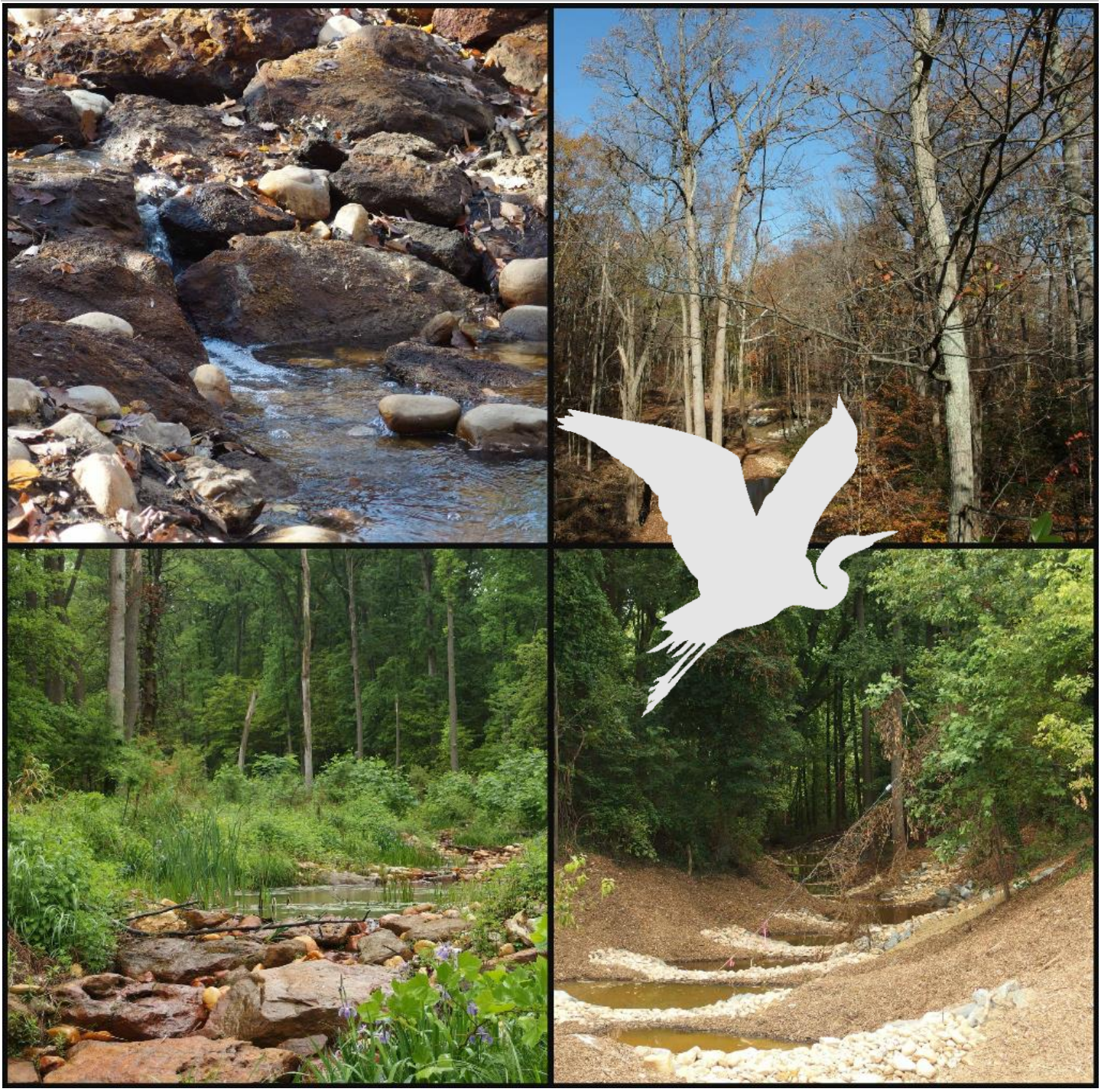
# Anne Arundel County
# Impervious Area Restoration Plan



Anne Arundel County
WATERSHED
Protection & Restoration
PROGRAM

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ANNE ARUNDEL COUNTY
MARYLAND

## Executive Summary

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

The Maryland Department of the Environment (MDE) has previously approved[1] the County's impervious surface area assessment and the associated baseline for impervious area restoration. The impervious area assessment identified 1,639 acres as managed to the MEP[2] (i.e., the baseline of managed impervious area) and 29,311 acres as either having no stormwater management or only partial management (i.e., the baseline of unmanaged impervious area). This resulted in 20% restoration acreage of 5,862 acres (restoration goal), to be completed by the County on or before February 2019.

