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Proposed Regulation
Agency Background Document

Agency name	Virginia Soil and Water Conservation Board
Virginia Administrative Code (VAC) citation	4 VAC 50 -60
Regulation title	Virginia Stormwater Management Program (VSMP) Permit Regulations
Action title	Amend, modify or delete provisions of the regulations to: (1) allow for changes in the statewide permit fee schedule supporting the Stormwater Management Program; and (2) allow for related changes as needed to improve the administration and implementation of the stormwater management fees.
Date this document prepared	April 9, 2009

This information is required for executive branch review and the Virginia Registrar of Regulations, pursuant to the Virginia Administrative Process Act (APA), Executive Orders 36 (2006) and 58 (1999), and the *Virginia Register Form, Style, and Procedure Manual.*

Brief summary

In a short paragraph, please summarize all substantive changes that are being proposed in this regulatory action.

This proposed regulatory action establishes a statewide fee schedule for stormwater management and state agency projects and establishes the fee assessment and the collection and distribution systems for those fees. Permit fees are established for: Municipal Separate Storm Sewer Systems (new coverage); Municipal Separate Storm Sewer Systems (major modifications); Construction activity general permit coverage; Construction activity individual permits, Construction activity modifications or transfers; and MS4 and Construction activity annual permit maintenance fees.

This action is closely tied to the proposed Part I, II, and III action as the fees generated are necessary to fund the local stormwater management programs established through that concurrent regulatory action. The fees have been established (see Appendix A) using estimates of the time determined to be necessary for different sized projects, for a local stormwater

management program to conduct plan review, inspections [including stormwater pollution prevention plan (SWPPP) review and re-inspections], enforcement, provide technical assistance, and issue permit coverage, and for the Department of Conservation and Recreation to provide oversight of the Commonwealth's stormwater management program.

The necessary proposed permit fee levels were arrived at through discussions of a subcommittee of the Technical Advisory Committee and discussions with the overall TAC and through corroboration of the costs of conducting the various components of program implementation with Department of Conservation and Recreation stormwater field staff and with local government program personnel.

Legal basis

Please identify the state and/or federal legal authority to promulgate this proposed regulation, including (1) the most relevant law and/or regulation, including Code of Virginia citation and General Assembly chapter number(s), if applicable, and (2) promulgating entity, i.e., the agency, board, or person. Describe the legal authority and the extent to which the authority is mandatory or discretionary.

The Virginia Stormwater Management Program was created by Chapter 372 of the 2004 Virginia Acts of Assembly (HB1177). This action transferred the responsibility for the permitting programs for Municipal Separate Storm Sewers (MS4s) and construction activities from the State Water Control Board and the Department of Environmental Quality to the Virginia Soil and Water Conservation Board and the Department of Conservation and Recreation. This federally-authorized program is administered in accordance with requirements set forth in the federal Clean Water Act (33 USC § 1251 et seq.) as well as the Virginia Stormwater Management Act (§10.1-603.1 et seq.).

Section 10.1-603.2:1 of the Code of Virginia speaks to the powers and duties of the Virginia Soil and Water Conservation Board. Among those powers and duties, the Board:

> "…***shall permit, regulate, and control stormwater runoff in the Commonwealth***. *In accordance with the VSMP [Virginia Stormwater Management Program], the Board may issue, deny, revoke, terminate, or amend stormwater permits; adopt regulations; approve and periodically review local stormwater management programs and management programs developed in conjunction with a municipal separate storm sewer permit; enforce the provisions of this article; and otherwise act to* ***ensure the general health, safety and welfare of the citizens of the Commonwealth as well as protect the quality and quantity of state waters from the potential harm of unmanaged stormwater***."

Subdivision 2 of §10.1-603.2:1 of the Code of Virginia authorizes the Virginia Soil and Water Conservation Board to delegate to the Department or an approved locality the implementation of the Virginia Stormwater Management Program:

> *§10.1-603.2:1 Powers and duties of the Virginia Soil and Water Conservation Board.*
> *(2) Delegate to the Department or to an approved locality any of the powers and duties vested in it by this article except the adoption and promulgation of regulations.*

Delegation shall not remove from the Board authority to enforce the provisions of this article.

Section 10.1-603.3 of the Code of Virginia [as it will read effective July 1, 2009] requires establishment of stormwater management programs by localities. The Board must amend, modify or delete provisions of the Virginia Stormwater Management Program (VSMP) Permit Regulations to allow localities to implement local stormwater management programs:

§10.1-603.3. Establishment of stormwater management programs by localities.
A. Any locality located within Tidewater Virginia as defined by the Chesapeake Bay Preservation Act (§ 10.1-2100 et seq.), or any locality that is partially or wholly designated as required to obtain coverage under an MS4 permit under the provisions of the federal Clean Water Act, shall be required to adopt a local stormwater management program for land disturbing activities consistent with the provisions of this article according to a schedule set by the Board. Such schedule shall require adoption no sooner than 15 months and not more than 21 months following the effective date of the regulation that establishes local program criteria and delegation procedures, unless the Board deems that the Department's review of the local program warrants an extension up to an additional 12 months, provided that the locality has made substantive progress. A locality may adopt a local stormwater management program at an earlier date with the consent of the Board.
B. Any locality not specified in subsection A may elect to adopt and administer a local stormwater management program for land disturbing activities pursuant to this article. Such localities shall inform the Board and the Department of their initial intention to seek delegation for the stormwater management program for land disturbing permits within six months following the effective date of the regulation that establishes local program criteria and delegation procedures. Thereafter, the Department shall provide an annual schedule by which localities can submit applications for delegation.
C. In the absence of the delegation of a stormwater management program to a locality, the Department will administer the responsibilities of this article within the given jurisdiction in accordance with an adoption and implementation schedule set by the Board.

Note: Additionally, enactment clause 2 of the Chapter 18 of the 2009 Virginia Acts of Assembly stipulates that *the regulation that establishes local program criteria and delegation procedures and the water quality and water quantity criteria, and that is referenced in subsections A and B of §10.1-603.3 of this act, shall not become effective prior to July 1, 2010.*

In order to properly pay for these local stormwater management programs and to fund the Department of Conservation and Recreation's necessary program oversight, the Stormwater Management Act, §10.1-603.4.5 of the Code of Virginia allows for the establishment of a statewide permit fee at a level sufficient to carry out the program. The current fees will be evaluated and necessary increases or decreases made to implement this section of the Code.

§10.1-603.4. subsection 5. Establish, with the concurrence of the Director, a statewide permit fee schedule for stormwater management related to land disturbing activities of one acre or greater. The fee schedule shall also include a provision for a reduced fee for

land disturbing activities between 2,500 square feet and up to 1 acre in the Chesapeake Bay Preservation Act (§10.1-2100 et seq.) localities. The regulations shall be governed by the following:
a. The revenue generated from the statewide stormwater permit fee shall be collected and remitted to the State Treasurer for deposit in the Virginia Stormwater Management Fund established pursuant to §10.1-603.4:1. However, whenever the Board has delegated a stormwater management program to a locality or is required to do so under this article, no more than 30 percent of the total revenue generated by the statewide stormwater permit fees collected within the locality shall be remitted to the State Treasury for deposit in the Virginia Stormwater Management Fund.
b. Fees collected pursuant to this section shall be in addition to any general fund appropriation made to the Department; however, the fees shall be set at a level sufficient for the Department to carry out its responsibilities under this article;

Note: Chapter 102 of the 2005 Virginia Acts of Assembly (HB2365), changed the "may" provision (in the section presented above) to "shall" for the development of a fee for activities between 2,500 square feet and up to 1 acre in Chesapeake Bay Preservation Act localities.

Additionally, the Stormwater Management Act, §10.1-603.4.10 of the Code of Virginia allows for the establishment of MS4 fees.

§10.1-603.4. subsection 10. Establish, with the concurrence of the Director, a statewide permit fee schedule for stormwater management related to municipal separate storm sewer system permits.

Also, requirements set forth in the federal Clean Water Act (33 USC § 1251 et seq.), formally referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483, and Public Law 97-117, or any subsequent revisions thereto, and its attendant regulations set forth in 40 CFR Parts 122, 123, 124 and 125 requires states to establish a permitting program for the management of stormwater for municipal separate storm sewer systems (MS4s) and construction activities disturbing greater than or equal to an acre.

Purpose

Please explain the need for the new or amended regulation by (1) detailing the specific reasons why this regulatory action is essential to protect the health, safety, or welfare of citizens, and (2) discussing the goals of the proposal, the environmental benefits, and the problems the proposal is intended to solve.

The stormwater management program funded through the fees authorized pursuant to this regulatory action is necessary to address water quality within the Commonwealth. Controlling stormwater runoff and its impacts is a serious issue facing the Commonwealth and its local governments. Citizens are complaining about flooding caused by increased amounts of stormwater runoff and the runoff is also reported as a contributor to excessive nutrient enrichment in numerous rivers, lakes, and ponds throughout the state, as well as a continued

threat to estuarine waters and the Chesapeake Bay. Numerous studies have documented the cumulative effects of urbanization on stream and watershed ecology. Research has established that as impervious cover in a watershed increases, stream stability is reduced, habitat is lost, water quality becomes degraded, and biological diversity decreases largely due to stormwater runoff. We recognize that impervious areas decrease the natural stormwater purification functions of watersheds and increase the potential for water quality impacts in receiving waters. Additionally, runoff from managed turf is recognized as a significant source of pollutants.

