. 1, 2013 – Sept. 30, 2018

NPDES wastewater discharge permit renewals for the Cox Creek WRF, the Maryland City WRF, and the Patuxent WRF were submitted to MDE and are pending issuance. Until the new permits are issued, the current permit conditions remain in force.

The Mayo Large Communal WRF, permit number 02DP2291, was decommissioned in FY2018 and now serves as a regional pumping station. There is no permit reapplication for this facility.

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 submitted NOIs to MDE. These facilities, their General Permit Number, the date MDE received the NOIs and Stormwater Pollution Prevention Plans (SWPPPs), and the permit coverage period is listed in Table 10. The General Permit coverage expired and MDE administratively extended the permit term until a new general permit is issued. In the interim, all covered facilities are required to maintain compliance with the existing permit terms.

Table 10. County 12-SW-permitted facilities

Facility	Permit	NOI & SWPPP Received by MDE	Permit Coverage Period
Bureau of Highways (BOH) – Northern District Road Yards			
200 Dover Rd	12-SW-1176	July 8, 2014	Sept. 12, 2014 – Dec. 31, 2018
318 Mountain Rd	12-SW-1181	July 8, 2014	Aug. 21, 2014 – Dec. 31, 2018
BOH – Central District Road Yards			
1427 Duckens St	12-SW-1177	July 8, 2014	Aug. 21, 2014 – Dec. 31, 2018
1847 Crownsville Rd	12-SW-1179	July 8, 2014	Aug. 21, 2014 – Dec. 31, 2018
415 Broadneck Rd	12-SW-1182	July 8, 2014	Aug. 21, 2014 – Dec. 31, 2018
BOH – Southern District Road Yards			
350 West Central Ave	12-SW-2298	July 8, 2014	Aug. 21, 2014 – Dec. 31, 2018
6657 Old Solomons Island Rd	12-SW-1180	July 8, 2014	Aug. 21, 2014 – Dec. 31, 2018
Bureau of Waste Management Services (WMS)			
Millersville Landfill & Resource Recovery Facility (MLFRRF)	12-SW-1304	July 16, 2019	Aug. 15, 2014 – Dec. 31,2018
Northern Recycling Center (NRC)	12-SW-0298	December 7, 2018	Aug.15, 2014 – Dec. 31, 2018
Southern Recycling Center (SRC)	12-SW-0297	December 7, 2014	Aug. 18, 2014 – Dec. 31, 2018
Bureau of Utility Operations (BOU)			
Annapolis WRF	12-SW-0756	May 20, 2014	June 16, 2014 – Dec. 31, 2018
Broadneck WRF	12-SW-0758	June 27, 2014	July 30, 2014 – Dec. 31, 2018
Broadwater WRF	12-SW-0757	June 18, 2014	June 26, 2014 – Dec. 31, 2018
Cox Creek WRF	12-SW-0760	June 30, 2014	Aug. 11, 2014 – Dec. 31, 2018
Patuxent WRF	12-SW-2459	June 27, 2014	Aug. 6, 2014 – Dec. 31, 2018
Maryland City WRF	12-SW-0761	June 11, 2014	July 14, 2014 – Dec. 31, 2018

Table 10. County 12-SW-permitted facilities

Facility	Permit	NOI & SWPPP Received by MDE	Permit Coverage Period
Anne Arundel County Utility Operations Center	12-SW-2345	July 16, 2014	Sept. 8, 2014 – Dec. 31, 2018

At a minimum, each facility performs quarterly and annual inspections as well as staff training on stormwater pollution prevention plans. Compliance documentation, as required by General Permit 12-SW, is maintained at each facility and is available for inspection upon request. Information specific to these facilities and their permit compliance activities is presented in the *MunicipalFacilities* table of the MS4 Geodatabase. Copies of the most recent FY19 quarterly inspection, the most recent annual comprehensive site inspection, and training records, for the above-listed facilities are found in **Appendix G**.

Bureau of Highways (BOH) Stormwater Pollution Prevention Plan Development and Implementation

During the period July 1, 2018, through June 30, 2019, the following items related to General Permit 12-SW at the County's Road Operations Yards 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 2019.
  - 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.
    - Added wooden bulkheads to entryway of salt barns, in addition to straw bales
- Completed underground storage tank testing and inspection of Bureau of Highways facilities using Maryland Department of the Environment Certified UST Inspectors for the following conditions:
  - Annual testing of spill buckets (catchment basins) at two facilities in March 2019.
  - Third Party Inspections at two facilities in calendar year 2019 based upon MDE notification.
  - Five-year tank tightness testing and five-year containment sump testing were completed at all applicable facilities.
- Completed capital improvements to underground storage tank infrastructure at the following facility:

- Northern District, 318 Mountain Rd., waste oil tank replaced, July 2019.

Bureau of Waste Management Services Stormwater Pollution Prevention Plan Development and Implementation

The State's General Discharge Permit 12-SW also applies to the three County-owned facilities managed by Waste Management Services (WMS) identified in Table 10. During the reporting period annual comprehensive SWPPP compliance inspections were performed at these facilities in November 2018 and will be performed again in November 2019; visual inspections occur on a quarterly basis. In addition, the stormwater management facilities at these sites are routinely inspected and all identified repairs are immediately reported and scheduled for maintenance. WMS employs two technicians who inspect and manage the stormwater facilities to ensure proper function.

In FY18, MDE conducted General Permit 12-SW compliance inspections at the three WMS facilities. These inspections resulted in MDE concurring that these facilities should be reclassified to the following subsectors:

- Millersville Landfill & Resource Recovery Facility – reclassified as Subsector L.1 (Landfill Site) and Subsector N.2 (Source-Separation Recycling Facility);
- Northern Recycling Center – reclassified as Subsector L.3 (Landfill Site) and Subsector N.2 (Source-Separation Recycling Facility); and
- Southern Recycling Center – reclassified as Subsector L.3 (Landfill Site) and Subsector N.2 (Source-Separation Recycling Facility).

On June 19, 2018, the County submitted updated NOIs for each WMS facility. Updated SWPPPs for each facility were submitted to MDE on November 30, 2018. MDE approved the County's updated NOIs and SWPPPs for each facility on December 7, 2018 (see MDE Approval of Modified NOI (Enclosure #4 – Bureau of Waste Management Services) in **Appendix G)**.

In FY19, MDE conducted a Permit 12-SW compliance inspection at the Millersville Landfill & Resource Recovery Facility (MLFRRF). This inspection resulted in MDE requesting an NOI and SWPPP modification to add Sector A (Timber Products), SIC Code 2499 (Wood Products, Not Elsewhere Classified) for the composting operation at this facility. The updated NOI and SWPPP for MLFRRF was submitted to MDE on July 16, 2019 (see Enclosures #5, #6, and #7 – Bureau of Waste Management Services in **Appendix G**).

Bureau of Utility Operations Stormwater Pollution Prevention Plan Development and Implementation

During this reporting period, Anne Arundel County's Bureau of Utility Operations continued SWPPP implementation specific to the six WRF facilities and the Utilities Operations Center site listed in Table 9 (above). In support of the NOI and in compliance with the SWPPP, 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. It should be noted that the Cox Creek WRF is undergoing ENR

upgrades and associated construction. As such, the SWPPP documents for the Cox Creek WRF will be reviewed, revised, and updated accordingly once construction is completed. Similarly, the Patuxent, Annapolis, and Broadwater WRFs are experiencing active construction on-site. Staff at these facilities are aware of the need to maintain a current and accurate SWPPP and will make any necessary revisions as soon as possible following construction completion. In the interim, these WRF staff continue to conduct routine inspections and take appropriate action to ensure SWPPP and 12-SW compliance.

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.

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 the County's program for routine street sweeping during the reporting period. Roads with higher traffic volumes are prioritized to maximize collection. The primary focus of the County's street sweeping program is on main thoroughfares (arterial roads, local and collector streets, roads with high traffic volume), business parks and industrial areas, County park and ride lots, NPDES priority areas, and facility parking lots subject to SWPPP implementation. These areas were scheduled for twice-monthly street sweeping.

During Fiscal Year 2019, the County swept 6,654 curb miles, which equates to 554-curb miles per month - a 1.9% decrease from the last reporting period. Accomplishments may vary 5% annually depending on disposal costs and other factors. The current funding level supports sustainable accomplishment of approximately 6,800 curb miles annually, a 40% increase over FY16 levels. This contracted street sweeping program collected more than 479 tons of material from County-maintained streets in FY19.

ii. Inlet inspection and cleaning;

Status:

Anne Arundel County BOH conducts manual and mechanical storm drain inlet cleaning throughout the county. For FY19, the County manually cleaned and removed debris from catch basins, inlets, and outlets of pipes to maintain proper drainage for 4,932 structures. This is a 34% decrease from the previous reporting period in which 7,432 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 3,987 structures required cleaning with a sewer vacuum, a decrease of 4% from the last reporting period in which 4,135 were cleaned with a sewer vacuum. A total of 120,752 feet of pipe were cleaned, an increase of 35% from the last reporting period in which 89,773 feet were cleaned.

Ditch & Curb-line 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 180,217 feet during the reporting period. This is an increase of 13% from the last reporting period in which the County cleaned 159,421 feet. Year-to-year variability in linear feet of ditch and curb-line cleaning is routinely around 30%.

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). The County does not maintain information regarding the quantity of materials used by these State programs.

Herbicide use associated with road maintenance performed by the BOH 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 35 gallons of glyphosate was used during the reporting period. This is a 40% increase over the previous reporting period in which a total of 25 gallons was applied. The increase 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 MDA guidelines 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.

Anne Arundel County Recreation and Parks (AACRP) is committed to providing parks with pest-free environments through the implementation of preventive methods, integrated pest management

(IPM), and chemical strategies when necessary. Because 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. As such, AACRP Turf Division has reported using the compounds listed in Table 11 at AACRP properties during FY19.

Table 11. Herbicides used at AACRP-managed properties during FY19

Trade Name	Active Compounds	Units	Total Amount Applied
Ranger Pro	Glyphosate (41%) – 2 oz/gal	Gallon	282
Prosecutor	Glyphosate (41%)	Gallon	91
Finalsan Organic	Ammonium soap of fatty acids (22.10%)	Gallon	64
Freehand	Dimethenamid-P + Pendimethalin	Pounds	60
Fiesta Organic	Iron HEDTA (26.5%)	Gallon	16
Lesco Momentum	2,4,D (44.2%), Triclopyr (3.86%), Fluroxypyr (4.2%)	Gallon	102
Burnout II	Citric Acid (20.4%), Clove Oil (8.0%)	Gallon	4

Anne Arundel County Facilities Maintenance Division (FMD), Horticulture Unit, maintain landscaping on County properties including all Administrative Buildings, Libraries, Police and Fire Stations, Senior Centers, and Health Centers throughout the County. In Table 12, the herbicides and quantities used by the FMD Horticulture Unit are reported for FY19.

Table 12. Herbicides used by the FMD Horticulture Unit during FY19

Trade Name	Active Compounds	Units	Total Amount Applied
Ortho GroundClear	Glyphosate (2.97%), Imazapyr (0.47%)	Gallon	4
Monsanto RoundUp Pro liquid	Glyphosate (50.2%)	Gallon	4
Monsanto RoundUp QuickPro –granular	Glyphosate (73.3%), Diquat dibromide (2.9%)	Pounds	35
Lesco Prosecutor – granular	Glyphosate (41%)	Pounds	6
SedgeHammer granular	Halosulfuron-methyl, methyl 3-chloro-5-(4,6-dimethoxypyrimidin-2-ylcarbamoylsulfamoyl)-1-methylpyrazole-4-carboxylate (75%)	Ounces	2

Landfills and recycling centers managed by WMS do not use herbicides to control unwanted woody and herbaceous vegetation. Weeds and other problematic vegetation at these facilities are removed almost entirely by physical and mechanical means. Occasionally, however, limited application of herbicide (RoundUp, active ingredient Glyphosate) is used around the WMS Administrative Building and parking lot. WMS recorded no herbicide application in FY2019.

WMS employs a contractor who holds a Pest Control Applicator Certificate. Pesticides are applied indoors at WMS facilities and outside around buildings. In FY2019 indoor and outside pesticide use was approximately 43.52 grams and 101.92 grams of active pesticide ingredients, respectively. Pesticide active ingredients for indoor use include Bifenthrin (0.628 grams), Bromadiolone (0.037 grams), Orthoboric Acid (6.577 grams), Brodifacoum (0.002 grams), Dichlorvos (36.275 grams), and Indoxacarb (0.002 grams). Active ingredients for outside use include Bifenthrin (0.218 grams), Bromadiolone (0.240 grams), Orthoboric Acid (98.658 grams), Brodifacoum (0.002 grams), and Etofenprox (2.800 grams). Each time there is chemical application, a pesticide report is completed and filed.

Integrated Pest Management (IPM)

The maintenance plan for all FMD properties and rights-of-way include IPM. Key elements include the following:

- 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 using only 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 AACRP 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 Recreation and Parks public facilities. Key elements of the IPM program at AACRP facilities include the following actions:

- 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 BOH during FY19 are found in Table 13. De-icing chemical data for the four previous reporting periods are provided as a comparison. The quantity of de-icing chemicals used each year is highly variable because it is based on actual winter weather conditions including precipitation type, precipitation frequency, and factors such as road surface temperature.

Table 13. De-icing material applied by the Bureau of Highways, fiscal years 2014–2019

Material	2014–2015	2015–2016	2016–2017	2017–2018	2018-2019
Road Salt (tons)	32,250	11,318	5,361	17,420	12,760
Liquid Salt Brine (gal.)	0	71,500[a]	139,000[a]	142,850[a]	133,500[a]
Total Salt (tons)	32,250	11,390	5,500	17,563	12,894
Liquid Calcium Chloride (gal.)	11,925[b]	6,578[b]	1,046[b]	2,900[b]	432[b]
NWS Snow Totals – BWI (in.)	28.7[c]	35.1[c]	3.0[c]	15.4[c]	18.3[c]
NWS Avg. Winter Temp (°F)	32.0	39.4	40.5	36.4	37.5

[a] One ton of rock salt produces 1000 gallons.
[b]Average winter temperature at BWI Thurgood Marshall Airport is 35.1 degrees per the National Weather Service (NWS). Calcium Chloride depresses the freezing point and is used more extensively during colder periods to prevent ice formation and to deice road surfaces. Increased use is likely when average temperature is near or below freezing, or in cases of ice and heavy snowfall.
[c] Average long-term annual snowfall total at BWI Thurgood Marshall Airport is 20.1 inches per the National Weather Service (NWS). Winter 2017-2018 snowfall total at BWI was 15.4 inches. Below-normal snowfall, moderate temperatures, anti-icing, and sensible salting practices partially offset three additional salting storm events and an ice event in 2017-2018; this resulted in a modest increase in salt use above that recorded in the 2016-2017 winter season.

In 2014, subsequent to the promulgation of a Statewide Salt Management Plan, the County's BOH developed the Department of Public Works Salt Management Plan to outline the practices intended to effectively manage road salt for winter maintenance activities within the County. The Salt Management Plan is organized into the following areas:

- Winter maintenance policies;
- Trends and data analysis;
- Materials ordering, delivery, storage, handling and record keeping;
- Equipment upgrading, calibration and washing;
- Snow and ice control training;
- Weather forecasting, storm response, environmentally sensitive areas;
- Technology review; and

- Public outreach and education.

Near-Term Goals incorporated in the Salt Management Plan include:

- *Winter Maintenance Policies:* The Department has established level of service and maintenance standards which have been generally accepted by the community at large. These policies form the foundation for program delivery and can have a significant effect on the environment. The goal is to review the various departmental standards relating to the winter maintenance program and seek endorsement for the level of service and maintenance policies.
- *Record Keeping:* One of the keys to an effective winter maintenance program is to place the right amount of material in the right place at the right time. At the present time, the record of material usage is tracked manually and reconciled with the residual inventory but should be enhanced to document salt usage by route, by vehicle, and by storm.
- *Winter Maintenance Training:* A thorough understanding of good housekeeping practices, the measures of snow and ice control and the expectations of program delivery will result in a greater probability of success with the salt management plan. For this reason, it is essential that all staff involved with winter operations be provided with Winter Maintenance and Operations Training.
- *Communications:* The goal in this area is to communicate the Department's winter maintenance program and salt management initiatives to staff and to the public. The prime focus in this area will be to increase public awareness in the role of de-icing materials in snow and ice control through the development of appropriate information on the Department's webpage.
- *GPS Upgrade:* It is recommended that the Snow Operations fleet be upgraded by installing an Automated Vehicle Location system (AVL). Strategic and tactical decision making during a storm response, informed by an AVL system, improves effectiveness, resource allocation, and potentially reduces storm response duration. The GPS data provided by an AVL can assist with the analysis of complaints, trouble spots, and claims against the County. This is possible because the location of a truck can be pinpointed in time throughout the storm with a high level of accuracy.

Longer Term Goals identified in the Salt Management Plan include:

- *Equipment Upgrading:* It is intended that the winter maintenance fleet be capable of delivering appropriate levels of de-icing materials within a full range of climatic conditions. The most cost-effective way of fleet upgrading is to consider changes as vehicles within the fleet come up for replacement. In this regard, as the salt spreader fleet comes up for replacement within the County's heavy equipment replacement program, the vehicles are to be equipped with electronic controllers, infrared thermometers and pre-wet capabilities. The equipment upgrades will improve the capability of placing the right amount of de-icing material in the right place, at the right time and allow for an increased level of data collection which, in turn leads to more effective use of salt.
- *Environmentally Sensitive Areas:* Concentrations of chloride in the environment can have negative environmental impacts and the Statewide Salt Management Plan suggests a program to assess the levels of impact due to winter maintenance. Initially, the

environmentally sensitive areas can be identified and ranked starting with the most vulnerable areas (highest ranked); a monitoring program can be developed, where appropriate, to explore the level of impact resulting from the County's winter maintenance practices. Over time, where appropriate, action plans are to be developed to reduce the chloride impacts on the environment.

In 2018–2019, the Bureau continued its efforts to reduce the use of winter weather de-icing materials through application of best practices and improvement of materials, equipment calibration, employee training, and effective decision making. The County issued contracts to continue a County-wide anti-icing program during the 2019–2020 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 an 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 de-icing chemicals.

Annual training on proper snow plowing techniques and safety is also offered to both County and contractor personnel responsible for maintaining the County's roadways during inclement winter weather. The training includes information on the application of de-icing products and proper application rates. Training sessions are held in October and November each year. Approximately 150 County personnel and 115 contractors attended the training sessions in FY19.

These training sessions present the concept of "Sensible Salting" to all winter operations personnel (County and contractors). "Sensible Salting" training creates an awareness of the need to protect the environment and is another way of saying "Enough and no more." Sufficient salt is required to produce the desired safety and mobility to achieve the level-of-service goal. "Excess" applications add cost but no further benefit, and harm the environment.