In its approval, MDE has requested the County provide an impervious area restoration plan with the following information:

- Local ID
- Specific BMP type (use the comprehensive list of BMP's from MDE's geodatabase)
- Watershed (8-digit, 12-digit)
- Precise location (lat/long)[3]
- Estimated impervious acres treated (drainage area or equivalent impervious acres)
- Estimated construction completion (FY)
- Estimated cost
- Impervious acres proposed for BMP design
- Impervious acres proposed for BMP construction completion
- BMPs completed with impervious acres treated and cost

The purpose of this impervious area restoration plan is to provide:

- Summary of county's progress towards restoration goal;
- The County's strategy to meet the restoration goal; and
- Specific information requested by MDE, which is provided as appendix 1 to this report.

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

[2] 238~~,~~ out of the 10,500 existing BMPs were counted as managed, as only these met MDE's triennial inspection requirement.

[3] Precise location for programmed projects is the proposed location at this time. As these projects go through schematic design, and as precise location is available, it will be provided with future reports.

## Summary of Progress Towards Restoration Goal

| Activity | Acres | Reference |
|---|---|---|
| FY15 Water Quality Projects | 198 | Appendix A of FY2015 MS4 Annual Report |
| FY15 Septic Connection to WWTP | 09 | Appendix 1 of this plan |
| Septic ENR Upgrades | 49 | Appendix 1 of this plan |
| FY15 Water Quality Projects [4] | 242 | Appendix 1 of this plan |
| FY15 Street Sweeping | 246 | Section B. (1) of this plan |
| Total FY15 Acreage | **744** | Sum total of FY15 Activities |
| Restoration Acres Feb 2014 -June 30 2014 | **48** | MS4 Addendum Submittal to MDE, May, 2015. |
| Total Restoration Acreage (Since Feb 2014) = **792 acres** | | |

## Impervious Area Restoration Goal

The County is committed to improving water quality and its meeting MS4 permit requirements. The County's strategy to meet the restoration goal is based on:

A. Capital Improvement Program (CIP) restoration projects anticipated to be completed by February 2019;
B. Impervious acre equivalent credit for alternative urban BMPs, approved by MDE;
C. Tracking managed impervious area, which was previously counted as unmanaged in the baseline analysis;
D. WPRP Grant Funded projects;
E. Restoration projects implemented in the County by Non-Governmental Organizations (NGOs); and
F. Alternative Strategies.

Figure 1 below provides a summary of the County's restoration strategy. The sections below provide context and summarize these strategies and the County's efforts to meet the restoration goal. The restoration goal tracking will be provided with each annual report and the strategies to meet the goal will be evaluated as well. The County recognizes the need for adaptive management to meet the restoration goal by utilizing all available opportunities and enhancing alternative strategies, including but not limited to, the possibility of County grant expansion, nutrient trading/offset mitigation, and additional CIP projects to close the "gap" (if any) as the restoration goal is tracked annually.

[4] To be consistent with the WIP Final report to MDE, these projects are not being reported in Table D of Appendix A at this time, as the competition of these projects was reported to the County after WIP Final report was sent to MDE.