The purpose of this proposed action is to develop regulations that establish statewide stormwater permit fees at a level sufficient to carry out the stormwater management program per §10.1-603.4.5 of the Code of Virginia and to revise the related provisions in the regulations, as needed, to improve the administration and implementation of fees under the Virginia Stormwater Management Act (§10.1-603.2 et seq.).

The fees that are in effect under the current VSMP regulations were transferred over with the stormwater program from the Department of Environmental Quality in 2005 and are essentially only minimal processing fees. These fees are proposed to be amended in this regulatory action, as they are insufficient for the operation of a local program and for necessary program oversight.

- Per the Code, the fees need to be set at level sufficient to cover expenses associated with all portions of the administration of the Commonwealth's stormwater management permit program.

- The proposed fees are estimated to appropriately cover the costs of the key elements of administering a stormwater program: plan review, permit review and issuance, inspections, enforcement, program administration and oversight, and travel. The permit fee also includes costs associated with Department oversight functions and database management.

- The construction fees are based on the area being disturbed. Administrative expenses routinely increase with the size of the project. When the higher fees are put on a per lot basis, they do not result in a large increase per lot. Such increases will most likely be passed on to the consumer as part of doing business.

- The annual maintenance fees have been established to allow local programs to recoup inspection and enforcement expenses for a project that has not been completed and terminated within the first year. Additionally, modification fees are added to allow a local program to recover expenses associated with significant plan modifications that require review.

- The CPI-U annual increase was added to provide a mechanism to ensure that fees keep pace with the costs of doing business.

- Localities may establish lower construction fees for their program if they can demonstrate their ability to fully and successfully implement a qualifying program at a lower rate or from a different funding source.

- The municipal separate storm sewer system (MS4) fees have been set at a level sufficient to provide oversight to regulated entities MS4 programs and to allow for implementation plan review, report review, and enforcement.

The fees are necessary, as the sole funding source, to support work to minimize the cumulative impacts of stormwater on humans and the environment and to moderate the associated hydrologic impacts. If not properly managed, stormwater can have significant economic impacts and the stream restoration costs to fix the problems after the fact are very costly. Without the fees generated through this regulatory action, local programs could not be properly administered.

Substance

Please briefly identify and explain the new substantive provisions, the substantive changes to existing sections, or both where appropriate. (More detail about these changes is requested in the "Detail of changes" section.)

This proposed regulatory action establishes a statewide fee schedule for stormwater management and state agency projects and establishes the fee assessment and the collection and distribution systems for those fees.

- Construction permit fees are proposed to be established at a level to allow a local program to cover stormwater program costs associated with plan review, permit review and issuance, inspections, enforcement, program administration and oversight, and travel. Fees also include costs associated with Department oversight functions and database management.

- 50% of the construction fees are due upon application and the remaining 50% at issuance of coverage.

- The construction fees are split 72% to the local program and 28% to the Department.

- Localities may establish lower construction fees for their program if they can demonstrate their ability to fully and successfully implement a qualifying program at a lower rate or from a different funding source.

- The construction fees shall be periodically assessed and revised as necessary through regulatory actions.

- Permit fees are established for:
    - Municipal Separate Storm Sewer Systems new coverage (Individual and General Permit)
    - Municipal Separate Storm Sewer Systems major modifications (Individual)
    - Construction activity coverage (Individual and General Permit) (based on project acreage)

- Construction activity modifications or transfers (Individual and General Permit) [For those permits that require significant additional administrative expenses such as additional plan reviews, etc.]
- MS4 and Construction activity annual permit maintenance fees (Individual and General Permit) [For those projects that have not been completed and terminated within a year, allows for recovery in the out years of expenses associated with inspection, enforcement, etc.]

- Allows for an annual increase in fees based on the CPI-U. [Not to exceed 4% per annum without formal action by the Board.]

Issues

Please identify the issues associated with the proposed regulatory action, including:
1) the primary advantages and disadvantages to the public, such as individual private citizens or businesses, of implementing the new or amended provisions;
2) the primary advantages and disadvantages to the agency or the Commonwealth; and
3) other pertinent matters of interest to the regulated community, government officials, and the public.

If the regulatory action poses no disadvantages to the public or the Commonwealth, please so indicate.

The primary advantage of this regulatory change for the public is an enhanced statewide stormwater management program that will be properly funded and administered at the local level. This will result in improved compliance with the VSMP regulations and thus improved water quality. The regulated community will also benefit from properly funded and staffed local stormwater management programs, as local administration will improve efficiency and service over today's scenario of Erosion and Sediment Control being administered by the locality and Stormwater Management being administered by the Department. By developing the fee structure based upon the estimated actual costs of administering a local stormwater management program, there is not expected to be any disadvantage to localities or to the Department from the fees associated with permits for construction activities.

The primary disadvantage of this proposed regulation is increased permit fees for the regulated community. Today's fees for permits associated with construction activities are set at levels insufficient to support the vast majority of responsibilities associated with administering a stormwater management program. The fees proposed by this regulatory action, while in many cases are higher than the current fees, will allow for proper funding of permit oversight and service. In addition to the increased proposed initial issuance permit fees, annual maintenance fees have been created for the Construction General Permit (by acreage), and for the Construction Individual Permit.

The fees proposed by this regulatory action for municipal separate storm sewer systems (MS4s) are, like the construction activity permitting fees, based on the estimated actual costs of permit administration. For Large and Medium MS4s (Individual Permit), the estimation has resulted in a lower proposed initial issuance permit fee than currently exists. For Small MS4 Individual Permit and for the Small MS4 General Permit, the proposed regulations do include an increased

fee. Additionally, MS4 annual maintenance fees have been increased for the MS4 Individual Permit (Large and Medium) and the MS4 Individual Permit (Small)] and created for the MS4 General Permit.

Requirements more restrictive than federal

Please identify and describe any requirement of the proposal which are more restrictive than applicable federal requirements. Include a rationale for the need for the more restrictive requirements. If there are no applicable federal requirements or no requirements that exceed applicable federal requirements, include a statement to that effect.

There are no applicable federal requirements related to fees for stormwater management permits. The administration of a stormwater management program within the Commonwealth is, however, mandated by the Clean Water Act; the fees proposed by this action are necessary in order to fund the implementation of such a program.

Localities particularly affected

Please identify any locality particularly affected by the proposed regulation. Locality particularly affected means any locality which bears any identified disproportionate material impact which would not be experienced by other localities.

The regulations are not intended to have a disproportionate impact upon any locality. The Code of Virginia, however, dictates that options under the regulations may differ across classes of localities. Section 10.1-603.3 of the Stormwater Management Act specifies that any locality located within Tidewater Virginia as defined by the Chesapeake Bay Preservation Act (§10.1-2100 et seq.), or any locality that is partially or wholly designated as required to obtain coverage under an MS4 permit under the provisions of the federal Clean Water Act, shall be required to adopt a local stormwater management program (qualifying local program) consistent with the criteria established by the Board. Other localities may elect to adopt a qualifying local program; however, in the absence of adoption by such a locality, the Department will administer a local stormwater management program within a jurisdiction. As such, the fees proposed by this action may be received by either a locality administering a qualifying local program or the Department, as may be applicable. As all fees are calculated to fund the costs of program administration, however, no locality should bear a fiscal burden under either program administration scenario.

Additionally, the fee schedule has been set to be applied equally Commonwealth wide. During early fee establishment discussions, the TAC investigated the potential for establishing regional fees. This was not determined to be the preferred approach as it was thought that this could lead to competitive disadvantages within those localities with a higher fee structure.

Public participation

Please include a statement that in addition to any other comments on the proposal, the agency is seeking comments on the costs and benefits of the proposal and the impacts of the regulated community.

Public Participation to date:

Public participation in the development of these regulations has already been substantial and is very important to the Board. This regulatory action has been conducted in tandem with the Part I, II, and III regulatory action. The proposed regulations reflect the combined advice of two technical advisory committees (TAC) that were assembled associated with the complementary Part I, II, and III action and that also each worked on the Part XIII fee regulation. The Board originally passed a motion authorizing the development of NOIRA on July 21, 2005. The NOIRA was filed on November 15, 2005 and published in the Virginia Register on December 26, 2005. The 60-day public comment period and two public hearings were held between December 26, 2005 and February 24, 2006.

The first TAC was assembled during March and April of 2006 and was composed of 23 members including local governments (9); environmental groups (3); state agencies (5 members; 4 agencies); federal agencies (1); consultants - Home Builders (3); a soil and water conservation district (1); and a planning district commission (1). Between May 4, 2006 and August 21, 2007, DCR held 12 TAC, 4 TAC subcommittee, and 1 technical discussion group meetings as well as over 50 internal discussions and team drafting meetings to consider the recommendations being received from the TAC.

Following the withdrawal of the original Part I, II, and III action as directed by the Virginia Soil and Water Conservation Board on September 20, 2007 in order to address a question regarding the intent of the original NOIRA related to the Part II water quality and quantity technical criteria, a new Part I, II, III NOIRA was filed and a second TAC was established to continue the work of the first. This TAC was comprised of 29-members and included most of the original TAC but incorporated a number of additional stormwater engineers to bring additional technical expertise to the TAC. This second TAC continued its work on this Part XIII fee action also.