The Department's Sensible Salting Practices include:

- Limited Salting During the Late Evening/Early Morning Hours (11:00 p.m. – 4:00 a.m.): Salting is not as effective at this time due to low traffic volumes. During these hours, the goal is to ensure passable roads which means only intersections, hills, curves, and bridges will be salted. Beginning at 4:00 a.m., the Department prepares the roads for rush hour.
- Limited Salting on Secondary Roads: Secondary Roads (local streets) will be plowed as often as possible, but will only be salted at intersections, hills, curves, bridges, and school zones. "Spot Salting" will also be used when necessary.
- Proper Calibration of Equipment: All equipment will be calibrated to ensure that desired application rates are applied correctly and over-salting is avoided.

Activities at WMS facilities also require the use of de-icing materials. The amount of salt used at each facility in FY19 was as follows:

- Millersville Landfill and Resource Recovery Facility & Central Recycling Center – 74.80 tons;
- Northern Recycling Center – 4.90 tons; and
- Southern Recycling Center – 2.45 tons.

The County's Bureau of Utility Operations and the Utility Operations Center relies on the Bureau of Highways to ensure access roads to treatment facilities are plowed and remain open during the winter months. As such, no winter weather de-icing material usage is actively tracked by this Bureau.

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

Status:

The Bureau of Highways held quarterly staff training sessions with Road District personnel during the reporting period to support SWPPP implementation, as summarized in Table 14.

Table 14. SWPPP training summary for Bureau of Highways facilities in FY19

Training Number	Training Location	Training Date	# Attendees	Training Session Topic
18359243	1310ND	07/12/2018	14	Topic #1: When it Rains it Drains, & Crisis Under Control
18360218	1310NM	08/24/2018	18	Topic #1: When it Rains it Drains, & Crisis Under Control
18367318	1312SD	08/17/2018	19	Topic #1: Storm Water Pollution Prevention Plan & Good House Keeping
18360220	1311CO	10/17/2018	12	Topic #1: Secondary Containment
18360413	1311CC	10/17/2018	13	Topic #1: After The Storm
18360423	1311CS	10/17/2018	11	Topic #1: After The Storm
18360453	1310ND	10/12/2018	15	Topic of Training: Good House Keeping
18360477	1312SD	11/05/2018	27	Topic of Meeting: Storm Water Pollution Prevention Plan & When it Rains, it Drains.
18360462	1310ND	12/03/2018	14	Class Title: What is Storm Water Run Off?
18360466	1311CO	12/04/2018	11	Topic of Training: Good House Keeping

Table 14. SWPPP training summary for Bureau of Highways facilities in FY19

Training Number	Training Location	Training Date	# Attendees	Training Session Topic
18360470	1311CC	12/20/2018	12	Topic of Training: Good House Keeping
18360474	1311CS	12/20/2018	9	Topic of Training: Good House Keeping
19392104	1310NM	12/21/2018	19	Staff Training: Good House Keeping
18360486	1310NM	02/28/2019	8	Topic of Training: What is a SWPPP
18360487	1311CO	02/14/2019	14	Topic of Training: What is a SWPPP
18360492	1311CC	02/13/2019	12	Topic: When it Rains it Drains & What is a SWPPP
18360493	1312SD	03/06/2019	15	Topic: When it Rains it Drains & Good House Keeping
18360486	1310NM	04/26/2019	18	Topic: Storm Water Pollution Prevention Plan
19411505	1310ND	04/18/2019	16	Topic : What is a SWPPP
18360498	1311CC	05/01/2019	11	Topic of Training: When it Rains it Drains
18360497	1311CO	05/03/2019	11	Topic for Training: When it Rains it Drains
18360501	1312SD	05/24/2019	15	Topic for Training: Storm Water Pollution Plan? When it Rains it Drains.
18360500	1311CS	05/28/2019	16	Topic for Training: Our Storm Water Pollution Plan?
19422102	1310ND	06/11/2019	14	Topic of Training: What is Our Storm Water Pollution Prevention Plan?

The County's WMS staff continued their training on stormwater pollution prevention with formal SWPPP training sessions held in February, March, and April 2019, as summarized in Table 15 below.

Table 15. SWPPP training for Bureau of Waste Management Services in FY19

Training Date	# Attendees	Course #	Course Title
02/15/2019	14	CRS0001191	Revised Stormwater Pollution Prevention Plan Annual Training (NRC)
03/13/2019	24	CRS0001191	Revised Stormwater Pollution Prevention Plan Annual Training (MLFRRF)
03/21/2019	8	CRS0001191	Revised Stormwater Pollution Prevention Plan Annual Training (SRC)

Table 15. SWPPP training for Bureau of Waste Management Services in FY19

Training Date	# Attendees	Course #	Course Title
04/25/2019	14	CRS0001191	Revised Stormwater Pollution Prevention Plan Annual Training (CRC)

The Bureau of Utility Operations conducted SWPPP staff training sessions at the WRFs and Utility Operations Center facilities. Stormwater pollution prevention training sessions occurred in June 2018, October 2018, March 2019, May 2019, June 2019 and July 2019 as summarized in Table 16 below.

Table 16. SWPPP training for Bureau of Utility Operations in FY19

Training Date	# Attendees	Course Title
6/11/2018	9	SWPPP Broadneck WRF
10/25/2018	5	SWPPP Patuxent WRF
3/13/2019	8	SWPPP Annapolis WRF
5/6/2019	12	SWPPP Cox Creek WRF
6/12/2019	7	SWPPP Broadwater WRF
6/12/2019	4	SWPPP Maryland City WRF
6/18/2019	19	SWPPP Training: Utility Operations Center
6/19/2019	18	SWPPP Training: Utility Operations Center
6/26/2019	21	SWPPP Training: Utility Operations Center
7/16/2019	9	SWPPP Training: Utility Operations Center

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 critical area violations, 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 Inspections and Permits webpage: www.aacounty.org/departments/inspections-and-permits/index.html. In August of 2017, the Hotline number was changed. The current number is 410-222-7171.

In addition to the 24-hour environmental hotline, the County webpage provides a link for citizens to submit on-line requests for investigation of environmental concerns or any other observation or issue of concern: https://www.aacounty.org/services-and-programs/report-a-concern. This on-line reporting interface is in addition to the options for reporting concerns and issues through the mobile app SeeClickFix.com© (SeeClickFix,Inc., 2008-2017) or by dialing 311 (Mon–Fri from 8:00 to 4:30) to reach a County customer service representative. The County is committed to customer service and promptly responds to reported concerns.

In August of 2018, the County implemented a new complaint management system whereby complaints received via the above reporting mechanisms are entered into a database based on one of three major categories (Building, Environment, or Zoning) and assigned to one of numerous subcategories within each major category (e.g., Illegal Discharges is an Environmental subcategory). The complaint is then assigned to an inspector for follow-up and enforcement action, all of which is documented within the database. Information on complaints received and the subsequent actions taken can be viewed via the County's Inspections and Permits webpage by clicking on the hot link "Code Compliance Database" found on the right side of the webpage. This link takes you to: https://www.aacounty.org/departments/inspections-and-permits/code-compliance/review-system/index.html where case information can be searched by address, Tax ID, or Case ID number. Of note, the Case ID for all environmental complaints begins with "E" followed by the calendar year opened (e.g., 2019).

During this reporting period 887 building, 1,540 zoning, and 986 environmental complaints were documented via the compliance database. The environmental concerns included illegal discharges (30 complaints), stormwater management issues (17 complaints), grading without a permit (251 complaints), and general drainage concerns (229 complaints) among other subcategories.

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 relevant information to make informed decisions regarding water quality issues and environmental stewardship. Several County departments have public education and outreach programs tailored to their specific discipline. In some cases,

education and outreach occurs though organizations in partnership with the County. Examples of some of the outreach activities are described in this section of the report.

Watershed Protection and Restoration Program

In an effort to increase stormwater pollution awareness throughout Anne Arundel County, the Watershed Protection and Restoration Program (WPRP) has developed a comprehensive education and outreach program.

WPRP Internet Resources

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. Below is a listing of WPRP's public facing resources:

- **WPRP Annual Reports** – WPRP's FY annual report summarizes the watershed protection and restoration actions initiated by the WPRP and our partners and the fiscal resources used to implement those actions.
    - https://www.aacounty.org/departments/public-works/wprp/annual-reports/index.html
- **Financial Assurance Plan** - This report constitutes Anne Arundel County's financial assurance plan, required by MDE per State regulations, identifying actions that will be required of the County to meet the requirements of its NPDES MS4 permit along with projected annual and 5-year revenues or other funds that will be used to meet the impervious surface restoration plan requirements of its NPDES MS4 permit.
    - https://www.aacounty.org/departments/public-works/wprp/financial-assurance-plan/index.html
- **Frequently Asked Questions** – Addresses common questions residents may have about the WPRP and the Watershed Protection and Restoration Fee (WPRF).
    - https://www.aacounty.org/departments/public-works/wprp/frequently-asked-questions/index.html
- **WPRF Credit Program** – Explains how eligible property owners in Anne Arundel County have the opportunity to reduce their WPRF assessments by up to 50% for proactive and sustainable uses of stormwater runoff controls.
    - https://www.aacounty.org/departments/public-works/wprp/wprf-credit-program/index.html
- **Stormwater Property Tax Credit Program** - Residential and commercial property owners can receive a credit on their property taxes by installing and maintaining stormwater treatment practices. It provides for a reduction in County property taxes for qualified stormwater improvements.
    - https://www.aacounty.org/departments/public-works/wprp/stormwater-property-tax/index.html

- **WPRF Appeal Program** – The WPRF Appeal Program is intended for property owners who feel that they have been billed in error.
    - https://www.aacounty.org/departments/public-works/wprp/wprf-appeal-program/index.html
- **WPRP Highlighted Projects** – Shows in-depth details about some of the restoration projects that are currently underway in the County. This is not an exhaustive list of projects.
    - https://www.aacounty.org/departments/public-works/wprp/restoration/WPRP_Projects
- **WPRP Restoration Project Interactive Map** – Shows the location and status of all WPRP programmed restoration projects. Also includes status of non-County projects which includes NGO, private, and Maryland State Highway Administration restoration projects.
    - http://annearundelmd.maps.arcgis.com/apps/webappviewer/index.html?id=e7e7fb6733e448a8809938140bed9e18
- **WPRF Mapping Application** – Interactive map shows the specific WPRF for each parcel in the County. Residents can also identify impervious surfaces on their property.
    - http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=StormWaterFee?viewer=StormWaterFee
- **WPRP Watershed Application** – Interactive map identifying environmental information regarding watershed studies, stream assessment survey, as well as subwatershed and stream priorities for restoration and preservation.
    - http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=WPRP
- **WPRP Goals Dashboard** – Shows the number of completed and anticipated projects by type. Also shows progress of impervious surface attainment goal.
    - https://www.aacounty.org/departments/public-works/wprp/WPRP_Goals
- **Targeted Biomonitoring** – The Anne Arundel County Watershed Protection and Restoration Program's Ecological Assessment & Evaluation Program routinely collects biological, habitat, and geomorphological data from local streams as part of a long term targeted biological monitoring program. The sample sites are located on reaches of interest where certain stream restoration activities have occurred or are planned for the future.
    - https://www.aacounty.org/departments/public-works/wprp/targeted%20biomonitoring/index.html
- **TMDL Restoration Plans** - WPRP has developed several restoration plans to address certain local water quality impairments for watersheds with an approved Total Maximum Daily Loads (TMDL) issued by the Maryland Department of the Environment (MDE) and approved by the U.S. Environmental Protection Agency (EPA). This also includes progress reports as required by the MDE.
    - https://www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/chesapeake-bay-tmdl/index.html

- **NPDES MS-4 Permit** – Includes a link to the current Anne Arundel County NPDES-MS4 permit and all annual reports as required by MDE.
    - https://www.aacounty.org/departments/public-works/wprp/npdes-ms4-permit/index.html
- **Education and Outreach** – This section is for educating and motivating students, homeowners, and other stakeholders to take positive personal actions and work together for greater impact. Topics range from watershed identification, understanding impacts of stormwater, responsible boating, and actions residents can take to help minimize stormwater pollution.
    - https://www.aacounty.org/departments/public-works/wprp/education-outreach/index.html
- **Waterfront Homeowners Guide** - Anne Arundel County is lucky to have over 533 miles of shoreline. This resource outlines opportunities for waterfront homeowners to protect and enhance their waterfront properties and outlines their responsibilities in regards to the Critical Area Law.
    - https://www.aacounty.org/departments/public-works/wprp/waterfront-homeowners/index.html
- **BMP Maintenance** – Highlights a selection of typical stormwater BMPs found in the region and suggested maintenance actions to keep BMPs functional to ensure water quality is protected.
    - https://www.aacounty.org/departments/public-works/wprp/bmp_maintenance/index.html
- **Watershed Studies** - Since 2002, the County has conducted systematic and comprehensive assessments of the County's watersheds. These assessments were conducted to assess current water quality conditions and prioritize the County's streams and subwatersheds for restoration and preservation to improve the conditions of the County's watersheds.
    - https://www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/watershed-studies/index.html
- **Biological Monitoring** - In 2004, Anne Arundel County initiated a County-wide Aquatic Biological Monitoring Program. The County program is based upon the Maryland DNR MBSS program, scaled down to a County level. The program is structured such that all major watersheds of the County are sampled in a 5-year period.
    - https://www.aacounty.org/departments/public-works/wprp/ecological-assessment-and-evaluation/biological-monitoring/index.html
- **Illicit Discharge Detection & Elimination** – Examines the County's Illicit Discharge Detection & Elimination Program and provides resources for residents to identify and report potential illicit discharges.
    - https://www.aacounty.org/departments/public-works/wprp/illicit-discharge/index.html
- **Storm Drain Marking Program** – The storm drain marking program allows the community to work together to protect our waterways. Volunteers apply educational

messages on storm drains to remind residents that whatever goes into storm drains travels untreated to our creeks, streams, and rivers.
    - https://www.aacounty.org/departments/public-works/wprp/storm-drain-markers/index.html
- **Explore Your Watershed** - Anne Arundel County consists of 12 primary watersheds and hundreds of sub-watersheds and all of them discharge directly into the Chesapeake Bay. Residents can learn about the specific watershed they live in.
    - https://www.aacounty.org/departments/public-works/wprp/watersheds/index.html
- **Science of Stormwater** - Many people believe that stormwater is "clean" and that it does not harm water quality. This perception is understandable since the amount of pollution from any one spot is not usually significant by itself. This resource explains how stormwater pollution occurs, where it goes, and how to minimize sources of pollution.
    - https://www.aacounty.org/departments/public-works/wprp/science-of-stormwater/index.html
- **Reduce Stormwater Pollution at Your Home** – Explains simple things property owners can do around their home and yard to help reduce the flow of stormwater pollution to the Bay. Strategies include: Pet waste collection and disposal, proper lawn fertilization techniques and alternatives, rainwater collection methods, septic tank maintenance, proper household waste disposal options and alternatives, bay-friendly car maintenance tips, and responsible boating tips.
    - https://www.aacounty.org/departments/public-works/wprp/think-bay/index.html
- **Responsible Boating** - While most boaters appreciate the natural resources that abound in the watersheds in which they recreate, many are unaware of the impacts boating can have upon those resources.
    - https://www.aacounty.org/departments/public-works/wprp/clean-boating/index.html
- **Rhode River Bacteria Brochure** – A brochure was distributed to marinas on the Rhode River relating to bacteria pollution. The brochure was targeted to boaters to explain how boating can contribute to bacteria issues in the river.
    - https://www.aacounty.org/departments/public-works/wprp/education-outreach/Bacteria_Handout_FINAL_2.pdf

In addition to the WPRP webpage, several social media outlets including Facebook (https://www.facebook.com/aawprp) and Twitter (**Error! Hyperlink reference not valid.**), are used 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 relevant 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.

WPRP in the Community

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 two select articles about the WPRP that were published during the reporting period:

- "Bay scientists: Stream restoration benefits not clear cut" – November 30, 2018 Bay Journal, http://bit.ly/33g6eBm
- "County contracts with outside firms for environmental projects" – May 9, 2019 Eye on Annapolis, http://bit.ly/2Cdrw6N

The following (Table 17) is a list of informational presentations and events in which the WPRP participated during the reporting period:

Table 17. WPRP events during FY19

Date	Organization/Event	Topic
7/25/2018	AA Chamber – Enviro Committee	Program Update
7/13/2018	WPRP Community Meeting	Sappington Hill Pond Retrofit
7/16/2018	WPRP Community Meeting	Cape St. Claire Outfall Repair
7/16/2018	WPRP Community Meeting	Lakeland Road Outfall Repair
8/9/2018	Four Seasons Community Association	Stormwater fee questions and Easement discussion
8/16/2018	WPRP Community Meeting	Cat Branch Stream, Outfall, Pond Restoration & Sewer Repair
8/17/2018	MACo	Surviving the Stormwater Surge: MS4 Permit Update
8/29/2018	Tri-Con Conference	Nutrient Trading
9/10/2018	Harting Farm HOA	Harting Farm Pond Retrofit
9/13/2018	WPRP Community Meeting	Shipleys Choice Dam
9/13/2018	WPRP Community Meeting	Crownsville Road Outfall
9/18/2018	WPRP Community Meeting	Millrace Pond Retrofit
9/24/2018	Baltimore City S W Fee Committee	Full Delivery Contracting
9/26/2018	WPRP Community Meeting	Mount Airy Court Outfall Restoration
10/3/2018	WPRP Community Meeting	Mountain Estates Pond Retrofit
10/9/2018	Glen Burnie Master Gardeners	WPRP Program
10/25/2018	WPRP Community Meeting	Key School Pond Retrofit
10/25/2018	WPRP Community Meeting	Mt. Airy Court Outfall
10/27/2018	AA WSA	WPRP Program
11/4/2018	AWRA Stream Conference	Tour of Furnace Branch
11/9/2018	Advocates for Herring Bay	Herring Bay Watershed Assessment
11/20/2018	WSA Property Managers	WPRP Program
11/20/2018	WSA Property Managers	Stormwater fee questions
12/7/2018	MWMC Conference	Phys/Chem Monitoring of Stream Restorations
12/10/2018	MDE Stormwater Conference	Full Delivery Contracting
1/31/2019	EPA Webinar	Full Delivery Contracting
2/20/2019	Generals Highway Assoc	Local projects
2/23/2019	WSA Annual Conference	WPRP Program
2/23/2019	WSA Annual Conference	Steep slope solutions
3/6/2019	ERBA Conference	Full Delivery Contracting

Table 17. WPRP events during FY19

Date	Organization/Event	Topic
3/7/2019	Severn River Commission	WPRP Program
3/23/2019	Davidsonville Green Expo	WPRP Program
3/27/2019	WPRP Community Meeting	Shipley's Choice Dam
3/28/2019	Tyler Heights (3rd Grade)	WPRP Program
3/28/2019	WPRP Community Meeting	Barrensdale Outfall Repair
4/11/2019	Leadership Anne Arundel	WPRP Program
4/12/2019	Glen Burnie High School	WPRP Program
4/27/2019	Severna Park Earth Day	WPRP Program
4/30/2019	WPRP Community Meeting	Heritage Hills Stormwater Projects
5/3/2019	Study Class	WPRP Program
5/10/2019	Stormwater Partners Forum	Full Delivery Contracting
5/13/2019	Cypress Improvement Assoc	WPRP Program
5/17/2019	DNR	AACo Monitoring Program Overview
5/18/2019	DPW Open House	WPRP Program
5/20/2019	NAEP Conference	WPRP Program
5/30/2019	NOAA Webinar	WPRP Program
6/12/2019	Mayo Civic Association	WPRP Project Tour

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 many cases, feedback from the local community is taken into account from the design process through construction.

