

# 2007 VPDES Permit Annual Report

Fairfax County, Virginia

VPDES Permit No. 0088587

March 31, 2008

The following annual report is submitted to the Virginia Department of Conservation and Recreation (DCR) in compliance with Fairfax County's Virginia Pollutant Discharge Elimination System (VPDES) permit. The permit was issued January 24, 2002 and expired January 24, 2007. The county is currently operating under an administrative continuance of the existing permit in anticipation of permit renewal. This report covers the previous calendar year from January 1, 2007 to December 31, 2007, and describes all of the activities performed to satisfy the county's permit requirements.

**Annual Report requirements as specified in Part I section C.4 of the permit are bold and underlined below** and *the stormwater program requirements as specified in the permit, Part I sections B.1, C.1, C.2 and C.3 of the permit are in italics* under the applicable annual report section. The estimate of annual expenditures for the reporting period, with a breakdown for the major elements of the Storm Water Management Program and the budget for the following year, are presented in sub-section d) of this report.

**NOTE:** Fairfax County's response to the annual report and permit requirements are indented.

**a) Provide the status of the components of the Watershed Management Program to include a summary of the implementation of each component and an evaluation of the effectiveness of each component.**

*The Municipal Separate Storm Sewer System and any stormwater structural controls shall be operated in a manner that reduces the discharge of pollutants to the maximum extent practicable (B.1.a).*

Watershed management plans are one component of the Virginia Pollutant Discharge Elimination System Permit requirements and are part of the Fairfax County Board of Supervisors' Environmental Agenda. The goals of the plans include protecting and restoring County streams by identifying strategies to prevent and remove pollution, to support Virginia's commitment under the Chesapeake Bay 2000 Agreement, to help restore the bay, and to replace the current 1970s-era watershed master plans, while preserving property values.

The watershed management planning process includes the following tasks: 1) review and synthesis of previous studies and data compilation; 2) evaluation of current watershed conditions and projection of stormwater runoff from ultimate development conditions; 3) development of non-structural and structural watershed management projects to improve streams; 4) development of capital project implementation options including preliminary cost estimates, cost/benefit analysis, and prioritization; 5) public involvement to gain input, provide education, and build community support ; and 6) documentation of the watershed management plan.

The development of comprehensive watershed management plans began in 2003 with the Little Hunting Creek Watershed. To date, five watershed management plans have been completed and adopted by the Fairfax County Board of Supervisors:

- Little Hunting Creek Watershed Management Plan (adopted February 7, 2005)
- Popes Head Creek Watershed Management Plan (adopted January 23, 2006)

- Cub Run and Bull Run Watershed Management Plan (adopted February 26, 2007)
- Difficult Run Watershed Management Plan (adopted February 26, 2007)
- Cameron Run Watershed Management Plan (adopted August 6, 2007)

These five watershed management plans are being implemented. The Middle Potomac Watershed Management Plan is in the final draft stage with completion slated for 2008. Combined, these six plans will cover more than 50 percent of the land area in the county. In 2007, work on watershed management plans for the remaining 50 percent continued, and the watershed plans are anticipated to be completed by 2010. The watershed plans provide an assessment of watershed conditions, encourage public involvement, and prioritize recommendations for implementation of stormwater management projects.

### **a.1) Structural and Source Controls**

#### **a.1 (a) Report all inspections performed on SWM facilities and BMP Ponds.**

In 2007, the county inspected all 1,206 county-maintained Stormwater Management (SWM) and Best Management Practice (BMP) facilities at least once for maintenance purposes. This was above the permit requirement to inspect all county-maintained facilities once during the term of the permit. In addition, the county inspected 558 (20%) of the 2,790 privately maintained facilities to meet the permit requirement to inspect each private facility once during the permit cycle. Records of these activities are maintained by the Maintenance and Stormwater Management Division of the Department of Public Works and Environmental Services.

#### **a.1 (b) Report all maintenance performed on SWM facilities and BMP Ponds.**

In 2007, the county cleaned and/or mowed 1,120 dam embankments associated with county-maintained SWM facilities, including 35 regional ponds which were maintained four times each during the calendar year. The county completed 277 maintenance work orders to correct deficiencies in publicly maintained SWM/BMP facilities. In addition, the county inspected 285 miles of the county-maintained storm drain conveyance system for deficiencies and wrote 754 orders to correct deficiencies, all of which were completed.

The county maintains dams that are state regulated and are inspected every year by county maintenance staff. A biennial inspection is conducted by staff with expertise in dam design and construction. The purpose of the inspections is to identify any safety or operational items in need of corrective action and to ensure that the dams satisfy state requirements for dam safety. State issued operating permits are typically valid for six years and are reissued at the end of each permitting period. Permit reissuing is tied to the most recent biennial inspection and its associated operation and maintenance plan. Based on these biennial inspections, as well as other less formal inspections, a work program to correct deficiencies and address maintenance items is established and implemented. Critical items such as the stability of the dam embankment and the functioning of the water control structures are addressed on a priority basis. Routine items such as mowing are accomplished on a scheduled basis, currently five times per year.

### **a.2) Areas of New Development and Significant Redevelopment**

*The permittee shall comply with and enforce all components of the County's Comprehensive Land Use Plan that are relevant to storm water discharges. The goals of such controls shall be to limit increases in the discharge of pollutants from storm water as a result of development and significant re-development (B.1.b).*

On November 15, 2004, the Board of Supervisors adopted an amendment to the Comprehensive Plan pursuant to the comprehensive planning requirements of Virginia's Chesapeake Bay Preservation Act and Chesapeake Bay Preservation Area Designation and Management Regulations. Included in the amendment were revisions and additions to Comprehensive Plan text and policies as well as the incorporation into the plan of a "Chesapeake Bay Supplement." The amendment satisfied the specific requirements identified by the state while more comprehensively addressing water resource conditions, issues, policies, regulations, and initiatives in support of the county's commitment to the regional Chesapeake Bay Program, in furtherance of the County Board of Supervisors' "Environmental Excellence 20-year Vision Plan," and in support of other environmental and open space goals. The supplement presents information regarding water quality factors, water pollution sources, water quality conditions, and shoreline conditions in the county within the context of the county's land use and its water quality policies, regulations and initiatives. The supplement culminates in an analysis and series of recommendations addressing water pollution sources, infill development, redevelopment, shoreline erosion control, and shoreline access.