Between June 10, 2008 and September 9, 2008, the Department held an additional 5 TAC meetings.

DCR also contracted out with Dr. Kurt Stephenson, an economist at Virginia Tech, in June of 2008 to assist in determining the cost of the regulations as well as the general off-setting costs associated with further degradation of Virginia's waters in the absence of these regulatory revisions. As part of developing this report, which was released on December 31, 2008, interviews were held with a number of the affected entities and surveys of local governments utilized. This report has been included in its entirety in Appendix B.

The proposed regulations have also been the subject of public presentations before a variety of organizations, at conferences, and before a legislative study committee.

Additionally, in an effort to keep the public involved in the development of the proposed regulations, the Department posted to its website all of the materials associated with each TAC or subcommittee meeting in order for the public to remain informed of the discussions of the TAC and the development of the proposed regulatory language (http://www.dcr.virginia.gov/lr2.shtml).

Overall, DCR and the Board have made monumental strides in making sure that the public has been aware of both this Part XIII regulatory fee action as well as the more comprehensive Part I, II, and III action and have been provided the opportunity to participate in and to follow the process. In summary, the Department to advance the two regulatory actions combined, has established two TACs, a Water Quantity Workgroup, a BMP Clearinghouse Advisory Committee, and a Handbook Advisory Committee, and has held almost 50 public meetings associated with the regulations (including a series of charrettes that have reached over 350 professionals), held over 75 internal working sessions to draft and revise the regulations, presented the regulations at a number of meetings, and established three supporting contracts (CWP-scientific and technical, VT-BMP Clearinghouse, and VT-economic). We truly believe that these actions collectively may already be among the most vetted environmental regulatory actions and a lot more public conversation is still envisioned.

Continuing public participation opportunities:

As this regulatory action moves forward, in addition to any other comments concerning the proposed regulations that individuals wish to offer during the public comment period, the Board is also seeking comments on the costs, benefits, and potential impacts of this regulatory proposal. Also, the Board is seeking information on impacts on small businesses as defined in § 2.2-4007.1 of the Code of Virginia. Information may include 1) projected reporting, recordkeeping and other administrative costs, 2) probable effect of the regulation on affected small businesses, and 3) description of less intrusive or costly alternative methods of achieving the purpose of the regulation.

Persons desiring to submit written comments pertaining to this proposed regulation and the additional concepts outlined above may do so during the public comment period by the Internet, mail, or facsimile. It is preferred for comments to be posted to the "Public Comment Forums" page of the Virginia Regulatory Town Hall website in the "Secretariat of Natural Resources" portion of the page under the Virginia Soil and Water Conservation Board's stormwater management regulations action entitled, "Amendments to statewide permit fee schedule and to improve the administration and implementation of fees". Comments pertaining to this proposed regulation may also be mailed to the Regulatory Coordinator at: Virginia Department of Conservation and Recreation, 203 Governor Street, Suite 302, Richmond, Virginia 23219. Comments may also be faxed to the Regulatory Coordinator at: 804-786-6141. All written comments must include the name and address or email address of the commenter. In order to be considered, comments must be received by 5:00 p.m. on the date established as the close of the comment period.

The Department, as authorized by the Board, will hold at least one public hearing to provide opportunity for public comment. Notice of the hearing(s) will be posted on the Virginia

Regulatory Town Hall website (www.townhall.virginia.gov) and on the Department's website. Both oral and written comments may be submitted at that time.

The Department will also continue to the best of our ability to meet with interested entities to discuss areas of concern to better enable the Department in seeking solutions that may be considered in the final regulations, and will continue to attend meetings to better inform affected entities of the details of the proposed regulations and to foster discussions on areas that might be improved.

As has been the history of regulatory actions taken by DCR, all comments will be fully reviewed and thoroughly discussed by DCR in coordination with the Board and the final regulations will be carefully constructed giving full consideration to the public comments received.

Economic impact

Please identify the anticipated economic impact of the proposed regulation.

Introduction

This economic analysis has been prepared to show the genesis of the fees that developers, state agencies, and other regulated entities will pay for their construction projects and to account for the resulting funds they will generate for local stormwater program administration and Department overview. This analysis should serve as a companion to the detailed analysis developed for Part I, II, and III that outlines the benefits and costs associated with program implementation. The analysis also discusses fees associated with the municipal separate storm sewer system (MS4) program and the entities affected by these fees.

Understanding the significant potential implications of both the Part I, II, and III and the Part XIII proposed regulations and the importance of a sound economic discussion of the benefits and costs of the regulations, DCR, on behalf of the Virginia Soil and Water Conservation Board (Board), contracted in June of 2008 with Dr. Kurt Stephenson, a professor at the Department of Agricultural and Applied Economics at Virginia Tech (Blacksburg, VA) to provide an economic analysis of the proposed regulations. Dr. Bobby Beamer, an economist with BBeamer LLC (Keswick, VA) assisted with the study. The report, entitled *Economic Impact Analysis of Revisions to the Virginia Stormwater Regulation* (December 31, 2008), is appended to this discussion document as Appendix B and is available in its entirety for download at http://www.dcr.virginia.gov/lr2c.shtml. While DCR offered input and comments on the "Virginia Tech Report" as it will be referred to throughout this discussion document, the authors note that all statements, conclusions, omissions, or errors are the sole responsibility of the authors.

The discussion included herein is a compilation of the findings presented in the Virginia Tech Report as well as additional discussion and computations developed by the Department of Conservation and Recreation meant to build on and complement the report. This document does liberally draw from the Virginia Tech Report throughout this discussion. Where possible, the direct attribution for the materials is specifically noted and pages for the excerpt are referenced.

This discussion document and the report also draw on:

- An online survey of localities in the summer of 2007 regarding personnel and budgetary needs performed by DCR;
- Independent discussions by Dr. Stephenson and Dr. Beamer with localities and other affected entities;
- Permit data from DCR's existing stormwater permitting database (since January 29, 2005 when DCR took over program administration);
- Data provided to the Department's regional Soil and Water Conservation offices from localities pursuant to §10.1-566.1 that states that each local erosion and sediment control plan-approving authority shall report to the Department a listing of each land-disturbing activity in the locality for which a plan has been approved; and
- A literature search performed by the Chesapeake Bay Foundation for DCR of relevant fiscal articles.

Development of Fees

Fees have been established based on the costs associated with providing services. Detailed computations indicating how the fees were developed are presented in Appendix A.

Future Adjustments of Fees

The necessary fee levels were set utilizing the computations provided in and discussed throughout Appendix A and were arrived at through discussions of a subcommittee of the Technical Advisory Committee and discussions with the overall TAC. Additionally, in order to keep pace with the cost of living, the regulations do contain a CPI adjuster as follows:

> **4VAC50-60-840** The fees set out in sections 4VAC50-60-800 through 4VAC50-60-830 shall be increased each July 1st by multiplying the fee by the percentage by which the consumer price index for all-urban consumers published by the United States Department of Labor (CPI-U) for the 12-month period ending May 31 of the preceding year exceeds the CPI-U for the 12-month period ending May 31, 2007, and the result shall be rounded to the nearest $1 increment. The fee schedule shall be posted to the department's website and distributed to each qualified local program in advance of each fiscal year. Notwithstanding the foregoing, in no event shall the permit fee be decreased and in no event shall any increase exceed 4% per annum, without formal action by the board.

Also, in case a locality is already levying a local fee that it wishes to keep in place, the regulations also specify that "[s]hould a qualifying local program demonstrate to the board its ability to fully and successfully implement a qualifying local program without a full implementation of the fees set out in this Part, the board may authorize the administrative establishment of a lower fee for that program provided that such reduction shall not reduce the amount of fees due to the department for its program oversight and shall not affect the fee schedules set forth herein." The regulations also specify that " [a]s part of its program oversight, the department shall periodically assess the revenue generated by both the localities and the department to ensure that the fees have been appropriately set and the fees may be adjusted through periodic regulatory actions should significant deviations become apparent. The

department may make such periodic adjustments in addition to the annual fee increases authorized by 4VAC50-60-840."

Comparison to other States

Virginia's fees are generally unique when compared to other states in that Virginia is one of the first states in the nation to pursue the implementation of the federal stormwater management program, including the issuance of general permit coverages for construction activity, at the local level. As such, many other state's permit fees have not been established to cover local program implementation as well as state oversight, just administration of permit coverage issuance (application fee). States that do have a permit fee structure oriented toward implementation of a program, have often developed their construction permit fees based on the size (acreage) of the land disturbing project and have established annual maintenance fees.

1) Projected cost to the state to implement and enforce the proposed regulation, including (a) fund source / fund detail, and (b) a delineation of one-time versus on-going expenditures

Overview

Two primary state entities are affected by these regulations (although all state agencies engaged in regulated construction activities may be impacted by the enhanced water quality and quantity standards advanced by these proposed regulations). The two agencies are the Department of Conservation and Recreation (DCR or the Department) and the Virginia Department of Transportation (VDOT). Impacts to each will be discussed in this section.