As mentioned in last year's annual reports, to help local Anne Arundel County residents begin to recognize the uniqueness of our network of streams throughout the County, and to build community pride, WPRP, in partnership with the Bureau of Highways, started signage installations at various creek crossings along County-owned roads. Initially the signage is being installed along major thoroughfares but, if successful, the program could easily be expanded. The signs identify the creek name, major watershed, and the WPRP logo to improve branding of the program. The program installed over 60 creek crossing signs in FY19.

Watershed Restoration Grant Program

Successful conservation and preservation of Anne Arundel County's watersheds takes teamwork. To that end, in 2014 the Anne Arundel County Department of Public Works, in partnership with the Chesapeake Bay Trust, created 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 permit and local waterway cleanup plans. This program encourages on-the-ground restoration activities that reduce stormwater flow and pollutants and engage Anne Arundel County residents in these activities.

Below (Table 18) is a list of organizations that were awarded funding from Anne Arundel County for water quality restoration projects in 2019:

Table 18. Projects awarded WPRP grant funding in FY19

Organization	Project Description	Watershed	Funding Amount	Match Amount	Impervious Acres Treated
Arundel Rivers Federation	Gravely-Kings Branch Stream Restoration	South River	$378,487	$1,976,433	33.2
Chesapeake Rivers Association	Circle Drive Outfall Restoration in Winchester on the Severn	Severn River	$161,544	$256,688	2.3
Arundel Rivers Federation	Beechnut Kennels Bioretention Project	Rhode River	$47,331	$4,000	0.44
Annapolis Roads Property Owners Association	Mayapple Watershed Remediation	Severn River	$38,358	$9,752	0.47
Arundel Rivers Federation	Herrington Harbour North Headcut Stabilization, Wetland Enhancement, & Living Shoreline	Herring Bay	$192,940	$98,244	9
Alliance for the Chesapeake Bay	Cape St. Claire Living Shoreline and Marsh Project	Magothy River	$298,868	$235,000	38.88
		TOTAL	**$1,117,528**	**$2,580,117**	**84.29**

More information about the grant program can be found at www.cbtrust.org.

Bureau of Utility Operations

The Anne Arundel County Bureau of Utility Operations (BUO) is tasked with providing safe, clean drinking water and to manage the collection and processing of wastewater in public service areas throughout the County. As such, a major aspect of the BUO outreach program focuses on water conservation.

Resources have been developed to promote water saving actions, including the distribution of toilet tank leak detection kits. In addition to leak detection, other water conservation tips include the use

of commercial car washes, limiting or eliminating lawn watering, use of low-flow showerheads, and the use of rain barrels to harvest rainwater for use in gardens.

During the reporting period, the BUO attended numerous community events to promote water conservation and conducted tours of various County-operated water treatment plants and wastewater reclamation facilities (Table 19).

Table 19. Bureau of Utilities community events and tours in FY19

Date	Organization/Event	Topic
7/31/2018	CAT-N Open House	Outreach Event
8/7/2018	SERC	Facility Tour
9/22/2018	National Night Out -Piney Orchard	Outreach Event
10/7/2018	Emergency Preparedness Expo.	Outreach Event
10/8/2018	MAMSA	Outreach Event
10/10/2018	MAMSA	Outreach Event
10/18/2018	STEM Day - Glen Burnie Library	Outreach Event
10/29/2018	Lindale Middle School STEM	Facility Tour
11/10/2018	STEM Day - Glen Burnie Library	Outreach Event
11/14/2018	AACC Science Night	Outreach Event
4/9/2019	Cub Scout - Water Presentation	Outreach Event
4/11/2019	Old Mill Middle School Students	Facility Tour
5/18/2019	DPW Open House	Outreach Event

The BUO produces an "Annual Water Quality Report" as required by the Safe Drinking Water Act which summarizes the state of the County's drinking water sources and production methods. The reports are found on the BUO webpage and are mailed to all direct bill customers. More details can be found here: https://www.aacounty.org/departments/public-works/utilities/forms-and-publications/water-quality-reports/index.html

Sanitary Sewer Overflows caused by sewer system obstructions, damage, or flows in excess of sewer capacity can have a significant impact on local water quality. In FY19 BUO developed a tool residents can use to view information about Sanitary Sewer Overflows that have occurred in the County. Details can be found here: http://bit.ly/33gVbrG. The BUO works in partnership with the Anne Arundel County Department of Health to notify the community when a Sanitary Sewer Overflow causes a closure to a local waterway.

With nearly 1,800 miles of sewer lines throughout its service area, BUO appreciates notification from the public if a sewer backup is suspected. Citizens are directed to call the 24-hour Emergency Services at 410-222-8400 at any time to report water or sewer emergencies in Anne Arundel County. BUO is committed to protecting the health of the public and the environment.

Bureau of Highways

The Anne Arundel County Bureau of Highways (BOH) performs maintenance activities to keep the County's road's safe and in good condition. Among other things, the BOH is responsible for roadside maintenance, drainage maintenance, and snow removal.

Roadside maintenance is mainly performed by three Road Districts. Some examples of the services performed in County-maintained roadways include:

- **Litter/Debris Removal** - Help keep roadways, stormwater inlets, and ditches free of litter and debris. Litter and debris is picked up along all County-maintained roadways. Residents may request litter/debris removal within the County-maintained road right-of-way by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Roadside_Maintenance/litterdebris-removal
- **Leaf Removal/Recycling** - Helps keep ditches and curblines free of leaves. The page explains relevant County services, and suggests opportunities for homeowners to manage leaves responsibly. Residents may request removal of leaves that have accumulated on County-owned roadways or ditches and are causing a hazard or blocking the flow of water by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Roadside_Maintenance/leaf-removalrecycling

Drainage maintenance is performed by various divisions within BOH including Road Operations and Infrastructure Management. Some examples of the services performed in County-maintained roadways include:

- **Culvert & Closed Storm Drain Program** - The Bureau of Highways is responsible for the inventory, inspection, and maintenance of the County's culverts and closed storm drain systems. The Road Operations Division performs routine maintenance on these systems. The Infrastructure Management Division, inventories and inspects these systems via a programmed approach. There are approximately 85,000 components in the inventory at this time. These components include inlets, manholes, pipes, culverts and outfalls. Residents may request Storm Drain System Maintenance by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/culvert--closed-storm-drain-program
- **Ditch/Curb and Gutter Cleaning** - By completing necessary ditch or curb and gutter cleaning work on County-maintained property, we are reducing sediment and debris traveling to the bay during periods of inclement weather. Keeping ditches and curblines free of debris also protects the citizen's investment in our infrastructure by insuring that these structures do not overflow and cause stormwater to pond on roadways causing safety issues and pavement damage. Residents may request Ditch/Curb and Gutter Cleaning by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/ditchcurb-and-gutter-cleaning
- **Drainage Construction** - Construction of new drainage systems including inlets, pipes, headwalls, and/or placement of outfall protection on County-maintained property. By completing necessary drainage construction work on County-maintained property, we help control the flow of water and sediment into the bay. Residents may request Drainage Construction by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/drainage-construction

- **Drain Pipe Cleaning** - Drainage pipes are critical to carry the flow of water under the road so that it may continue on its natural drainage course. Pipe obstructions may result in flooding and/or damage to the roadway surface. Work under this activity includes cleaning and removing debris from pipes and flushing pipes using a power rodder to remove any obstructions. Residents may request Drain Pipe Cleaning by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/drain-pipe-cleaning
- **Drain Pipe Repair/Replacement** - This work protects the citizen's investment in our infrastructure by preventing the undermining of roadways due to a failing pipe. Work in this activity includes the repair or replacement of pipes, depending on the degree of deterioration. This activity is scheduled throughout the year, however, in the presence of a safety hazard, work is scheduled when detected. Residents may request Drain Pipe Repair/Replacement by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/drain-pipe-repair-and-replacement
- **Emergency Storm Drain Program** - The BOH is responsible for resolving flooding or water ponding problems that are caused by storm runoff from County-maintained roadways. Residents may request flooding and/or ponding assistance by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/emergency-storm-drain-program
- **Erosion Control** - Repair of eroded areas caused by water coming from a County-owned or County-maintained road. To reduce water pollution and prevent erosion, we place material such as topsoil, jute mats, grass seed, rip rap, etc. on County-maintained property. Residents may request Erosion Control by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/erosion-control
- **Rain Gardens** - 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.
    - https://www.aacounty.org/services-and-programs/rain-gardens
- **Storm Drain Cleaning** - Cleaning of storm drain inlets on County-owned property reduces sediment traveling to the Bay. Work is completed on a rotating basis using a vactor (vacuum) truck on approximately 25,850 inlets. Inlets are cleaned every 3 years with special attention given during and after rainfall events to insure proper drainage. Residents may request Storm Drain Cleaning by contacting their local Roads District.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/storm-drain-cleaning
- **Storm Drain Repair** - Repair to storm drain inlets and manholes on County-maintained property reduces sediment traveling to the Bay. This work also protects the citizen's investment in our infrastructure by preventing deterioration of the road network due to consistent ponding on streets. In addition, road shoulders and side slopes are protected from erosion caused by the flow of uncontrolled water. Residents may request Storm Drain Repair by contacting their local Roads District.

    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/storm-drain-repair
- **Stormwater Management Facilities** - The BOH currently manages the maintenance of approximately 700 County-owned stormwater facilities. These facilities generally serve single-family residential developments. Other BMP's found in apartment and townhome complexes, industrial and business centers, or in developments under construction are privately maintained. Services provided on County-maintained BMP's include mowing, inspection, and general maintenance of these devices. Residents may report a problem with a County-maintained BMP by contacting the Infrastructure Management Division (IMD). Inquiries regarding privately maintained BMPs should be directed to the Department of Inspections and Permits.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/stormwater-management-facilities
- **Street Sweeping** - Anne Arundel County's street sweeping program is designed to keep debris out of storm drains, our creeks, rivers and ultimately the Chesapeake Bay. The list of roads included in the street sweeping program is available for viewing. Street sweeping data is shared on social media and in the WPRP Annual Report.
    - https://www.aacounty.org/departments/public-works/highways/road-maintenance/Drainage_Maintenance/street-sweeping

Snow removal on County-maintained roads is performed by the BOH. The BOH is dedicated to insuring the safety of the traveling public while providing timely service to our citizen and business communities during inclement weather by planning and executing its winter operation activities on more than 6,700 County-maintained roads and streets, and doing it in an environmentally friendly way.

De-icing materials are an effective tool for maintaining safe winter road conditions. However, the County is aware that excessive use can have negative impacts on the environment. 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. The BOH strives to only apply as much salt as necessary to achieve safe driving conditions. Use of salt management data is shared on social media and in the WPRP Annual Report.

The County's winter de-icing strategy and resources are well explained on the County webpage at www.aacounty.org/departments/public-works/highways /snow-information/index.html. 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.

Bureau of Waste Management Services

The County's Bureau of Waste Management Services (WMS) is responsible for collecting recycling, yard waste and trash from over 162,000 curbside customers. The Bureau also is

responsible for the operation of the Millersville Landfill and Resource Recovery Center and the County's three Recycling Centers.

The Recycling and Waste Reduction Division of WMS administers an extensive outreach program geared toward residential and commercial recycling and other source reduction strategies and promotes the proper disposal of household hazardous waste (HHW) materials.

Outreach pertinent to HHW disposal has been reported in previous annual reports and is also documented in the County's Litter and Floatables Comprehensive Plan **(Appendix F)**; a summary of events related to HHW is located in Part IV.D.4. of the Annual Report. Additional information on HHW disposal is available on the County's website at: https://www.aacounty.org/services-and-programs/household-hazardous-waste-drop-off-days.

In FY19, WMS held six resident-only HHW collection events. These events accounted for the proper disposal of 161 tons of HHW, successfully keeping these materials out of our landfills, roadside ditches, storm drains, and waterways. These collection events are vital to keeping harmful toxins out of our landfill, and also discourage the improper disposal of hazardous materials. All HHW materials collected at the events are packaged, transported, and disposed of by a licensed hazardous waste contractor.

WMS also provides information such as what can be recycled; ways to get recycling and composting bins; dealing with yard waste and grass cycling; source reduction; 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 (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 County-wide recycling rate has increased from 31% to 40%.

Department of Health

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 in the series include the following:

- 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.

Recreational Water Quality

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 campaign's major focus areas 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 Anne Arundel County Department of Health also issues a closure when a sewage spill, leak or other problem indicates human waste has impacted the water. Subscribers to the Department's Recreational Water Quality E-mail Alerts receive an e-mail notifying them when County waterways are closed and reopened. Alerts can also be received via text messages by following the Department of Health on Twitter or Facebook.

Bay Restoration Fund

The Department of Health promotes the Bay Restoration Fund Program. This program provides grant funding to qualified applications for assistance to install nitrogen reducing pretreatment units 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. Additionally, the grant funds can be used to help qualified applicants connect to existing public sewer system. These connections can be funded if the existing dwelling, currently served by a septic system, are located where public sewer is available and immediately abuts the property. The Department of Health administers this grant, awarded by MDE.

In FY19, the Department of Health used the Bay Restoration Fund to cost-share the installation of 223 pretreatment units and 13 connections to public sewer. 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. Additionally, the Fund subsidized four new septic connections to the public sewer system.

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 videos are also available to view on the department's website (https://aahealth.org/).

Department of Inspections & Permits

The Department of Inspections and Permits (I&P) strives to provide the citizens of Anne Arundel County with the highest inspection standards consistent with the adopted codes and regulations. This is accomplished through the consistent and equitable application of regulations in the built and natural environment through plan reviews, inspections, enforcement, and the issuance of permits and licenses.

The I&P website contains general information available to the public regarding erosion and sediment control, buffer management, grading and permits, the Chesapeake Bay Critical Area, invasive species, and sensitive areas. This information can be found at https://www.aacounty.org/departments/inspections-and-permits/permit-center/index.html.

The Anne Arundel Soil Conservation District also plays a role in the prevention of erosion and sediment during construction activity.

The Emergent Grasses Program is a County supported effort between the Department of Inspections and Permits and the Department of Recreation and Parks. Through this program, County residents with qualifying living shoreline or other tidal projects can receive appropriate Emergent Marsh Grasses for planting in marsh areas free of charge.

I&P also maintains the Anne Arundel County Environmental Hotline at 410-222-7171.

Anne Arundel Soil Conservation District

For more than 70 years, farmers have turned to the Anne Arundel Soil Conservation District (the District) as a trusted source of knowledge and technical expertise in managing and protecting soil and water resources on their farms. Today, farmers, developers, businesses, environmental groups, and government agencies rely on the District to help them meet nutrient and sediment reduction goals outlined in the County's Watershed Implementation Plan to protect and restore the Chesapeake Bay by 2025. Resources are available on the District's website at http://www.aascd.org/. Below are some highlighted programs conducted by the District:

- **Agricultural Programs** - Agriculture is making tremendous strides on behalf of the Bay, accounting for approximately 46% percent of all nutrient and sediment reductions since 2009. This success is largely due to the on-the-ground efforts of soil conservation professionals who work with farmers to develop Soil Conservation and Water Quality Plans (SCWQPs) that address natural resource and environmental concerns for their farms. These plans usually include a menu of best management practices (BMPs) that can be installed to protect soil and water resources. Cover crops and streamside buffers are often recommended to prevent nutrients from crop fields and nurseries from entering waterways. Livestock fencing, watering facilities and improved pasture management practices help farmers protect streams from livestock impacts. In FY 2019, the Anne Arundel Soil Conservation District developed/updated 22 SCWQPs for county farms. These plans

included more than 86 (37 WIP) BMPs. The design, installation and construction supervision of these practices are the responsibility of the District's technical staff.

- **Urban Programs** - Construction and road building projects can have a significant impact on water quality. The District is authorized to review and approve erosion and sediment control plans for projects in the County. This ensures that environmental safeguards are in place to minimize soil erosion, nutrient runoff and sediment buildup in local waterways. In FY 2019, the District reviewed 1,111 erosion and sediment control plans for construction projects on 23,311 acres. Approximately 22% of these plans were approved (241 approved plans with 1,428 acres of disturbance). To further protect the county's valuable natural resources, the District provides planning, design and management services for local stream restoration projects, shoreline stabilization projects, and drainage management projects.
- **Envirothon** - Each year, the District sponsors a local Envirothon competition for high school students interested in learning about natural resources and gaining a better understanding of today's complex environmental issues. Designed by soil conservationists, foresters, wildlife experts and other natural resource professionals, the Envirothon moves students beyond the classroom to solve real life environmental problems in field settings. Students learn directly from natural resource professionals and compete at the local, state and national levels.

Table 20. Anne Arundel Soil Conservation District Agricultural BMPs FY19

Best Management Practice	Achieved	Percent of WIP Goal Achieved	2025 WIP III Goal
Cover Crops – Traditional (acres)	3,937	84%	4,667 AC/ Year
Soil Conservation & Water Quality Plans (cumulative acres)	8,758	63%	14,000 AC/ Year
Forest Buffers (acres)	2.1	3%	75
Livestock Fencing (linear feet)	750	0.3%	236,752
Land Retirement to Open (acres)	31	6%	538
Watering Facility (number)	3 No. (53.1 AC treated)	15%	Treats 10% of Pasture AC (346.1 AC)

Anne Arundel County Watershed Stewards Academy

The Anne Arundel County Watershed Stewards Academy (WSA) was created in 2009 out of a partnership between Arlington Echo Outdoor Education Center and the Anne Arundel County Department of Public Works to build capacity within communities to reduce pollutants entering our waterways via stormwater runoff.

The Watershed Protection and Restoration Program continues to provide critical support in connecting Stewards and communities with watershed studies, planning, and restoration efforts. WSA trains citizens in Anne Arundel County to help neighbors reduce pollution in our local streams, creeks, and rivers.

WSA's hands-on training courses 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. Collectively, these community and individual actions add up to better health for our local waterways and the Chesapeake Bay.

As noted in previous 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. This and more can be found on the WSA website at http://aawsa.org/

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.