The Environmental Quality Corridor (EQC) policy, as found in the Environment section of the Policy Plan volume of the county's Comprehensive Plan, does not directly address stormwater discharges. However, it is particularly relevant to the county's overall water quality management program, as it serves to identify, protect, and, in some cases, restore environmentally-sensitive resources. Specifically, the EQC policy recommends the preservation and restoration of areas such as floodplains, steep slopes (slope gradients of 15% or greater) adjacent to streams or floodplains, wetlands connected to stream valleys, minimum stream buffers (variable in width depending on topography), and sensitive habitat areas. While there is no county regulation requiring EQC protection (Resource Protection Areas (RPA) and floodplain provisions in the County Code protect many, but not all, EQC areas), the application of the EQC policy during the zoning process has been effective in protecting, and in some cases restoring, environmentally-sensitive areas.

On February 25, 2008, the Board of Supervisors adopted an amendment to the Policy Plan to strengthen Comprehensive Plan guidance regarding the protection and restoration of streams and associated buffer areas along stream channels upstream of Resource Protection Areas and Environmental Quality Corridors. This new guidance augments the EQC policy by explicitly encouraging stream and buffer area protection and restoration in these headwaters areas.

Another area of interest with respect to the Comprehensive Plan is an objective addressing water quality and stream protection, and there is a series of policy statements in the plan related to this objective. This section of the Plan was amended in the year 2000 to provide explicit support for better site design and low impact development (LID) measures, and opportunities to implement such measures are explored during the zoning process. In a number of cases, staff have negotiated successfully for measures such as reductions in proposed impervious cover and the provision of biofiltration facilities (rain gardens) to provide water quality control through infiltration. In 2007, an amendment to the Public Facilities Manual was adopted that incorporated six low impact development stormwater practices: pervious pavement, bioretention filters and basins, vegetated swales, tree box filters, vegetated roofs, and reforestation.

In 2007, the Environment and Development Review Branch of the Department of Planning and Zoning (DPZ), in coordination with other DPZ staff and staff from other county agencies, reviewed 95 rezonings and related applications (e.g., amendments), 66 special exceptions and amendments, and 150 special permits for environmental considerations.

### **a.3) Roadways**

*Public streets, roads, and highways maintained by the permittee shall be operated and maintained in a manner to minimize discharge of pollutants, including those pollutants related to deicing or sanding activities (B.1.c).*

The county maintains the roadways and parking lots of public facilities such as government centers, libraries, fire stations, police stations, health centers, bus transit facilities, park and ride lots, commuter rail stations, and approximately 5 miles of road segments. In an effort to limit the discharge of sand and deicing materials into the county's streams, sand and chemical treatment are provided only when dictated by safety. Magnesium chloride is used on sidewalk applications as necessary, as it is more environmentally acceptable than sodium chloride. The Department of Public Works and Environmental Services performed street sweeping operations following the winter 2007 season at a total of 103 sites that they treated to reduce the discharge of these materials into the county's streams.

### **a.4) Retrofit**

*Receiving water quality impacts shall be assessed for all storm water management facilities. When the permittee determines water quality impact, they shall continue to evaluate and implement retrofitting existing storm water management facilities and areas without stormwater controls (B.1.d).*

In 2007, the county retrofitted seven stormwater management facilities to provide enhanced water quality. The retrofits included enhancement of water quality through excavation of silt, installation of BMP plates, creation of fore-bays and shallow wetlands, and construction of bioretention swales and basins (rain gardens). The retrofits are designed to reduce the volume of nutrients discharged, and to reduce the impacts of storm flows downstream. These water quality retrofits enhance nutrient uptake, provide an increase in water infiltration, uptake and transpiration, and create habitat for wildlife. Retrofits also include structural repairs or improvements to principal and emergency spillways, outfall pipes, and dams.

Two regional stormwater management facilities, D-37 and R-17, were completed in 2007. Combined, they provide BMP control for a total of 396 acres and control stormwater runoff from a total of 762 acres of land. (BMP control for additional acreage is provided through the use of smaller stormwater management facilities.) Two other regional ponds, D-17 and D-46, were still under construction by the close of 2007.

One site retrofit took place at Fairfax County's Sherwood Regional Library. Additionally, a privately owned site (a church) was retrofitted for water quality through the use of rain gardens and water quality swales.

### **a.5) Pesticides, Herbicide, and Fertilizer Application**

*The permittee will implement controls to reduce the discharge of pollutants related to the storage and application of pesticides, herbicides, and fertilizers applied to public right of ways, parks, and other municipal property. The permittee shall develop and implement a program within one year of the effective date of the permit to achieve the above goal (B.1.e).*

In 2007, the county agencies that are involved in the management of public rights of way, parks and other municipal property continued collaborating to implement nutrient management and integrated pest management. As part of this effort, the county is tabulating the acreage of land being managed, determining the various management techniques and striving to improve the way

county land is being managed by all entities. The preliminary tabulation shows that over 23,000 acres are managed by the various county agencies, and over 2,300 are mowed. The data also indicates that only 717 acres have herbicide or pesticide applied to them and only 434 acres have fertilizers applied to them. The balance of the 23,000 acres is either undisturbed or the turf is managed by over seeding and aeration. Further tabulation of the acres is ongoing as the land area managed by the county changes.

