

National Pollutant Discharge Elimination System

Municipal Separate Storm Sewer System Discharge Permit

2012 Annual Report

Harford County, Maryland

Permit Number 99-DP-3310 MD0068268

December, 2013

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Annual Report 2012

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**MARYLAND DEPARTMENT OF THE ENVIRONMENT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE PERMIT**

PART I. IDENTIFICATION

A. **Permit Number:** 99-DP-3310 MD0068268

B. **Permit Area**

This permit covers stormwater discharges to and from the municipal separate storm sewer system owned and operated by Harford County, Maryland.

C. **Effective Date:** November 1, 2004

D. **Expiration Date:** November 1, 2009

PART II. DEFINITIONS

Terms used in this permit are defined in relevant chapters of the Code of Federal Regulations (CFR) or the Code of Maryland Regulations (COMAR). Terms not defined in CFR or COMAR shall have the meanings attributed by common use unless the context in which they are used clearly requires a different meaning.

PART III. STANDARD PERMIT CONDITIONS

A. **Permit Administration**

The County shall designate an individual to act as a liaison with the Maryland Department of the Environment (MDE) regarding permit issues. Additionally, the name, title, address, phone number, email address, and function of all primary administrative and technical personnel responsible for compliance with this permit shall be submitted to

MDE. An organizational chart including the individuals identified above shall also be submitted and any changes immediately reported to MDE.

An updated organizational chart is included in Appendix A.

B. Legal Authority

Adequate legal authority shall be maintained in accordance with National Pollutant Discharge Elimination System (NPDES) regulations 40 CFR 122.26(d)(2)(i) throughout the term of this permit. In the event that any provision of its legal authority is found to be invalid, the County shall make the necessary changes to maintain adequate legal authority.

Harford County received MDE approval for the draft updates to the Erosion and Sediment Control Ordinance in October 2012. The updates were mandated by MDE to incorporate updates to the State program adopted in 2011. Updates to the County Code were approved in 2013.

C. Source Identification

Sources of pollutants in stormwater runoff shall be identified and linked to specific water quality impacts on a watershed basis. This process shall be used to develop watershed restoration plans that effectively improve water quality. The following information shall be submitted in geographic information system (GIS) format with associated tables as required in PART IV of this permit:

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

Stormdrains

New stormdrains were installed associated with the two and seventy seven hundredths (2.77) miles of roadway accepted by Harford County during calendar year 2012.

All stormdrain features, including point features (ie. outfalls, manholes, inlets, etc.), stormdrain pipes, and stormdrain drainage areas were entered into the geodatabase stormdrains.mdb. The locations for the point features (ie. outfalls, manholes, inlets, etc.) were input into the geodatabase by georeferencing stormdrain design drawings. Associated attributes for the point

features were also entered. A map of the outfall locations and the outfall attributes are included in Appendix B. Ninety eight percent (98%) of the three hundred forty six (346) point features were input from rectified design drawings.

The county-maintained point features consist of forty two (42) outfalls, one hundred eighty (180) inlets, one hundred fifteen (115) manholes, and nine (9) various other features (ie. inflows, stubs, joints, etc.). The forty two (42) outfalls consist of thirty two (32) outfalls from closed systems, three (3) culverts, five (5) water quality outfalls and two (2) outfalls from stormwater management facilities. One (1) outfall was from systems 36" or larger in diameter from residential development, and no outfalls were from systems 12" or larger in diameter from commercial/industrial development.

Using the point features, arcs for the stormdrain pipe were added to the geodatabase and the associated attributes were entered. Three hundred eight (308) pipes were added. By length, seventy six percent (76%) are concrete pipe and sixty two percent (62%) are fifteen (15) or eighteen (18) inches in diameter.

The enclosed CD contains the stormdrain geodatabase with feature classes for stormdrain points and stormdrain pipes.

Drainage Areas

Two (2) drainage areas to major outfalls (36" or larger in diameter for non-industrial and 12" or larger for industrial) for roads accepted during calendar year 2012 were delineated. OF003368 is an existing private outfall. During 2012 County stormdrain was added to this system and the drainage to the downstream most manhole was delineated. (Appendix C).

The enclosed CD contains the stormdrain geodatabase with a feature class for the stormdrain drainage areas.

2. ***Urban best management practices (BMP): stormwater management facility data including locations and delineated drainage areas;***

Stormwater Management Facilities and Drainage Areas

Forty nine (49) stormwater management facilities were completed during calendar year 2012, including forty five (45) new facilities, one (1) expansion, and three (3) repairs. The spatial and tabular data were added to the stormwater geodatabase (Appendix D).

Drainage areas for the stormwater facilities completed during calendar years 2012 were completed and the spatial and tabular data were added to the stormwater geodatabase (Appendix E).

With the adoption of the 2000 Stormwater Design Manual stormwater management systems have become more complicated to inventory in the current database. With multiple devices on a single site, Harford County is unsure if full credit for water quality loadings are being applied towards the Chesapeake Bay Model. Harford County fully supports MDE's effort to update the database and hopes the final version will be implemented soon. In preparation for the migration of existing data into the new database, Harford County requests to meet with MDE to review a representative sample of recently approved stormwater management plans to ensure full water quality credit is correctly being inventoried. After this meeting takes place, Harford County anticipates reviewing and updating all of the stormwater management facilities completed under the 2000 Stormwater Design Manual. Verification of older stormwater management facilities is anticipated to be completed within the next three months.

Stormwater Management Waivers, Exemptions, and Fees in Lieu

Nine (9) waivers were approved during calendar year 2012, and the spatial and tabular data were added to the stormwater geodatabase (Appendix F).

Four (4) exemptions were approved during calendar year 2012, and the spatial and tabular data were added to the stormwater geodatabase (Appendix G).

Five (5) fees in lieu for stormwater management were approved during calendar year 2012, and the spatial and tabular data were added to the stormwater geodatabase (Appendix H).

The enclosed CD contains the stormwater geodatabase including feature classes for facilities, drainage areas, waivers, exemptions and fees in lieu.

3. **Impervious surfaces:** *delineated impervious areas including those associated with BMP implementation;*

Aerial photography was updated in 2013. With the 2013 photography, there will be updates to the LIDAR, topography and planimetrics, including impervious cover.

4. **Monitoring locations:** *locations established for chemical, biological, and physical monitoring of watershed restoration efforts and the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE; and*

A total of sixty (60) monitoring sites including twenty eight (28) chemical, five (5) physical, seventeen (17) biological, nine (9) flow and two (2) rain fall sites were active during calendar year 2012. A table of the attributes and map of the locations for active monitoring sites are included in Appendix I.

The enclosed CD contains the monitoring geodatabase.

5. **Watershed restoration:** *restoration project descriptions and locations identified in PART III. G., below.*

No construction projects were completed in 2012.

D. Discharge Characterization

Harford County and 10 other municipalities in Maryland have been conducting discharge characterization monitoring since the early 1990's. From this expansive monitoring, a statewide database has been developed that includes hundreds of storms across numerous land uses. Summaries of this dataset and other research performed nationally effectively characterize stormwater runoff in Maryland for NPDES municipal stormwater purposes. These data shall be used by Harford County for guidance to improve stormwater management programs and develop watershed restoration projects. Monitoring required under this permit is now designed to assess the effectiveness of stormwater management programs and watershed restoration projects developed by the County. Details about this monitoring can be found in PART III. H.

E. Management Programs

The following management programs shall be implemented in all areas served by the County's municipal separate storm sewer system. These jurisdiction-wide programs are designed to control stormwater discharges to the maximum extent practicable and shall be maintained for the term of this permit. Additionally, these programs are to be integrated with other permit requirements to promote a comprehensive approach toward solving water quality problems. The County shall address any needed program improvements identified as a result of periodic evaluation by MDE and annual self-assessment.

1. Stormwater Management

An acceptable stormwater management program shall be maintained in accordance with the Environment Article, Title 4, Subtitle 2, Annotated Code of Maryland. At a minimum, the County shall:

- a. Conduct preventative maintenance inspections of all stormwater management facilities at least on a triennial basis. Documentation identifying the facilities inspected, the number of maintenance inspections, follow-up inspections, the enforcement action(s) used to ensure compliance, the maintenance inspection schedules, and any other relevant information shall be submitted in the County's annual reports;*

During calendar year 2012, a total of four hundred and two (402) stormwater management facilities were inspected for preventative maintenance. A total of two hundred seventeen (217) facilities were in compliance with Harford County's stormwater management regulations (Appendix J).

Three hundred eighteen (318) sites were new for 2012. One hundred seventy (170) of these facilities were in compliance with Harford County's stormwater management regulations.