2019 WSA Successes

- Installed 964,538 square feet of new-in-the-ground projects
- Reached 31,688 County residents, providing technical assistance or environmental education
- Planted 7,463 Native Plants and Trees
- Stewards donated 8,984 volunteer hours towards restoration, education, and outreach in their communities
- Removed 6,640 square feet of invasive species
- Removed 11,050 pounds of trash

During the reporting period, WSA recruited 30 Stewards as part of the 11th Certification Course. Of the 30, 50% were from priority communities and watersheds, particularly in Northern and Southern Anne Arundel County.

WSA also held many networking and continuing education events through the year including maintenance and residential site assessment workshops, RiverWise Congregation networking events, environmental literacy and field trips to tour practices representing innovative approaches to stormwater management. They also partnered with Master Gardeners, and Chesapeake Bay Landscape Professionals to offer joint continuing education and networking sessions. WSA's annual conference in February brought together over 220 Stewards, Consortium, and environmental advocates.

RiverWise Congregations
For WSA's RiverWise Congregation Stewards, there were two major re-engagement events during this reporting period:

- Summer 2018 Listening Session and Maintenance: A luncheon event gave staff an opportunity to reconnect with RiverWise Stewards and to hear what support they would like to receive from WSA. The #1 issue Congregations told us they have struggled with is maintenance, and as a result, WSA devoted several thousand dollars to pay for maintenance service at these congregations.

- Spring 2019 Creation Care Event, Maintenance, and the One Water Partnership: A dinner event with interactive workshops allowed WSA to reengage RiverWise Congregations. Eleven congregations received funds to be used for greening projects or maintenance of their Stormwater BMPS. Five new congregations were also engaged through this event. WSA also used this event to announce that they would be the technical partner in Anne Arundel County for a NFWF-funded, three-year, faith-based initiative, the One Water Partnership. With Interfaith Partners for the Chesapeake and Interfaith Power & Light, WSA will be using One Water Partnership to expand their RiverWise Congregations Program, by supporting their existing network of congregations, engaging new faith-based communities, and working to install stormwater BMPs on congregational grounds.

WSA has developed its Maintenance Corps Steward Action Group, with a goal of creating a volunteer-led team of Master Watershed Stewards, who will donate their time to ensure that congregations have the resources and knowledge they need to maintain their stormwater BMPs. Corps members are trained to pull weeds, remove non-native species, and clean out excess sediment to keep projects functioning at their maximum potential; then, they can train members of congregations to perform these essential tasks with the proper level of skill and confidence. WSA is using a "pay-it-forward" model to encourage congregations that have received assistance on their own grounds to help at another faith-community's clean-up event. Since spring 2019, WSA has hosted events at 3 congregations in Anne Arundel County; two of these congregations are African American Churches.

Clean Water Communities
WSA has continued to work with the Glen Isle community to reach the following Clean Water Communities benchmarks:

- Community Stormwater Assessment
- Minimum of 2 Master Watershed Stewards from the community certified
- 10-15 Community Stewards trained
- Launch a "Habits that Help" campaign, and secure pledges from 20% of residents
- Install rainscaping projects on 10 residential properties

As of the writing of this report, Glen Isle has reached all benchmarks except the installation of ten residential rainscaping projects. In May of 2019, WSA's Class 11 Steward Candidates installed two adjacent projects in Glen Isle that worked towards their ten-project goal. Along with impervious surface removal, two rain cisterns, and a conservation landscape were installed at a

private residence. At a neighboring community property, 500 square feet of invasive plants were removed and a native buffer planting was installed. These combined projects covered 840 square feet and included the planting of 9 trees and 250 native perennials and shrubs.

Through the late spring and early summer of 2019, Glen Isle's lead Master Watershed Steward and his team of Community Stewards conducted outreach to interested community members to identify the remaining 8 residential projects. Two larger scale projects and six smaller scale projects are in the process of having their designs completed and installations are slated for the fall of 2019.

A Master Watershed Steward Candidate has spearheaded the inclusion of the South County community of Columbia Beach into WSA's Clean Water Communities program. The Steward Candidate worked with community volunteers to remove 360 square feet of invasive phragmites and installed a 360 square foot conservation landscape that included 176 native forbs and shrubs.

The Steward Candidate is working to reach additional benchmarks. He has convened a team of potential Community Stewards who will be trained in a Community Steward Short Course to be held in 2020. He is also actively working to get a Community Stormwater Assessment that will help identify the remaining nine residential rainscaping projects. WSA will continue to support Columbia Beach as it works through the remaining Clean Water Communities benchmarks.

Short Course for HOAs and Property Managers

Formative research was conducted to design a short course for property managers and HOA leaders, including topics of interest, action outcomes, duration, support materials, format and meeting time. Formative research included a survey and 4 interviews/focus groups with property managers and HOA leaders. WSA's Executive Director also participated in the County-led Stormwater Workgroup during 2018 during which developers and HOA leaders discussed barriers to successful BMP implementation and maintenance. The results of this formative research were used to design a Stormwater Success Short Course. A total of 27 people attended the course, representing both HOAs and property management firms.

Arlington Echo Outdoor Education Center - Chesapeake Connections

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 hosts fourth grade elementary students on day and overnight trips, but also hosts middle, and high school groups.

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 provide 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 incorporated 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, raingardens, and manage runoff areas on school grounds or in the community to treat stormwater pollution. 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. In 2019, over 1,500 Anne Arundel County Public School students participated in planting events at 4 newly restored water quality project sites around the County. Below is a listing of those opportunities that occurred during 2019:

- **Cape St. Claire Outfall Repair:** Severna Park Middle (450 students)
- **Towering Oaks Pond Retrofit:** Marley Middle (300 students)
- **Revell Downs Outfall Restoration:** Lindale Middle (407 students), Chesapeake Science Point (80 students)
- **Granite Baptist Stream Retrofit:** Old Mill Middle South (312 students)

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) 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. Furthermore, the facility staff implement all aspects of their SWPPPs including quarterly and annual compliance inspections to ensure proper good housekeeping and stormwater pollution prevention practices are maintained and functioning accordingly.

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. The County provides training for staff working at those County facilities with stormwater discharge permits as discussed in **Part IV.D.5.b.v.**

E. <u>Restoration Plans and Total Maximum Daily Loads</u>

In compliance with §402(p)(3)(B)(iii) of the CWA, MS4 permits must require stormwater controls to reduce the discharge of pollutants to the MEP. By regulation at 40 CFR §122.24, BMPs and programs implemented pursuant to this permit must be consistent

with applicable WLAs developed under EPA approved TMDLs (see list of EPA approved TMDLs attached and incorporated as Attachment B).

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 program within the Watershed Protection and Restoration Program (WPRP) to facilitate NPDES MS4 permit compliance. One component of the program was oversight of watershed assessments for each of the County's 12 watersheds as stipulated by permit requirements (**Part E.1.a and b**). These watershed studies involved a partnership between the County, various consultants, and citizen stakeholders. The field data collection was performed primarily by consultants for each watershed study effort. Modeling, analysis, subsequent action prioritization, and reporting were performed by County staff working with the consultants. The work effort also included coordination of professional management team meetings between the County, the consultants, and citizen stakeholders to reach consensus pertaining to assumptions and data interpretations, and desired restoration/preservation implementation strategies. Following consensus, the watershed study was advertised for a 30-day public comment period after which a summary of comments received and the County's response was incorporated into the final watershed study document. Environmental concerns and

recommendations can be found in GIS files published on the County website and viewable on the interactive 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 (CIP) expenditures relating to environmental restoration and preservation in support of TMDL compliance.

As reported in the FY18 Annual Report, the County completed the Herring Bay and Middle Patuxent River watershed assessments in June 2018. With completion of these watershed assessments, the County satisfied this permit requirement. The watershed assessment documents, for all 12 watersheds (Table 21), are found on the County's website: https://www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/watershed-studies/index.html

Table 21. 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 River	02131002	Complete	Complete	Complete
South River	02131003	Complete	Complete	Complete
Upper Patuxent River	02131104	Complete	Complete	Complete
Magothy River	02131001	Complete	Complete	Complete
Patapsco Non-Tidal	02130906	Complete	Complete	Complete
Patapsco Tidal	02130903	Complete	Complete	Complete
Bodkin Creek	02130902	Complete	Complete	Complete
Little Patuxent River	02131105	Complete	Complete	Complete
Rhode River	02131004	Complete	Complete	Complete
West River	02131004	Complete	Complete	Complete
Herring Bay	02131005	Complete	Complete	Complete
Middle Patuxent River	02131102	Complete	Complete	Complete

2. Restoration Plans

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 WQv 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 managed to the maximum extent practicable (MEP).

In 2015 the County submitted to the Maryland Department of the Environment (MDE) an impervious surface area assessment and the associated baseline for impervious area restoration (*Establishing Baseline – Impervious Area Assessment; Anne Arundel County, May 2015*). As part of the County's FY18 Annual Report, the County proposed revisions to this assessment and the restoration baseline (*Revision of Anne Arundel County's 2014 Baseline & Impervious Surfaces Treated to the MEP, February 2019*). MDE indicated its acceptance of the County's proposed revisions in "Attachment 1: MDE's Review of Anne Arundel County's 2018 MS4 Annual Report," received by the County on May 15, 2019. The updated impervious area assessment identified 5,970 acres of managed impervious area and 24,981 acres as the baseline of unmanaged impervious area, which set the 20% restoration goal at 4,996 acres. Please refer to Part IV.E.2.a and Appendix H in the County's FY18 Annual Report for the complete details of the adjustments made to the County's impervious surface assessment, associated analyses, and supporting data.

Impervious Area Restoration Plan Progress

The County previously submitted an *Impervious Area Restoration Plan* (Appendix I of the FY15 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, alternative urban BMPs (e.g., street sweeping, septic system connections to WRF, and septic systems upgraded to enhanced denitrification systems), County-funded restoration grant projects, and other NGO restoration projects.

This report section summarizes the County's progress toward meeting the 20% ISR goal. **Part IV.C.6** (Water Quality Improvements Projects) describes the inventory of watershed restoration projects. To document impervious restoration and permit compliance at the end of the MS4 permit term (February 11, 2019), in its FY18 Annual Report the County included projects completed through December 2018 (i.e., projects completed through the first half of FY19, outside of the

FY18 reporting period). As the current permit has been administratively continued pending issuance of the next generation MS4 permit, this section will cover all restoration completed for the entire FY19 reporting period, including those projects that were already submitted with the FY18 Annual Report. Table 22 provides a summary of the types of restoration projects completed in FY19 and impervious restoration credits, as well as cumulative restoration credit totals (FY14-FY19). Credits for annual BMPs (e.g., street sweeping, inlet cleaning, and septic pumping) are updated yearly and are not cumulative; averaged values since the time of full programmatic implementation are used for the cumulative restoration total (FY16-FY18 for street sweeping and septic pumping; FY17-FY18 for inlet cleaning).

Table 22. FY19 Impervious Surface Restoration Credit Acres

Restoration Project	Impervious Acres Credited	
	Completed in FY19	Completed – Cumulative through FY19
Restoration BMPs		
- ESD	1.4	18.1
- structural	203.6	773.7
Alternative Restoration BMPs		
- street sweeping[1]	191.7	168.9
- impervious surface elimination	0	0.3
- reforestation	0.6	0.6
- catch basin and storm drain cleaning[1]	115.5	69.8
- stream restoration[2]	549.1	839.5
- outfall stabilization	14.8	31.3
- shoreline management	30.3	627.2
- septic pumping[1,3]	387.3	287.0
- septic denitrification[4]	76.4	298.7
- septic connections to WWTP	8.6	54.6
TOTAL ACRES	1,579.3	3,169.7

[1]For annual practices, cumulative progress values are based on the average equivalent impervious treatment achieved after full implementation of the programs. Averages for street sweeping and septic pumping are based on FY16-FY18, and catch basin cleaning is based on FY17-FY18. FY19 implementation of annual practices shows the County has maintained a level of programmatic effort beyond that required to continuing claiming the average annual credit.

[2] Equivalent impervious credit for stream restoration projects is no longer capped based on the impervious area within the project drainage area, per the latest guidance provided by MDE (MS4 Phase I Large Tentative Determination Permit MACO Meeting, January 16, 2020).

[3] The County's cumulative average septic pumping credit was revised from that reported in FY18. Additional data was obtained from the County's water reclamation facilities and is detailed in the MS4 Geodatabase and supplemental documentation in Appendix A.

[4]The FY19 credit total includes septic denitrification systems that were installed in previous reporting years, but were newly identified during a data cleanup effort by the County Department of Health. These "newly found" systems are identified in the MS4 Geodatabase in Appendix A.

Impervious Areas Restored: Projects completed in FY19 restored and managed 1,579.3 equivalent impervious acres, and contributed to cumulative total of 3,169.7 impervious acres restored from FY14 through FY19. Projects currently under design or under construction are anticipated to restore a sufficient amount of impervious surface for the County to meet its 20% ISR goal. Restoration projects that are proposed for design and construction, but for which design contracts are not yet in place, will also provide additional impervious surface management.

There were a few instances (see below) where the County made adjustments to its impervious surface accounting, all of which are also documented in the MS4 Geodatabase in **Appendix A** and noted in Table 22.

- Per MDE's letter to the Maryland Association of Counties, dated December 26, 2018, the County calculated the equivalent impervious credit for stream restoration projects using the pollutant load reductions based on the Chesapeake Bay Program (CBP) protocols, where such data were available. After meeting with MDE on January 16, 2020 (MS4 Phase I Large Tentative Determination Permit MACO Meeting), the County adjusted its equivalent impervious area crediting for stream restoration projects to reflect the removal of the impervious surface cap.
- The County Department of Health performed a comprehensive review of its septic system dataset. This exercise identified 100 enhanced septic denitrification systems, installed during previous reporting periods, but never submitted for impervious restoration credit. The County has included these systems in its FY19 reporting.
- While compiling data for this year's annual report, it was noted that the County had only reported and claimed credit for septage delivered to the Cox Creek Water Reclamation Facility (WRF) from FY16 through FY18. Additional data received from the Annapolis and Mayo WRFs was used to revise the credit claimed in relation to septic pumping for those previous years, and is provided in Appendix A.

Attainment of the 20% ISR Goal

The end of the County's permit term, February 11, 2019, fell in the middle of the FY19 reporting period. As of the end of the permit term, the County met its 20% ISR goal of 4,996 acres. This goal was attained through implementation of restoration and alternative BMPs (2,389 equivalent impervious acres), a revision of the County's 2014 baseline impervious area assessment, and the acquisition of nutrient credits generated by Anne Arundel County's WRFs (equivalent to 2,607 impervious acres) from mid-July through December 2018. Attainment of the 20% ISR Goal was documented in both the FY18 Annual Report, and in a submittal on March 29, 2019 to MDE, in response to a data request from Jennifer Smith (MDE) on March 13, 2019 for a final impervious acre restoration analysis.

During the second half of FY19, the County continued implementation of its impervious surface restoration plan, and attained an additional 781 acres of ISR credit through restoration and alternative BMPs. At the end of FY19, the County remains in compliance with its 20% ISR goal, while relying on fewer of the nutrient credits generated by Anne Arundel County's WRFs than at the end of the permit term which fell in the middle of FY19 (**Part IV.E.3**).

The County recognizes that all equivalent impervious surface restoration credit achieved through nutrient trading must eventually be replaced with impervious restoration credit provided through on-the-ground restoration and alternative BMPs. The County is confident that this is achievable based on the pipeline of projects shown in the FY19 MS4 Geodatabase (**Appendix A**) that are under design or under construction, and with the inclusion of projects currently proposed but not yet in design (see the FY2018 Financial Assurance Plan).

Strategy to Maintain Attainment of the 20% ISR Goal

As noted above, the County has met its goal of restoring or providing equivalent stormwater management for 20% of unmanaged impervious surfaces in the County. To maintain attainment of its goal, the County's understands it must continue its restoration efforts, as described below:

Restoration Projects in Progress: While the County has already completed a large number of restoration projects, a large number of projects are also currently under design and under construction that will provide a sufficient amount of credit for the County to be able to meet its 20% ISR goal (Table 4 in **Part IV.C.6** and **Appendix A**). Additional proposed projects are slated for design in FY20 and beyond. Credits for these projects are continuously tracked, verified, and will be documented in future reports.

BMP Maintenance Inspection: The County is continuously enhancing its BMP maintenance inspection program, ramping up field inspection efforts, and increasing inspection and maintenance of existing and new BMPs to meet triennial inspection requirements. In the future this effort will be further enhanced as the County is in the process of automating and fully integrating our asset and work order management system (AWOM); stormwater BMP maintenance inspection is slated to be a part of this system. In addition, the County will continue to work, in the coming year, to inspect the backlog of BMPs identified through the historic BMP cleanup project.

Full Delivery Water Quality Improvement Projects: Since FY17, the County has solicited proposals for full delivery design-build water quality improvement projects. The FY17 solicitation resulted in three pond retrofit projects that were completed in FY19, with a total impervious area credit of 119 acres. In FY18, the County awarded a contract for a large-scale, commercial septic to sewer conversion project that is anticipated to deliver 113.5 acres of treatment in FY21. The FY19 solicitation resulted in the selection of three firms to construct four projects, consisting of three living shorelines and one stream restoration, anticipated to deliver 255 acres of equivalent impervious credit. The County is currently reviewing project proposals received in response to its FY20 solicitation.

Alternative Strategies to Attain Restoration Goal: The County anticipates continued attainment of the 20% ISR goal through a combination of the strategies discussed above, along with adaptive management. Adaptive management includes utilizing all available restoration opportunities and enhancing alternate strategies including, but not limited to, identifying additional CIP projects with restoration potential or restoration components, the possibility of expanding the County restoration grant program, and nutrient trading/offset mitigation. Nutrient trading/offset mitigation has been approved by MDE for the remainder of this administratively extended permit term (**Part IV.E.3**). In addition to trading with County WRFs, the County is currently exploring the viability of trading

with local oyster aquaculture growers. These and other 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, the strategies employed to meet the goal will be evaluated, and adjustments made if necessary.

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:

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 (SW-WLA). 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. Restoration plans are 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*

A summary of all TMDLs approved for Anne Arundel County is provided in **Appendix H** to this annual report.

Described below are EPA-approved TMDLs for Anne Arundel County that have a SW-WLA, the status of each TMDL restoration plan and, as applicable, associated FY19 implementation progress. **Appendix H** contains individual TMDL restoration plans completed in FY19 and FY19 annual implementation assessment reports. MDE-approved TMDL restoration plans completed prior to FY19 can be found at https://aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/chesapeake-bay-tmdl/ .

The final date for meeting the Chesapeake Bay TMDL SW-WLA is 2025, as set by EPA. Anne Arundel County established final dates for meeting the SW-WLAs in the individual sediment and nutrient TMDLs, approved by EPA prior to FY19, as 2025 and 2030, respectively. Individual sediment TMDLs approved in FY19 have a target date of 2030 for meeting the SW-WLA. The target date, set by the County, for meeting the Baltimore Harbor & Curtis Bay/Creek PCB SW-WLA was originally set at 2025 to be consistent with the sediment TMDL target dates. However, due to the magnitude of required load reduction and the complexity of achieving PCB load reductions, the County may revisit that target date with MDE. Lastly, and in light of these same concerns, the County established 2040 as the target date for achieving the Patuxent Watershed PCB TMDL.