**a.6) Illicit Discharges and Improper Disposal**

**a.6 (a) Report all identified illicit dischargers. This shall include site inspections and a description of any follow-up activities associated with illicit dischargers (see No. 12 below for dry weather screening);**

*Non-storm water discharges to the Municipal Separate Storm Sewer System will be effectively prohibited (B.1.f).*

The Fire and Rescue Department's (FRD) Hazardous Materials and Investigative Services (HMIS) section aggressively enforces County Code Chapters 62, 105 and 106 in conjunction with the Department of Public Works and Environmental Services (DPWES) and the Department of Planning and Zoning, and issues criminal citations during investigations of Hazardous Materials Incidents. Chapters 105 and 106 contain provisions that address illicit discharges to state waters and the county's storm drainage system. Procedural Memorandum No. 71-01, Illegal Dump Site Investigation, Response, and Cleanup, outlines the process of follow-up action for non-emergency incidents of illegal dumping; establishes action under County Code Chapter 46, Health or Safety Menaces; and provides referrals for action on complaints that are neither public health hazards nor regulated.

HMIS monitors, on a long-term basis, contaminated sites that have a potential for the contaminant coming in contact with surface waters or stormwater management facilities. As a part of the Oversight Program, HMIS, as an agent of the Director of DPWES, accepts, reviews, and processes requests to discharge treated groundwater from remedial activities at those sites into county storm sewers. HMIS then monitors the discharge for the duration of the agreement. In 2007, the Hazardous Materials Technical Support Branch performed oversight management to 63 sites that had ongoing remediation activities and opened 10 more oversight files. By the end of 2007, 23 oversight files were closed. Fifty oversight files will be carried into 2008.

The Sanitary Sewer Infiltration Abatement Program conducts wastewater flow measurements and analysis to identify areas of the wastewater collection system with excessive inflow/infiltration problems, and uses closed circuit television (CCTV) to inspect trunk sewer mains in an effort to specifically identify defective sewer lines for repair and rehabilitation. In 2007, 188 miles of old sewer lines and 15 miles of new sewer lines were inspected, resulting in the identification of sanitary sewer lines and manholes needing repair and rehabilitation. In 2007, approximately 32,014 feet of sanitary sewer lines were rehabilitated, bringing the total length of sewer lines repaired over the past nine years to 1,262,329 feet (239 miles).

The Sanitary Sewer Extension and Improvement Program addresses pollution abatement and public health considerations by providing sanitary sewer service to eligible areas that have been identified by the Department of Health as having non-repairable malfunctioning septic systems. In 2007, one Extension and Improvement project was completed consisting of 1,300 linear feet of eight inch sanitary sewer and providing sanitary sewer connections to 11 existing homes.

**a.7) Spill Prevention and Response**

*A program to prevent, contain, and respond to spills that may discharge into the Municipal Separate Storm Sewer System shall be implemented. The spill response program may include a combination of spill response actions by the permittee (and/or another public or private entity), and legal requirements for private entities within the permittees' jurisdiction (B.1.g).*

The Fire and Rescue Department (FRD) responds to all reported incidents of hazardous material releases, spills, and discharges. Staff are trained and equipped to initiate spill control measures to reduce the possibility of hazardous materials reaching the MS4 drainage systems. Resources available to FRD personnel include personal protective equipment, technical tools and equipment for spill control, and absorbent products such as pads and booms for spill containment. The FRD also maintains a contract with a major commercial hazardous materials response company to provide additional containment and clean-up support for large-scale incidents.

In 2007, the Fire and Rescue Department's Hazardous Materials and Investigative Services (HMIS) section received 315 complaints, the majority (231) of which were reported spills, leaks, or releases of petroleum based substances. There were 54 hydraulic oil spills (mostly from trash trucks), 41 home heating fuel oil, 48 gasoline, 35 diesel fuel, 26 motor oil, and 17 mineral oil spills. Other releases involved antifreeze, paint, sewage, and mercury. Storm drains and waterways were involved in 53 of the above releases.

HMIS, through vigorous enforcement of appropriate codes and ordinances, ensures that the responsible party takes appropriate spill control and cleanup action. In both emergency and non-emergency spills that reach the municipal storm sewer system, HMIS utilizes appropriate enforcement actions to ensure that proper cleanup activities are undertaken to protect and restore the environment, as well as recover costs incurred by the county for initial emergency response to the incident.

HMIS staff receive regular training in pollution prevention measures and in proper response procedures for incidences where pollutants or spills are found that have the potential of reaching storm sewers. As part of the Household Hazardous Waste collection program, HMIS staff are trained in the proper handling of hazardous wastes.

**a.8) Industrial & High Risk Runoff**

**a.8 (a) Report on all inspections of any new or previously unidentified facilities.**

**a.8 (b) Report an updated list of all industrial storm water sources and VPDES permitted facilities that discharge into the MS4.**

*A program to identify and control pollutants in storm water discharges to the Municipal Separate Storm Sewer System (municipal landfills; other treatment, storage, or disposal facilities for municipal waste; hazardous waste treatment, storage, disposal and recovery facilities; facilities that are subject to EPCRA Title III, Section 313) and any other industrial or commercial discharge the permittee determine are contributing a substantial pollutant loading to the Municipal Separate Storm Sewer System shall be implemented under this program (B.1.h).*

The county has not located any new or unidentified industrial facilities that discharge directly into the county's MS4.

Fairfax County's efforts regarding the permit requirements related to Industrial and High Risk Runoff are also presented in sections a.12.b and -c of this report, which contain a discussion of the county's Wet Weather and Industrial and High Risk Runoff Monitoring Program.

Fairfax County's Division of Solid Waste Disposal and Resource Recovery (DSWDRR) is responsible for the operation of the I-95 Landfill located at 9850 Furnace Road, Lorton, Virginia 22079, and the I-66 Transfer Station/Closed Landfill, located at 4618 West Ox Road, Fairfax, Virginia 22030. Both facilities are located on county property. Both facilities are covered under a VPDES General Permit. The I-95 Landfill is registered as permit number VAR051076, and the I-66 Transfer Station/Closed Landfill is registered as VAR051074.