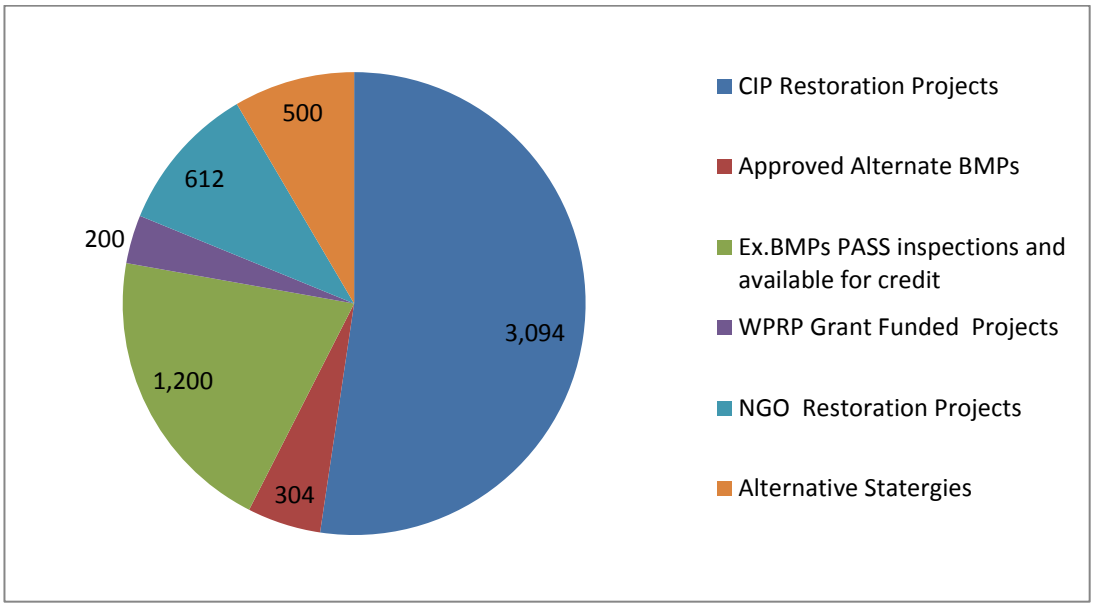


Figure 1 - 20% Restoration Goal Strategy

## A. County Capital Improvement Program

**Program Background and Funding**

Anne Arundel County adopted legislation in June 2013 to create the 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 pollutant load reductions required by the Chesapeake Bay TMDL, EPA approved individual TMDLs with a stormwater WLA, and to meet the impervious surface management requirements as well as other stormwater obligations set forth in the County's NPDES MS4 Permit. Given the basis upon which the Fee was established, at this time, funding to achieve applicable stormwater WLAs is considered to be sufficient to satisfy expenses associated with MS4 compliance.

As the restoration goal is a construction standard, the County has identified Capital Improvement Program (CIP) restoration projects from FY14, FY15, and FY16 which are anticipated to be completed by February 2019 to meet a portion of the goal. A list of projects to meet a portion of the goal are included in Appendix 1. These projects provide impervious area restoration through implementation of stream restoration, outfall restoration (e.g., SPSC), and structural stormwater facility retrofits (e.g., BMP retrofit to provide/enhance WQv). Our specific plan is primarily predicated on the County's CIP, which appropriates funding for implementation of infrastructure and environmental restoration projects. The Capital Budget Program Class for Watershed Protection and Restoration Projects identifies and provides cost estimates for those projects specifically identified to meet stormwater WLAs and MS4 restoration requirements. A summary of this funding from FY15 and FY16 is:

FY15: $81,309,300
FY16: $76,582,100

Figure 2 provides a summary of restoration acreage per fiscal year (FY). The restoration acreage is further broken-up into: programmed, under contract, in-design, and completed, to represent the life cycle of restoration projects.

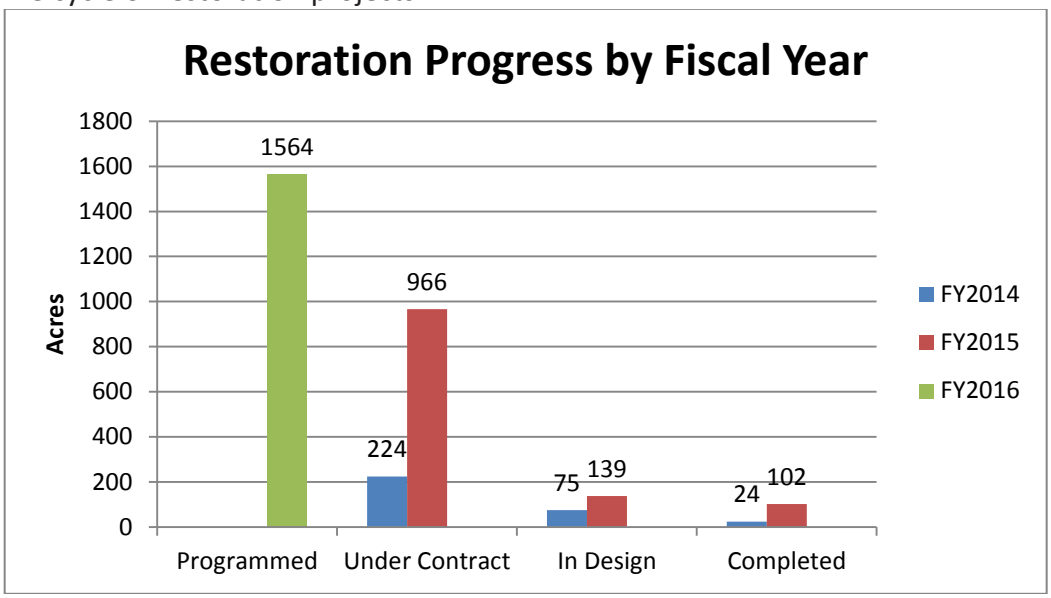


Figure 2 -Summary of CIP projects progress towards restoration requirement.