Chesapeake Bay Nitrogen, Phosphorus, and Sediment TMDL

The Chesapeake Bay TMDL was approved on December 29, 2010 and applies to all of Anne Arundel County. Anne Arundel County's Phase II Watershed Implementation Plan (WIP) serves as the restoration plan for the SW-WLAs for the impairments addressed by the Chesapeake Bay TMDL. Anne Arundel County's Phase II WIP and 2-Year Milestone Progress Reports can be found here: https://mde.maryland.gov/programs/water/TMDL/TMDLImplementation/Pages/WIPPhaseIICountyDocuments.aspx

On September 15, 2011 MDE finalized its Phase II Load Allocations. Anne Arundel County's Phase I NPDES MS4 load allocations are set forth in Table 23.

Table 23. Anne Arundel County (Non-Federal) Stormwater SW-WLA for the Bay TMDL*

	Total Nitrogen (TN) (lbs/yr)	Total Phosphorus (TP) (lbs/yr)
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.

FY19 Progress:

Anne Arundel County submitted an interim progress report to MDE on January 16, 2019 for its 2018-2019 2-Year Programmatic Milestones. With the integration of 2-Year Milestone reporting into the NPDES MS4 annual reporting process, MDE is no longer requiring the submittal of 2-Year Milestone reports for documenting progress toward the Bay TMDL. Guidance provided by MDE's Integrated Water Planning Program rendered progress reporting of WIP milestones by MS4 Phase I jurisdictions optional. (MDE Correspondence 9.30.2019)

The County's progress toward meeting its Bay TMDL goals through FY19 is summarized below (Table 24, Figure 2). The pollutant load reductions are calculated for all completed restoration projects and County programs, using an in-house spreadsheet model. The model follows 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), individual expert panel reports from CBP, and any communications with MDE that clarify or modify existing credit guidance.

Table 24. Summary of Bay TMDL Pollutant Load Reductions for TN and TP in Anne Arundel County, MD[1]

Pollutant	2009 Baseline (lbs/yr)	2025 Target (lbs/yr)	Required Reduction (lbs/yr)	Current Reduction (lbs)	% Reduction Achieved through FY19
TN	657,383	449,641	207,742	28,439	13.7%
TP	56,531	30,147	26,384	7,355	27.9%
TSS	14,218,000	4,646,000	9,572,000	5,042,974	52.7%

Note:
[1]For BMPs designed, under construction or completed prior to the final FY18 report, guidance from draft expert panel report or guidance from MDE 2014 has been used.

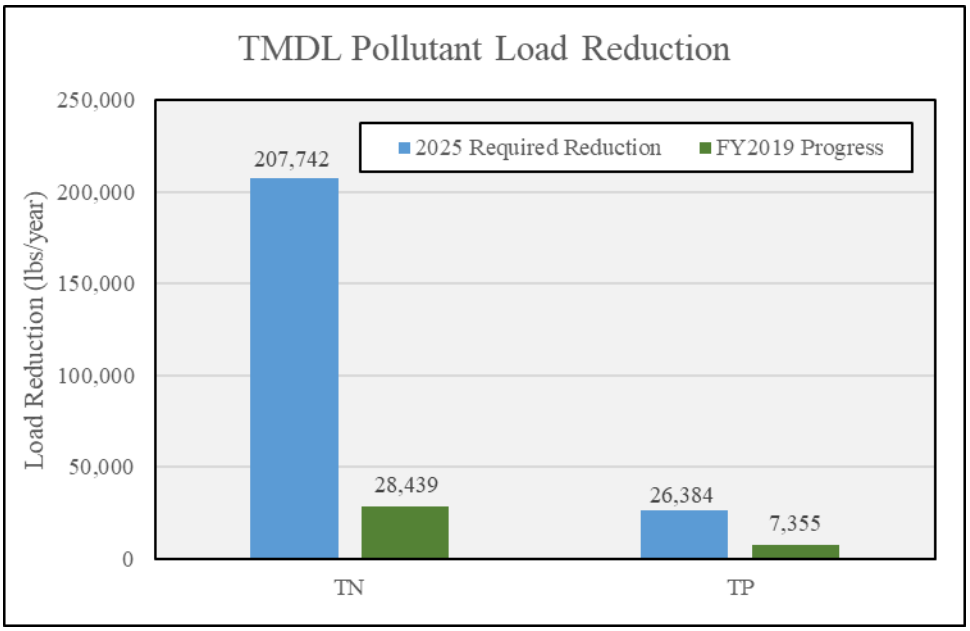

Figure 2. Summary of Bay TMDL pollutant load reductions for TN and TP in Anne Arundel County, MD

Individual Bacteria TMDLs

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 or Enterococci are identified as the impairing pollutant for the remaining four (4). Each of the TMDLs set forth a SW-WLA that is noted as a percent reduction in Table 25 below.

Table 25. Bacteria TMDLs for Anne Arundel County

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 *Total Maximum Daily Load Restoration Plan for Bacteria, February 2017.* Percent reductions required for the Patapsco and Upper Patuxent are for the Anne Arundel County portion only.

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 26).

Table 26. Bacteria Source Categories and Contribution

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 the four source categories were represented in all of the impaired waterbodies, Anne Arundel County chose to develop a single consolidated implementation plan to address all 19 bacteria TMDLs. Anne Arundel County's Bacteria TMDL Restoration Plan is posted on the County's WPRP Bay TMDL webpage, under TMDL Restoration Plans, at www.aacounty.org/departments/public-works/wprp/watershed-assessment-and-planning/chesapeake-bay-tmdl/index.html .

FY19 Progress:

During this reporting year the County developed a long-term bacteria trend monitoring strategy, which was implemented in July 2019. The monitoring plan entails monthly sampling at twelve (12) sites within the Marley and Furnace Creek bacteria TMDL watersheds. The first year of data from this effort will be reported in the County's *2020 Annual Bacteria TMDL Assessment*.

The County's Septic Task Force produced a Final Report in July 2018 and in September 2018 the County hired a Septic Conversion Program Manager. In August 2019 a customer survey was distributed to County residents to gauge citizens' attitudes towards water quality and willingness to pay for a septic-to-sewer conversion program, with nearly 1,500 residents responding. The 2018 Septic Task Force Final Report, as well as Septic Task Force meeting minutes can be found at https://www.aacounty.org/departments/public-works/septic-task-force/minutes/index.html

The County continued implementing Tier B (non-human source) recommendations during FY19 by continuing to develop a pet waste outreach program. In 2018 the County purchased three pet waste stations to make available to interested communities. In May 2019, a pet waste station was accepted by a community in the West River Mainstem bacteria TMDL watershed. A second pet waste station was accepted by a community in the Marley Creek bacteria TMDL watershed to be installed in spring 2020. More research on new potential pet waste station installations will continue into 2020.

An evaluation of the Restoration Plan's implementation progress was completed in FY19. This evaluation, the *2019 Annual Bacteria TMDL Assessment*, is included in **Appendix H**. 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 (WTM). Existing literature was used to evaluate load reduction progress associated with remaining Tier B strategies. Table 27 presents a summary of the County's progress toward achieving the SW-WLAs for Bacteria TMDLs.

Table 27. Bacteria TMDL SW-WLAs Implementation Progress for Anne Arundel County

Watershed	SW-WLA		Percent Reduction	
	Baseline	Target	Required	Reduction through FY19
Magothy River Mainstem	$4.97x10^{12}$	$4.33x10^{12}$	12.8%	25.36%
Forked Creek	$1.83x10^{11}$	$1.35x10^{11}$	26.3%	16.54%
Tar Cove	$9.82x10^{11}$	$2.07x10^{12}$	0.0%	1.29%
Furnace Creek	$3.66x10^{12}$	$8.14x10^{11}$	77.7%	20.28%
Marley Creek	$6.19x10^{12}$	$1.50x10^{12}$	75.7%	17.63%
Patapsco Lower North Branch	$2.37x10^{15}$	$1.99x10^{15}$	20.7%	21.67%
Upper Patuxent River	$1.20x10^{16}$	$6.01x10^{15}$	22.3%	1.78%
Bear Neck Creek	$3.55x10^{11}$	$2.01x10^{11}$	43.3%	5.88%
Cadle Creek	$3.54x10^{11}$	$9.85x10^{10}$	72.2%	17.37%
Severn River Mainstem	$6.07x10^{12}$	$4.92x10^{12}$	19.0%	26.61%
Mill Creek (Severn River)	$1.78x10^{12}$	$2.49x10^{11}$	86.0%	9.37%
Whitehall & Meredith Creeks	$4.92x10^{11}$	$4.92x10^{10}$	90.0%	2.62%
South River Mainstem	$1.32x10^{13}$	$9.31x10^{12}$	29.5%	24.46%
Duvall Creek	$1.52x10^{11}$	$8.27x10^{10}$	45.6%	10.29%
Ramsey Lake	$5.57x10^{11}$	$2.27x10^{11}$	59.3%	0.14%
Selby Bay	$3.27x10^{11}$	$3.57x10^{11}$	0.0%	0.20%
Tracy & Rockhold Creeks	$1.67x10^{12}$	$3.06x10^{11}$	81.6%	0.52%
West River Mainstem	$1.77x10^{12}$	$1.15x10^{12}$	35.3%	3.79%
Parish Creek	$2.56x10^{11}$	$1.20x10^{11}$	53.1%	13.14%

Comparison of FY18 and FY19 Modeling Results

The percentage of bacteria load reductions estimated from implementation of Tier A and Tier B strategies for FY19 were compared with the percentage of bacteria load reductions achieved in FY18. Observations regarding the modeling results are provided below:

- There were no changes or updates to the data related to the retirement of County septic systems for the bacteria TMDL watersheds; therefore the percent bacteria load reductions from this Tier A strategy remained unchanged from FY18 data.

- The slight increase in the elimination of illicit discharges resulted in a slight increase in percent bacteria load reductions across all watersheds. The Severn River Mainstem watershed showed the greatest change with a 0.26 percent increase in bacteria load reductions. The South River/Ramsey Lake and W. Chesapeake Bay/Tracy and Rockhold Creeks watersheds showed no increase in bacteria load reductions.

- Implementation of urban stormwater management retrofits slightly reduced the percent bacteria load reductions in Severn River/Whitehall and Meredith Creek watersheds because the drainage area and impervious cover treated data for BMP projects was updated in the FY19 dataset compared to the FY18 data. No stormwater management projects were proposed in Magothy River/Tar Cove, Patuxent River Upper, Rhode River/Cadle Creek, South River/Ramsey Lake, South River/Selby Bay, W. Chesapeake Bay/Tracy and Rockhold Creeks, and West River/Parish watersheds. The percent bacteria load reductions remained the same for Rhode River/Bear Creek and West River Mainstem watersheds, as no new projects were implemented in these watersheds. The percent bacteria load reductions increased for all of the remaining watersheds because of updated impervious cover treated, designed rainfall treatment depth, and the addition of new stormwater projects in FY19.

Overall, a slight increase in percent bacteria load reductions was observed in most watersheds as compared to the FY18 annual progress modeling results. Significant increase in bacteria load reductions were observed in Magothy River Mainstem, Patapsco River/Furnace Creek, Severn River/Mill Creek, South River Mainstem due to the implementation of new and retrofit urban stormwater projects in FY 2019. The Severn River/Whitehall and Meredith Creek watershed experienced a 0.08 percent decrease in overall percent bacteria load reductions. Bacteria load reductions in the Rhode River/Bear Neck Creek, W. Chesapeake Bay/Tracy and Rockhold Creeks, and South River/Ramsey Lake watersheds all remained the same compared with the FY 2018 results.

Detailed information on the WTM modeling, and the County's FY19 implementation progress, is documented in the previously referenced *2019 Annual Bacteria TMDL Assessment* found in **Appendix H**.

Individual Nutrient TMDLs

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 currently the only individual nutrient TMDL applicable to 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.

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.

FY19 Progress:

During FY19 the County continued to implement restoration projects to reduce nutrient loads to the Baltimore Harbor. A summary of nutrient baseline loads, TMDL allocations, required load

reductions, and progress toward meeting the required load reductions through FY19 for Anne Arundel County's portion of the Baltimore Harbor is presented in Table 28.

Table 28. Nutrient TMDL SW-WLA Implementation Progress for Baltimore Harbor (Anne Arundel County)

Watershed	SW-WLA (lbs/yr)			% Reduction Required	
	Baseline[1] (1995)	Target	Current	Required	Reduction Through FY19
Baltimore Harbor	**Nitrogen**				
	228,361	194,107	218,937	15%	4.13%
	Phosphorus				
	11,889	10,105	11,140	15%	6.29%

[1] Baseline, Target and Current loads were modeled in CAST. Baseline stream bed and bank loads from CAST were disaggregated to the MS4 scale using methods recommended by MDE.

Anne Arundel County spent $4.7 million dollars in capital and operational costs, during FY19, on practices to address the Baltimore Harbor Nutrient TMDL. With those funds, the County is completing restoration projects and continuing programmatic practices including inlet cleaning and street sweeping. Load reductions through FY19 are at 4.13% for nitrogen and 6.29% for phosphorus, on a total goal of 15.0% reduction for each. The County currently has approximately 50 restoration projects in this watershed that are scheduled for implementation by FY2023. These projects include stream restoration, shoreline stabilization, SPSCs, bioretention, wet ponds and wetlands, and infiltration basins and trenches. With completion of these projects and through continuation of currently existing operations programs, the County plans to meet the load reductions with additional project implementation before the 2030 date set in the County's plan. Detailed information on the modeling and implementation progress is found in the *2019 Annual Baltimore Harbor Watershed Nutrient TMDL Assessment* (**Appendix H**).

Individual PCB TMDLs

There are currently six (6) approved PCB TMDLs for Anne Arundel County. Table 29 provides information on the six TMDLs, their approval dates, and the required percent load reductions to achieve the SW-WLAs. Of these six, only the Baltimore Harbor and Curtis Creek/Bay and the Patuxent Mesohaline, Oligohaline and Tidal Fresh TMDLs have SW-WLAs. The following text documents the County's progress toward achieving SW-WLAs for these two TMDLs, including the modeled load reduction achieved through FY19. The remaining four individual PCB TMDLs are addressed, in this report, in a more summary manner.

Table 29. PCB TMDLs for Anne Arundel County

Location	Approval Date	% Reduction Required
Subsegment of 8 Digit WS 02130903		
Baltimore Harbor	October 1, 2012	91.1%
Curtis Creek/Bay		93.5%
Magothy River 8 Digit WS 02131001	March 16, 2015	0

Table 29. PCB TMDLs for Anne Arundel County

Location	Approval Date	% Reduction Required
Severn River 8 Digit WS 02131002	July 19, 2016	0
South River 8 Digit WS 02131003	April 27, 2015	0
West and Rhode Rivers 8 Digit WS 02131004	January 8, 2016	0
Patuxent Mesohaline, Oligohaline, Tidal Fresh PCB Segments 8 Digit WS 02131101 and 02131102	September 19, 2017	99.9%

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

The Maryland Department of Environment identified the Baltimore Harbor portion of the Patapsco River Mesohaline Tidal Chesapeake Bay Segment, and the Curtis Creek/Bay portion of that Segment, as individually impaired by PCBs in fish tissue and by PCBs in sediment as well as fish tissue, respectively. Both 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. Because the Curtis Creek/Bay segment was individually identified as impaired for PCBs due to sediment data, in addition to the listed impairment 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.

The PCB load to the Baltimore Harbor Embayment and Curtis Creek/Bay is primarily due to point and nonpoint source loads. Resuspension/diffusion from within the embayment and loading from the Chesapeake Bay mainstem may occur but is not considered to be a major source of PCBs to these TMDL watersheds. Moreover, modeling results indicate a likely net transport of PCBs out of the embayment and Curtis Creek. This PCB TMDL SW-WLA addresses only controllable sources (e.g., point and nonpoint sources) for load reduction implementation, and does not include resuspension or tidal influx from the Chesapeake Bay mainstem.

FY19 Progress:

Consistent with the *Baltimore Harbor and Curtis Creek/Bay PCB TMDL Restoration Plan*, progress toward meeting the PCB WLA was modeled using the Center for Watershed Protection Watershed Treatment Model (WMT) adapted for PCBs. The model was updated to compute the 2019 progress in PCB load reduction for Anne Arundel County's portion of the watersheds. Progress was tracked independently for each subwatershed. Further information can be found in the *2019 Annual Baltimore Harbor and Curtis Creek/Bay PCB TMDL Assessment Report* (**Appendix H)**. A summary of the PCB baseline loads, TMDL allocations, required load reductions, and implementation progress through FY19 is presented in Table 30.

Table 30. PCB TMDL SW-WLA Implementation Progress for Baltimore Harbor and Curtis Creek/Bay -- Patapsco River Mesohaline Tidal Chesapeake Bay Segment (Anne Arundel County)

Watershed	SW-WLA (g/year)			% Reduction Required	
	Baseline (2011)	Target	Current	Required	Reduction Through FY19
Baltimore Harbor Embayment	454.55	40.45	449.40	91.1%	1.13%
Curtis Creek/Bay	262.89	17.09	258.37	93.5%	1.72%

In addition to BMP retrofits, Anne Arundel County finalized a targeted PCB action strategy, one of the recommendations in the 2016 Restoration Plan. The *Baltimore Harbor and Curtis Creek/Bay Polychlorinated Biphenyls (PCB) TMDL Action Strategy, July 2019* is found in **Appendix H** and is focused on PCB monitoring logistics and monitoring plan development. County staff also collaborated with MDE's Integrated Water Planning Program regarding a scope of work to develop a monitoring strategy to further investigate watershed sources of PCBs, thus moving this PCB Action Strategy forward. The County anticipates initiating monitoring in 2020-2021.

Patuxent River Mesohaline, Oligohaline, and Tidal Fresh Chesapeake Bay Segments

The Maryland Department of the Environment identified the waters of the Patuxent River mesohaline, oligohaline, and tidal fresh segments as impaired by Polychlorinated Biphenyls (PCBs) in fish tissue. This impairment is addressed through the *Total Maximum Daily Loads of Polychlorinated Biphenyls in the Patuxent River Mesohaline, Oligohaline and Tidal Fresh Chesapeake Bay Segments, Maryland* which was approved by EPA on September 19, 2017. Although the transport of PCBs from bottom sediments to the water column through re-suspension and diffusion can be a major source of PCBs in estuarine systems they were not considered a source within the framework of this TMDL which, as modeled, considers the exchange between the sediment and water column an internal load. Only external sources to the system are assigned a baseline load. The transport of PCBs into the Patuxent mesohaline tidal segment due to tidal influences from the Chesapeake Bay mainstem is the identified external source of PCBs to the system; however, this load contribution results from other point and nonpoint source inputs and is not considered to be a directly controllable source.