One hundred thirty two (132) sites were not in compliance at the end of 2011. Eighty four (84) of these sites were re-inspected in 2012; forty seven (47) of these facilities are now compliance. Forty eight (48) sites from 2011 were not re-inspected in 2012; twenty two (22) of these sites have been re-inspected in 2013 to date.

Ratings, which reflect the condition of the stormwater facility, were provided for each inspection. Two hundred fifty six (256) or fifty percent (50%) of the overall inspections were rated a 1 or 2 which consists of minimal maintenance such as mowing and/or clearing debris from the barrel or storm drain outfalls.

Thirty six (36) or seven percent (7%) of the overall inspections were rated with a 3 required a moderate amount of work such as brush or tree removal from the dam.

Three (3) sites had a rating of 4 which included major problems with the principal spillways.

On average, two (2) inspections along with notices were sent to the owner before compliance was achieved. Correction action will be pursued on the remaining sites in the 2012 calendar year. Five hundred twelve (512) maintenance inspections were conducted.

Two (2) principal spillway replacements were performed: Clayton Station and Greenbrier Hills Sec 5. Parsons Ridge was dredged and storage restored as per the approved plan. The riser base for the BGE Level Substation was excavated and sealed to prevent piping under the principle spillway. Cranberry Woods' residents were assessed by the County; the pond was cleared of overgrowth and sections of the fence were replaced.

During 2012, one hundred twenty one (121) field meeting were conducted with homeowner associations (HOAs), contractors, management companies and developers, and one (1) SWM training class was held for HOAs and contractors.

- b. Implement the stormwater management design policies, principles, methods, and practices found in the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE;*
- c. Track the progress toward implementing the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE and report annually the modifications needed to address any programmatic problems; and*

In 2010, the County began to require the use of ESD practices and implement Supplement 1 of the 2000 Design Manual. During 2012, the County continues to issue Administrative Waivers

for the transition to the new regulations. Fourteen (14) administrative waivers were issued (Appendix K).

Modifications to the program that need to be resolved are the contradictions in Supplement 1 of the Design Manual. There are several areas where there is one requirement on one page and a different requirement indicated on a different page. One example of this is in the Micro-bioretenion section where on one page the drainage to the practice shall not exceed 20,000 sq. ft. but on the preceding page the manual states that if the drainage area exceeds ½ acre the practice effectiveness weakens.

- d. Maintain programmatic and implementation information according to the requirements established as part of MDE's triennial stormwater program review.*

All records and information for design, construction, and maintenance are being maintained as required for the triennial stormwater program review. The County's stormwater program has not been reviewed since the new design manual went into effect. When the program is reviewed by MDE the County will make any necessary revisions to its program. Harford County Stormwater Programmatic and Information is presented in Appendix L.

2. Erosion and Sediment Control

An acceptable erosion and sediment control program shall be maintained in accordance with the Environment Article, Title 4, Subtitle 1, Annotated Code of Maryland. At a minimum, the County shall:

- a. Address any needed program improvements identified during MDE's evaluation of the County's application for the delegation of erosion and sediment control enforcement authority;*

Delegation review was conducted in the fall of 2010. The review determined that Harford County's sediment and erosion control program was adequate and delegation was granted for the period of July 1, 2011 through June 30, 2013. No programmatic changes were required.

- b. At least twice per year, conduct responsible personnel certification classes to educate construction site operators regarding erosion and sediment control compliance. Program activity shall be recorded on MDE's*

“green card” database and submitted as required in PART IV of this permit; and

In 2012, Harford County conducted three (3) Responsible Personnel Certification classes on 5/17/2012, 5/23/12, and 10/24/12. Sixty eight (68) individuals received “Green Card” certification (Appendix M).

The enclosed CD contains the MDE Access database with the course attendees.

- c. Report 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 shall be specific to the permitting activity for the preceding three months.*

In 2012, seventy seven (77) grading permits were issued (Appendix N). Quarterly reports were submitted to MDE. The enclosed CD contains the MDE Access database with the above information.

3. **Illicit Discharge Detection and Elimination**

The County shall implement an inspection and enforcement program, or other alternative methods approved by MDE, to ensure that all discharges to and from the municipal separate storm sewer system that are not composed entirely of stormwater are either permitted by MDE or eliminated. At a minimum, activities shall include:

- a. Field screening at least 100 outfalls annually. Each outfall having a discharge shall be sampled using a chemical test kit;*

Harford County contracted with Versar, Inc. to conduct illicit discharge inspections for a minimum of one hundred (100) outfalls located within the County for 2012 (Appendix O). From December 2012 to March 2013, one hundred and eight (108) outfalls were investigated during dry weather periods. All investigated outfalls were physically inspected and were sampled using a chemical test kit if the outfall was discharging during dry weather periods. Physical inspections of each outfall must include qualitative parameters (color, vegetative conditions, sedimentation etc.) and visual inspection of the outfalls including photographs. The chemical and/or sonde testing of each outfall include the quantitative parameters; chlorine, color, copper, phenols,

surfactants (detergents), temperature, pH, conductivity, and dissolved oxygen. All outfall inspections were performed using the Illicit Discharge Detection and Elimination: A Guidance Manual as the criterion.

Of the one hundred and eight (108) outfalls that were inspected, only twenty seven (27) outfalls had flow during dry weather periods. All sites were physically inspected. However, only the twenty seven (27) outfalls that had flow during dry weather periods were chemically and sonde tested. Two (2) of the flowing outfalls had measured water quality parameters within acceptable ranges and are not considered illicit discharge. The source of the dry weather flow is believed to be groundwater flow entering the system.

Nineteen (19) of the flowing outfalls were found to have low potential for illicit discharge due to water quality parameters minimally exceeding the acceptable ranges. Of the nineteen (19) low potential outfalls, all nineteen (19) exceeded the threshold for color parameters while two (2) of the nineteen (19) low potential outfalls minimally exceeded the threshold for phenols. One (1) of the flowing outfalls was found to have medium potential for illicit discharge due to exceeding the acceptable ranges for residual chlorine. The County performed an additional site visit during a dry weather period and determined that the outfall no longer has dry weather flow. The original source of illicit discharge could not be located.

Five (5) of the flowing outfalls were found to have high potential for illicit discharge due to exceeding the acceptable range for surfactants (detergents). Four (4) of the five (5) high potential outfalls minimally exceeded the acceptable range for surfactants (detergents) on either the initial test or the retest, but not both. One (1) of the five (5) high potential outfalls exceeded the acceptable range for surfactants (detergents) on both the initial test and the retest. The source of the surfactants has not been located and the pollutant has not reoccurred. Follow-up field visits and outfall monitoring will continue to successfully locate and eliminate the illicit discharge.

In addition to the inspection and monitoring of illicit discharge potential at the one hundred and eight (108) outfalls, the outfalls were also inspected for possible maintenance issues. Of the one hundred and eight (108) investigated outfalls, ten (10) were identified as needing maintenance. The ten (10) outfalls have been referred to the responsible parties for maintenance. It was field determined that three (3) of the investigated outfalls needing maintenance were actually private storm drains. Courtesy letters recommending maintenance were sent to the owners informing them of the findings.

b. Conducting routine surveys of commercial and industrial watersheds for discovering and eliminating pollutant sources;

Harford County contracted with Versar, Inc. to conduct surveys of commercial and industrial sites for identifying and eliminating potential pollutant sources. During January 2013, fifty two (52) commercial/industrial facilities were inspected for potential pollutants (Appendix O). The majority of the facilities are located along the Edgewood, Joppatowne, and Abingdon corridor. Windshield inspections were performed at all fifty two (52) facilities. All facility inspections were performed using the Illicit Discharge Detection and Elimination: A Guidance Manual as the criterion. Additionally, the field investigation hot spot inspection form used for all facility inspections was developed by the Environmental Protection Agency (EPA).

Of the fifty two (52) facilities that were inspected, sixteen (16) were found to not be hotspots. Thirty three (33) of the inspected facilities were found to be potential hotspots. The remaining three (3) inspected facilities were determined to be confirmed hotspots. The majority of the findings included uncovered dumpsters with overflowing trash, uncovered storage, or vehicle storage on site. All potential and confirmed hotspot facilities received follow-up site visits performed by the County. Follow-up site visits by the County concluded that the overflowing dumpsters and uncovered storage at all facilities inspected have been cleaned and corrected.

c. Maintaining a program to address illegal dumping and spills;

Water Resources continues to implement and improve several initiatives to address illegal dumping and spills. Coordination continues with Harford County Division of Water and Sewer, Harford County Health Department and Harford County Emergency Operations Hazmat Team to ensure the public has adequate resources for reporting illegal dumping, spills and stormwater pollutants. The public has several phone numbers to report these activities. They can utilize Water Resources (24hr) hotline number (410.638.3400) to report illegal dumping, spills and stormwater pollutants. This phone number is staffed by Harford County Emergency Operations Personnel. The staff is trained in emergency operations. Water Resources developed an emergency phone tree so that the staff can direct phone calls to the appropriate agency. This number is published in water and sewer bills, websites and public education literature. Citizens can also use the following phone numbers for reporting purposes: Harford County Government main phone numbers (410.638.3000 or 410.879.2000) and Water Resources Office phone number (410.638.3545). All reports of illegal spills, dumping and stormwater pollutants are referred to Emergency Operations. They perform the follow-up and document the calls in the

Hazmat Responses Report (Appendix P). If the illegal dumping or spill requires enforcement action this is done through The Local Emergency Planning Committee (LEPC). They conduct investigative hearings. Representatives from Emergency Operations serve on the LEPC.