The I-95 Closure Project was designed to complete the capping of approximately 130 acres of the Municipal Solid Waste section of the landfill and was approved by the Virginia Department of Environmental Quality (DEQ). The closure project is divided into four phases, with each phase consisting of approximately 40 acres. Phase IVB, the final phase, was completed during the summer of 2007. The final cover system consists of 18 inches of low-permeability soil and a 15-inch protective cover/vegetative support layer. As a result of this work, stormwater is managed more efficiently and infiltration is reduced significantly, in turn providing for less generation of leachate. The final cover system also minimizes the need for post-closure maintenance.

Phase IIB is part of the I-95 Area Three Lined Landfill Project (ATLL). The Phase IIB project has a disposal capacity of 375,000 tons, and continues to accept ash from the Energy/Resource Recovery Facility (E/RRF) located at the I-95 Complex and a similar facility in Alexandria. This phase has a service life of four years, with filling likely to be completed sometime in 2008. The 7.5-acre cell consists of a bottom lining system that includes two feet of low-permeability soil, a double synthetic liner (60 mil HDPE) system, and a leachate collection and detection system. The next cell in which ash will be placed, Phase IIIA, was under construction in 2007. This 7-acre cell consists of three different liner systems, each featuring low permeability soil, a 60 mil HDPE liner, a geosynthetic clay liner, and a composite drainage network that will transport leachate. The new cell will be covered with a rain cap to separate leachate and stormwater.

Stormwater improvements at the I-66 Transfer Station include the construction of a new stormwater detention pond located immediately west of the Citizen's Disposal Facility (CDF) to accommodate stormwater runoff from the northeast slope of the existing closed landfill and the adjacent CDF lot. At present, the detention pond is not connected to the CDF lot's stormwater drainage system and therefore is not yet fully functional.

Staff perform quarterly visual inspections of the stormwater outfalls located at the I-95 Landfill and the I-66 Transfer Station/Closed Landfill. The inspections are performed in each quarter of the calendar year (January through March, April through June etc.). Annual benchmark sampling is performed between July 1 and June 30 of the monitoring year. The costs for the required VPDES monitoring, testing and other related activities are included as part of the operating budget for each facility and are not funded separately. This is because most of the activities required by the VPDES permit are also required under the operating permits granted by VADEQ. Test results and inspection reports are maintained at the division's main office, and copies are on file at the facility's administration offices.

Training in pollution prevention for facility staff is provided and is a part of the I-95 Landfill and I-66 Transfer Station/closed landfill waste disposal permits. Stormwater Pollution Prevention Plans (SWPPPs) are maintained at each facility and are updated when conditions change. Additionally, spill kits are readily available at each location. Water quality test results conducted to satisfy VPDES permit conditions have been satisfactory.

**a.9) Construction Site Runoff**

**a.9 (a) Report all Erosion and Sediment Control Plans the permittee has approved for sites disturbing greater than 1 acre of land for that year.**

*A program to reduce the discharge of pollutants from construction sites (land disturbing activities equal to or greater than one acre) shall be implemented under this program (B.1.i).*

In 2007, a total of 767 Erosion and Sediment Control (E&S) plans were submitted and approved for projects that would disturb a land area of 2,500 square feet or more. Written reports were provided to Virginia Department of Conservation and Recreation (DCR) informing them of these individual sites on a monthly basis. It is planned that these reports will be provided electronically in 2008.

Two amendments to the Public Facilities Manual were adopted on March 12, 2007 that affect land disturbance policy. The first amendment incorporated six low impact development stormwater practices: pervious pavement, bioretention filters and basins, vegetated swales, tree box filters, vegetated roofs, and reforestation. The second amendment addresses new enabling authority in the Code of Virginia, which allows the submittal of general E&S specifications to the state by persons engaging in the creation and operation of wetland mitigation banks that fall in multiple jurisdictions in lieu of the submittal of a conservation plan to the county. Letters to Industry were issued to advise the industry of these amendments.

Fairfax County's Alternative Inspection Program, established in cooperation with the DCR, resulted in 35,046 E&S inspections in 2007 on all sites under construction. Staff issued 836 'notices to comply with the approved plans' noting the deficiency found in each case and the respective corrective action required. There were 208 notices of violation given to developers who failed to take the required corrective action. Criminal proceedings were started in 22 cases. The county's E&S program is fully approved by DCR.

The county made presentations in English and Spanish to the Heavy Construction Contractors Association Conference and EXPO on the county's E & S requirements. In June 2007, an exhibit on E & S controls was displayed at Celebrate Fairfax, the annual county fair. A class was conducted for practicing engineers in the land development industry through the Engineers and Surveyors Institute on designing, installing, and inspecting erosion and sediment controls on individual lots.

A 24-hour hotline established by Department of Public Works and Environmental Services continues to be a means for citizens to report complaints about erosion and sedimentation. More information is available with regard to reporting environmental concerns or possible violations of Fairfax County Environmental Regulations at DPWES' Web site:

<http://www.fairfaxcounty.gov/dpwes/publications/urbanfor.htm>

**a.10) Storm Sewer Infrastructure Management**

*A program to maintain and update the accuracy and inventory of the storm sewer system shall be implemented. The permittee shall submit to the Department of Environmental Quality, Northern Virginia Office a plan and schedule by which the entire storm sewer Infrastructure will be mapped. The plans and schedule shall be submitted within 180 days of the effective date of this permit (B.1.j).*

A Storm Sewer Infrastructure Management Plan and Schedule was submitted to DEQ on July 24, 2002, in accordance with the permit, and has been updated with each annual report (see the

attachment for this year's update). The requirements in the plan have been fulfilled and the infrastructure inventory will continue to be updated in accordance with the permit.