Responsibility for the Patuxent River watershed PCB load reduction is divided among multiple contributing jurisdictions. Anne Arundel County has been assigned a SW-WLA for its portion of the Patuxent Tidal Fresh Segment (PAXTF).

FY19 Progress:

A summary of the PCB baseline loads, TMDL allocations, required load reductions, and implementation progress through FY19 is presented in Table 31.

Table 31. PCB TMDL SW-WLA Implementation Progress for the Patuxent Watershed Oligohaline, Mesohaline and Tidal Fresh Chesapeake Bay Segments (Anne Arundel County)

Watershed	SW-WLA (g/year)			% Reduction Required	
	Baseline (2014)	Target	Current	Required	Reduction Through FY18
Mesohaline	0.0	0.0	N/A	0.0%	N/A
Oligohaline	0.3	0.3	N/A	0.0%	N/A
Tidal Fresh	25.41[1]	0.03	24.69	99.9%	2.83%

[1] The 2014 baseline load was calculated using the MDE 2014 Progress BMPs in CAST. Baseline and progress modeling details are found in *The 2019 Annual Patuxent River PCB TMDL Assessment* in **Appendix H.**

The draft *Patuxent River Watershed PCB TMDL Restoration Plan* that was submitted with the County's FY18 Annual NPDES MS4 Report was advertised for a 30-day public comment period from March 9 to April 9 2019. No public comments were received; however, MDE provided comments and subsequently approved the draft on November 5, 2019. Anne Arundel County's response to MDE's comments is submitted in **Appendix H.** The Restoration Plan is being revised to address MDE's comments.

With respect to PCB remediation, the FY18 Annual Report noted that the County is exploring an opportunity to remediate PCBs in-situ in a stormwater detention pond located in the Severn River watershed. This remediation proposes amending soils with activated carbon and PCB de-chlorinators and aerobic degraders. During FY19, the County continued to pursue application of this remediation technology and assess its effectiveness. The soil amendment is anticipated to occur spring 2020. Although the proposed site is not located within the Patuxent River watershed it is anticipated that the findings will be applicable to watersheds that are assigned a SW-WLA, including the Baltimore Harbor, Curtis Creek/Bay and the Patuxent River watersheds.

Individual PCB TMDLs with no SW-WLA

As noted earlier, four individual PCB TMDLs applicable to Anne Arundel County do not have prescribed SW-WLA reduction requirements and, thus, individual restoration plans were not developed. Table 32 provides a summary of NPDES MS4 regulated PCB baseline loads, TMDL allocations, load reductions, and maximum daily loads for the Magothy, Severn, South, and Rhode/West River Watersheds as sourced from the documents listed below.

- *The 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*
- *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*
- *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*

- *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*

Table 32. PCB TMDL SW-WLA Baseline Loads and Load Reductions for Four Anne Arundel County Watershed Segments

Watershed	SW-WLA (g/year)			% Reduction Required	
	Baseline (2011)	Target	Current	Required	Reduction Through FY19
Magothy River	7.9	7.9	N/A	0.0	N/A
Severn River	21.5	21.5	N/A	0.0	N/A
South River	3.9	3.9	N/A	0.0	N/A
West and Rhode Rivers	1.6	1.6	N/A	0.0	N/A

Each of these four watersheds are identified as impaired for PCBs in fish tissue. The objective of each TMDL is to reduce the total PCB loads to the waterbodies such that water column and sediment PCB TMDL endpoint concentrations are achieved, and the designated uses (e.g., fishing) are supported. Per the EPA-approved TMDL documents, the PCB TMDL for each of these watersheds is achieved through the decline in PCB concentrations in the Bay and natural attenuation in sediments. Therefore, no reduction in PCB load 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

Prior to this reporting period, seven (7) individual sediment TMDLs were approved for Anne Arundel County. During this reporting period EPA approved an individual sediment TMDL for the Non-Tidal West River Watershed. The eight (8) approved sediment TMDLs for Anne Arundel County are listed in Table 33 along with their approval dates.

Table 33. 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
South River, 8 Digit WS 02131003	September 28, 2017
Other West Chesapeake, 8 Digit WS 02131005	February 9, 2018
Middle Patuxent River, 8 Digit WS 02131102	July 2 , 2018
Lower Patuxent River, 8 Digit WS 02131101	July 2, 2018
West River, 8 Digit WS 02131004	April 24, 2019

A description of the individual sediment TMDLs, including the NPDES MS4 regulated area baseline and target loads, and required load reduction follows. It should be noted that progress

toward meeting the required individual sediment load reductions for FY19 is not presented in this annual report. During FY19, MDE and the MS4 Phase I jurisdictions worked to develop an updated methodology for sediment modeling and load reduction progress reporting. As of September 2019 an acceptable methodology had yet to be agreed upon and, because MAST and BayFAST are no longer available to model and report progress, MDE requested that local jurisdictions not create a temporary system for modeling and reporting sediment load reductions for the FY19 reporting year. This MDE guidance is documented in a September 16, 2019 email from MDE that is included in **Appendix H**. It is important to note that the County continued implementing restoration BMPs and annual street sweeping and inlet cleaning practices throughout FY19. Prior progress toward meeting the SW-WLA was documented in the County's FY2018 Annual Report and this progress, to include FY19 activity, will be updated for the FY2020 Annual Report pending completion of an acceptable modeling and reporting methodology.

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. To attain the TMDL loading cap, reductions were only applied to the urban sediment sources, because urban land was identified as the only predominant controllable sediment source in the watershed.

Prior progress toward meeting the SW-WLA as documented in the County's 2018 Annual Report is summarized in Table 34 below.

Table 34. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY2018) for the Little Patuxent River Watershed (Anne Arundel County)

Watershed	SW-WLA (lbs/year)			% Reduction Required	
	Baseline (2005)	Target	Current	Required	Reduction Through FY18
Little Patuxent	1,207,534	959,989	977,517	20.5%	19.0%

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 River Watershed as an average annual load to ensure the support of aquatic life. 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 SW-WLA is equivalent to the urban land use loads resulting from applying reductions to all of the predominant land uses.

Prior progress toward meeting Anne Arundel County's portion of the SW-WLA as documented in the County's 2018 Annual Report is presented in Table 35.

Table 35. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY2018) for the Upper Patuxent River Watershed (Anne Arundel County)

Watershed	SW-WLA (lbs/yr)			% Reduction Required	
	Baseline (2005)	Target	Current	Required	Reduction Through FY18
Upper Patuxent	485,565	430,211	450,451	11.4%	7.2%

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* presents the TMDL for the Lower North Branch as an average annual load to ensure that there will be no sediment impacts affecting aquatic health.

Prior progress toward meeting Anne Arundel County's portion of the SW-WLA as documented in the County's 2018 Annual Report is presented in Table 36.

Table 36. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY2018) for the Patapsco Lower North Branch Watershed (Anne Arundel County)

Watershed	SW-WLA (lbs/year)			% Reduction Required	
	Baseline (2005)	Target	Current	Required	Reduction Through FY18
Patapsco LN Branch	1,422,388	1,106,618	1,237,670	22.2%	13.0%

South River

The *Total Maximum Daily Load of Sediment in the Non-tidal South River Watershed, Anne Arundel County, Maryland,* approved on September 28, 2017 presents the TMDL for sediment in the South River watershed as an annual average load to ensure the support of aquatic life. The NPDES regulated stormwater loads within the South River watershed is expressed as an aggregate NPDES SW-WLA. The SW-WLA is based on reductions applied to the sediment load from the portion of the urban land-use in the watershed associated with the NPDES MS4 Permit.

During the prior reporting period, Anne Arundel County conducted a modeling analysis of sediment load reductions achieved through restoration project implementation to determine whether the SW-WLA for sediment in the South River watershed was achieved. This analysis showed that the SW-WLA had been achieved, and on September 28, 2018 the County provided that documentation of attainment to MDE for review and comment. Table 37 presents the result of this modeling analysis. When the MDE sediment modeling methodology is finalized, Anne Arundel County will re-model sediment loads in the South River watershed. If the SW-WLA has not been met, based on the updated modeling, the County will develop a restoration plan to address the SW-WLA in lieu of updating the previously submitted documentation of attainment.

Table 37. Sediment TMDL NPDES MS4 Regulated SW-WLA Implementation Progress (FY2018) for the South River Watershed

Watershed	SW-WLA (lbs/year)			% Reduction Required	
	Baseline (2009)	Target	Current	Required	Reduction Through FY18
South River	3,964,651	1,110,102	1,669,519	28%	58%

Loads calculated by AACo. and submitted to MDE September 28, 2018.

Nontidal Other West Chesapeake Sediment

The *Total Maximum Daily Load of Sediment in the Other West Chesapeake Watershed, Anne Arundel County and Calvert Counties, Maryland,* approved by EPA on February 9, 2018 presents the sediment TMDL as an average annual load to ensure acceptable biological integrity in the watershed's streams. The Anne Arundel County regulated SW-WLA, the required percent reduction and progress achieved through FY18 are presented in Table 38.

Table 38. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for Other West Chesapeake Watershed (Anne Arundel County)

Watershed	SW-WLA (lbs/yr)			% Reduction Required	
	Baseline (2009)	Target	Current	Required	Reduction Through FY18
Other West Chesapeake	3,895,399	2,609,917	3,754,604	33%	3.6%

The draft restoration plan that was submitted to MDE in February 2019 was advertised for public comment from March 9, 2019 to April 9, 2019. No public comments were received. On October 2, 2019 MDE approved the draft plan with minor comments. A Response to Comments document and the final restoration plan that addresses MDE's comments is submitted with this annual report in **Appendix H**.

Middle Patuxent River and Lower Patuxent River

The *Total Maximum Daily Load of Sediment in the Non-Tidal Patuxent River Middle Watershed, Anne Arundel, Calvert, and Prince George's Counties, Maryland, July 2, 2018* presents the TMDL for sediment in the Non-Tidal Middle Patuxent River Watershed as an average annual load to ensure acceptable biological integrity in the watershed's streams. The Anne Arundel County regulated SW-WLA for the Non-Tidal Middle Patuxent River watershed, and the required percent reduction are presented in Table 39.

The *Total Maximum Daily Load of Sediment in the Non-Tidal Patuxent River Lower Watershed, Anne Arundel, Calvert, Charles, Prince George's and Saint Mary's Counties, Maryland, July 2, 2018* presents the TMDL for sediment in the Lower Non-Tidal Patuxent watershed as an average annual load to ensure acceptable biological integrity in the watershed's streams. The Anne Arundel County regulated SW-WLA for the Non-Tidal Lower Patuxent River watershed, and the required percent reduction are presented in Table 40.

Table 39. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for the Non-Tidal Middle Patuxent River Watershed (Anne Arundel County)

NPDES MS4 Regulated SW	Baseline Load (lbs/year)	SW-WLA (lbs/year)	% Reduction Required
Nontidal Middle Patuxent River	324,000	142,000	56%

Table 40. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for the Non-Tidal Lower Patuxent River Watershed (Anne Arundel County)

NPDES MS4 Regulated SW	Baseline Load (lbs/year)	SW-WLA (lbs/year)	% Reduction Required
Nontidal Lower Patuxent River	28,000	11,000	61%

The County submitted a draft restoration plan that addresses the Sediment SW-WLAs for both the Middle and the Lower Patuxent watersheds on July 1, 2019. The draft plan was advertised for public comment from July 6 through August 9, 2019. The County received comments from MDE as well as the Chesapeake Bay Foundation. A revised final plan that addresses all comments is submitted with this Annual Report in **Appendix H**.

West River

The *Total Maximum Daily Load of Sediment in the Non-Tidal West River Watershed, Anne Arundel County, Maryland, April 24, 2019* presents the West River watershed sediment TMDL as an average annual load to ensure acceptable biological integrity in the watershed's streams with the objective of supporting the Use Class I designation. The regulated SW-WLA for the West River watershed, and the required percent reduction, are presented in Table 41.

Table 41. Sediment TMDL SW-WLA Baseline Load and Load Reduction Required for the West River Watershed

NPDES MS4 Regulated SW	Baseline Load (lbs/year)	SW-WLA (lbs/year)	%Reduction Required
Non-Tidal West River	576,000	452,000	22%

Anne Arundel County is currently developing a restoration plan to address this sediment WLA. Due to the previously discussed concerns regarding modeling in the context of restoration plan development, the County is developing this plan to include all necessary elements with the exception of load reduction modeling. As required by the County's MS4 permit the County will submit the restoration plan to MDE on or before April 24, 2020. When the sediment modeling methodology has been finalized, the restoration plan will be updated to include that component.

3. Nutrient Trading

Anne Arundel County may acquire total nitrogen (TN), total phosphorus (TP), and total suspended solids (TSS) credits, in accordance with the requirements of the Maryland Water Quality Trading and Offset Program, COMAR 26.08.11, to meet its twenty percent impervious surface area restoration requirement in this permit. The basis for an equivalent impervious acre restored through trading is the difference in pollutant loads between urban and forest stormwater runoff according to MDE's "Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits" (MDE, 2014, or the most recent version). On an annual basis, until reissuance of this permit, the permittee shall report to the Department:

a. The cumulative impervious acres restored achieved through installation of BMPs during the permit compliance period;
b. The equivalent impervious acres restored achieved through credit acquisition during the permit compliance period; and
c. Documentation required to verify credits acquired and to be used for impervious surface restoration during the permit compliance period.

Status:

Effective December 31, 2018, MDE modified the discharge permits for the six County WRFs to allow nutrient trading. In early 2019, the County submitted Discharge Monitoring Reports (DMRs) for the calendar year 2018 to MDE to confirm the nutrient credits generated and available for trading via the registry. MDE verified the County's documentation and then entered the credits in MDE's Water Quality Trading (WQT Register) on October 4, 2019. The letter from MDE to the County providing verification of available credits for trading and a copy of the State's Water Quality Trading (WQT) Register are found in **Appendix I**.

Due to the County's Permit expiration (February 11, 2019) falling in the middle of the FY19 reporting period, and to demonstrate compliance with the 20% ISR metric by the end of the permit term, the County included a snapshot of restoration progress achieved through December 2019

(i.e., the first half of FY19) in its FY18 MS4 Annual Report (submitted February 11, 2019). This included 2,389 acres of equivalent impervious area credit attained through implementation of restoration and alternative BMPs and the acquisition of nutrient credits, equivalent to 2,607 impervious acres, generated by Anne Arundel County's WRFs. In the second half of FY19, the County was able to achieve an additional 781 acres of equivalent impervious restoration credit through the completion of restoration and alternative BMP projects, thereby reducing the County's reliance on nutrient credits acquired during that period.

The FY19 MS4 Geodatabase contains a summary of impervious restoration acreage, completed restoration and alternative BMP projects, and associated BMP records. Together, these data provide an up-to-date and accurate accounting of the County's cumulative impervious area restoration. Table 42 provides a summary of the impervious acres restored during the current permit term; more detailed data is available in the FY19 MS4 Geodatabase feature classes: *RestBMP, AltBMPLine, AltBMPPoint, and AltBMPPoly*.

Table 42. Cumulative Impervious Surface Restoration Achieved through Restoration and Alternative BMP Implementation through FY19.

	# of Projects Completed	Impervious Acres Restored
Restoration BMPs		
- ESD	22	18.1
- structural	140	773.7
Alternative Restoration BMPs		
- street sweeping* (annual practice)	422 tons/yr.	168.9
- impervious surface elimination	3	0.3
- Reforestation	2	0.6
- catch basin and storm drain cleaning* (annual practice)	175 tons/yr.	69.8
- stream restoration	23 (21,744 ft.)	839.5
- outfall stabilization	49 (3,383 ft.)	31.3
- shoreline management	66 (15,678 ft.)	627.2
- septic pumping* (annual practice)	9,566 units/yr.	287.0
- septic denitrification	1,149	298.7
- septic connections to WWTP	140	54.6
Total (# of projects excl. annual practices)	1,594	3,169.7

* For annual practices, Imperious Acres Restored is the average annual equivalent impervious treatment achieved, dating from the full implementation of the programs. Averages for street sweeping and septic pumping are based on FY16-FY18, and the average for catch basin cleaning is based on FY17-FY18. Septic pumping # of Units Completed is the average annual number based on FY16-FY18 program implementation.

Anne Arundel County currently owns and operates six WRFs. Over the course of five years the County invested over $250 million dollars in upgrading these facilities with enhanced nutrient removal (ENR) technology. Due to the "over-performance" of these facilities (i.e., achievement of nutrient reductions greater than those required for the facility to comply with the Chesapeake Bay

TMDL), excess nutrient reductions are available for conversion to equivalent impervious restoration acreage, which may then be traded with other MS4 permittees. For the FY19 reporting period, nutrient trading credits are available from the following five County facilities:

- Annapolis WRF (ENR upgrades completed 1/1/2015)
- Broadneck WRF (ENR upgrades completed 4/1/2014)
- Broadwater WRF (ENR upgrades completed 9/1/2015)
- Cox Creek WRF (ENR upgrades completed 1/1/2018)
- Maryland City WRF (ENR upgrades completed 5/1/2014)

The nutrient trading credits available from this group of five County WRFs is detailed in Table 43. In the future, nutrient trading credits will be available from its sixth facility, the Patuxent WRF (ENR upgrades completed 3/31/2015), when those credits are verified by MDE.

Table 43. Equivalent Impervious Acre Credits Generated in CY18 by Anne Arundel Co WRFs (Credits verified by MDE on October 4, 2019).

	Equivalent Impervious Acre Credit
Facility	
Annapolis WRF	1,004
Broadneck WRF	781
Broadwater WRF	177
Cox Creek WRF	1,766
Maryland City WRF	106
Subtotal	3,834
Credit Reduction	
July 1 – July 15, 2018[1]	(343)
Annapolis WRF[2]	(467)
Total Available Credit	**3,024**

[1] Credit generation began on July 16, 2018 (date of formal adoption of COMAR 26.08.11). Total credit for month of July estimated at 686 acres (after 5% State credit reserve).
[2] City of Annapolis is entitled to 50% of the credits generated by this facility (estimated total of 934 acres available from July 16 –December 31, 2018).

Table 44 lays out the County's current accounting of impervious surface restoration credits, in relation to the required 20% ISR goal. The credits claimed by the County for compliance with the ISR requirement are allocated from the Annapolis, Cox Creek, and Maryland City WRFs (see MDE Trading Register documentation in **Appendix I**). For the reporting period, and to demonstrate compliance with the ISR metric, the County is claiming 1,827 equivalent impervious restoration credits via nutrient trading. This is 780 fewer credits than were claimed at the end of the permit term (February 2019); those 780 nutrient trading credits were replaced by 781 acres of ISR credit via implementation of restoration and alternative BMPs. The County tracks its ISR credit to the tenth of an acre, but thought it more appropriate to account for nutrient credit trading in whole acre units. To account for any for small discrepancies that occur when rounding ISR

credit values, the County acquired one more whole acre of equivalent impervious credit through nutrient trading than was required per the rounded credit values.