The Harford County Health Department assists the Division of Water and Sewer with sewer overflows. They determine appropriate forms of public notification, identifying downstream users, directing stream testing and assessing adequacy of site cleanup. Water and Sewer is responsible for placing signs, issuing press releases, contacting downstream users, conducting stream testing and implementing cleanup.

The Health Department responds to citizen reports of leaking or overflowing septic systems and private sewer lines. Most of these calls are placed directly to the Health Department offices. A portion of citizen reports are routed from Emergency Operations. The Water Resources staff continues to work with sanitarians from the Bureau of Environmental Health to coordinate preventive and clean-up protocol regarding discharges (oil, grease, leaky dumpsters) from restaurants that impact the stormdrain system. Emergency Operations coordinates with the Recycling Office in distributing information on household hazardous waste disposal. They also schedule dates for citizens to drop off household hazardous waste.

During calendar year 2012, Hazmat conducted one hundred and fifty (150) responses. Ninety three (93) of the responses had a potential water quality impact (Appendix P).

Water Resources coordinated with appropriate agencies such as Sediment Control and the Soil Conservation District in developing a “Numbers to Know” for the Environment brochure. This brochure is now distributed as a public education tool. Harford County has utilized the Environmental Protection Agency Door Hanger: *“Stormwater Pollution Found in Your Area”* to inform and educate residents on stormwater pollution. Harford County has developed a brochure *“When it Rains it Drains (Stormwater Pollution)”* for public education. This brochure is now distributed as a public education tool. The video “Municipal Storm Water Pollution Prevention Storm Watch” was purchased as an in house training tool. Water Resources will use this video to train municipal employees in Stormwater Pollution Prevention and Illicit Discharge Detection in the field. We continue to update the database established for public education materials distributed to commercial/industrial facilities.

- d. *Using appropriate enforcement procedures for investigating and eliminating illicit discharges, illegal dumping, and spills. Significant discharges shall be reported to MDE for enforcement and/or permitting; and*

The Local Emergency Planning Committee (LEPC) is responsible for the enforcement of all reported illegal dumping and spills that take place in Harford County that are not classified as criminal activity. They work in conjunction with Harford County Government Hazmat Operations Team to address these issues. They establish monetary fines and conduct hearings on reported environmental incidents. They conducted two (2) hearings for 2012. The first hearing was for a fuel spill at Harford County Transit. The second hearing was for incorrect chemical mixing at Courtyard by Marriot. Information on hearings is included in (Appendix Q). A representative from Water Resources is a member of the LEPC.

The Environmental Crimes Unit is a part of the Emergency Operations Center. They are responsible for investigating and enforcement of all civil actions involving environmental crimes. Any environmental crime requiring criminal enforcement is referred to the Sheriff's Department. This unit is extensively trained in the investigation of Illegal Hazardous Materials and Waste Dumping, Transportation (DOT) violations, cleanup and reporting of accidental spills and enforcement of all federal, state and local laws. They routinely inspect numerous commercial activities within the county for compliance with federal, state and local laws. This unit also assists with planning for Hazardous Materials Response in Harford County through the Local Emergency Planning Committee (LEPC). The team is equipped with the necessary chemical / biological protective equipment to respond, analyze, and neutralize environmental threats in Harford County.

Harford County Emergency Operations is responsible for implementing SARA Title III. SARA Title III supports local emergency planning efforts by informing the public, state and local governments of potential chemical hazards in their community. Owners/operators of potential hazardous chemicals are required to submit the following information: inventory list, hazardous waste storage, spills and response to hazardous waste spills. Reports of spills are received through the 911 center and are directed to the Hazmat Team as appropriate.

- e. *Reporting illicit discharge detection and elimination activities as specified in PART IV of this permit. Annual reports shall include any requests and accompanying justifications for proposed modifications to the illicit discharge detection and elimination program.*

The Illicit Discharge monitoring program again has seen significant improvements in the areas of inspection, remediation and public education. Consistently, the mandatory number of outfalls and facilities has been inspected. A database is maintained that documents suspected illicit discharges and tracks corrective action and maintenance for outfalls. Commercial/industrial facilities information is also maintained in a database. This information provides a valuable picture of the extensiveness of the stormdrain system and how facilities have an important impact. A few illicit discharges have been obtained from these activities, but most from windshield surveys and emergency situations.

Public education has been an invaluable tool for increasing community awareness of the stormwater system. Along with public education programs addressing illegal dumping and spills the County also targets stormwater pollutants such as car washing, pet waste, lawn waste and swimming pools.

4. **County Property Management**

The County shall identify all County-owned and municipal facilities requiring NPDES stormwater general permit coverage and submit Notices of Intent (NOI) to MDE for each. The status of pollution prevention plan development and implementation shall be submitted annually.

Eight (8) County properties have been determined to require NPDES stormwater general permit coverage (Appendix R). NOIs have been submitted for each of the facilities and pollution prevention plans have been completed. All eight facilities will need to update their pollution prevention plans and submit NOIs in 2014 in response to the new general permit for stormwater discharges including watershed restoration for 20% of the impervious surfaces.

Harford County Public Schools is not owned by Harford County, Maryland and the status of their coverage is therefore not included in this section.

The implementation of the pollution prevention plans for the various facilities involves the use of best management practices such as good housekeeping, preventative maintenance, inspections, spill prevention and response, sediment and erosion control, management and runoff, and employee training.

Monthly evaluations are conducted to identify if:

- pollutants are entering the drainage system,
- the measures to reduce pollutant loading are effective, :
- the structural measures, sediment controls, and other storm water BMPs are operating properly, and
- spill response equipment is located in areas susceptible to pollutants entering the storm water.

In 2012, Water Resources conducted Pollution Prevention training at several of the County facilities. Topics included good housekeeping and spill prevention, vehicle and equipment washing and maintenance, spill reporting and response, outdoor storage of material and waste and landscaping and lawn care. Training was also provided on illicit detection and elimination. Addition divisions with field staff such as construction inspections and transportation services were also provided illicit detection and elimination training. Everyone that attended the training received a window decal to place in their county vehicle with the hotline number to report illegal spills. A total of one hundred eighty (180) County employees attended (Appendix R).

5. **Road Maintenance**

A plan to reduce pollutants associated with road maintenance activities shall be developed and implemented. At a minimum, an annual progress report shall be submitted that documents the following activities:

- a. *Street sweeping;*
- b. *Inlet cleaning;*
- c. *Reducing the use of pesticides, herbicides, fertilizers, and other pollutants associated with roadside vegetation management through the use of integrated pest management (IPM); and*

- d. *Controlling the overuse of winter weather deicing materials through continual testing and improvement of materials, equipment calibration, employee training, and effective decision-making.*

During 2012, Harford County Bureau of Highways continued its road maintenance operations to ensure public safety in a cost-efficient manner.

Street Sweeping

Harford County maintains 1,057 miles of roadway. Approximately 80% of all public streets are swept annually with a mechanical brush vacuum truck. Additionally, certain major collector roads may be swept monthly. In 2012, 2,643 lane miles of hard surface roads were swept. Dirt roads are not swept. In 2012, 1,983 tons of material was collected during street sweeping. Material collected during street sweeping is disposed of in the local landfill or maintenance yard.

Inlet Cleaning

In 2012, the schedule for cleaning inlets was increased from every five year to every three years. Inlets may be cleaned more frequently if needed. Inlets may be cleaned with vacuum sweepers, backhoes, or manually. In calendar year 2012, 4,874 inlets were inspected and were cleaned as needed resulting in 2,437 cubic yards of material removed from the stormdrain system.

Roadside Vegetation Management

The only pesticides that Harford County utilizes for roadside maintenance are herbicides and continue to minimize their use. Harford County only applies Roundup to areas beneath guardrails which cannot be mowed. No herbicides are applied immediately adjacent to stream crossings. For calendar 2012, Harford County Bureau of Highways reported no herbicide usage. Harford County Bureau of Highways does not use fertilizer as part of the road maintenance operations.