One of the key elements of these proposed regulations is to establish a stormwater management program in every locality in the Commonwealth that can be administered in conjunction with a locality's existing erosion and sediment control program. This approach will improve efficiencies in the administration of land disturbing projects and provide developers with one-stop shopping for erosion and sediment control and stormwater reviews and approvals. This concept was embodied in the Code of Virginia when the Stormwater Management Act was amended in 2004. The Code specifies that:

> §10.1-603.3. Establishment of stormwater management programs by localities.
>
> A. Any locality located within Tidewater Virginia as defined by the Chesapeake Bay Preservation Act (§10.1-2100 et seq.), or any locality that is partially or wholly designated as required to obtain coverage under an MS4 [Municipal Separate Storm Sewer System] permit under the provisions of the federal Clean Water Act, shall be required to adopt a local stormwater management program for land disturbing activities consistent with the provisions of this article according to a schedule set by the Board. Such schedule shall require adoption no sooner than 15 months and not more than 21 months following the effective date of the regulation that establishes local program criteria and delegation procedures, unless the Board deems that the Department's review of a local program warrants an extension up to an additional 12 months provided the locality has made substantive progress. A locality may adopt a local stormwater management program at an earlier date with the consent of the Board.
>
> B. Any locality not specified in subsection A may elect to adopt and administer a local stormwater management program for land disturbing activities pursuant to this

> article. Such localities shall inform the Board and the Department of their initial intention to seek delegation for the stormwater management program for land disturbing permits within six months following the effective date of the regulation that establishes local program criteria and delegation procedures. Thereafter, the Department shall provide an annual schedule by which localities can submit applications for delegation.
>
> C. In the absence of the delegation of a stormwater management program to a locality, the Department will administer the responsibilities of this article within the given jurisdiction in accordance with an adoption and implementation schedule set by the Board.

A portion of the Department's responsibilities are derived from subsection C above. It is anticipated that DCR will become responsible for administering a local stormwater management program in those localities not amongst the cumulative 103 Chesapeake Bay Act and those covered by Municipal Separate Storm Sewer System (MS4) permits that are required by statute to administer a local stormwater management program. Many of the localities that DCR may be responsible for establishing a local stormwater management program in are the more rural localities across the Commonwealth that may find it more fiscally challenging and less cost effective due to lower numbers of permits to run their own program. The Department estimates that there could be as many as 222 localities that do not adopt a program [12 cities, 62 counties, and 148 towns]. The Department would collectively administer these programs as 74 local programs (towns would be handled as part of counties). A list of the subject localities and the estimated costs associated with administering such programs is presented in Appendix A and will be discussed in more detail below.

The Virginia Tech Report (Appendix B, page 36) acknowledges that "DCR, however, may be able to achieve some administrative economies of scale by consolidating administrative activities across larger geographic regions in their regional offices."

The Department of Conservation and Recreation will also have statewide program oversight responsibilities associated with the local administration of this federal permitting and pollutant control program. Additionally, while enforcement authority is expected to be passed to the localities with EPA's concurrence, the Department, as does the federal government with the state, retains over-filing authority to address enforcement actions directly should it be necessary. Specifics associated with the estimated program oversight costs are also presented in Appendix A and will be discussed in more detail below.

The costs advanced in this section associated with fees will be on-going although the exact amounts may vary with the economy and the number of construction projects occurring in the Commonwealth at any one time. The number of MS4's in the Commonwealth is for the most part stationary until the next federal census is completed where additional localities may become subject to federal MS4 requirements.

Estimated workload and revenue to cover costs associated with Local Program Administration and Statewide Program Oversight through permit fees

As part of calculating state costs, the first step was to estimate the number of construction permits that might be administered on an annual basis by the 74 mandatory programs (represents

222 localities). Utilizing a series of computations discussed in Appendix A and highlighted in Figures A-1 and A-2 and Tables A-1 through A-10, it was determined that 5,000 permits per year would be a reasonable estimate of the permit load statewide. The computations next estimated how long plan review, inspections, and the various elements of program administration take as well as the associated costs. Tables A-11 through A-14 present the amount of time and estimated costs associated with program administration from each construction project (dependent on size of project).

Utilizing these computations, and after removing the localities' anticipated workload, it was estimated that the 74 DCR run local programs would administer 1,576 of the permits. Table A-18 indicates that DCR should have $4.4 million in expenses and the need for 54 staff associated with construction program administration (some of which it already retains). The fees have been modified to a level to support these identified costs.

Like the localities, DCR will be responsible for:

- Stormwater BMP plan review and approval
- Stormwater BMP construction inspection
- Stormwater BMP record keeping/tracking
- General Permit coverage issuance
- General Permit enforcement
- Stormwater BMP long-term post-construction compliance monitoring & enforcement
- Receipt of permitting and program administration fees

It was then calculated in Appendix A the oversight costs that DCR would have associated with this statewide responsibility. Although not a comprehensive list, key responsibilities for DCR will generally include:

- Review of all local program approval packages submitted to the Virginia Soil and Water Conservation Board for consideration.
- General training and educational outreach.
- Ordinance development and review.
- Local program technical assistance including local plan review, inspection, and BMP questions.
- Response to complaints not resolved at the local level.
- Enforcement responsibilities as deemed necessary.
- Response to issues related to permit issuance and fee accounting.
- BMP Clearinghouse and the enterprise website development and maintenance and maintain the stormwater management handbook.
- Statewide program oversight responsibilities for the auditing of all local programs on a periodic cycle to insure compliance.
- Oversight of state stormwater management projects.

Table A-19 and the discussion that precedes it outline the staffing and fiscal needs associated with these oversight services. They indicate that DCR should have $2.8 million in expenses and the need for 33 staff associated with construction program oversight (some of which it already

retains). The fees have also been modified to a level to support these identified costs and correspond to 28% of all construction general permit coverage fees collected.

Table A-20 and Table A-20a outline the MS4 Program Oversight costs. With the enhancement of the state's stormwater management program technical and administrative functions, MS4 program responsibilities will commensurately grow. DCR should have approximately $446,000 in expenses and the need for 5 staff associated with MS4 program oversight. Fees have been established at a level sufficient to oversee the regulated MS4 entities.

Table 2 (from Appendix A, Table A-31) outlines the necessary staff, projected costs for DCR and the revenue expected to be generated by fees for DCR. As noted in the table, DCR will receive revenue from the initial permit fees for the programs it administers (72%), revenue from all permit fees for program oversight (28%), the maintenance fees should DCR administered projects extend multiple years (some are projected to last as long as 10 years), and some revenue from those projects where plan review may be conducted but the project does not advance and seek general permit coverage (1/2 of the permit fee costs). Fees associated with MS4 program oversight are also included in the table. The fees that were modified to cover the responsibilities outlined in Appendix A, Table A-24 and to generate the necessary revenue are presented in Tables A-25 and A-26.

Table 2 (From Appendix A; Table A-31): DCR Total Costs and Revenue Calculations [Includes existing staff and potential contract staff in the computations: SEE DISCUSSION BELOW]

Category	Staff (FTE)	Total Projected Cost	Revenue
Construction: Program Oversight	33 (From Table A-19)	$2,897,974 (From Table A-19)	28% = $3,306,229 (From Table A-30)
Construction: Administration of 74 local programs	54 (From Table A-18)	$4,414,867 (From Table A-18)	72% = $3,800,592 (From Table A-29)
10% increase for contracting		$441,487	
Construction: Maintenance Fees Generated	0		$477,768 (From Table A-36)
MS4: Program Oversight (From Table A-20)	5	$445,947	$446,800
Fees generated from the 5% of projects that have plan review but do not seek General Permit coverage (1/2 fee) [1,576 *.05] = 78 * $2,412[1]*.5 = $94,068	0		$94,068
Totals	92	$8,200,275	$8,125,457

Note 1: $3,800,592 (from Table A-29) / 1,576 = $2,412

Of the 92 stormwater staff identified above, DCR currently has 18 filled positions allocated solely to stormwater paid out of the existing revenue generated by fees and has another 8 stormwater allocated positions vacant. Insufficient fee revenue currently exists until the new fees are implemented to allow for the full filling of the currently authorized 26 positions in total. Once the revenue stream begins, DCR will over several years need to request in the budget

additional positions as found necessary to fully implement the program as outlined in Appendix A, contract out with other entities to administer the programs, or both. (Contracting may be DCR's preferred alternative in order to better manage the implementation of the program.) DCR will also evaluate staffing in other related portions of the Agency and see where resources may be allocated to stormwater implementation at least in the short-term to allow a reasonable phase-in of program personnel. It should also be noted that should permit loads not meet the estimate, DCR would not require as many individuals to administer the program and would have lower costs (and commensurately less revenue would be generated). Out of the projected $8.2 million, DCR currently generates from fees about $1 million per year of this amount (See Table A-27).

Virginia Department of Transportation, Colleges and Universities, and other State Agencies

Construction

All state agencies implementing construction projects will be subject to the construction fees that have been established in the proposed regulations. Of the past projects tabulated in Table A-1, approximately 3.4%, or on average 76 projects/ year, represent state agency construction projects (excluding VDOT permits) (See Table A-3a). Size of the projects is variable (as are the associated fees) not allowing for a meaningful annual fiscal estimate.

VDOT permits are outlined in Tables A-2 through A-4. Unlike other construction projects, VDOT will be held to a different fee structure ($500, $300, or $200 dependent on project size) as they have approved annual standards and specifications and implement their own stormwater management program. In general, VDOT may pay approximately $66,000 per year in fees based on current construction levels. Of this amount, only about $6,000 should represent new fees with the addition of the $200 fee for projects equal to or greater than 2,500 square feet and less than 1 acre.