Table 44. Impervious restoration credit accounting, including acquired nutrient trading credits, demonstrating attainment of the 20% ISR goal.

Category	Acres	Restoration Progress	Source
Total unmanaged impervious area	24,981		2018 Revised Baseline
20% impervious surface restoration (ISR) goal	4,996		2018 Revised Baseline
Impervious area restored through FY19 through implementation of restoration and alternative BMPs	3,170	12.7%	FY19 MS4 Geodatabase (see summary in Table 42)
Available Equivalent Impervious Restoration Credits	3,024		Nutrient Trading
Acquired Equivalent Impervious Restoration Credits	1,827	7.3%	Nutrient Trading (only a portion of the available credits are required for MS4 permit compliance) **Appendix J**
Total		**20.0%**	**20% ISR Attainment**

When the 20% ISR goal was introduced into the County's MS4 permit, the County recognized it would need a robust program to fully meet its permit obligations. Anne Arundel County has spent the past six years building up its Watershed Protection & Restoration Program. The early part of this Permit term was spent fully staffing the program and creating a pipeline of projects to restore impervious surface throughout the County. The lead-time necessary to procure contracts for design, and to build a large number of complex BMPs meant that the County only recently was able to begin installing BMPs at the rate necessary to comply with the impervious surface restoration mandate in its MS4 permit. The credits available through the nutrient trading mechanism allow the County to remain in compliance with the 20% ISR requirement included in its administratively continued MS4 permit, as it continues to install BMPs to replace those borrowed credits. The County has a set of BMP projects both under design and under construction, as documented in the MS4 Geodatabase, which will allow the County to meet the permit-mandated 20% ISR goal by the end of the next MS4 permit term without the use of nutrient trading credits.

4. 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 environmental restoration projects via the County WPRP website (www.aarivers.org) as well as through its interactive online mapping application. As the comprehensive watershed assessments were completed, the assessment study document was publicized for a 30-day comment period after which a summary of comments and County responses were incorporated into the final documents. The final associated study reports were published on the WPRP webpage and environmental concerns and recommendations were also published as GIS files via the interactive mapping application, as noted in Part IV.E.1.

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 allows these organizations, and anyone with internet access and interest, to open and view the many data layers that have resulted from the County's watershed assessments. Since 2010, the County has provided additional functionality by making changes to the overall look and feel of the application, and by moving it to the more robust Geocortex viewer. The mapping application can be accessed at: http://gis-world3.aacounty.org/HTML5Viewer/index.html?viewer=WPRP

During this reporting period, EPA approved three individual sediment TMDLs (see Part IV.E.2.b). Restoration plans were developed, or are being developed, to address the required SW-WLAs in these TMDL documents. Public outreach associated with these documents is described below.

- The Non-Tidal Lower and Middle Patuxent Watershed Sediment TMDLs (July 2, 2018): The *Non-Tidal Lower and Middle Patuxent Watershed TMDL Restoration Plan* was posted on the County's web page and advertised for public comment in the *Maryland Gazette* and *The Capital* Newspapers from July 6 to August 9, 2019. Comments were received from MDE and the Chesapeake Bay Foundation. The County drafted a response to both sets of comments and edited the draft plan in response to the comments received. An appendix was also added to the final plan that included all comments received and the County's response to those comments.
- The Non-Tidal West River Watershed Sediment TMDL (April 24, 2019):

A restoration plan is currently under development for the Non-Tidal West River Sediment TMDL. When the draft plan is complete in early 2020 it will be submitted to MDE and posted for a 30-day public comment period.

Two previously developed TMDL restoration plans, the *Non-Tidal Other West Chesapeake Sediment TMDL Restoration Plan* and the *Patuxent River Watershed PCB Restoration Plan* were submitted to MDE in FY19 and advertised for public comment from March 9 through April 9, 2019.

- The *Non-Tidal Other West Chesapeake Sediment TMDL Restoration Plan* was revised in response to comments received and is found in **Appendix H** of this report.
- *Patuxent River Watershed PCB Restoration Plan* is currently under revision. A response to MDE's comments is provided in **Appendix H**.

The County recognizes the importance of public input into both watershed assessments and restoration plans and provides a minimum of 30 days for public comment on draft plans and reports. Draft documents are made available for review and/or download through the County webpage, and a minimum number of hard copy reports are also be made available on request. Prior to final acceptance, a summary of the comments received and County response are incorporated into each document.

5. 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 FY19, the County continued implementing the individual TMDL restoration plans previously submitted to and reviewed by MDE. Progress made during 2019 on these plans is documented in the individual Annual TMDL Implementation Assessment Reports found in **Appendix H**. Annual TMDL Assessment Reports submitted in **Appendix H** include:

- 2019 Annual Bacteria TMDL Assessment,
- 2019 Annual Baltimore Harbor Watershed Nutrient TMDL Assessment,
- 2019 Annual Baltimore Harbor and Curtis Creek/Bay PCB TMDL Assessment.
- 2019 Annual Patuxent River Watershed PCB TMDL Assessment.

A summary of progress is presented in **Part IV.E.2b.** FY19 progress is also reported in the *LocalStormwaterWatershedAssessment* table of the MS4 Geodatabase **(Appendix A).**

As reported in **Part IV.E.2b.**, MDE and the MS4 Phase I jurisdictions are developing a methodology for sediment modeling and reporting. In September 2019 an acceptable methodology had yet to be agreed upon and, since MAST and BayFAST are no longer available to report progress, MDE recommended that local jurisdictions not create a temporary system for reporting sediment load reductions for the FY19 reporting year. This guidance is documented in a September 16, 2019 email from MDE and is included as **Appendix H**. Therefore, sediment progress modeling is not included in this year's annual report for the following sediment TMDLs in Anne Arundel County:

- Little Patuxent River Sediment TMDL,
- Upper Patuxent Sediment TMDL and,
- Patapsco River Lower North Branch Sediment TMDL,
- South River Sediment TMDL.

During FY19, three new sediment TMDLs were approved by EPA:

- Non-Tidal Middle Patuxent Sediment TMDL (July 2, 2018)
- Non-Tidal Lower Patuxent Sediment TMDL (July 2, 2018)
- Non-Tidal West River Sediment TMDL (April 24, 2019)

The Non-Tidal West River Sediment TDML Restoration Plan is under development and will be submitted to MDE on or before April 24, 2020 as required by the County's MS4 permit. Restoration plans for the Non-Tidal Middle and Lower Patuxent River Sediment TMDLs and the Non-Tidal Other West Chesapeake Sediment TMDL were finalized in FY19 and are submitted in **Appendix H**. The Patuxent River Mesohaline, Oligohaline, Tidal Fresh PCB TMDL Restoration Plan is being revised to address MDE's comments and to include a revised monitoring strategy.

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). The County's progress for this TMDL is reported in Part IV.E.2.b., and in the *CountywideStormwaterWatershedAssessment* table of the MS4 Geodatabase (**Appendix A**).

With respect to the net change in pollutant load reductions necessary to meet TMDL requirements, the *CountywideStormwaterWatershedAssessment* and *LocalStormwaterWatershedAssessment* tables of the FY19 MS4 Geodatabase (**Appendix A**) 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 current FY19 reporting year only, the County pollutant load reduction realized through restoration project implementation is 9,852 lbs/year of Total Nitrogen, 2,296 lbs/year of Total Phosphorus, and 1,325,533 lbs. /year (662.77 tons/year) of Total Suspended Solids. Specific itemized costs for the projects completed in FY19 are found in the FY19 MS4 Geodatabase in the *RestBMP*, *AltBMPPoint*, *AltBMPLine*, and *AltBMPPoly* feature classes. Costs associated with the restoration projects implemented by NGOs or other private entities are not provided.

The net pollutant load reductions associated with the County's cumulative stormwater management and restoration efforts, and the County's Chesapeake Bay TMDL SW-WLA are presented in **Part IV.E.2**. Any remaining reductions required to meet the SW-WLAs will be achieved through a blending of sector WLAs under the purview of Anne Arundel County. The cumulative cost of these restoration efforts is detailed in the County's FY2018 Financial Assurance Plan (FAP) previously submitted to MDE and also appended to this FY19 Annual Report (**Appendix J**). The associated cumulative cost, as of FY18, was $42,262,858 (see FY2018 FAP, Spec Actions tab). The FY19 project specific costs are documented in the County's 2019 WPRP Annual Report (**Appendix K**, *NarrativeFiles* table of the MS4 Geodatabase) that is submitted concurrent with this FY19 Annual Report. Additional information on FY19 expenditures associated with restoration efforts is also found in the *FiscalAnalysis* table of the MS4 Geodatabase (**Appendix A**).

The County continues to work toward meeting the targeted goals. Currently there are 89 projects planned (design contract issued) or under construction that are expected to be completed in upcoming reporting cycles (e.g., FY20, FY21) as previously mentioned in **Part IV.C.6** of this report. Additional projects are proposed for restoration and will be included in the planned projects once a design contract is initiated.

Part IV.E.5.e. of this Permit requires the development of a plan for implementing additional watershed restoration actions that can be enforced when benchmarks, deadlines, and applicable SW-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 the achievement of SW-WLA goals needs to be evaluated and watershed restoration plans modified in response to the rate of progress, additional modeling results, and resource availability. The adoption in 2018 of nutrient trading regulations by the State, and the subsequent modification of the County's permit on December 7, 2018 now

allowing cross sector trading as an adaptive management tool for achieving load reductions, is an integral component of adaptive management to ensure future progress. The County recognizes that this nutrient trading provides temporary credit which must ultimately be replaced by restoration actions.

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 when 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 at that time. With these watershed assessments now complete opportunities for load reduction are being 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 Fee is structured to provide sufficient funding for projects to meet the requirements of the County's MS4 Permit which also assists in meeting pollutant load reduction required by the Chesapeake Bay TMDL, EPA approved individual TMDLs with a SW-WLA, and to meet the impervious surface management requirements and other stormwater obligations set forth in the County's NPDES MS4 Permit.

Adaptive management is a critical component of achieving the SW-WLAs required by the County's NPDES MS4 Permit. The Chesapeake Bay TMDL and individual approved TMDLs clearly established load reduction targets. Two-Year Implementation Milestones were established by the County to provide interim planning targets and to serve as a vehicle for assessing progress toward the Bay TMDL reduction targets. Likewise, the progress toward meeting local TMDLs is evaluated annually. Progress is 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 are re-evaluated against progress and revised to ensure that Anne Arundel County is on track to meet its goals.

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 SW-WLAs. 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) rating 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, a determination is made whether more detailed constructability assessments are needed. These

assessments may result in identifying projects previously thought to be implementable but are not due to a variety of reasons, or identifying additional and new opportunities for load reduction. As these 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, are evaluated as part of TMDL compliance assessment. The milestones and progress assessments contribute to continual reassessment of management plans, and adapting responses accordingly as technologies and efficiencies change, programs mature, credit trading is implemented, 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 Kjeldahl Nitrogen (TKN)
Nitrate plus Nitrite
Total Suspended Solids
Total Petroleum Hydrocarbons (TPH)
E. coli or enterococcus
Total Lead
Total Copper
Total Zinc
Total Phosphorus
Hardness

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 2018 through June 2019. The full Church Creek monitoring report can be found in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2018-2019*) 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. Figure 3 shows the locations of chemical, biological, and physical monitoring sites/reaches, as well as the location of stream and pond restoration projects.

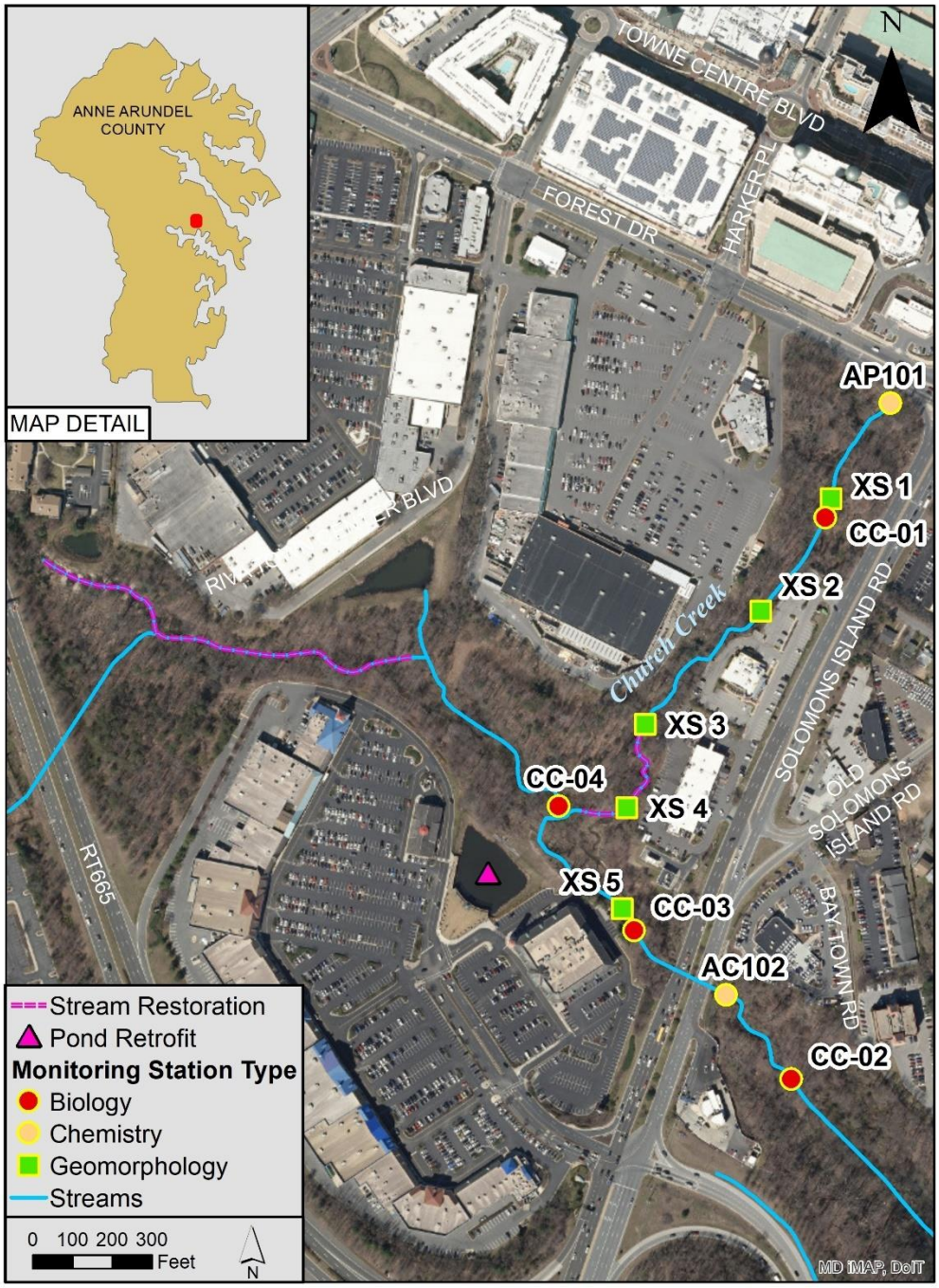

Figure 3. Church Creek and Parole Plaza study area, stream monitoring sites, and approximate stream restoration locations

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

- Parole Plaza Station: Outfall representing highly impervious (78.5 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 on the mainstem of Church Creek, approximately 500 feet downstream of the Parole Plaza Tributary confluence (69.2 percent impervious).

Located within the Church Creek subwatershed and upstream of the Church Creek Station and the Parole Plaza Tributary confluence, restoration of the Annapolis Harbor Center pond occurred during a prior reporting period (July through September 2017). This restoration involved draining the pond and excavating the bottom to provide additional storage; and construction of two forebays, a wetland berm, and aquatic benches all within the existing pond footprint. Prior to this pond retrofit work, the South River Federation (SRF), now Arundel Rivers Federation (ARF), completed 1,500 linear feet of stream restoration in the Church Creek reach upstream of the Harbor Center pond and the Church Creek sampling station. ARF and the Smithsonian Environmental Research Center (SERC) collaboratively monitored the restored stream reach to document changes in habitat as well as post-restoration in-stream nutrient processing. The County is sharing the continuous flow data and storm event water quality data from both MS4 monitoring stations with the researchers.

During the 2019 reporting period, nine storm events were sampled and four baseflow samples were collected and analyzed. 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. Please see the monitoring report in **Appendix C**, and the *ChemicalMonitoring* table in the MS4 Geodatabase (**Appendix A**) for specific information related to each monitored storm event as well as the water quality analytical results. The FY19 dates for successful storm event and baseflow sampling are provided in Table 45.

Table 45. Storm and baseflow sample collection dates for the Church Creek monitoring stations in FY19

Quarter	Date of Sampling	Sample Type
Summer Quarter 2018	8/17/18	Baseflow
	8/21/18	Storm
	9/21/18	Baseflow
Fall Quarter 2018	10/11/18	Storm
	10/26/18	Storm
	11/9/18	Storm
	12/6/18	Baseflow
Winter Quarter 2019	1/19/19	Storm
	2/24/19	Storm
	3/21/19	Storm
Spring Quarter 2019	5/11/19	Storm
	6/13/19	Storm
	6/26/19	Baseflow

Four baseflow samples were collected in place of storm samples due to a low number of opportunities to sample qualifying events in each quarter of the monitoring period. Please see the

monitoring report in **Appendix C**, and the *ChemicalMonitoring* table in **Appendix A**, for baseflow event information and water quality monitoring data.

- Summer Quarter 2018:
    - Summer quarter conditions, prior to August 17, were not amenable to storm event sampling. Dry conditions prevailed before a major storm that inundated the area over the weekend of July 21–22. Trained field crew were unavailable to capture that storm when it began due to schedule conflicts. The severity of the storm, which delivered 6.5 inches of rain, and the subsequent days of continuing rain resulted in saturated conditions at the monitoring sites. Baseflow samples were collected at both stations on August 17.
    - On two occasions in early September, field crews attempted to capture two storms; in both cases, the storms dissipated before depositing enough rainfall to satisfy program requirements. Subsequently, a field crew collected samples to document baseflow conditions at both stations on September 21. At Parole Plaza, staff observed flowing discharge in both outfall pipes: At the 60-inch CMP, field staff documented a water level of 0.01 feet, and at the 54-inch RCP, water level height was 0.02 feet. Staff measured 0.578 feet of water at the outfall at Church Creek.

- Fall Quarter 2018:
    - Samples were collected to document baseflow conditions at both stations on December 6, 2018. At Parole Plaza, staff observed flowing discharge only from the RCP; field staff documented a water level of 0.03 feet. Staff measured 0.612 feet of water at the outfall at Church Creek.