The inventory of stormwater management and storm sewer facilities is tracked through the use of the county's GIS. The county's 400-square-mile jurisdiction is currently divided into 436 tax map grids. The documented inventory of storm drainage infrastructure has been digitized in GIS format for management and identification purposes, and the county is continually field-verifying the inventory, verifying ownership, and maintaining/updating the GIS layer.

#### **a.11) Public Education**

*A public education program shall be implemented (B.1.k).*

Fairfax County has more than one million residents, making its public education and involvement program an essential component of stormwater management. The program raises awareness about stormwater issues facing the county and educates residents about what they can do to help improve Fairfax County's waterways. A summary of the education activities conducted by Fairfax County in 2007 follows.

Fairfax County gives presentations to various groups throughout the county regarding stormwater management and watershed basics. The presentations include an overview of watersheds, stormwater management, and actions that residents can take to protect the water quality of local streams, the Occoquan Reservoir, the Potomac River, and the Chesapeake Bay. In 2007, the county presented this information to homeowner's associations, school groups (teachers and students), civic associations, Fairfax Master Naturalist trainees, Master Gardeners, Northern Virginia Community College students, and others. In addition, the county works with residents on each stormwater project, of which education is a component.

Fairfax County hosts educational booths at several public events annually to raise awareness among residents about stormwater issues and to encourage watershed-friendly behaviors. In 2007, Fairfax County participated as an exhibitor or environmental educator at Celebrate Fairfax, Boy Scout Camporee at Lake Fairfax Park, and Fall for Fairfax.

In partnership with the Northern Virginia Regional Commission and surrounding jurisdictions, Fairfax County implemented a region-wide radio outreach campaign to raise awareness among residents about harmful non-point source pollutants and actions residents can take to help protect the water quality of local streams and the Chesapeake Bay. The radio campaign first aired in July 2005. Calendar year 2007 marked the third consecutive year of the campaign, with "The Call" radio advertisement airing 926 times on nine radio stations, including one Spanish-speaking station. Pre- and post-campaign surveys revealed a 15 percent increase in people recalling the ad than in 2006, with approximately three-quarters of the survey respondents who heard the ad stating it was effective at changing their behaviors in regards to the targeted three pollutants (from pet wastes, used motor oil and lawn fertilizers). In addition to the ad, the partners developed complementary print, public service announcements for television, and web-based messages ([www.onlyrain.org](http://www.onlyrain.org)). The total cost of the 2007 campaign was \$168,500 which is funded by the participating local governments and authorities. Fairfax County's 2007 contribution was \$93,450.

Environmental issues and concerns are a part of many science courses. The Fairfax County Public Schools curriculum for its approximately 14,000 seventh grade students includes a course titled "Investigations in Environmental Science." During this course, the students study basic ecology concepts and how to apply them to their local watershed and the Chesapeake Bay

ecosystem. The Biology curriculum for the approximately 10,000 ninth grade students in the county includes exploring the interactions of populations in ecology. The course in Geosystems includes a section on the hydrologic cycle and a study of the effect of economic and public policy on natural resources. This course exposes students to specific environmental projects across the county. Students in advanced courses in biology and environmental science do school-based projects that examine geomorphologic changes, nonpoint source pollution and stream monitoring.

Fairfax County Stormwater Management continues to partner with Fairfax County Public Schools to implement the Meaningful Watershed Field Experience (MWFE) Program. The program incorporates field trips for students in the seventh grade “Investigations in Environmental Science” course and creates a hands-on learning experience that calls for the students to collect data on and analyze a variety of water quality parameters. Fairfax County Public Schools have adapted some of their materials from information provided by the Chesapeake Bay Foundation. Stormwater Management assists this program by training Life Science teachers in the county’s water quality monitoring techniques and program; local, state, and federal policies surrounding watershed protection; and stewardship opportunities offered by the county for teachers and students.

Fairfax County Stormwater Management Program has partnered with the county’s Wastewater Management Program to implement a Sewer Science program for high school students. The program promotes an understanding of stormwater, its relationship with wastewater, how the water and the land are connected, and how each individual can make a difference in the health of the environment. This program was presented to over 981 students in 7 schools in 2007. The county also presented information about the program to an audience of stormwater professionals at StormCon 2007, a national stormwater conference held in Phoenix, Arizona in August 2007.

In 2007, Northern Virginia Soil and Water Conservation District (NVSWCD), Earth Sangha and the McLean Citizens Association partnered with the Fairfax County Park Authority (FCPA) to design and install an 825-square-foot rain garden at the Marie Butler Leven Preserve, a 20-acre park in McLean. It treats an acre of stormwater runoff from road, parking and grassed areas. The garden is designed to serve as an education and demonstration site for this low impact development practice. The rain garden is highly visible and easily accessed by the public. Signage will explain the concept and functions of the facility, as well as the significance of the plant types. Contact information will be provided at the site for more details and for materials about creating rain gardens in individual yards.

NVSWCD continued its successful Volunteer Stream Monitoring Program in 2007. This program supplements the county’s stream bioassessment program. Trained volunteers assess the ecological health of streams using the Virginia Save Our Streams protocols. Monitoring includes biological and chemical aspects and a physical habitat assessment. NVSWCD provides training, equipment, support, data processing, and quality control. Data collected by volunteers are shared with Fairfax County, the Virginia Department of Environmental Quality, Virginia Save Our Streams, and other interested organizations or individuals. In 2007, there were 20 active volunteer monitoring sites in Fairfax County.

In 2007, NVSWCD held 40 educational workshops that reached approximately 490 people. NVSWCD led 18 special water resources outreach events that educated approximately 700 people. Watershed programs include indoor stream ecology programs at schools, presentations to civic groups, table displays at environmental programs, tours of water and sewage treatment plants, watershed walks, and stream clean-ups.