Deicing

During 2012, Harford County Highways Division did not apply any sand/aggregate mix. Traction control and ice melting was achieved solely from salt application. In 2012, two

thousand two hundred ninety eight (2,298) tons of salt was applied. Harford County does not track the amount of material applied to State or municipal roads. County staff evaluates road conditions for each storm to determine the most effective treatment for the conditions of the particular storm and for the area of the County affected. Harford County Bureau of Highways has an internal employee training program for equipment operators at the beginning of each snow season. The training includes equipment operation, safety, maintenance, inspection and record-keeping.

6. **Public Education**

A public education and outreach program shall be implemented to reduce stormwater pollutants. Outreach efforts are to be integrated with all aspects of the County's activities. These efforts are to be documented and summarized in each annual report. At a minimum, the County shall:

- a. *Establish and publicize a compliance hotline for the public reporting of suspected illicit discharges, illegal dumping, and spills.*
- b. *Provide information regarding the following water quality issues to the general public:*
 - i. *Water conservation;*
 - ii. *Stormwater management facility maintenance;*
 - iii. *Erosion and sediment control;*
 - iv. *Household hazardous waste;*
 - v. *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. *Litter control, recycling, and composting;*
 - vii. *Car care, mass transit, and alternative transportation;*
 - viii. *Private well and septic system management; and*
 - ix. *Pet waste management.*

- 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.*

Public Outreach Events

In 2012, staff participated in various public outreach events. These events include the Arbor Day Festival in April, Earth Day Festival in Aberdeen in April, and the Upper Western Shore Wade-In in June. During each event, staff promoted the importance of healthy watersheds, the need for proper erosion and sediment control measures, the impacts of impervious surfaces, the benefits of recycling, native plants, proper lawn care, best management practices, and rain gardens, the importance of proper disposal of hazardous household materials and pet waste, along with additional nonpoint source pollution and stormwater related materials. Staff offered promotional items such as t-shirts, pencils, and cups, in addition to environmentally themed toys, balls and recycled frisbees. Staff engaged the public in conversation about relevant environmental and watershed issues and enticed the youth with watershed and insect puzzles, games and water conservation coloring books.

Wheel Creek Watershed Public Outreach Events

In 2012, staff gave a presentation to the Harford County Master Gardeners highlighting the Trust Fund efforts, the Wheel Creek Restoration Project, biological, physical and chemical monitoring efforts in the County, and the importance and value associated with stream and habitat restoration.

In 2012, staff partnered with Maryland DNR, the University of Maryland, Harford County Master Gardener's and the Harford County Library conducted a Rain Garden Workshop at the Abingdon Library. The focus of the workshop was how homeowners can create a rain garden in their own backyard. Topics included a description of rain gardens, how they work and why they are valuable, the role of native plants in the landscape, the importance of improving wildlife habitat, "bayscaping" and how each benefits our local streams. There was also a tour of the rain garden constructed at the library in the fall of 2010.

In 2012, staff set up a rain garden display at the Abingdon Library. The display included a concept design of the rain garden installed at the library, a cross-sectional model of the materials used in the garden, a landscaping plan for the garden, native plant information and a description about how rain gardens work and why they are valuable.

School Activities

In May 2012, staff conducted an aquatic insect demonstration for preschool, 1st and 2nd grade students at North Harford Elementary School. Staff utilized preserved specimens and live specimens collected in Falling Branch and the Little Gunpowder River to demonstrate the importance of aquatic communities. The discussion included explanations of insect life cycles, food webs, ecosystems and watersheds, what they are and why they are important. The discussion explained how everyday human activities and land use changes impact our watersheds and water quality in addition to stressing what we can do to improve water quality.

In March 2012, staff participated as a judge and mentor for the St. Stephen School annual science fair. Activities included classroom presentations on types of experiments to perform, principles of the scientific method, ways to effectively collect and display data and communicate results.

In 2012, staff met several times with the Environmental Club at Forest Hill Elementary School and discussed the water cycle, impervious surfaces, water quality monitoring, and watershed restoration. The purpose of the presentations was to prepare the students for a day long field trip on the Bay. The Environmental Club also assisted staff in a spring cleanup of the rain gardens at the school.

Stormwater Management Workshops for Homeowners Associations and Property Management Companies

Most stormwater management facilities in Harford County are privately-owned, many by Homeowners Associations (HOAs). As part of our effort to improve maintenance of these facilities, stormwater management inspection staff routinely offers to meet with HOAs and professional property management companies to describe the purpose of and maintenance requirements of their stormwater management facilities. In 2012, staff conducted one (1) stormwater management training class with HOAs and contractors, and one hundred twenty one

(121) field meetings with HOAs, contractors, management companies and developers regarding pond maintenance requirements, barrel replacement issues, and beneficial user agreements.

Capital Project Community Meetings

In February 2012, staff attended the Woodbridge Homeowners Association Board of Directors meeting. The Board was briefed on the final design, project schedule and was provided with the Right-of-Entry Agreement. Maintenance requirements were also presented.

From June to September, 2012, staff met with property owners along the Woodbridge Stream Restoration Project. Since the project would impact the 100-year floodplain elevation, it was necessary to educate the property owners on the impact of the floodplain change and to obtain agreements from all affected property owners, prior to obtaining construction easements. Five floodplain agreements were obtained.

In 2012, staff met with the management company for the Calvert's Walk Apartments to discuss the stream restoration project that began construction in December 2012. Letters to the residents were distributed by the management company, a facebook page was developed, and a project sign with contact information was installed. There were no calls, emails or responses via facebook from the residents.

Miscellaneous Outreach

In September 2012, staff, along with park naturalists and natural resources professionals, participated in the sixth annual BioBlitz at the Anita C. Leight Estuary Center. The event was designed to increase the public's understanding of the variety of wildlife at the park by conducting a two-day survey of the park for plants and animals and then documenting the different species that make their home at the park and Bosely Conservancy. Sessions were conducted on inventories of marsh plants, submerged aquatic vegetation, insects, birds, herpes (snakes, turtles, and lizards), fish, trees, and bats.

During 2012, staff continued to serve on the board of directors for the Maryland Water Monitoring Council (MWMC). MWMC serves as a state-wide collaborative body to help achieve effective collection, interpretation, and dissemination of environmental data related to issues, policies, and resource management involving the Maryland water monitoring community. The MWMC addresses the full range of aquatic watershed resources in Maryland including

ground and surface waters, freshwater, estuarine and marine environments, and associated watershed resources in Maryland.

During 2012, staff continued to serve on the board of directors for the Otter Point Creek Alliance (OPCA). OPCA is a non-profit organization dedicated to the support of the research, education, and conservation goals of the Otter Point Creek Component of the Chesapeake Bay National Estuarine Research Reserve in Maryland through raising money, securing volunteers, sponsoring special events and aiding staff in implementing the Reserve's Management Plan.

In 2012, staff continued to participate in the Bush River Partnership. This partnership was formed for the purpose of providing information about existing programs and projects occurring within the Bush River Watershed; to explore areas of collaboration; and outline steps to improve and enhance the watershed. The partnership includes individuals representing federal, state and local agencies and various non-profit organizations that focus on three sectors: Research and Monitoring; Management, Protection, and Restoration; and Education/Outreach & Training.

In 2012, staff participated as a reviewer for the Harford County Public School's Environmental Scholarship Awards Program. This scholarship is offered at each high school for graduating seniors intending to prepare for a career focused on the environment. Staff evaluated each application based on the applicant's intent to pursue an environmental career, commitment to volunteer efforts for the improvement of the environment and the quality of life in the community, and academic achievements that would indicate success in obtaining a post-high school education.

F. Watershed Assessment and Planning

The County shall continue the systematic assessment of water quality within all of its watersheds. These watershed assessments shall include detailed water quality analyses, the identification of water quality improvement opportunities, and the development and implementation of plans to control stormwater discharges to the maximum extent practicable. The overall goal is to ensure that each County watershed has been thoroughly evaluated and has an action plan to maximize water quality improvements.