MS4s

In total, 22 colleges, universities, community colleges, VDOT and other state entities also operate MS4s and would be subject to MS4 fees. Specific counts include: Universities (7), Colleges (3), Community Colleges (8), DMHMRSAS (1), VDOT (1), Eastern Virginia Medical School (1), and Southside Virginia Training Center (1). Currently each of these facilities pays $600 every five years with permit renewal. Under the proposed fees, they will be subject to an annual maintenance fee of $4,000 per year to cover program oversight expenses that are currently not sufficiently covered.

Summary

It is recognized that the proposed regulations will increase costs to the Department of Conservation and Recreation, Department of Transportation, and other state entities that are conducting land disturbing activities. However, the Department suggests that the fees established will be sufficient to address the Department of Conservation and Recreation's increased costs and that the costs to other agencies is justified given the significant benefits associated with clean water that are outlined in the Part I, II, and II discussion. The state needs to lead by example and be model stewards of the Commonwealth's aquatic resources.

Additionally, the fees established associated with providing program oversight associated with the MS4 program are justifiable in order to provide the expected services, enforcement, and annual reporting associated with this program. This program is becoming a very important and recognized program in addressing the Commonwealth's water quality issues.

2) Projected cost of the regulation on localities

Overview

One of the key elements of these proposed regulations is to establish a stormwater management program in every locality in the Commonwealth that can be administered in conjunction with a locality's existing erosion and sediment control program. This approach will improve efficiencies in the administration of land disturbing projects and provide developers with one-stop shopping for erosion and sediment control and stormwater reviews and approvals. This concept was embodied in the Code of Virginia when the Stormwater Management Act was amended in 2004. The Code (as amended during the 2009 Session in HB1991; effective July 1, 2009) specifies that:

> § 10.1-603.3. Establishment of stormwater management programs by localities.
>
> A. Any locality located within Tidewater Virginia as defined by the Chesapeake Bay Preservation Act (§ 10.1-2100 et seq.), or any locality that is partially or wholly designated as required to obtain coverage under an MS4 [Municipal Separate Storm Sewer System] permit under the provisions of the federal Clean Water Act, shall be required to adopt a local stormwater management program for land disturbing activities consistent with the provisions of this article according to a schedule set by the Board. Such schedule shall require adoption no sooner than 15 months and not more than 21 months following the effective date of the regulation that establishes local program criteria and delegation procedures, unless the Board deems that the Department's review of a local program warrants an extension up to an additional 12 months provided the locality has made substantive progress. A locality may adopt a local stormwater management program at an earlier date with the consent of the Board.
>
> B. Any locality not specified in subsection A may elect to adopt and administer a local stormwater management program for land disturbing activities pursuant to this article. Such localities shall inform the Board and the Department of their initial intention to seek delegation for the stormwater management program for land disturbing permits within six months following the effective date of the regulation that establishes local program criteria and delegation procedures. Thereafter, the Department shall provide an annual schedule by which localities can submit applications for delegation.
>
> C. In the absence of the delegation of a stormwater management program to a locality, the Department will administer the responsibilities of this article within the given jurisdiction in accordance with an adoption and implementation schedule set by the Board.

The Code, also contemplating efficiencies that may be gained through this regulatory action, noted that:

> § 10.1-603.3. Establishment of stormwater management programs by localities.

> E. Each locality that is required to or that elects to adopt and administer an approved local stormwater management program shall, by ordinance, establish a local stormwater management program that may be administered in conjunction with a local MS4 program and a local erosion and sediment control program…

All counties, cities, and towns covered by the Chesapeake Bay Preservation Act (17 cities, 29 counties, and 38 towns) and counties, cities, and towns covered by Municipal Separate Storm Sewer System (MS4) permits (27 cities, 15 counties, and 8 towns) are required by statute to administer a local stormwater management program. As some overlap exists in these lists, it is anticipated that 103 localities will need to adopt a stormwater management program. All of these localities are today administering some level of a stormwater management program due to the Chesapeake Bay Act and or the federal MS4 requirements. See Appendix A for a listing of all localities required to adopt a local stormwater management program. These localities represent approximately three quarters of the state population.

Per this Code requirement, the Department of Conservation and Recreation, as discussed above, will likely be responsible for administering collectively 74 local stormwater management programs as the localities may find it fiscally challenging to run their own program in some of the more rural localities. These program costs will be reflected in the state costs associated with these regulations.

Although efficiencies will be realized by localities through the increased integration of erosion and sediment control and stormwater management requirements, it is anticipated that additional staff may be required by some jurisdictions. However, it is anticipated that fees established through this regulatory action will cover those staffing needs. Appendix A outlines both the anticipated program costs and the proposed fees that were developed based on those costs.

The Virginia Tech Report states (Appendix B; page 31) that "the proposed regulation will require local governments to spend additional resources on administering stormwater control" and notes that "in general, local administration of a stormwater program involves a number of activities including:

- Stormwater BMP plan review and approval
- Stormwater BMP construction inspection
- Stormwater BMP record keeping/tracking
- General Permit coverage issuance
- General Permit enforcement
- Stormwater BMP long-term post-construction compliance monitoring & enforcement
- Receipt of permitting and program administration fees"

In order to determine the potential workload and necessary staffing, analysis of a variety of information was conducted by the Department and the Virginia Tech economist. The Virginia Tech Report notes (Appendix B, page 31) that "the analysis identifies possible ways the proposed changes will impact program administration costs to state and local government. The expenditure of additional resources to implement the proposed changes represents a societal cost that is in addition to practices and actions associated with constructing and maintaining

stormwater control practices. Any changes in program administration cost, however, must be distinguished conceptually from those who will pay the cost. Although program costs are expected to increase for state and local governments in ways described below, the proposed fee structure will mean that a portion of those costs will be paid by the regulated community."

DCR Survey of Localities Staffing Needs

In August of 2006, prior to the specifics of the regulations being known, DCR conducted a survey of local stormwater and erosion and sediment control programs. Thirty-four counties, nine cities, and 12 towns completed or partially completed the survey. Through this survey, the Department wished to evaluate the number of staff currently allocated to the erosion and sediment control program and to the local stormwater program (if the locality had one), as well as information on how many additional staff are needed to properly run these programs. As part of the information received, 15 of the localities responded to the question related to the need for additional staff to administer construction general permit issuance. From the responding localities, it was estimated that on average, 2.25 additional employees per locality were needed to properly administer construction general permit coverage issuance. However, overall from the data, it was also noted that size of programs and potential needs had a very wide range and, upon review, it was determined that this was not an appropriate or accurate vehicle to determine staffing needs and to determine sufficient permit fees. Additionally, it was difficult to separate existing needs from those associated with the proposed regulations. Instead, it was determined that the Department should study in a more detailed process the costs of plan review, inspections, etc. to generate better estimates for staffing needs and in estimating appropriate permit fees.

VT Economist Interviews with localities regarding staffing needs

The Virginia Tech Report (Appendix B, page 31) states that "during the fall [of] 2008, interviews were conducted with staff for 7 large stormwater programs within the Chesapeake Bay Preservation Act area (jurisdictions representing about a third of Virginia's total population)." The Report (Appendix B, page 34) notes, speaking to all localities, that "the cost to these jurisdictions to implement the new regulations is subject to considerable uncertainty". The Report states that "most local governments interviewed were reluctant or unable to provide an estimate of the amount of new resources needed for implementation. All agreed that additional staffing and budgetary resources would be necessary (These additional costs would be fully or partially covered by new stormwater fees). The challenge of estimating future costs is compounded by the fact that many localities felt that additional resources were needed to adequately implement *existing* stormwater and erosion and sediment control programs." The Report notes that "the overlapping responsibilities of program administration (E&S, stormwater, public works) and the challenge of separating costs across existing and new proposed activities further complicate estimating the increase in costs associated with proposed regulation."

The Virginia Tech Report (Appendix B, pages 34-35) noted that "either through the interview process or a portion of the data from the DCR survey (outlined above), eleven local stormwater programs provided an estimate of the increase in costs or staff needed to comply with the proposed regulations. These programs represented almost one fourth of all disturbed acres in the set of localities identified above. These 11 localities estimated 31 to 41 additional staff in total would be needed to administer the proposed regulation [this equates to an average of 2.8 to 3.7 per locality]. Three localities provided a minimum estimate of additional staffing needs (e.g.

"need at least 2 additional staff"). Assuming a full time equivalent staff paid at $36/hour (wage + fringe) plus 10% overhead costs, a rough estimate of the incremental staffing costs for these 11 localities would be between $2.6 and $3.4 million per year. Assuming the remaining localities with existing stormwater programs would have to increase in the roughly the same proportion as this sample, total estimated local government staffing costs may be between $10.6 and $14.2 million per year." The Department notes that it is intended for these additional costs to be fully covered by new stormwater fees although the Department does not calculate the costs (DCR's computations noted below) to be of this magnitude. Part of this may be attributed to a majority of the interviews being conducted with large stormwater management programs that are functioning in highly urbanized areas and may not be fully representative of statewide costs.

Estimated workload and revenue to cover costs through permit fees

As was the case above in estimating the state costs, as part of calculating expenses, the first step in estimating locality costs was to estimate the number of permits that might be administered on an annual basis by the 103 mandatory programs. Utilizing a series of computations discussed in Appendix A and highlighted in Figures A-1 and A-2 and Tables A-1 through A-10, it was determined that 5,000 permits per year would be a reasonable estimate of the total statewide permit load. The computations next estimated how long plan review, inspections, and the various elements of program administration take as well as the associated costs. Tables A-11 through A-14 present the amount of time and estimated costs associated with program administration from each construction project (dependent on size of project).