Most of the programmed projects in FY14 and FY15 are already under contract, in-design, or completed. FY16 projects are programmed at this time. As projects move to next stages of the project cycle (e.g., from programmed to under contract, under contract to in-design, etc.,) the corresponding acreage and changes will be updated with each annual reporting.

Figure 3 provides a breakdown of the restoration acreage per FY by project type (e.g., BMP retrofit, outfall restoration, and stream restoration)

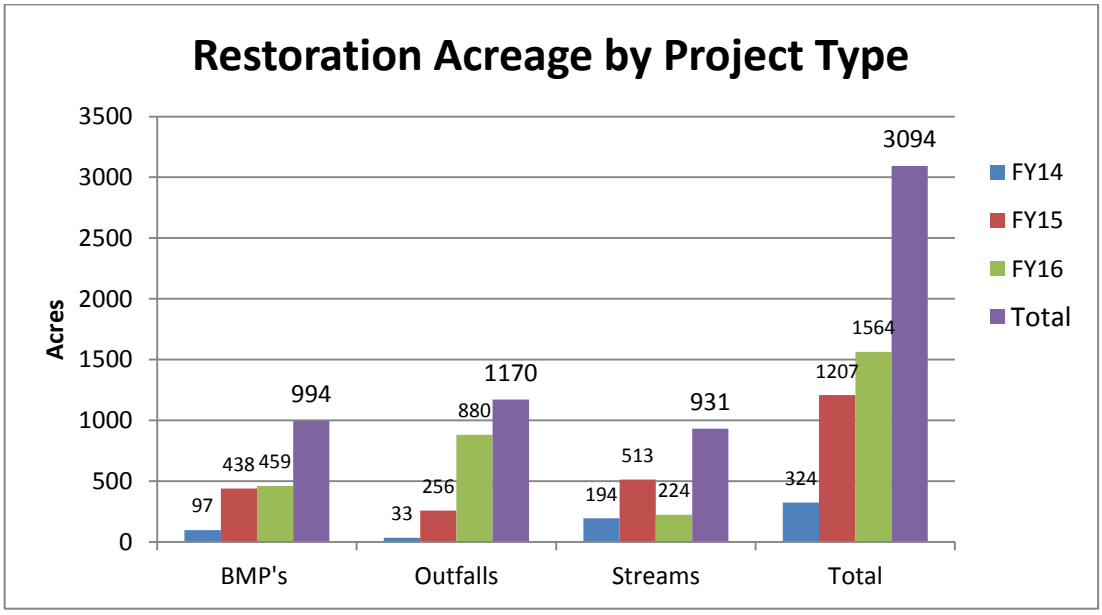


Figure 3- Restoration Acreage by Project Type

**Project Identification and Implementation**

Using the information obtained from the County's watershed assessments, the County identified and prioritized stream reaches for restoration. These reaches were identified and prioritized based on field–collected data pertaining to the physical characteristics of the stream reach and the adjacent habitat, as well as the position of the stream within the sub watershed and watershed landscape. The watershed assessments also identified and prioritized sub watershed areas for restoration based on both land use characteristics and field-collected data. Within the prioritized sub watershed areas, the County identified structural stormwater facilities whose design predated the 2000 Maryland Stormwater Design Manual, as these structures are likely candidates for water quality improvement. Lastly, for potential restoration purposes, the County identified closed storm drain outfalls having poor ratings, indicating a need for rehabilitation. These outfalls would provide an opportunity for structural facility repair as well as downstream channel rehabilitation, water quality improvement, and possibly opportunities to implement upland retrofits into areas without stormwater management facilities.