**a.12) Monitoring Programs**

**a.12 (a) Report on the Dry Weather Screening Program; (1) Number of outfalls inspected and test results; (2) Follow-up activities to investigate problematic areas and illicit dischargers.**

*The permittee shall continue ongoing efforts to detect the presence of illicit connections and improper discharges to the Municipal Separate Storm Sewer System. Representative outfalls of the entire Municipal Separate Storm Sewer System must be screened at least once during the permit term. Screening methodology may be modified based on experience gained during actual field screening activities and need not conform to the protocol at 40 CFR 122.26(d)(1)(iv)(D). Sample collection and analysis need not conform to the requirements of 40 CFR Part 136 (B.1.1.1).*

In 2007, the county selected 103 MS4 outfalls for dry weather screening in accordance with the protocol outlined in the Stormwater Management Program Plan (July 2006), and the county recorded physical parameters at each outfall. Water was found to be flowing at 19 of the outfalls, and was tested for a range of pollutants (ammonia, conductivity, surfactants, fluoride, pH, potassium, phenol, copper and chlorine) using field test kits. Of the outfalls tested, six required follow-up investigations because low levels of copper and fluoride were detected. Upon retesting these sites, four continued to exceed the screening criteria, and further testing was conducted in an attempt to track down the source. This track down procedure consisted of using a map of storm drainage and a GPS unit to track the network upstream of sites, recording observations of flowing water and land use, and testing the water where flow was found. This procedure was followed all the way up the network of storm sewer pipes until there was no flowing water. A specific source could not be found at any of the four sites.

**a.12 (b) Report on the Wet Weather Screening Program; (1) Number of outfalls inspected and test results; (2) Follow-up activities to investigate problematic areas and illicit dischargers.**

*The permittee shall investigate, and address known areas within their jurisdiction that are contributing excessive levels of pollutants to the Municipal Separate Storm Sewer System. The Permittee shall specify the sampling and nonsampling techniques to be used for initial screening and follow-up purposes. Sample collection and analysis need not conform to the requirements of 40 CFR Part 136 (B.1.1.2).*

Wet weather screening and industrial high risk monitoring was conducted twice at each of six sites in Fairfax County in 2007. These sites were identified as industrial and commercial facilities with the greatest potential for discharging pollutants using the county's GIS data layers and the procedures outlined in the Stormwater Management Program Plan (July 2006). Sampling consisted of automatic sampling at outfalls or in manholes, which enabled calculations for event mean concentrations as well as for first flush sampling for oil and grease and chemical oxygen demand. The water chemistry data indicated that there was not a significant source of pollution in the stormwater from any of the sites when compared to the Center for Watershed Protection's Illicit Discharge Detection and Elimination Guidance Manual (October 2004) and the Virginia Water Quality Standards (January 2006).

**a.12 (c) Report on the Industrial and High Risk Runoff Monitoring Program**

*The permittee may include monitoring for pollutants in storm water discharges to the Municipal Separate Storm Sewer System which include: municipal landfills; other treatment, storage, or disposal facilities for municipal waste; hazardous waste treatment, storage, disposal and recovery facilities; facilities that are subject to EPCRA Title III, Section 313. Monitoring may also be required on other industrial or commercial discharges the permittee determines are contributing a substantial pollutant loading to the Municipal Separate Storm Sewer System. Permittee may require the industrial facility to conduct self-monitoring to satisfy this requirement (B.1.1.3).*

This part of the permit is satisfied through the Wet Weather Screening Program in the preceding section, a.12 (b).

**a.12 (d) Report on the Watershed Monitoring Program; (1) Monitoring plan; (2) Summarize the implementation including, Storm Event Data, Station test results, Seasonal Loadings and Yearly Loadings.**

*The permittee shall develop a long-term monitoring plan and trend analysis to verify the effectiveness and adequacy of control measures in the County's Storm Water Management Plan and to identify water quality improvement or degradation. The permittee shall submit an approvable monitoring program to the Department of Environmental Quality no later than one year from the effective date of this permit. The program shall be implemented within two years of the effective date of the permit. Monitoring shall be conducted on representative stations to characterize the quality of storm water in at least two watersheds during the term of this permit (C.1).*

In 2007, four storms were monitored at two monitoring sites according to Fairfax County's Watershed Water Quality Monitoring Program submitted on January 24, 2003. Rainfall, flow, and water quality analysis data were collected. Samples were tested for concentrations of nine constituents of concern. Statistical analyses using the Simple Method were performed to determine if there were significant differences between constituent concentrations at the two stations, as well as seasonal and annual unit-area constituent loadings.

Tests found significant statistical differences for concentrations of five of the nine of the constituents measured at the two sites: Ammonia Nitrogen (NH<sub>3</sub>-N), Chemical Oxygen Demand (COD), Nitrate plus Nitrite Nitrogen (NO<sub>3</sub>+NO<sub>2</sub>-N), Total Kjeldahl Nitrogen (TKN), and Total Phosphorous (TP). The differences for the other four constituents were not statistically significant. Results for the 2005, 2006 and 2007 sampling years appear in Tables 1-2. Monitoring will continue in 2008, and the full data set will be used to determine if the observed high variance in constituent concentrations from the medium/high density residential site can be reduced sufficiently to allow detection of statistically significant differences for other constituents. The data set will also support the development of continuous water quality models that provide more refined prediction of water quality loadings.