Utilizing these computations, and after removing the Department of Conservation and Recreation's anticipated workload, it was estimated that the 103 localities would administer 3,424 of the permits. Tables A-22 and A-23 indicate that the localities should have $6.7 million in expenses associated with construction program administration. The fees have been established at a level to support these identified costs.

Table 3 (from Appendix A, Table A-32) outlines the necessary staff, projected costs for localities and the revenue expected to be generated by fees for localities. As noted in the table, localities will receive revenue from the initial permit fees (72%), the maintenance fees should projects extend multiple years (some are projected to last as long as 10 years), and some revenue from those projects where plan review may be conducted but the project does not advance and seek general permit coverage (1/2 of the permit fee costs). The fees that were established to cover the responsibilities outlined in Table A-24 and to generate the necessary revenue are presented in Table A-25.

Table 3 (from Appendix A, Table A-32): Locality Total Costs and Revenue Calculations

Category	Staff (FTE)	Total Projected Cost	Revenue
Administration of 103 local programs	82 (From Table A-23)	$6,704,058 (From Table A-23)	72% = $5,818,766 (From Table A-28)
Construction Maintenance Fees Generated	0		$703,792 (From Table A-36)
Fees generated from the 5% of projects that have plan review but do not seek General Permit coverage (3,424*.05) = 171 * $1,699[1] * .5 = $145,265			$145,265
Totals	82	$6,704,058	$6,667,823

Note 1: $5,818,766 (from Table A-28) / 3,424 = $1,699

It is expected that some localities may supplement these fees with other sources of revenue. Throughout the Regulatory Technical Advisory Committee process, localities inquired whether they could charge additional (non-stormwater) fees to supplement their revenue under other authorities. The Department indicated that this would be a determination and decision of the local jurisdictions.

Virginia localities and other public entities fees

Construction

All localities implementing construction projects will be subject to the construction fees that have been established in the proposed regulations. Of the past projects tabulated in Table A-1, approximately 12.0%, or on average 270 projects/ year, represent public/ local construction projects (See Table A-3a). Size of the projects is variable (as are the associated fees) not allowing for a meaningful annual fiscal estimate.

However, the stormwater fee regulations do provide authority to a locality to waive or reduce fees. This was inserted to allow localities to waive their own costs or, in other special situations, for others. However as is noted in 4VAC50-60-780, "if a qualifying local program waives or reduces any fee due in accordance with 4 VAC50-60-829, the qualifying program shall remit the 28% portion that would be due to the Virginia Stormwater Management Fund if such fee were charged in full". Additionally, 4VAC50-60-700 also authorizes that "should a qualifying local program demonstrate to the board [Virginia Soil and water Conservation Board] its ability to fully and successfully implement a qualifying local program without a full implementation of the fees set out in this Part, the board may authorize the administrative establishment of a lower fee for that program provided that such reduction shall not reduce the amount of fees due to the department for its program oversight and shall not affect the fee schedules set forth herein."

MS4s

Localities that manage Municipal Separate Storm Sewer Systems (MS4s) will be responsible for annually paying a maintenance fee to the Department of Conservation and Recreation for MS4 program oversight. The Department of Conservation and Recreation's program costs are

presented in Table A-21 and the resulting fees that were established to cover the Department's program costs are outlined in Table A-26.

The 11 localities that will be subject to the proposed MS4 Phase I Individual Permit maintenance fee ($8,800/ year) are: Arlington, Chesapeake, Chesterfield, Fairfax County, Hampton, Henrico, Newport News, Norfolk, Prince William, Portsmouth, and Virginia Beach. These jurisdictions are currently subject to $3,800/ year maintenance fee.

Additionally, 50 localities (27 cities, 15 counties, and 8 towns – See Appendix A) will be subject to the MS4 Phase II General Permit maintenance fee ($4,000/ year). Additionally, 5 public school systems will also subject to this fee. Currently these entities pay $600 every 5 years with permit renewal which is insufficient revenue for the Department to operate the program.

Summary

It is recognized that the proposed regulations will increase costs to localities. However, the Department suggests that the fees established will be sufficient to address these increased costs and that the regulations and existing Code authorities for localities provide sufficient opportunities for the localities to be able to manage costs associated with activities beyond completion of the project such as long-term inspections and BMP maintenance.

Additionally, the fees established associated with providing program oversight associated with the MS4 program are justifiable in order to provide the expected services, enforcement, and annual reporting associated with this program. This program is becoming a very important and recognized program in addressing the Commonwealth's water quality issues.

3) Description of the individuals, businesses or other entities likely to be affected by the regulation

Overview

The Virginia Tech Report (Appendix B, page 7) notes that "the proposed regulation revises water quality and quantity control requirements for land disturbing activities. As such, the proposed regulations will primarily impact private land developers, public land developers, businesses, and homeowners." The report continues that "[a] portion of those costs will be passed down to buyers of newly constructed properties, homeowners and businesses." The report also notes that "Virginia residents will also likely pay for the higher costs associated with local stormwater program requirements".

Costs Associated with Permit Fees

Existing fees are being amended in order for DCR and localities to properly administer local programs and for DCR to provide necessary program oversight. The Code of Virginia specifies in §10.1-603.4 that fees shall be set at a level sufficient for the Department [or the local program administering the program for the Department] to carry out its responsibilities under this stormwater law.

Computations in Table A-27 indicated that DCR currently generates on average $1,051,716 per year in fee revenue, although there is an expectation that revenue will continue to decline in 2009

with the sagging economy. This revenue is comprised of $60,400 from MS4 permits and $991,316 from construction permits.

Table A-31 indicates that the Department's projected revenue from the new fees would be $8,131,892, comprised of $446,800 in fees from MS4s [from localities] and $7,685,092 in fees from construction [see Table A-3a for a breakdown of entities]. Additionally, the revenue to localities from their portion of the fees is estimated in Table A-32 to be $6,667,823 from construction [see Table A-3a for a breakdown of entities]. The total fee revenue generated will therefore be $14,799,715 per year. This represents an increase in fee revenue of $13,747,999 per year. Of this amount, the increase from MS4s is $386,400 [from localities] and $13,361,599 from construction [see Table A-3a for a breakdown of entities]. Should the actual number of land disturbing projects decline from the projected permit numbers, the total cost to developers and other affected entities will decline, as will the revenue available to the Department and localities for program administration.

Private and federal entities fees

Construction

Not accounted for in the state and locality sections are those construction projects associated with federal projects and those associated with private entities. Each of these entities implementing construction projects will be subject to the construction fees that have been established in the proposed regulations. Of the past projects tabulated in Table A-1, approximately 2.4%, or on average 53 projects/ year, represent federal construction projects and approximately 82.2%, or on average 1,853 projects/ year, represent private construction projects (See Table A-3a). Size of the projects is variable (as are the associated fees) not allowing for a meaningful annual fiscal estimate (see composite calculations above).

MS4s

Federal entities that manage Municipal Separate Storm Sewer Systems (MS4s) will be responsible for annually paying a maintenance fee to the Department of Conservation and Recreation for MS4 program oversight. The Department of Conservation and Recreation's program costs are presented in Table A-21 and the resulting fees that were established to cover the Department's program costs are outlined in Table A-26.

Twenty entities will be subject to the MS4 Phase II General Permit maintenance fee ($4,000/ year). These include military installations (14), George Washington Memorial Parkway (1), NASA (1), Navy Medical Center (1), Veteran Affairs Medical Center (2), and a U.S. Department of Energy Laboratory (1). Currently these entities pay $600 every 5 years with permit renewal which is insufficient revenue for the Department to operate the program.

No private entities are subject to MS4 fees as all MS4s are currently administered by local, state, or federal entities.

Summary

The construction and MS4 fees have been established at a level sufficient to support program administration by localities and where applicable the Department and for the Department to provide stormwater management program and MS4 program oversight.

4) Agency's best estimate of the number of such entities that will be affected. Please include an estimate of the number of small businesses affected. Small business means a business entity, including its affiliates, that (i) is independently owned and operated and (ii) employs fewer than 500 full-time employees or has gross annual sales of less than $6 million.

Substantial discussion in the sections preceding this question and in the document discussing the Board's action to amend Parts I, II, and III of the VSMP regulations outline the wide variety of entities that will be affected by this proposed regulation and the potential costs and administrative benefits associated with the fee regulations to these entities. Such discussions and computations shall not be repeated here. The fee regulation will affect state and federal agencies, localities, developers and their consultants and engineering firms, and home buyers. Indirectly, through the implementation of comprehensive local stormwater management programs, the public will benefit both aesthetically and perhaps financially in terms of reduced water treatment and other utility fees, as will all of the various businesses that are dependant upon a healthy aquatic environment.

The MS4 program fees will impact almost 100 entities, slightly over half of them localities. Additionally, the construction fees will affect an estimated 5,000 permittees (see Appendix A) annually that are initiating a land disturbing activity. These permittees are made up of federal, state, and local governments as well as a wide size range of development corporations. However, we are unable to estimate specifically how many of these would be categorized as small businesses. It should be noted that where developers have discretion, their increased costs will often be passed on to the consumers.