It should be recognized that the proposed FY16 restoration projects were identified primarily from existing and/or non-field verified information. Thus, the impervious area restoration plan is, truly, planning level information. As such, the County recognizes the need for continual re-assessment and adaptive management implementation to ensure permit compliance as well as successful implementation of the Phase II WIP strategy for meeting the Chesapeake Bay TMDL.

**Restoration Schedule**

Appendix 1 includes the information below requested by MDE and is broken in to: BMPs, Outfalls, and Streams. This information is provided in spreadsheet format.

- Local ID
- Specific BMP type (use the comprehensive list of BMP's from MDE's geodatabase)
- Watershed (8-digit, 12-digit)
- Precise location (lat/long)
- Estimated impervious acres treated (drainage area or equivalent impervious acres)
- Estimated construction completion (FY)
- Estimated cost
- Impervious acres proposed for BMP design
- Impervious acres proposed for BMP construction completion
- BMPs completed with impervious acres treated and cost

Utilizing the same data that built the current and future CIP budgets for environmental restoration, the County identified the specific outfalls, stream reaches, and ponds associated with each class of project that was proposed for funding in County Fiscal Year FY16. While the

CIP is projected beyond FY16, our current plan has stopped with the FY16 proposed projects because the Goal is a construction standard and it is anticipated that these projects up to FY16 are expected to meet this standard. CIP projects funded FY14 (i.e., February 2014 thru June 30 2014) and FY15, and implemented after February 2014, are also included in the impervious area restoration plan.

To project the impervious area restoration to be achieved through the end of the permit term, the County used the guidance provided in *Accounting for Stormwater Wasteload Allocations and Impervious Acres Treated, Guidance for National Pollutant Discharge Elimination System Stormwater Permits (MDE, August 2014*). As better data was available (e.g., as projects go through schematic design submittal, have as-built data), this information was used; but where this data was not available, estimated impervious acres treated was used. The impervious acreage to be restored was determined by project type as follows:

- Stream restoration projects were projected to restore 1 acre of impervious area per every 100 linear feet of stream[5];
- Structural stormwater facility retrofits (i.e., ponds) were projected for retrofit that would achieve 100% of the required $WQ_v$ for the associated drainage area.
- Outfall projects (e.g., SPSC) were projected to achieve 100% of the required $WQ_v$ for the associated drainage area, but the impervious area to be restored was capped at a maximum of 10 acres or the actual impervious area within that drainage area, whichever was less.

Lastly, it should be noted that the impervious area restoration plan is, as noted previously, a plan. As CIP projects have moved forward to feasibility study and then to design, some project components have not moved forward. For example some outfalls identified for retrofit were found to no longer be in need of retrofit and their upland areas were unsuitable for stormwater implementation, or retrofit was deemed not feasible at the current time due to site access issues. Alternatively, some projects (streams) which were in the design/assessment stage have increased in length because reaches previously identified as stable were found to be unstable and associated outfalls in these reaches were also identified which were not previously included in the programmed outfall list. As these projects move to schematic design and further, project specific data will be used to refine the impervious area restored for reporting back to MDE on an annual basis.

For programmed FY16 projects that do not move forward, the County plans to utilize alternative strategies to make-up the "gap." These strategies include, but are not limited to, identifying

[5] As stream restoration projects are in the design submittal phase, credits would be calculated based on the applicable protocols from the approved expert panel report. Linear feet are used as a measure at this time, as this is the best available data for estimated credit calculation purposes and is a conservative estimate of treatment.

retrofit opportunities, documenting credit for recently inspected and maintained BMPs having WQv documentation, adding restoration projects identified by County staff through fieldwork, and working with stakeholders and other NGO groups to implement restoration projects.

## B. Alternative Urban BMPs

### 1. Street Cleaning

The County's street cleaning program is designed to keep debris out of storm drains, our creeks and, rivers, and ultimately the Chesapeake Bay, by reducing the pollutants associated with maintenance activities at County-owned facilities including parks, roadways, and parking lots. This program is administered by the County's Bureau of Highways (BOH).

The County's program covers manual litter collection, street sweeping, cleaning storm drainage pipes and structures, inlet cleaning, and ditch cleaning. During FY15 the County contracted for street sweeping services. Currently the County targets curbed roads with high traffic volumes and/or roads with storm drain outfalls that discharge to and/or touch a tidal or non-tidal water body within the Patapsco River Watershed, a priority area given the Baltimore Harbor Trash TMDL.