- Spring Quarter 2019:
    - After the storm event on June 13, the field team did not monitor another storm for the period; storms occurring at this time either developed too quickly for crews to assemble on-site or dissipated before reaching a qualifying level of rain. On June 26, the field team collected baseflow samples at both stations. At Parole Plaza, staff observed flowing discharge only from the RCP; field staff documented a water level of 0.09 feet. Staff measured 0.581 feet of water at the outfall at Church Creek.

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. Discharge was then determined using the rating curves developed for each monitoring location. Event Mean Concentrations (EMCs) for each measured water quality parameter were calculated for each event 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 (U.S. EPA 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.

Water chemistry data collected in 2019 continue to show general, gradually decreasing pollutant levels at the Parole Plaza outfall and in Church Creek, but at concentrations that continue to exceed surface water criteria for certain parameters.

During the 2019 monitoring year, annual average EMCs for BOD5, TKN, total phosphorus, nitrate-nitrite, TSS, lead, and hardness were the same or higher at Church Creek than at Parole Plaza. Annual average EMCs for total phosphorous, nitrate-nitrite, and E. coli exceeded their corresponding criteria at both stations. The annual average EMCs for copper and lead exceeded chronic criteria at Parole Plaza and Church Creek, respectively (see Table 4-5, **Appendix C**).

Storm concentrations of phosphorus, combined nitrate and nitrite, and E. coli exceeded surface water criteria in 100% of wet weather samples collected at both Church Creek and Parole Plaza in 2019. Zinc and copper exceeded their corresponding acute criteria between 26% and 46% of wet weather samples at both stations. BOD5 exceeded its criterion in 7% and 8% of samples at Church Creek and Parole Plaza, respectively (see Table 4-4, **Appendix C**).

At Parole Plaza, average annual pollutant concentrations decreased between 2018 and 2019 for all parameters, except for TPH. Most average annual pollutant concentrations decreased at Church Creek in 2019 except for combined nitrate and nitrite. Overall, there is a moderate downward trend in EMC values at Parole Plaza since approximately 2006, except for E. coli, which is trending upward. EMCs of parameters at Church Creek are trending in a similar fashion to Parole Plaza.

During the 2019 monitoring year, for most parameters, annual loads at Church Creek exceeded those at Parole Plaza during 2019. Only E. coli. had a higher loading rate at Parole Plaza compared to the Church Creek station. In comparison to 2018, annual loads at Parole Plaza were lower for all parameters. The same general trend was also true at Church Creek—only nitrate-nitrite and BOD5 were greater in 2019 versus 2018. Seasonally, 2019 Church Creek loads were highest in either summer (5 of 10 parameters) or winter (5 of 10 parameters). For Parole Plaza, summer generally had the highest loading rates with 7 of 10 parameters peaking during this season (see Tables 4-6 through 4-8, **Appendix C**).

When comparing annual loading rates from the period before the redevelopment of the Parole Plaza area to the period after, the mean annual loading rates for all parameters at the Parole Plaza station were lower during the post-redevelopment period (2009 to 2019) than in the pre-redevelopment period (2002-2006). However, at the Church Creek station, all mean annual post-redevelopment parameter loads (except for lead and total phosphorus), exceeded the mean annual pre-redevelopment loads, likely due to higher annual flow volume during the post-redevelopment period than the pre-redevelopment period.

Recent stream restoration (2016) and stormwater pond retrofit (2017) projects in the Church Creek watershed upstream of the monitoring station may be influencing annual loading rates at the Church Creek station. When the average annual loads from the post-redevelopment/post-restoration period (2017-2019) are compared to the average annual loads from the post-redevelopment/pre-restoration period (2009-2016), decreases of between 17 and 52% are observed for BOD, TP, TKN, nitrate-nitrite, zinc, and hardness. Conversely, increases were observed in TSS (9% increase), lead (10%), copper (7%) and E. coli (24%). While regression relationships developed for concentration and EMC values appear to indicate that long-term declining trends may predate 2016-2017 period restoration work, the following observations regarding concentration and EMC conditions in the post-restoration period (2017-2019) are evident:

- Total phosphorus EMCs in 2017-2019 were slightly higher than in 2016;
- Average TKN and BOD5 concentrations declined by 58% and 70%, respectively since 2016; and
- Average metals concentrations declined by between 29% and 41% from the 2016 level.

The short post-redevelopment/post-restoration assessment period (2017-2019) prevents any strong conclusions regarding positive trends in pollutant loading and concentrations, as measured at the Church Creek instream station, from being made at this time. As additional data are obtained, these trends will continue to be explored.

Again, further discussion of the monitoring activities at these stations and the resulting data can be found in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2017-2018*) 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:

Four 75-meter biological monitoring reaches are positioned along Church Creek between the Annapolis Towne Centre (Parole Plaza) outfall station and the Church Creek in-stream water quality monitoring station. Benthic macroinvertebrate samples were collected from these stations in April 2019, following the MBSS spring index period protocols. Three sites were established and first monitored in 2006; one site is located on the Parole Plaza Tributary just below Forest Drive (CC01), and two sites are located along the Church Creek mainstem, on either side of Solomons Island Road (Maryland State Highway 2), CC02 is the downstream station and CC03 is the upstream station. A fourth site, CC04, is located just upstream of the confluence with the Parole Plaza Tributary and was added in 2007 to monitor the effects of runoff from the adjacent Annapolis Harbour Center and Festival at Riva shopping centers (see Figure 3 in this document and Figure 2-1, CC Report, **Appendix C** for site locations).

The biological condition at each station was evaluated using the BIBI developed for use in Maryland's Coastal Plain streams. The 2019 BIBI score narrative ratings at the Church Creek sites ranged from 'Poor' at CC02 to 'Very Poor' at CC01, CC03, and CC04. BIBI scores ranged from 1.6 and 2.1 indicating a highly impaired benthic macroinvertebrate community. The BIBI rating at stations CC03 decreased from Poor in 2018 to Very Poor in 2019 and the rating at CC02 increased from Very Poor in 2018 to Poor in 2019. The BIBI scores and narrative rating remained the same at CC01 and CC04 between 2018 and 2019. Since 2006, all stations have consistently been rated as either 'Poor' or 'Very Poor.' The low BIBI scores were driven by low scores for EPT

taxa, the number and percent of Ephemeroptera and the percent intolerant to urban metrics at all biological monitoring reaches.

Physical habitat quality was evaluated using the MBSS Physical Habitat Index (PHI) and EPA Rapid Bioassessment Protocol (RBP). PHI scores decreased at CC01, CC03, and CC04, and increased at CC02. In the interval between 2018 and 2019, the PHI narrative ratings did not change for CC02 and CC03; both CC01 and CC04 declined from Partially Degraded to Degraded. The stream physical habitat has remained characterized as Degraded or Partially Degraded at all study reaches since monitoring began in 2006. Similarly, RBP scores at two sites decreased in 2019, which were sufficient to shift the associated narrative rating into a lower category than that observed in 2018 at two of these sites (CC01 and CC04); RBP score and narrative rating increased at site CC03 from 2018 to 2019. Reductions in epifaunal substrate and velocity/depth diversity scores were the main driving factors in the lower narrative ratings between 2019 and 2018. The stream physical habitat has remained characterized as Supporting or Partially Supporting at all study reaches since monitoring began in 2013, with the exception of CC02 in 2015, 2018, and 2019, and CC01 in 2019, where narrative ratings were scored as Non-Supporting. Overall, PHI and RBP scores indicate that habitat conditions may limit the potential for healthy biological communities. The close proximity to roads and development and a scarcity of stable epifaunal substrate may prevent the stream from supporting a diverse and healthy macroinvertebrate community. Continued elevated conductivity levels indicate the presence of water quality stressors and may limit biological condition improvement within Church Creek. The results of the biological monitoring work are included in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2018-2019*) 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. Physical Monitoring

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 can be difficult to locate in the field; thus, best professional judgment is often used to augment data interpretation and categorize the stream segments. Table 46 is a

summary of each reach and its classification for the past 7 years (for site locations, refer to Figure 3 in this document and Figure 2-1 in **Appendix C**).

Table 46. Summary of the physical characterization assessments for cross-sections in the Church Creek subwatershed

Reach	Classification by Year							Notes
	2013	2014	2015	2016	2017	2018	2019	
XS-1	F4	F5/4	F4	F4	F4	F4	F5	Channel degradation, loss of floodplain connectivity, and widening indicate this channel is not stable.
XS-2	G5c	G4c	G4	G4c	G4c	G4c	G4c	Channel is widening, scouring, and is unstable, with increasing entrenchment ratio and low sinuosity.
XS-3	G4c	G4c	G4/3c	G4c	G4c	G4c	G4c	This section was stabilized, with modification to the channel dimensions.
XS-4	C5	C5	C5	E5/4	E4/5	E4/5	E5	Channel affected by restoration just downstream. Entrenchment ratio increased, width-depth ratio decreased.
XS-5	F4/3	F3	F4/3	F4	F4	F4	F4	Slight entrenchment, moderate width/depth ratio, and low sinuosity.

The Church Creek subwatershed has a high percentage of impervious surface and no reach was classified as a C channel, which are generally considered the most stable stream types due to floodplain connectivity. Four reaches were classified as either F or G channels, indicating a degree of entrenchment and instability. One reach, located at the most downstream extent of the Parole Plaza tributary, was classified as an E channel and maintains some limited floodplain connectivity.

Bankfull channel dimensions (cross-sectional area, width, and depth) in the Church Creek subwatershed showed significant departure from expected values, as derived from Maryland Coastal Plain regional relationships of bankfull channel geometry (McCandless 2003). Almost all dimensions were generally larger in the Church Creek study area and were often more similar to relationships of bankfull channel geometry derived from gaged urban watersheds located in the Coastal Plain (AADPW 2002). Values measured in 2019 were slightly higher than prior assessment results. This reflects the higher level of imperviousness in the study area, as compared to the lower impervious levels in the drainage areas used to develop the regional relationship data, suggesting the stream has enlarged as a result of high imperviousness and is both wider and deeper than the more stable channel forms (C and E-type channels) found in rural/suburban watersheds of the Coastal Plain.

Additional information and data pertinent to the water quality, biological, physical and habitat assessments of Church Creek are found in the full report in **Appendix C** (*Chemical, Biological,*

and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2018-2019).

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 County continues the monitoring program at the Church Creek and Parole Plaza monitoring stations. The required chemical monitoring results are found in the *ChemicalMonitoring* table, and the required biological monitoring results are found in the *BiologicalMonitoring* table, of the MS4 Geodatabase in the prescribed format (**Appendix A**). As there is no geodatabase table for the physical monitoring results, these data are presented in **Appendix C** (*Chemical, Biological, and Physical Characterization of the Church Creek and Parole Plaza NPDES Monitoring Stations: 2018-2019),* which also provides greater detail on the work performed in this watershed.

The County's ongoing, long-term monitoring (chemical, biological, and physical) will continue at these same locations for the duration of this administratively extended permit term.

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:

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

b. 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

c. 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, located adjacent to the Odenton Regional Library (formerly called West County Library), began in 2003 and is conducted annually. Five permanent cross-sections were established throughout the study area to evaluate channel stability over time (see *Biological and Geomorphological Condition in the Picture Spring Branch Subwatershed, Severn River Watershed, Anne Arundel County, Maryland: 2018-2019* in **Appendix D** for a location map, Fig 2-1). Three of the five cross-sections are located on the North Tributary, one is downstream of Maryland State Highway 170, and one is on the South Tributary. In FY19, 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). It should be noted that the South Tributary does not receive significant stormwater runoff from the Odenton Regional Library site. Most of the runoff from this site drains to the North Tributary, downstream of XS-1.

To compare changes over time, the cross-sectional area from 2011 through 2019 was calculated using the top of bank elevation from the baseline survey to standardize comparisons and reduce variability among more subjective bankfull elevation reference points, or even changes that can occur to top of bank elevations from year to year. As documented in prior years' reports, calculations prior to 2011 did not use this baseline reference elevation; instead, the corresponding year's top of bank elevation was used to calculate cross-sectional area. Consequently, these values are not directly comparable to the cross-sectional areas reported in 2011 through 2019. Comparison of baseline cross-section area is, however, comparable from 2011 through 2019 as all calculations are made using the same top of bank elevation.

Channel dimensions along the North Tributary have not changed substantially from baseline conditions, although some aggradation has occurred in the past six years (2014-2019). Channel dimensions appear relatively constant for three (XS-2, XS-3, and XS-5) out of the five cross-sections in 2019 compared to baseline conditions; the cross-sectional areas decreased by 4.7%, 7.5%, and 3.9%, respectively, since the beginning of the study in 2003. Larger increases in overall cross-sectional area at XS-1 (75%) and XS-4 (approximately 40%) have been observed over the same interval. Unlike the other stations, XS-1 and XS-4 are not located in an engineered or partially armored channel. Additionally, XS-1 is located upstream of the library site; as such, it does not receive stormwater runoff from this site. When examining changes in cross-sectional area since 2011, when calculations were standardized as discussed above, the changes in cross-sectional area decrease at each cross-section to much lower percentages. Cross-sections 1 and 4 still exhibit the greatest overall percent change using these standardized calculations; 15.4% and 14%, respectively (see Table 4-3, **Appendix D**).

Overall, it appears that the BMPs installed as part of the development of the Odenton Regional Library site have been effective in reducing the geophysical impacts of stormwater runoff. As noted previously, the South Tributary (XS-4) does not receive significant amounts of drainage from the West County Library site.

In April 2019, a benthic macroinvertebrate biological assessment was conducted at three previously established 75-meter reaches within the study area (see Figure 2-1 in **Appendix D** for a location map). Two sites were placed on the North Tributary, PSB01 and PSB02, and one site was placed downstream of the confluence with the South Tributary and below Piney Orchard Parkway (MD State Highway 170), PSB03.

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 narrative ratings were somewhat variable, fluctuating between the 'Poor' and 'Fair' categories. Each site sampled in both 2016 and 2017 received narrative BIBI ratings of 'Fair'. In 2018 and 2019, the benthic macroinvertebrate community at one site within the study area (PSB03) was rated as "Poor", while the other two sites received a "Fair" rating. Taxa diversity remained the same or slightly increased across all sites in 2019, and no Ephemeroptera taxa were found at any site during the 2019 sampling period.

Physical habitat was assessed at the same three benthic macroinvertebrate sampling reaches using the Maryland Physical Habitat Index (PHI) and EPA Rapid Bioassessment Protocol (RBP). The three Picture Spring Branch sites were given a narrative PHI rating of "Partially Degraded" in 2019. Although the narrative rating remained the same at these three stations, the PHI scores at all three sites showed an increase from 2018 scores. The stream physical habitat has remained largely characterized as Degraded or Partially Degraded at all study reaches since monitoring began in 2006, though a general trend in higher scores can be seen over time. The slight increase in scores is primarily a result of improvements in the quality of epifaunal substrate and instream habitat. Physical habitat quality was also evaluated using the RBP and rated "Partially Supporting" for two sites (PSB02 and PSB03) and "Supporting" for one site (PSB-01). Generally, the Picture Spring Branch sites had optimal or sub-optimal scores for channel flow status and channel alteration, and sub-optimal or marginal scores for bank stability, vegetative protection, and riparian zone width. The stream physical habitat has remained largely characterized as Partially Supporting or Supporting at all study reaches since monitoring began in 2013, and ratings have remained largely similar over time. The complete biological and geomorphological conditions report is found in **Appendix D** *(Biological and Geomorphological Conditions in the Picture Spring Branch Subwatershed: 2018-2019).*

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.***

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

   Status:

This Annual Report covers the reporting period of July 2018 through June 2019, and corresponds to the County's 2019 Fiscal Year (FY19). The summary of funding and expenditures for FY19 is found in the *FiscalAnalyses* table of the MS4 Geodatabase (**Appendix A**). Table 47 provides the FY19 break down of expenditures by permit condition.

Table 47. FY19 Fiscal Analysis (Operating and Capital Appropriations)

Permit Condition	Fiscal Year 2019
Legal Authority	$0
Source ID	$1,039,660
SW Management	$1,176,552
Erosion and Sediment Control	$59,535
Illicit Discharge Detection and Elimination	$152,698
Trash and Litter Control	$800,234
Property Management	$11,417,841
Inlet Cleaning	$611,915
Street Sweeping	$401,932
Other Road Maintenance	$0
Public Education	$483,529
Watershed Assessment	$191,856
Watershed Restoration	$7,047,302
Chemical Monitoring Assessment	$314,813
Biological Monitoring Assessment	$557,224
Physical Stream Assessment	$100,790
Stormwater Design Manual Monitoring	$0
TMDL Assessment	$896,563
Annual Report Preparation	$89,463
Total Annual Cost for NPDES MS4 Program	**$25,341,907**

The WPRP Fund was implemented July 1, 2013 in response to State legislated requirements found in Maryland Environmental Code Ann §4202.1 (2013). This Fund provides the primary fiscal support for all eligible components of the NPDES MS4 Permit program. Those MS4 permit-requirements not eligible for WPRP funding continue to be supported by the County's annual budget process (general revenue funds).

With the implementation of the WPRP Fund, a dedicated revenue source was created. These revenues for FY19 totaled $22,017,073. A total of 212,980 properties in Anne Arundel County were assessed the fee in FY19, which was the fourth year of the full fee implementation after the phase-in periods. In addition to the stormwater fee revenues, the WPRP Fund realized revenues from investment income as well as interfund recovery. Please refer to the FY19 WPRP Annual Report (**Appendix K**) for additional information. Estimated projections of revenue for FY20 are $23,336,094. These revenues fund the operating budget directly, and the CIP budget indirectly through debt repayment.

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 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" project classes have been, for the most part, incorporated into the Watershed Protection and Restoration CIP and operating budget items as appropriate. The Watershed Protection and Restoration CIP budgets for FY19 through FY24 total $40,106,000. The projected CIP budget for FY19 through FY24 decreased slightly due to restoration project budgets being spread over the project implementation phases. These costs were detailed in the County's FY18 Financial Assurance Plan (FAP), submitted to MDE in February 2019.

The Final FY18 WPRP Financial Assurance Plan (FAP) with Executive Summary and the Final County Council Resolution 3-19 approving the FAP were submitted to MDE on 25 February 2019. A copy of these final documents is included in **Appendix J.** Comments subsequently received from MDE indicate the County's FAP demonstrated sufficient funding to satisfy the projected two-year ISRP costs. At our current pace, Anne Arundel County is poised to exceed our required goal of treating 20% or 4,996 acres of impervious surface by the FY23 deadline.

The Anne Arundel County operating budget for FY19 also provides permit compliance support through funding of personnel associated with permit compliance actions. Such support is derived primarily from the County's I&P, SCD, and DPW. 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 stream assessments, public education, grants, and contracted street sweeping.

The complete FY20 approved County budget (operating and capital) is available for review and download at https://www.aacounty.org/departments/budget-office/index.html.

Lastly, 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 FY19 staffing levels were at 84% and additional hiring will be accomplished in FY20. The increase in staffing continues to assist the County to achieve MS4 permit compliance.

H. References

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