However, it should be noted that the Department, over this three and a half year period that the regulation has been developed, has consistently worked towards informing all affected parties of the potential impacts of these regulations and has fostered active on-going discussions with many of them. Release of these regulations for public comment will continue the outreach efforts to the general public and other affected entities.

The other key entity to be impacted by these regulations is the Department of Conservation and Recreation that will both be responsible for stormwater management program oversight as well as the administration of a number of local programs. These cost estimates are also provided in Appendix A and the preceding discussion.

5) All projected costs of the regulation for affected individuals, businesses, or other entities. Please be specific. Be sure to include the projected reporting, recordkeeping, and other administrative costs required for compliance by small businesses.

Appendix A has been developed to thoroughly outline the expected program implementation costs for both localities and the Department of Conservation and Recreation. It also provides the

supporting documentation for the derivation of fees that the regulated entities will be subject to in order to cover the program implementation costs. These results have been summarized and discussed in the prior questions. The preceding discussions have also outlined the potential cost of the fee regulation to developers and other regulated entities.

Additional insights into the cost implications of the fee regulations can also be found in the Virginia Tech Report, which may be found in its entirety in Appendix B.

Alternatives

Please describe any viable alternatives to the proposal considered and the rationale used by the agency to select the least burdensome or intrusive alternative that meets the essential purpose of the action. Also, include discussion of less intrusive or less costly alternatives for small businesses, as defined in §2.2-4007.1 of the Code of Virginia, of achieving the purpose of the regulation.

Provisions of the Stormwater Management Act, §10.1-603.1 et seq. of the Code of Virginia, require the Board to develop procedures for authorizing localities to administer local stormwater management programs and for the Department to administer local programs within jurisdictions that are not required or do not elect to adopt locally-administered stormwater management programs. The Act also requires the Board to adopt minimum technical criteria and statewide standards for stormwater management from land-disturbing activities of regulated size and to act to protect the quality and quantity of state waters from the potential harm of unmanaged stormwater.

With the Board's mandate in mind, the proposed fee regulations were developed over the past three and one half years in order to properly fund the administration of local programs by the Department of Conservation and Recreation and localities and for the Department to provide appropriate program oversight. No alternative to the current action exists that will result in full funding of the responsibilities of a qualifying local program or the Department in administering a stormwater management program. The Department continues to review permitting data throughout this process to determine whether further adjustments to the proposed fees (up or down) are warranted and, pursuant to the proposed 4VAC50-60-840, will continue to review the appropriateness of fee levels on a going forward basis.

Regulatory flexibility analysis

Please describe the agency's analysis of alternative regulatory methods, consistent with health, safety, environmental, and economic welfare, that will accomplish the objectives of applicable law while minimizing the adverse impact on small business. Alternative regulatory methods include, at a minimum: 1) the establishment of less stringent compliance or reporting requirements; 2) the establishment of less stringent schedules or deadlines for compliance or reporting requirements; 3) the consolidation or simplification of compliance or reporting requirements; 4) the establishment of performance standards for small businesses to replace design or operational standards required in the proposed regulation; and 5) the exemption of small businesses from all or any part of the requirements contained in the proposed regulation.

The proposed regulations establish fees, and do not establish compliance or reporting requirements or standards. It is recognized that many of the developers likely to be subject to the fees established for construction activities may be small businesses. However, any lowering of the proposed fee levels would result in insufficient funding of the local stormwater management and MS4 programs.

Public comment

Please summarize all comments received during public comment period following the publication of the NOIRA, and provide the agency response.

The Department has done much to encourage public comment on this regulatory action both during the official public comment periods and during the technical advisory group meetings, the subcommittee meetings, the meetings of the associated workgroups, and during the charrettes that have been utilized to conduct plan review scenarios with the participants utilizing the proposed criteria and tools. Through the over 50 public meetings held, special meetings with constituent groups, and feedback received through other venues, the Department has remained responsive to the comments received and will continue to be so as we enter the comment period on the proposed regulations. Attached below, are the fee related comments received and the Department's responses developed to both of the Part I, II, and III NOIRAs as well as to the fee NOIRA as often the comments were submitted in the same response and the public meetings considered both regulatory actions together.

Comments received during the comment period on the revised Part I, II, and III NOIRA from March 17, 2008 through April 16, 2008 are as follows:

Commenter	Comment	Agency response
Larry Land (Virginia Association of Counties)	The Virginia Association of Counties is very concerned that this could be a regulatory program with serious financial implications for local governments.	The Virginia Stormwater Management Program is intended to be self-funding. Section 10.1-603.4(5)(b) evidences this intent in requiring that permit fees be set at a level sufficient for the Department to carry out its responsibilities under the Virginia Stormwater Management Act. The fees proposed by this action are believed to provide sufficient funding for localities to carry out their responsibilities in administering a qualifying local program.
Michael Schaefer (Virginia Municipal Stormwater Association); J. Michael Flagg (Hanover County)	Fully consider feasibility, costs and cost-effectiveness in revising any technical criteria. Urge DCR to thoroughly investigate the economic impacts of this regulatory action and to involve parties including the Department of Planning and Budget with the expertise to address economic impacts.	The Department of Planning and Budget is required to conduct an economic analysis of the regulations when the proposed regulations are submitted to the Administration for review. This analysis is both based on the information provided in the Board's regulatory submittal package as well as their independent expertise. To aid in the development of the Board's package, the Department contracted with Dr. Kurt Stephenson, an economist at Virginia Tech in their Department of Ag and Applied Economics in June of 2008 to assist in determining the cost of the regulations as well as the general off-setting costs associated with further degradation of Virginia's waters. The report was completed in December of 2008 and posted to the Department's website at http://www.dcr.virginia.gov/lr2c.shtml. This information

		is referenced throughout the regulatory discussion document and has been included in its entirety in Appendix B.
Michael Schaefer (Virginia Municipal Stormwater Association)	Structure delegation rules to promote successful implementation at local level. Recommend giving localities more discretion in the regulation to set the local portion of the fee at the level determined necessary by the locality to implement its local program.	Section 10.1-603.4(5) of the Code of Virginia requires that the Board's regulations "[e]stablish…a statewide permit fee schedule…" The fees set by the proposed regulations would apply statewide. The fees were, however, developed utilizing data collected from statewide sources, and it is believed that these fees have been set at a level that will properly fund local programs across the state. Should a locality demonstrate that a lower fee is necessary to fully implement a qualifying local program in its jurisdiction, 4VAC50-60-700 does contain a provision that would allow for lesser fees to be established with the Board's authorization.
Michael Schaefer (Virginia Municipal Stormwater Association)	Structure delegation rules to promote successful implementation at local level. Concern that that a reservation of 30% of the fees for DCR oversight when a program is administered by the locality may result in a locality transferring monies to DCR in excess of the service rendered by DCR for overseeing the locality's implementation.	Through evaluation of the costs of operating local programs that will be experienced by localities and the costs of tasks that DCR will retain even where there is an adopted qualifying local program (including oversight, program review, technical assistance, etc.), it was determined that 28% of the fees collected by a qualifying local program should be submitted to DCR. The remaining 72%, however, does still include amounts deemed to be sufficient for the local program to be fully funded by the fees.
Michael Schaefer (Virginia Municipal Stormwater Association)	Structure delegation rules to promote successful implementation at local level. Recommend that DCR consider a lower set aside, and whatever set aside is selected, demonstrate that DCR requires funding to provide a reasonable and efficient level of oversight.	Through evaluation of the costs of operating local programs that will be experienced by localities and the costs of tasks that DCR will retain even where there is an adopted qualifying local program (including oversight, program review, technical assistance, etc.), it was determined that 28% of the fees collected by a qualifying local program should be submitted to DCR. The remaining 72%, however, does still include amounts deemed to be sufficient for the local program to be fully funded by the fees.
Michael Schaefer (Virginia Municipal Stormwater Association)	Structure delegation rules to promote successful implementation at local level. Use of fees should be accounted for and clearly documented as the program is implemented so that appropriate adjustments can be made in the future.	Monitoring of the appropriateness of permit fees is intended to be conducted over time to ensure that fee levels are appropriately adjusted and maintained. 4VAC50-60-700 requires this periodic assessment.
Uwe Kirste (Prince William County)	Funding and Staffing Plan; if the proposed regulations require the localities to increase its staff level(s), will there be a funding assistance from the state?	The Virginia Stormwater Management Program is intended to be self-funding. Section 10.1-603.4(5)(b) evidences this intent in requiring that permit fees be set at a level sufficient for the Department to carry out its responsibilities under the Virginia Stormwater Management Act. The fees proposed by this action are believed to provide sufficient funding for localities to carry out their responsibilities in administering a qualifying local program.
Uwe Kirste (Prince William County)	We request that the new regulations focus on manageable programs that can be funded through existing funding streams with targets that are	The Virginia Stormwater Management Program is intended to be self-funding. Section 10.1-603.4(5)(b) evidences this intent in requiring that permit fees be set at a level sufficient for the Department to carry out its responsibilities under the Virginia