At a minimum, the County shall:

- 1. Continue to perform detailed assessments of all watersheds in Harford County. These assessments shall be performed according to priorities established*

previously by the County and at an appropriate scale (e.g., Maryland's hierarchical twelve-digit sub-basins). At a minimum, watershed assessments shall:

- a. Determine current water quality conditions;*
 - b. Identify and rank water quality problems;*
 - c. Identify all structural and non-structural water quality improvement opportunities;*
 - d. Include the results of a visual watershed inspection;*
 - e. Specify how the restoration efforts will be monitored; and*
 - f. Provide an estimated cost and a detailed implementation schedule for those improvement opportunities identified above.*
- 2. Perform watershed assessments until all land area in Harford County is covered by a specific action plan to address the water quality problems identified. At a minimum, the County shall perform a detailed watershed assessment for one County watershed during this permit term.*
 - 3. Provide, in the first annual report for this permit, a description of the progress made toward performing detailed watershed assessments for all land area in the County. Subsequent annual reports shall continue progress reporting and the detailed watershed assessment required in PART III. F.2. above shall be submitted no later than the fourth annual report.*

In 2008, Harford County completed a small watershed assessment of Wheel Creek. A smaller scale assessment than had been completed in the past is more manageable and more likely to achieve measurable results from restoration. In 2012, many of the restoration projects proposed in the assessment were under design (Lower Wheel Creek Stream Restoration, Festival at Bel Air Stormwater Retrofit) or under construction (Gardens of Bel Air Stormwater Retrofit, Calverts Walks Stream Restoration). Small watershed assessments have also been completed for Plumtree Run (1,400 acres, 2011), Sam's Branch (370 acres, 2012) and Foster Branch (1,400 acres, 2012). Harford County anticipates continuing to use the Wheel Creek Small Watershed

Assessment as a model to pursue additional small watershed assessments in other areas with the inclusion of pollutant load and impervious treatment calculations in accordance with the most recent guidance documents.

Sam's Branch

Sam's Branch, a tributary to Otter Point Creek, in Edgewood, MD exhibits typical responses to uncontrolled stormwater runoff. Bank instability, inadequate riparian buffers and water quality degradation may be contributing to sedimentation and water quality degradation in Otter Point Creek and the Bush River. In May, 2008, Harford County contracted with Biohabitats, Inc. to perform an assessment of the 373 acre Sam's Branch watershed. The goals of the assessment were to monitor stream health for two years and assess watershed conditions.

The watershed assessment plan included several components. Biohabitats performed a survey of upland conditions by conducting a "Unified Subwatershed and Site Reconnaissance" along with a "Stormwater Management Retrofit Survey". A Community Awareness Survey was conducted in 2010 to help quantify land use behaviors that may impact water quality and to guide the development of a public education campaign. Biohabitats also performed a riparian condition survey, established baseline stream morphology conditions, conducted a biological survey and initiated a stream water quantity and quality monitoring program. In 2011, Harford County requested Biohabitats to add components to the report that meet EPA Section 319 criteria a through i for watershed implementation plans. A copy of the Sam's Branch Small Watershed Assessment, completed in August 2012, is included in Appendix S.

Foster Branch

The Foster Branch watershed (1,420 acres) is located in the lower portions of the Gunpowder River Basin south of US Route 40. The headwaters originate near the intersection of US Route 40 and MD Route 152. The stream becomes tidal near Joppa Farm Road where dredging has occurred twice within the past twenty years. A special assessment has been implemented for the waterfront properties in the community to assist in paying for the last dredging. The Foster Branch Small Watershed Assessment focused on identifying sources of sedimentation and recommending restoration focused on sediment reduction and water quality improvements. The community has been involved with all phases of the assessment. In 2012, the design for the Foster Branch at Trimble Road Stream Restoration project was initiated. The Woodbridge Stormwater Retrofit and Stream Restoration, also located within this watershed, were also under

design in 2012 but were identified prior to the Foster Branch Small Watershed Assessment. A complete copy of the Foster Branch Small Watershed Assessment is included in Appendix T.

Declaration Run and Riverside Area

The Declaration Run (930 acres) and Riverside (320 acres) watersheds are located in the lower portion of the Bush River Basin between US Route 40 and MD Route 7. A scope of work for developing a small watershed assessment was developed in 2012 and is included in Appendix U. The small watershed assessment is anticipated to be completed in 2013.

Future Small Watershed Assessments

Over the next five years, small watershed assessments will be pursued in watersheds with the greatest percentage of impervious surface and potential for restoration. These include the unofficially-named watersheds of Mariner Run & Rumsey Island (711 acres), Heavenly Waters (850 acres), Spenceola Run (3,260 acres), and Shamrock Run & Wright Creek (2,240 acres) and Lower Winters Run (3,220 acres). The format for watershed assessments will follow that of previously completed small watershed assessment with the inclusion of pollutant load and impervious treatment calculations in accordance with the most recent guidance documents.

USGS Stream Gages

Harford County Department of Public Works and the United States Geological Survey (USGS) has partnered for the installation and the continued operation of the following gages through 2012. The operation of these gages will support the ongoing efforts to create a state-wide stream gaging network and the data will supplement information recorded at other gages throughout the County that the County does not provide funding. Data collected at all of the County gages is presented in ‘real-time’ at <http://waterdata.usgs.gov/md/nwis/rt>.

- Bynum Run at Bel Air (01581500) – restarted 1999
- Plumtree Run near Bel Air (01581752) – installed 2001
- James Run near Belcamp (01581649) – installed 2004
- Swan Creek at Swan Creek (01580700) – installed 2007
- Wheel Creek near Abingdon (0158175320) – installed 2009

G. Watershed Restoration

The County shall implement those practices identified in PART III. F. above to control stormwater discharges to the maximum extent practicable. The overall goal is to maximize the water quality in a single watershed, or combination of watersheds, using efforts that are definable and the effects of which are measurable. At a minimum, the County shall:

- 1. Complete the implementation of those restoration efforts that were identified and initiated during the previous permit term to restore ten percent of the County's impervious surface area. The watershed or combination of watersheds where the restoration efforts are implemented shall be monitored according to PART III. H. below to determine effectiveness toward improving water quality.*
- 2. Within one year of permit issuance, begin to implement restoration efforts in a watershed, or combination of watersheds, to restore an additional ten percent of the County's impervious surface area. These efforts shall be separate from those specified in PART III. G.1. above and shall be monitored according to PART III. H. below to determine effectiveness toward improving water quality.*
- 3. Report annually:*
 - a. The progress toward meeting the goals established in PART III. G.1. and 2. above;*

Harford County has been implementing structural restoration projects since 2001 including new stormwater management facilities, retrofitting existing stormwater management facilities and stream restorations. Restoration has focused on providing the maximum management possible considering site constraints and property owner limitations. Stormwater management facilities are privately owned and there are no easements along streams. Therefore, extensive property owner coordination and construction easements are required for all restoration projects.

Local stream bank erosion has been the focus for Harford County's watershed restoration program; maximizing opportunities for channel protection first and water quality second. During this permit term, guidelines for credits towards restoration goals have been informal and somewhat vague. Harford County calculated full credit for restoration projects regardless of the

level and type of management provided since the opportunities on a site by site basis were maximized.

As a result of the Bay TMDL, the focus has been on achieving regional water quality and less on water quantity. Because of the aggressive schedule and level of management proposed within the Bay Implementation Plan, Harford County is forced to focus away from local quantity issues and towards improving water quality. With few local TMDLs and limited monitoring to demonstrate local water quality impairments, prioritizing restoration has become difficult. Restoration projects are very costly and should focus on restoring local problems, not just an urgency to tabulate credits for modeling purposes.

Harford County continues to need to complete a review / update of the stormwater management database to ensure all facilities are included and fully documented. As previously discussed, MDE's new database structure once finalized will provide the appropriate methods to properly quantify water quality within facilities constructed since to 2000. This database structure will likewise be used for quantifying watershed restoration projects and increase consistency amongst the Phase I permittees.

The Declaration Run and Riverside Area Small Watershed Assessment under development in 2012 include pollutant load calculations using the Center for Watershed Protection's watershed treatment model and calculations for impervious surfaces. This will be the first time this model has been used for a small watershed assessment. If proven to be an effective model for planning it will continue to be used for future assessments and completed assessments will be updated as necessary. Completed assessments either contained no pollutant load calculations or used the Simple Method.

In 2012, Harford County investigated the effectiveness of non-structural downspout disconnection on existing residential lots within the Wheel Creek watershed were. Staff conducted an on-line survey, distributed door hangers, developed a focus group and a facebook page soliciting participants for the project to assist in determining methods to quantify disconnected impervious surfaces and pursue low-cost management alternatives within the community. The incentives to the residents for participating in the project were free native plants, a free native tree or a free rain barrel. Although this project provided useful information about community perceptions and suggestions for improvements to our outreach program, a program to disconnect downspouts provided minimal credits towards water quality. Site constraints within the medium density residential lots limited many of the credits because slopes were too steep or distances to roadways too short. This project was funded through a grant from

the Bay Trust. A copy of the final report is included in Appendix V.