Accomplishment data for FY15 is provided below:

- The County swept 2,895 miles of streets during this period using Vactor trucks (Figure 2);
- The County cleaned and removed debris from catch basins, inlets and outlets of pipes to maintain proper drainage for 17,167 structures during this reporting period. This is a 9% increase from the last reporting period in which 15,804 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 1,591 structures were cleaned with a sewer vacuum, an increase of 37% from the last reporting period in which 1,165 were cleaned with a sewer vacuum. The County is currently working with different agencies (e.g., Highways and Waste Management Services) to identify a means of calculating the tonnage of debris and material collected, to calculate the impervious area equivalent credit for the catch basin;
- 8,733 bags of litter were manually collected throughout the County;
- A total of 30,220 feet of pipe were cleaned by a power rodder, an increase of 33% from the last reporting period in which 22,648 feet were cleaned. The County is currently working with different agencies (e.g., Highways and Waste Management Services) to identify a means of calculating the tonnage of material collected for purposes of determining the impervious area equivalent credit; and
- The County cleaned 172,763 linear feet of ditch during this period.

In FY15, the County swept 2,895 curb miles, which is 246 acres of equivalent impervious surface credit. The impervious area equivalent is based on the "Street Lane Approach" methodology. As the new *Street Cleaning Bay Expert Panel Report* is approved, beginning FY16 this report will be used to calculate the impervious area equivalent for the street miles swept. Per this new report,

one impervious acre is equivalent to one curb-lane mile swept for streets with curbs and gutters. At this time the County's street cleaning data is not maintained in a GIS format and, thus, is not geographically represented in Appendix 1. The County is currently working on developing GIS coverage for the street cleaning and this information should be provided with future reports.

Figure 4. The County's Vactor Truck Used in Street Cleaning

MDE allows equivalent impervious area credit for catch basin cleaning and stormdrain vacuuming. The County does not collect this data in tons but is working with different agencies (e.g., BOH and Waste Management Services), to calculate the tonnage of street debris collected, to calculate the impervious area equivalent credit for the catch basin cleaning, and to document stormdrain vacuuming activities. This plan assumes that the County continues to clean 2,895 curb miles each year. The actual miles swept would be updated with MS4 report, and this plan would be updated as well.

**2**. **Septic System Connection to Wastewater Treatment Plant Credit (WWTP)**

The August 2014 MDE guidance allows an impervious area credit equivalent of 0.39 acres for each septic system that was connected to the County's wastewater treatment system.

- July 1, 2014 through June 30 2015: The County made 23 connections, which translates to 9 acres of equivalent impervious surface credit

Appendix 1 has a listing of these connections.

**3**. **Septic Systems Upgraded to Enhanced Denitrification System Credit**

The August 2014 MDE guidance allows an impervious area credit of 0.26 acres for each septic

system upgrade to an enhanced denitrification system.

- July 1, 2014 through June 30, 2015: The County made 187 connections, which translates to 49 acres of equivalent impervious surface credit.

Appendix 1 has a listing of these upgrades.

## C. Existing BMPs Managed Impervious Area

MDE has approved the County's evaluation of impervious lands which identified 30,950 impervious acres under the County's MS4 jurisdiction (Establishing Baseline – Impervious Area Assessment; Anne Arundel County, May 2015). Of these acres, 1,639 were identified as managed to the MEP (i.e., the baseline of managed impervious area) and 29,311 acres were identified as either having no stormwater management or only partial management (i.e., the baseline of unmanaged impervious area).

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

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

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

Table 1 summarizes the BMP inspection verification and database clean-up efforts projected through the end of the permit term, to track managed impervious area.

| Fiscal Year | No. of Pass Inspections | Database Clean-Up | No. of Impervious Acres (as managed) | Counted as Managed in Baseline Analysis | Acreage to be Adjusted Towards Baseline |
|---|---|---|---|---|---|
| FY15 | 1,984 | Yes[3] | 1,500 | No | 300 |
| FY16 | 2,820[2] | Yes[1] | 1,500 | No | 300 |
| FY17 | 2,820[2] | Yes[1] | 1,500 | No | 300 |
| FY18 | 2,820[2] | Yes[1] | 1,500 | No | 300 |

| | | | | | |
|---|---|---|---|---|---|
| **Total** | | | 6,000 | | 1,200 acres[4] |

Table 1- Managed Acreage Tracking

[1] The County is procuring consultant services for the Urban BMP Database clean-up work effort which is anticipated to begin in early summer of 2016. This multi-year work effort will also result in documenting WQv, making these facilities available to be counted as managed to MEP.