Table 1 - Results of statistical analysis to determine if there is a significant difference between observed constituent concentrations at Stations VNA and OQN.

| Constituent*                        | Station VNA |        |      | Station OQN |       |      | Differences Statistically Significant ?** |
|-------------------------------------|-------------|--------|------|-------------|-------|------|---|
|                                     | Median      | High   | Low  | Median      | High  | Low  |   |
| NH <sub>3</sub> -N                  | 0.21        | 0.73   | 0.03 | 0.03        | 0.27  | 0    | Yes                                       |
| COD                                 | 93          | 194    | 22   | 30          | 69    | 2.5  | Yes                                       |
| E. Coli                             | 901         | 200000 | 18   | 747         | 38000 | 27   | No  |
| Fecal Strep                         | 2700        | 129000 | 117  | 1089        | 50900 | 45   | No  |
| NO <sub>3</sub> +NO <sub>2</sub> -N | 0.72        | 1.64   | 0.16 | 0.51        | 0.73  | 0.2  | Yes                                       |
| TDS                                 | 115         | 836    | 51   | 98          | 160   | 71   | No  |
| TKN                                 | 1.98        | 11.3   | 0.48 | 0.63        | 1.84  | 0.2  | Yes                                       |
| TP                                  | 0.41        | 1.61   | 0.1  | 0.05        | 0.8   | 0.01 | Yes                                       |
| TSS                                 | 91          | 1207   | 4.9  | 19          | 485   | 1.4  | No  |

\*All constituent units are mg/l, other than *E. coli* and Fecal Strep which are in # per 100 ml.

\* \*Based on a Mann-Whitney 2-sample test at a 0.1 significance level.

Table 2 - Computed seasonal and annual unit-area constituent loadings at monitored locations.

| Constituent                         | Unit-area loading * |       |        |        |         |        |        |        |         |        |
|-------------------------------------|---------------------|-------|--------|--------|---------|--------|--------|--------|---------|--------|
|                                     | Winter              |       | Spring |        | Summer  |        | Fall   |        | Annual  |        |
|                                     | VNA                 | OQN   | VNA    | OQN    | VNA     | OQN    | VNA    | OQN    | VNA     | OQN    |
| NH <sub>3</sub> -N                  | 0.278               | 0.001 | 0.109  | 0.029  | 0.064   | 0.016  | 0.075  | 0.012  | 0.527   | 0.059  |
| COD                                 | 61.5                | 4.2   | 30.0   | 11.7   | 22.4    | 3.7    | 57.4   | 10.2   | 171.3   | 29.8   |
| E. Coli                             | 0.234               | 0.039 | 2.485  | 12.924 | 130.228 | 3.545  | 28.449 | 10.314 | 161.397 | 26.821 |
| Fecal Strep                         | 0.721               | 0.156 | 17.586 | 13.408 | 90.434  | 14.759 | 66.298 | 9.869  | 175.038 | 38.193 |
| NO <sub>3</sub> +NO <sub>2</sub> -N | 0.651               | 0.114 | 0.233  | 0.113  | 0.278   | 0.070  | 0.325  | 0.116  | 1.488   | 0.413  |
| TDS                                 | 187.8               | 26.7  | 46.4   | 18.3   | 34.4    | 19.0   | 62.1   | 24.9   | 330.7   | 88.9   |
| TKN                                 | 1.610               | 0.099 | 1.874  | 0.289  | 0.769   | 0.145  | 0.643  | 0.187  | 4.896   | 0.719  |
| TP                                  | 0.227               | 0.005 | 0.115  | 0.086  | 0.149   | 0.019  | 0.337  | 0.068  | 0.829   | 0.178  |
| TSS                                 | 71.1                | 1.3   | 54.7   | 45.6   | 50.4    | 14.0   | 174.1  | 36.3   | 350.3   | 97.3   |

\*All units are lb/ac, except for *E. coli* and Fecal Strep which are in Billion colonies/ac. To compute total loads in lbs or Billion Colonies, multiply unit-area loading by drainage area of monitoring station.

**a.12 (e) Report on the Bioassessment Monitoring Program; (1) Monitoring plan; (2) Summarize test results.**

*The permittee can use and is encouraged to use a rapid bioassessment monitoring program to demonstrate the effectiveness of the stormwater management plan. The program will be implemented within one year of the effective date of the permit and an approvable program must be submitted within six months of the effective date of the permit (C.2).*

A probability-based site selection sampling methodology was used to identify randomly-selected stream bioassessment locations throughout Fairfax County. These sites were stratified and proportionally distributed throughout the county based on Strahler stream order applied to all perennially flowing streams in Fairfax County. This methodology eliminates any site selection bias and is commonly used as a cost-effective way of obtaining statistically defensible determination of stream conditions at a countywide scale. A total of 62 sites were sampled in 2007: 40 sites randomly selected within Fairfax County as part of the annual probabilistic monitoring program; 10 trend-monitoring sites in the County; 10 piedmont reference locations in Prince William National Forest Park; and two coastal plain reference sites in the Kane Creek watershed of Fairfax County. Results suggest that approximately 67 percent of the county's waterways are in "Fair" to "Very Poor" condition based on a decrease in biological diversity. The monitoring program is part of the framework to establish a baseline to evaluate future changes in watershed conditions.

**a.12. (f) Report on the Floatable Monitoring Program**

*The permittee shall conduct surveys of floatables. The intent of the survey is to document the effectiveness of the litter control programs for the Municipal Separate Storm Sewer System. Surveys shall be done in accordance with the following procedures: c) The above may be accomplished through the "Adopt a Stream" program referenced in Part I.B.1.k.2 (C.3.c).*

In 2007, The Fairfax County Floatables Monitoring Program fulfilled the floatables monitoring and Adopt-A-Stream requirements of the VPDES permit by (1) obtaining floatables survey data from organizations that sponsored stream cleanups in 2006; (2) developing and populating a Microsoft Access database with 2006 floatables survey data; (3) developing outreach/educational materials including a Floatables Data Entry Form, content for a Floatables Monitoring Program Web site, and a Floatables Monitoring Program Brochure; and (4) producing a Floatables Monitoring Report. The county promoted the "Adopt a Stream" program by providing support and staff for various stream and river cleanup events.