In 2012, Harford County continued to investigate land management practices on County owned properties. The purpose of the investigation was to determine if alternative land management practices could be implemented such as conversion of turf grass to meadow grass or forest. Additional structural practices were also included in the investigation. A cursory evaluation was completed for all County owned properties and more detailed evaluations were completed for representative categories of properties including schools, fire departments, and parks. The report is anticipated to be completed in 2013.

Harford County will continue to pursue these types of non-structural programs to determine the potential for lower cost alternatives to traditional structures measures.

b. The estimated cost and the actual expenditures for program implementation; and

Harford County's total impervious surface for 2002 excluding the municipalities and State highways is 11,500 acres. Estimated reductions for agriculture (1,300 acres) and industrial permits (55 acres) reduce the total impervious surface to 10,100 acres. Stormwater management facilities constructed through 2002 only provided quantity management and thus provide no reductions to the impervious surface. Watershed restoration for 20% of the impervious surfaces (as proposed in the draft MS4 permit for Harford County) would therefore be 2,020 acres. Estimates for completed watershed restoration projects total one hundred seventy two (172) acres and initiated watershed restoration projects that are fully or partially funded total one hundred sixty seven (167) acres. Credits for watershed restoration need to be reviewed and updated for completed projects based on the Chesapeake Bay Program Expert Panels on stream restoration and stormwater retrofit and the Accounting Document. Therefore, the total watershed restoration for 20% of the impervious surface is 1,700 acres. Based on actual expenses and cost estimates from the King and Hagan report, an estimate of \$55,000 per acre of impervious area treated would require \$94 M over the five year permit or approximately \$19 M per year. Harford County capital budgets associated with watershed restoration for fiscal year 2013 was \$2.1 M.

In response to the approval of House Bill 987, Harford County Department of Public Works established a committee to determine a fee structure for the stormwater utility to meet the requirements of the draft Phase I MS4 permit. The committee included ten members including representatives from residential homeowners associations, developers, engineering firms, and

County representatives from Treasury, Procurement, and Public Works. The committee met three times between October 2012 and December 2012.

Harford County Department of Public Works determined that approximately \$30 M per year for five years would be required to meet the all of the requirements of the draft Phase I MS4 permit. Initially, the committee explored several options for the division of the \$30 M including the following

- Based on flat fee for all parcels - \$400.
- Based on assessed value – residential between \$250 and \$500, commercial between \$1,000 and \$12,000.
- Based on impervious surface – residential average \$300, commercial average \$5,000.

Based on the review of this data the committee made the following recommendations / observations

- Division of the fee equally among all parcels would not directly reflect the amount of impact a property has on stormwater and would have a greater financial impact on residential properties.
- Basing the fee on assessed value would not directly reflect the amount of impact a property has on stormwater (ie. Office space has a higher assessed value than a warehouse that could occupy the same building footprint).
- Basing the fee on impervious surface for residential parcels was not logistically feasible. The most current impervious surfaces information was based on the 2007 aerial photography. It was not possible to update the impervious surfaces for residential impervious surface using the 2011 aerial photography within the allotted timeframe.
- The fees to collect \$30 M would be overly burdensome for taxpayers and decided that \$10 M was a “best effort” scenario that should be pursued.

Therefore, the committee made the following recommendations:

- Collect \$10.5 M; 76% from residential or \$9.0 M and 24% from commercial or \$1.5 M
- Residential flat fee of \$125
- Commercial fee of \$7 / 500 sq. ft. of impervious surface
- Agricultural landuse only charged if residence on the parcel; \$125 residential flat fee.

Harford County Bill 13-12 was introduced on February 19, 2013 and became law with amendments on April 23, 2013. Some of the amendments included collecting only 10% of the \$10.5 M requested, or \$1.05 M and the creation of a Watershed Protection and Restoration Task Force to report back to the County Executive and County Council on recommendations for fees by November 2013.

- c. *The monitoring data and surrogate parameter analyses used to determine water quality improvements.*

Water Resources Engineering Division Capital Project Monitoring and Assessment

During this permit term, Harford County established a capital project monitoring program. The goal of the program is to quantitatively establish improvements in water quality, habitat quality and/or bank stability over pre-construction conditions. In some instances, the scope and duration of monitoring is dictated by requirements of the waterway construction permit. Each project site is unique, with its own set of goals and expectations. The monitoring plans for each site must reflect the goals of the individual project. The capital project monitoring program has allowed the County to improve upon the design and construction of a variety of restoration techniques.

Box Hill – South Tributary Stream Restoration

Box Hill Long-term Monitoring Plan

Beginning in 2009, Harford County monitored the project at a reduced effort. The goal of the long-term monitoring program is to ensure the stability and functionality of the channel stabilization structures and assess the impact, if any on the biological community. This effort includes visual inspection and photographic documentation semi-annually, in the Spring and Fall. Macroinvertebrate sampling and habitat assessment is conducted biennially in the Spring. Fish surveys will be conducted once every five years, beginning in 2012.

Box Hill Five-Year Monitoring Schedule

Activity	2009		2010		2011			2012			2013	
	Spr	Fall	Spr	Fall	Spr	Summer	Fall	Spr	Summer	Fall	Spr	Fall
Visual Inspection	X	X	X	X	n/a		X	X		X	X	X
Macroinvertebrate/ habitat					X						X	
Fish						Postponed to 2012			X			

Box Hill 2012 Monitoring Results

In August 2012, KCI Technologies, Inc. was contracted by Harford County to conduct biological monitoring in the Box Hill – South Tributary restoration reach. The monitoring included in-situ water chemistry, fish sampling and summer habitat assessment. The water chemistry parameters indicated the stream reach met acceptable standards for Use I streams as defined by COMAR. The fish IBI score was the highest of the three years sampled (2002, 2006 and 2012) although still rated as “poor”. The habitat value remains “marginal”. KCI speculates that the fish species composition may be limited by a fish blockage located immediately downstream of the restoration reach at the culvert under Laurel Bush Road. The complete report and photo documentation for Calendar Year 2012 is included in the enclosed CD as Appendix W.

Laurel Valley Stormwater Retrofit and Bioretention Project and Laurel Valley Stream Restoration Project

Construction of the Laurel Valley Stormwater Retrofit and Bioretention Project began in October 2004, and was completed in spring 2005. In December, 2008, construction began on the Laurel Valley Stream Restoration Project, immediately downstream of the stormwater retrofit. In 2007, the County contracted with KCI Technologies, Inc (KCI) to perform pre-construction monitoring. The annual monitoring plan for Laurel Valley includes a geomorphic analysis; both within and downstream of the restoration reach. A biological analysis is performed upstream of the stormwater retrofit as well as the downstream channel.

Two years of monitoring occurred prior to the installation of stream restoration measures to establish base-line conditions. The County continued to monitor and assess stream conditions for a minimum of three years post-construction.

The three-year post-construction assessment, completed in 2012, showed that the restoration reach is mostly stable, although some downstream erosion is occurring at some of the log drop structures. The Laurel Valley Stream Restoration Year Three Post-Construction Monitoring Report is provided on the enclosed CD as Appendix X.

Heavenly Pond Dam Removal / Stream and Wetland Creation

The Heavenly Pond project involves the removal of a dam and conversion of a recreational pond into a stream and wetland complex. The area of the instream pond is approximately 1.5 acres and the drainage area is approximately 76 acres. The pond is located on County owned property approximately one mile west of the Town of Bel Air. The pond embankment and barrel are failing and in need repair, and the pond does not provide stormwater management. Harford County Water Resources in coordination with the Department of Parks and Recreation determined that removing the dam and reestablishing a stream channel and wetland complex would be the best alternative. In 2011, the County contracted with Parsons Brinkerhoff to develop a concept plan for the dam removal and the stream and wetland creation. Three alternatives were developed. The first includes a partial breach of the dam embankment and installing a 12' x 8' concrete box culvert, the second is a partial breach with a 90' notched opening with a pedestrian bridge, and the third is a partial breach with a 50' notched opening with a pedestrian bridge and pedestrian path along the existing embankment. The monitoring plan for this project includes monthly baseflow sampling upstream and downstream of the project site. Parameters collected will be total and dissolved nitrogen and phosphorus. A draft report is provided on the enclosed CD as Appendix Y.

H. Assessment of Controls

Assessment of controls is critical for determining the effectiveness of the NPDES stormwater management program and progress toward improving water quality. Therefore, the County shall use chemical, biological, and physical monitoring to document work toward meeting the watershed restoration goals identified in PART III. G. above. Additionally, the County shall continue physical stream monitoring in the Church Creek watershed to assess the implementation of the 2000 Maryland Stormwater Design Manual or other innovative stormwater management technologies approved by MDE. Specific monitoring requirements are described below.