[2] A schedule has been put together to inspect BMPs that do not currently have documented triennial inspections. As inspections are performed, the number of facilities that pass inspections would be updated yearly.

[3]. It should be noted that the County has procured consultant services in November, 2015 to clean-up FY15 inspected BMPs. WQv is currently being documented from this work effort, and will be updated with FY16 report.

[4] This acreage is forecasted as a reasonable estimation and will be updated annually as the facilities are inspected and WQv documented (as a part of the bigger database clean-up exercise).

With the Countywide implementation of the WPRP program, 10 FTEs are now dedicated to providing maintenance verification inspections of existing stormwater BMP facilities. As a result, the number of BMPs inspected in FY15 has increased from 238 to 1984. To facilitate these inspections and their concomitant impervious acreage accounting, a schedule for BMP inspections was developed and projected out a minimum of three (3) years. As stormwater BMP facilities are inspected and found to be in good working condition with a documented WQv, the BMP will become available for credit towards the managed impervious area goal and the County will track that managed acreage.

The County is committed to providing accurate data during the BMP inspection through the following:

- Training and certification programs for the inspectors that go out in the field
- GIS/desktop platforms to upload BMP data to local databases
- Quality control checks to validate the uploaded data

Additionally, County staff have attended and participated in BMP maintenance and verification training. Both internal and external training programs have been offered and have been well attended.

As the County further enhances its maintenance inspection program, ramps up field inspection efforts, and increases inspection and maintenance of additional BMPs, the impervious credit associated with these existing BMP practices will be documented toward impervious surface restoration or adjusted baseline. By contracting out the BMP database clean-up effort, it is expected that the County will achieve progress towards documenting water quality volumes for existing BMPs during the FY17 reporting year, and that such efforts will continue in-house into the future years. This effort is tied to the ongoing Urban BMP Database improvements and the required database enhancements associated with the August 2014 guidance, which the County began implementing shortly after receipt of that guidance (MDE 2014).

## D. WPRP Grant Funded Projects

The Anne Arundel County Government has partnered with Chesapeake Bay Trust to establish a grant program that supports watershed restoration projects and programs throughout Anne Arundel County: http://www.aacounty.org/DPW/Watershed/Watershed_Grant_Program.cfm. The goal of the Anne Arundel County Watershed Restoration Grant Program is to fund projects that reduce pollutants through the implementation of watershed restoration practices. Projects must be implemented in Anne Arundel County and applications must include at least one partner that represents a stakeholder group based in Anne Arundel County. Projects must accomplish on-the-ground restoration that will help the County meet local water quality and runoff reduction improvement goals. The grant applications are evaluated by a Technical Review Committee and funding is awarded based on the projects' merit (e.g., cost effectiveness, likelihood of project success, long term maintenance requirements, community support).

All proposals provide calculations of nutrient and sediment loads reduced by the project using a nutrient calculator compatible with the MDE 2014 guidance document. Proposals must include an estimate of the total drainage area and total area of impervious surface treated by the project. In addition, other quantifiable outcomes (e.g., square feet of bioretention created, number of trees planted, square feet of buffer planted) must be provided per the MDE 2014 guidance document.

The County's Watershed Restoration Grant Program will support the construction of the following types of watershed restoration implementation projects to achieve reductions of storm flow and pollutants to County waterways:

- Bioretention cells, bioswales, rain gardens, and other low impact development stormwater techniques;
- Stormwater wetland and marsh creation and enhancement;
- Stream and wetland restoration;
- Regenerative conveyance systems (coastal plain outfalls, etc.);
- Green roofs.

In FY15, the County funded 7 grant projects through this program; Appendix 1 includes a listing of these projects. The FY16 grant proposals are currently under review.

## E. Other Restoration Projects

The County partners with and works collaboratively with various Non-Governmental Organizations (NGOs) to install restoration projects on the ground. Appendix 1 includes a listing of 31 living shoreline projects to restore 15,302 linear feet of shoreline, which equates to 612 acres of impervious area credit. These include proposed and completed projects. Completed projects were assigned a Unique Storm_ID and have been added to the Urban BMP database.

The County is also working with local partners (e.g., Watershed Stewards Academy) on

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

## F. Alternative Strategies

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

## Summary

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

# APPENDIX 1