The county continues to work with and support the following organizations that coordinate large and small-scale volunteer cleanups:

- The Alice Ferguson Foundation (Potomac River Watershed Cleanup)
- The Virginia Department of Conservation and Recreation
- The International Coastal Cleanup
- The Friends of the Occoquan

In spring 2007, 117 sites were established throughout the county for the annual Alice Ferguson Foundation Potomac River Cleanup. More than 94,000 pounds of trash were removed from county waterways. In fall 2007, more than 736 volunteers removed 37,536 pounds of trash (or 18.8 tons) from 32 county sites for the International Coastal Cleanup.

**b) Proposed changes to the Storm Water Management Program including those changes that were implemented during the reporting year;**

*Storm Water Management Program Review and Update (B.4).*

The county continued to implement the existing program per the permit.

**c) Revisions, if necessary, to the assessments of controls and the fiscal analysis of the effectiveness of new controls established by the Storm Water Management Program;**

As the county approaches build-out conditions, it has become increasingly challenging to mitigate the impacts of impervious area and nonpoint source pollution on streams. Several efforts through the existing stormwater management program are helping to reduce or minimize water quality impacts. They include: the mandate of controls (BMPs) by the Chesapeake Bay Preservation Ordinance; development and implementation of Comprehensive Watershed Management Plans; development of a retrofitting program for existing developed areas; and changes to current stormwater management codes, policies, ordinance and guidelines.

**d) Annual expenditures for the reporting period, with a breakdown for the major elements of the Storm Water Management Program, and the budget for the year following each annual report;**

**Department of Public Works and Environmental Services**

The county has not tracked expenditures to meet permit requirements separate from its overall stormwater program, nor has it separately tracked the resources other agencies expend on programs that contribute towards meeting MS4 permit conditions. The total expenditures in the

Stormwater Business unit associated with stormwater management for calendar year 2007 was approximately \$29,001,105. Of the total, the operating expenditures for Stormwater Planning Division and the Maintenance and Stormwater Management Division were \$7,498,641. The capital stormwater funding expenditures totaled \$21,502,464.

Other costs not directly associated with stormwater management but of importance to the stream environment are incurred by the Division of Solid Waste Disposal and Resource Recovery, DPWES. This division is responsible for the operation of the I-95 Landfill located at 9850 Furnace Road in Lorton, Virginia, and the I-66 Transfer Station Landfill (closed), located at 4618 West Ox Road in Fairfax, Virginia. Annual VPDES expenditures are estimated to be \$180,000 for the I-95 facility and \$90,000 for the I-66 facility (closed). In addition, this division operates the Household Hazardous Waste program, which costs approximately \$560,000 annually. The Environmental Facilities Inspection Division of DPWES is responsible for ensuring that construction sites are operated in compliance with the county's E & S program, which also supports the county's efforts to protect instream water quality. More than 35,000 construction sites were inspected in 2007. The total inspection program cost is estimated at \$2 million.

As part of the annual budget, the county Board of Supervisors authorized one penny of the real estate tax to be dedicated to the stormwater management program for FY 2008, totaling \$22.7 million dollars in addition to the operational funding included in the general operating budget. The one cent of the real estate tax is currently renewed in the county executive's proposed budget for FY 2009. As part of the proposed budget, the county executive has proposed that the \$7.5 million dollar stormwater operating budget be funded from the dedicated one penny. This would result in a total proposed stormwater budget for FY 2009 of \$22.8 million dollars. The FY 2009 budget, which begins July 1st, is not established until the County Board adopts the annual budget in late April.

#### **Department of Planning and Zoning**

There are currently four full-time professional positions in the Environment and Development Review Branch, DPZ, devoted to environmental planning. Additional staff resources from other DPZ branches or divisions will occasionally address water quality issues. The environmental planning function in DPZ was funded at approximately \$275,000 in FY 2007. A similar budget allocation was established for FY 2008. The branch provides a full range of environmental review, and does not track stormwater efforts independently from other environmental efforts.

### **e) Identification of water quality improvements or degradation.**

Overall, the stormwater control program has complied with the permit to date. However, as the county approaches build-out, increasing challenges are placed on the MS4 program to control pollution and water quality impairments to water bodies. Challenges include, but are not limited to, addressing the increasing number of stream segments in the county being listed as impaired and prioritization of projects for implementation from multiple county watershed management plans that were adopted in recent years. The county, in anticipation of the increasing demands, will continue to implement best management practices to meet these challenges and regulatory requirements to achieve holistic watershed restoration and preservation. Efforts include enhanced infrastructure maintenance and inspections, development and implementation of watershed plans, improved construction inspection program, and ongoing outreach efforts to increase public awareness. It is anticipated that these efforts will have a positive long-range impact on the future health of county watersheds and help meet the goal of restoring the Chesapeake Bay.

ATTACHMENT  
to  
2007 VPDES Permit Annual Report  
March 31, 2008

# VPDES Permit No. VA0088587

## Fairfax County Municipal Separate Storm Sewer System (MS4) Permit (Updated 3/7/08)

### Storm Sewer Infrastructure Management Plan and Schedule

Permit Requirements - Fairfax County will maintain and update the accuracy and inventory of the storm sewer system that will be accomplished through an infrastructure management plan.

Infrastructure Management Plan - Fairfax County encompasses 399 square miles as identified on 436 tax map grids. Over a 5-year cycle (completed in 2005), Fairfax County has field verified the storm drainage conveyance system on each tax map grid, identified storm sewer pipes, outfalls, and associated appurtenances, and created a GIS-based data layer. A GIS-based spatial database of stormwater related easements was started in 2005. Work was completed on 15 tax maps in 2005 and 60 additional tax maps in 2006. In 2007, MSMD completed additional 91 tax grids and the final 270 tax grids are expected to will be complete by the end of 2008.

Infrastructure Rehab Program: Since 2006, Fairfax County developed a Rehab Program that CCTV'd 70 miles of pipe and 4600 structures as well as inspected 5 miles of channels. We designed repairs for 3 miles of pipe and 370 structures. The county is approximately 40 percent through the construction phase of 60 construction rehab projects that totals approximately \$4 million.

### Infrastructure Management Schedule