1. Watershed Restoration Assessment

The County shall continue monitoring in the Winters Run 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. An outfall and 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. *Eight (8) 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 (3) samples determined to be representative of each storm event shall be submitted to a laboratory for analysis according to methods listed under 40 CFR Part 136 and event mean concentrations (EMC) shall be calculated for:*

<i>Biochemical Oxygen Demand (BOD₅)</i>	<i>Total Lead</i>
<i>Total Kjeldahl Nitrogen (TKN)</i>	<i>Total Copper</i>
<i>Nitrate plus Nitrite</i>	<i>Total Zinc</i>
<i>Total Suspended Solids</i>	<i>Total Phosphorus</i>
<i>Total Petroleum Hydrocarbons (TPH)</i>	<i>Oil and Grease*</i>
<i>Fecal Coliform or E. coli</i>	<i>(*Optional).</i>

- 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 for the calibration of watershed assessment models;*

Wheel Creek Watershed 2012

In 2009, Water Resources staff and the MDE selected the Wheel Creek watershed to monitor ambient conditions. The Wheel Creek watershed (unofficially named) is centrally located in Harford County, approximately three (3) miles south of the Town of Bel Air. It is a second order tributary to Winters Run (MDEDIGIT 02130702) and Atkisson Reservoir (MDE8DIGIT 02130703) in the Bush River watershed (MDE6DIGIT 021307). Wheel Creek is situated along the eastern edge of the Piedmont physiographic province, drains 435 acres, and contains approximately 27% impervious cover. A mixture of commercial and high density residential land use dominate the headwaters, along with a mixture of medium and low density residential land use. The Harford Glen Environmental Education Center, which is part of the Harford County Public School system, is located in the lower reaches of the watershed and is predominately forest.

This watershed was selected based on the channel instability, sedimentation, pond retrofit and stream restoration opportunities and implementation recommendations outlined initially in the *Bush River Water Restoration Action Strategy* and more detailed in the *Wheel Creek Watershed Assessment*. Five (5) stormwater retrofits and four (4) stream restoration projects are proposed for this watershed to improve water quality, decrease stormwater discharges and improve stream habitat. Project development and success will be evaluated through a pre and post construction monitoring effort that includes chemical, biological and physical monitoring components.

Three permanent water quality monitoring stations were established in the Wheel Creek watershed between the summer of 2010 and the spring of 2011. Station WC002 is an instream station located on the mainstem of Wheel Creek just downstream of Wheel Road. Station WC003 is located on the Middle Branch of Wheel Creek at the outfall of the SWM facility located on Cinnabar Lane. Station WC004 is an instream station located upstream of WC003 on the Middle Branch just off of Wheel Court.

In 2012, Harford County contracted with Versar, Inc. to collect the stormflow samples at the three (3) long-term monitoring stations. During 2012, samples were collected during eight (8) sampling events. Three samples were collected and composited at each station over the course of the storm hydrograph. The instantaneous discharge, level, velocity, water temperature and pH were recorded at the time the samples were collected. Harford County staff collected discrete baseflow samples at each station during eleven (11) events in 2012.

To supplement baseline water quality conditions, a spring synoptic survey was conducted in the Wheel Creek and reference watersheds. Samples were collected at eight (8) stations located at each tributary and confluence throughout both watersheds to provide coverage of the entire area and were analyzed for dissolved nitrogen and phosphorus. Samples were collected in the spring to coincide with the period of maximum nitrogen concentration in the stream.

Harford County contracted with Atlantic Coast Laboratory (QC Laboratory) and Enviro-Chem Laboratory to analyze the water quality samples. Standard Methods or EPA methods are currently being used for the analysis. *Harford County requests that MDE review these methods and detection limits and provide alternatives if found to be unacceptable.* Each sample was analyzed for the parameters listed in the table below.

Parameter	Method	Reporting Limit
5-day Biological Oxygen Demand (BOD5)	SM 5210 B	4.00 mg/L
Total Suspended Solids (TSS)	SM 2540 D	4.00 mg/L
Total Kjeldahl Nitrogen (TKN)	EPA 351.2	0.200 mg/L
Nitrate (NO3)	EPA 300.0	0.100 mg/L
Nitrite (NO2)	EPA 300.0	0.0500 mg/L
Ammonia (NH3)	SM 4500NH3-G	0.200 mg/L
Total Phosphorus (TP)	EPA 351.2	0.0500 mg/L
Ortho Phosphate (PO4)	SM 4500P E	0.0100 mg/L
Total Petroleum Hydrocarbons (TPH)	EPA 1664	5.00 mg/L
Total Copper (Cu)	EPA 200.7	0.005 mg/L
Total Zinc (Zn)	EPA 200.7	0.01 mg/L
Total Lead (Pb)	EPA 200.7	0.005mg/L
<i>E. coli</i>	SM 9223B	1.0 MPN/100mL

Monitoring data consisting of precipitation, stream flow, and water quality were used to conduct the following analyses:

1. Calculation of storm event mean concentrations (EMCs)
2. Estimation of annual constituent loading
3. Comparison of EMCs to Maryland Department of the Environment (MDE) ambient water quality criteria
4. Spatial comparisons and temporal trend analysis of EMCs

An interpretive report of the water quality data is presented in Appendix Z.

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 approved study design; and*
- ii. *The County shall use the U.S. Environmental Protection Agency's (EPA) Rapid Bioassessment Protocols (RBP), Maryland Biological Stream Survey (MBSS), or other similar method approved by MDE.*

Wheel Creek Watershed 2012

In support of Chesapeake and Atlantic Coastal Bays Trust Fund monitoring, the Maryland Biological Stream Survey (MBSS) sampled seven (7) stations in Wheel Creek and one (1) station in a reference watershed during the spring and summer sampling periods. During the spring, temperature loggers were deployed in the stream at each site then sites were sampled for water chemistry, physical habitat, and presence of vernal pools, herpetofauna, and benthic macroinvertebrates. These same sites were also sampled in the summer for fish, crayfish, freshwater mussels, reptiles, amphibians, invasive riparian vegetation, and instream habitat. Sampling was conducted following the Maryland Biological Stream Survey Sampling Manual: Field Protocols (Stranko, et. al, 2010). A Technical Memorandum summarizing MBSS's baseline biological data is included in Appendix AA.

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 an approved study design. This assessment shall include an annual comparison of permanently monumented stream channel cross-sections and the stream profile;*

Wheel Creek Watershed 2012

Harford County contracted with Versar, Inc. to conduct the physical stream assessment in the Wheel Creek Watershed. The primary goal of the monitoring was to assess the geomorphic stability of the stream channels throughout the watershed as they respond to restoration activities. Assessment techniques included a survey of permanently-monumented channel cross-sections, a longitudinal profile survey, particle size analysis, and assessment of bank pins and scour chains. Four assessment reaches were established for geomorphic monitoring based on the following treatments:

1. within a proposed stream stabilization reach (WC-01);
2. downstream of a stream stabilization reach and BMP retrofit location (WC-02);
3. downstream of a BMP retrofit location only (WC-03); and
4. a control site with no proposed restoration activities (WC-04).

Cross-sectional and longitudinal profile surveys were conducted to establish baseline conditions of channel geometry and slope, to which subsequent data can be compared in determining whether lateral or vertical migration of the channel is occurring. Bank and bed pins were monitored to determine rates of potential bank and channel bed erosion or aggradations, while scour chains were used to quantify the extent of bed material scouring. Pebble counts were conducted to assess substrate particle size distribution and track changes in channel roughness. Detailed methodologies and results of the physical assessment are presented in Appendix BB.

- 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*

Wheel Creek Watershed 2012

The physical habitat assessment was conducted by the MBSS utilizing MBSS protocols and Stream Habitat Assessment Data Sheets. Metric selection and data analysis followed the guidance document A Physical Habitat Index for Freshwater Wadeable Streams in Maryland, Final Report, (Paul, et al. 2002). Eight metrics were used to calculate the Physical Habitat Index (PHI) for the Piedmont or Non-Coastal Plain ecoregion. These metrics include percent embeddedness, remoteness, percent shading, epifaunal substrate, instream habitat, instream woody debris and rootwads, bank stability and riffle run quality. A Technical Memorandum summarizing MBSS's baseline biological data is included as Appendix AA.

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

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 IV. A.2.d. below;*

ii. *Chemical, biological, and physical monitoring results and a combined analysis for the Winters Run or other approved monitoring locations; and*

iii. *Any requests and accompanying justifications for proposed modifications to the monitoring program.*

2. **Stormwater Management Assessment**

The County shall continue monitoring the Church Creek Watershed 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 at an unnamed tributary to Church Creek to evaluate channel stability in conjunction with the residential development of Wexford;*

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

Harford County continued to monitor the Wexford development to assess the best management practice criteria found in the Maryland Stormwater Design Manual. The 181-acre drainage area includes commercial redevelopment and new a residential development. Approximately twenty percent (20%) of the watershed was developed under the new design criteria while forty percent (40%) has existing development. Wexford is a single-family detached residential subdivision located along the south side of Route 7. The project is adjacent to the Riverside Commercial Park on its southern and eastern boundaries and borders the Bristol Forest Townhome Community to the west. The project is located on tax map 57, parcel 97. Construction of the Wexford Development was substantially completed in 2004.

The project site is served by two stormwater management facilities. Each pond is a micropool-type design with extended detention. In addition, one rain garden and two swales were constructed to provide water quality treatment. The combined facilities meet the 2000 Design Manual guidelines.

Beginning in 2003, the receiving channel has been surveyed annually for longitudinal profile and four permanently-monumented channel cross sections. Note that previous annual reports incorrectly stated that five cross-sections were surveyed instead of four. The profiles and cross-sections for Calendar Years 2005 through 2012 are provided in Appendix CC. The channel is surveyed annually to assess any changes in the channel profile and width.

No substantive changes in planform or cross-section were noted between 2005 and 2006. In 2006, it appeared that cross-section 3 was experiencing a shift in the thalweg. The 2007, 2008 and 2009 data indicate that this is, in fact, occurring and is not simply a function of normal variability in the survey. The 2008 data appear to confirm a permanent shift in the location of the thalweg and this shift continues in 2009 and 2010. It is probable that the debris jam first noted in 2007 has caused the shift in the thalweg. No new substantive changes in planform were noted in 2012. In 2010, it was noted that there appears to be some change in the bed elevation at the cross sections, indicating a shift in sediment as it is transported downstream. This continues to be evident in 2012, particularly for Cross section 4.

I. 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 below.*

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

Harford County has continued to maintain program funding sufficient to fulfill the permit requirements, despite significant fiscal challenges. The approved operation budget (FY13) of \$1,226,059 includes personnel costs, office equipment and supplies, vehicle charges, laboratory services, public outreach, and chemical/physical/ biological analysis. The FY13 operating budget was \$82,226 less than the approved FY12 budget.

With the completion of the Swan Creek, Bynum Run, Foster Branch, Winters Run and Little Gunpowder Falls and Church Creek Stream Assessments, along with the Bush River Watershed Restoration Action Strategy, the Deer Creek Watershed Restoration Action Strategy, and the Sam's Branch Watershed Assessment, Harford County has identified numerous potential capital projects. In FY13, Harford County allocated funding to complete several existing projects and to initiate new capital projects in the Joppatowne area. Additionally, the capital budget provides funding for watershed assessments and pollution prevention activities.

Activity	FY09	FY10	FY11	FY12	FY13
Stormwater Enhancement Watershed Restoration Improvement Projects	\$700,000	-\$500,000	\$215,911	\$0	\$0
Bynum Ridge Stabilization Laurel Valley Stream Restoration Plumtree Run @ Tollgate Rd Stream Restoration Woodbridge SWM Retrofit and Stream Restoration Stream Valley Buffer Enhancement	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	-\$68,639	\$0	\$0
	\$0	\$0	\$0	\$0	\$0
	\$0	\$0	\$0	\$0	\$300,000
	\$0	\$0	-\$72,272	\$0	

Watershed/Stream					
Assessment Studies	\$500,000	-\$150,000	\$0	\$0	\$250,000
Stream Gage					
Stations	\$135,000	-\$75,000	\$0	\$0	\$0
Maintenance/Repair					
of Dams	\$35,000	\$0	\$0	\$0	\$20,000
Sunnyview Stream					
Restoration	\$100,000	\$0	\$0	\$0	\$0
Moose Lodge					
Restoration	\$0	\$0	\$0	\$0	\$0
Bel Air Acres	\$0	-\$250,000	\$0	\$0	\$0
Sam's Branch					
Assessment	\$100,000	\$0	\$0	\$0	\$250,000
Woodland Run	\$50,000	\$0	\$0	\$0	\$250,000
Edgewood Plaza		\$250,000	\$0	\$0	\$0
Wheel Creek		\$725,000	\$0	\$142,818	\$400,000
Bynum Run @ St					
Andrews Way			\$260,000	\$0	\$0
Deer Creek					
Watershed					
Restoration			\$0	\$0	\$0
Plumtree Run					
Watershed					
Restoration				\$0	\$0
Stormwater					
Pollution					
Prevention				\$0	\$280,000
Joppatowne Area					
Watershed					
Restoration					\$150,000
Lily Run					
Watershed					
Restoration					\$150,000
Total by Fiscal	<hr/>				
Year	\$1,620,000	\$0	\$335,000	\$142,818	\$2,050,000

Grant Requests

In an effort to supplement the capital projects program, Harford County applies for grant funding from various sources. A summary of grant request for Calendar Year 2009 through 2012 is provided in Appendix DD.

J. Total Maximum Daily Loads

Stormwater BMPs and programs implemented as a result of this permit must be consistent with available waste load allocations (WLA's) [see 40 CFR 122.44(d)(1)(vii)(B)] developed under a Total Maximum Daily Load (TMDL). MDE has determined that owners of storm drain systems that implement the requirements of this permit will be controlling stormwater pollution to the maximum extent practicable. Therefore, satisfying the conditions of this permit will meet WLA's specified in TMDL's developed for impaired water bodies. If assessment of the stormwater management program indicates TMDL WLAs are not being met, additional or alternative stormwater controls must be implemented to achieve WLAs.

Harford County has been actively cooperating with MDE on the development and review of TMDLs. In addition, Harford County is collecting, analyzing and reporting supplemental water quality data for the purpose of TMDL development. Harford County acknowledges that stormwater management is an integral part of the implementation component of a TMDL.

PART IV. PROGRAM REVIEW AND ANNUAL PROGRESS REPORTING

A. Annual Reporting

1. *Annual progress reports, required under 40 CFR 122.42(c), will facilitate the long-term assessment of Harford County's NPDES stormwater program.*

The County shall submit annual reports on or before the anniversary date of this permit that include:

- a. *The status of implementing the components of the stormwater management program that are established as permit conditions;*
- b. *A narrative summary describing the results and analyses of data,*

including monitoring data that is accumulated throughout the reporting year;

- c. Expenditures for the reporting period and the proposed budget for the upcoming year;*
- d. A summary describing the number and nature of enforcement actions, inspections, and public education programs; and*
- e. The identification of water quality improvements or degradation.*

2. To further judge the effectiveness and progress of implementing this permit, the following information shall be submitted on databases (in a format) consistent with Attachment A. Annually, except where noted, the following shall be submitted:

- a. Storm drain system mapping (PART III. C.1.);*
- b. Urban BMP locations (PART III. C.2.);*
- c. Impervious surfaces (PART III. C.3.);*
- d. Chemical monitoring (PART III. C.4. and PART III. H.1.);*
- e. Watershed restoration project locations (PART III. C.5.);*
- f. Responsible personnel certification information (PART III. E.2.);*
- g. Grading permit information – quarterly (PART III. E.2.);*
- h. Illicit Discharge Detection and Elimination activities (PART III. E.3.); and*
- i. Fiscal analyses - cost for NPDES related implementation (PART III. I.).*

B. Program Review

In order to assess the effectiveness of the County's NPDES program for eliminating non-stormwater discharges and reducing the discharge of pollutants to the maximum extent practicable, MDE will review program implementation, annual reports, and periodic data submittal on an annual basis. Procedures for the review of local erosion and sediment control and stormwater management programs exist in Maryland's Sediment Control and Stormwater Management Laws. Additional periodic evaluations will be conducted to determine compliance with permit conditions.

C. Reapplication for NPDES Stormwater Discharge Permit

Continuation or reissuance of this permit beyond November 1, 2009 will require the County to reapply for NPDES stormwater discharge permit coverage in its fourth year annual report. As part of this application process, Harford County shall submit to MDE an executive summary of its NPDES stormwater management program that specifically describes how water quality goals set by the County are being achieved. This application shall be used to gauge the effectiveness of the County's NPDES stormwater program and will provide guidance for developing future permit conditions. At a minimum, the application summary shall include:

1. *Harford County's NPDES stormwater program goals;*
2. *Program summaries for the permit term regarding:*
 - a. *Illicit connection detection and elimination results;*
 - b. *Watershed restoration status including County totals for impervious acres, impervious acres controlled by stormwater management, and the current status of watershed restoration projects and acres managed;*
 - c. *Pollutant load reductions as a result of this permit; and*
 - d. *Other relevant data and information for describing County programs;*
3. *Program operation and capital improvement costs for the permit term; and*

4. *Descriptions of any proposed permit condition changes based on analyses of the successes and failures of the County's efforts to comply with the conditions of this permit.*