	attainable economically.	Stormwater Management Act. The fees proposed by this action are believed to provide sufficient funding for localities to carry out their responsibilities in administering a qualifying local program.
Uwe Kirste (Prince William County)	Will the fee for the VSMP permit for the discharge of stormwater from construction activities be based on the actual costs incurred? The allocation of revenues from this fee between the state and the locality should be based on a cost study and the services provided by the state and the locality, specific to the locality, not for the entire state. The locality's costs associated with the administration of this permit should be included in establishing this fee. The fee structure should be defensible for the localities to adopt a new fee.	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are based upon actual resources estimated to be required for each type of project and are expected to provide sufficient funding for a properly staffed program. Section 10.1-603.4(5) of the Code of Virginia requires that the Board's regulations "[e]stablish…a statewide permit fee schedule…" The fees set by the proposed regulations would apply statewide. The fees were, however, developed utilizing data collected from statewide sources, and it is believed that these fees have been set at a level that will properly fund local programs across the state. Should a locality demonstrate that a lower fee is necessary to fully implement a qualifying local program in its jurisdiction, 4VAC50-60-700 does contain a provision that would allow for lesser fees to be established with the Board's authorization.
David Nunnally (Caroline County)	Even for the most advanced local stormwater program, the implementation of the program is likely to have numerous challenging issues. Fee collection, permit issuance, coordination of the various existing environmental programs (Erosion and Sediment Control, Chesapeake Bay Preservation Act, etc.) are just a few issues and programs that will have to be coordinated locally.	The proposed regulations are intended to streamline the administration of stormwater management in the Commonwealth and allow for better integration of the stormwater program with the other programs administered by localities across the state. While it is understood that local adoption and implementation of the proposed regulations will represent a new venture for many localities, it is believed that the outcome of this process will be a stormwater management program that functions in a more efficient manner for all parties. In order to help ease program administration, fee collection and permit issuance are intended to be handled by localities through a Stormwater Management Enterprise Website under development by the Department. Use of this website will ease many of the administrative difficulties associated with those tasks.
Nick Evans (Thomas Jefferson Soil and Water Conservation District)	As the process moves forward, we hope that DCR will recognize the importance of local administration of the program, and will provide the necessary incentives to ensure that "non-Tidewater" and "non-MS4" localities choose to request delegation of the program. (This may require that greater than 70% of the stormwater permit fees remain with the locality.)	Through evaluation of the costs of operating local programs that will be experienced by localities and the costs of tasks that DCR will retain even where there is an adopted qualifying local program (including oversight, program review, technical assistance, etc.), it was determined that 28% of the fees collected by a qualifying local program should be submitted to DCR. The remaining 72%, however, does still include amounts deemed to be sufficient for the local program to be fully funded by the fees.
Chris Boies (Shenandoah	A mandatory fee schedule would not be in the locality's best interest.	Section 10.1-603.4(5) of the Code of Virginia requires that the Board's regulations "[e]stablish…a statewide permit fee schedule…" The fees set by the proposed

County)		regulations would apply statewide. The fees were, however, developed utilizing data collected from statewide sources, and it is believed that these fees have been set at a level that will properly fund local programs across the state. Should a locality demonstrate that a lower fee is necessary to fully implement a qualifying local program in its jurisdiction, 4VAC50-60-700 does contain a provision that would allow for lesser fees to be established with the Board's authorization.
Chris Boies (Shenandoah County)	The locality should determine what it will cost to administer the program and then set their fees to cover these costs (along with any monies the state will require).	Section 10.1-603.4(5) of the Code of Virginia requires that the Board's regulations "[e]stablish…a statewide permit fee schedule…" The fees set by the proposed regulations would apply statewide. The fees were, however, developed utilizing data collected from statewide sources, and it is believed that these fees have been set at a level that will properly fund local programs across the state. Should a locality demonstrate that a lower fee is necessary to fully implement a qualifying local program in its jurisdiction, 4VAC50-60-700 does contain a provision that would allow for lesser fees to be established with the Board's authorization.
Chris Boies (Shenandoah County)	If fees are set by the state, and we find they do not cover 100% of our costs to run the program, it is unlikely we will adopt a stormwater management program.	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are expected to provide sufficient funding for a properly staffed program.
John Carlock (Hampton Roads Planning District Commission)	This effort should also include consideration by the TAC of the Permit Fee Schedule (Part XIII of the Regulations) and the appropriate allocation of fee revenue to the state and localities.	This regulatory action has focused on permit fees. Fees are proposed to be established at a level sufficient to support the administration of the stormwater program. This is required by §10.1-603.4(5) of the Code of Virginia, which relates to land disturbing activities. Section 10.1-603.4(9) additionally grants the Board authority to establish fees related to municipal separate storm sewer systems (MS4s).
J. Michael Flagg (Hanover County)	Fees should be reviewed annually and be commensurate with services rendered.	Monitoring of the appropriateness of permit fees is intended to be conducted over time to ensure that fee levels are appropriately adjusted and maintained (see 4VAC50-60-700). As fees are established by regulation, changes require a regulatory action under the Administrative Process Act (§2.2-4000 et seq.). Thus, any fees established will remain effective until a separate regulatory action is undertaken. The proposed regulations do, however, allow for minor adjustments to be made annually based upon the Consumer Price Index for All-Urban Customers (CPI-U) without a regulatory action.
J. Michael Flagg (Hanover County)	State and local revenue requests should be accounted for separately and should include an accounting of associated cost for personnel and overhead.	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are based upon actual resources estimated to be required for each type of project and are expected to provide sufficient funding for a properly staffed program.

J. Michael Flagg (Hanover County)	Stormwater fees should be developed by localities and should be based on the actual cost to administer the program.	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are based upon actual resources estimated to be required for each type of project and are expected to provide sufficient funding for a properly staffed program. Section 10.1-603.4(5) of the Code of Virginia requires that the Board's regulations "[e]stablish…a statewide permit fee schedule…" The fees set by the proposed regulations would apply statewide. The fees were, however, developed utilizing data collected from statewide sources, and it is believed that these fees have been set at a level that will properly fund local programs across the state. Should a locality demonstrate that a lower fee is necessary to fully implement a qualifying local program in its jurisdiction, 4VAC50-60-700 does contain a provision that would allow for lesser fees to be established with the Board's authorization.
J. Michael Flagg (Hanover County)	Any corresponding overhead to the state should be definitively supported based on actual expense.	Through evaluation of the costs of operating local programs that will be experienced by localities and the costs of tasks that DCR will retain even where there is an adopted qualifying local program (including oversight, program review, technical assistance, etc.), it was determined that 28% of the fees collected by a qualifying local program should be submitted to DCR. The remaining 72%, however, does still include amounts deemed to be sufficient for the local program to be fully funded by the fees.

Fee related comments received on the initial Part I, II, and III NOIRA (which has since been withdrawn) and the Part XIII NOIRA during the public comment period from December 26, 2005 through February 24, 2006.

Commenter	Comment	Agency response
James A. Bishop	I support fees 100%.	Fees are proposed to be established at a level sufficient to support the administration of the stormwater program. This is required by §10.1-603.4(5) of the Code of Virginia, which relates to land disturbing activities. Section 10.1-603.4(9) additionally grants the Board authority to establish fees related to municipal separate storm sewer systems (MS4s).
James W. Patteson (Fairfax County)	The proper establishment of a fee framework will be paramount to localities in the determination, based on current and projected construction activities, of the proper staffing of the local program.	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are expected to provide sufficient funding for a properly staffed program.
James W. Patteson (Fairfax County)	The fee schedule and structure must be well founded based on the performance expectations for various construction project sizes. For example, a 100 acre construction project may require greater staff time and staff resources to administer than a 20 acre or a one-half acre project.	Section 820 of the proposed regulations sets forth fees associated with construction activities. These fees are scaled based upon the acreage of the land disturbing site being permitted, which, as noted by the comment, bears a relationship to the amount of staff time and resources necessitated by a project.
James W. Patteson (Fairfax County)	The state will need to define the necessary service levels for project categories such as the above [project sizes] and apply those time estimates to prevailing labor rate and programmatic costs in the determination of the fee structure.	The fees proposed to be established were developed using data concerning amounts of staff time necessary to complete tasks associated with operation of a program and prevailing labor rates. As noted above, the proposed fees, which are set at levels commensurate with the amount of staff time and resources expected to be necessary for each type of project, as expected to provide sufficient funding for a properly staffed program.
James W. Patteson (Fairfax County)	If possible, some mechanism would be helpful to incorporate varying wage scales across the Commonwealth in determining appropriate fees. Perhaps a regional scaling factor might be feasible to allow the locality to adjust fees for local economies after a demonstration of that need and acceptance by the state.	Section 10.1-603.4(5) of the Code of Virginia requires that the Board's regulations "[e]stablish…a statewide permit fee schedule…" The fees set by the proposed regulations would apply statewide. The fees were, however, developed utilizing data collected from statewide sources, and it is believed that these fees have been set at a level that will properly fund local programs across the state. Should a locality demonstrate that a lower fee is necessary to fully implement a qualifying local program in its jurisdiction, 4VAC50-60-700 does contain a provision that would allow for lesser fees to be established with the Board's authorization.
James W. Patteson (Fairfax County)	If the locality is able to issue fines, will the state require those funds to be remitted to the state or may they be retained by the locality and use to offset program costs?	Section 10.1-603.14 of the Code of Virginia dictates that civil penalty amounts collected by localities be paid into the treasury of the locality where the land that is the subject of an action is located. These funds are then "…to be used for the purpose of minimizing, preventing, managing, or mitigating pollution of the waters of the locality and abating environmental pollution therein in such manner as the court may, by order,

		direct."
James W. Patteson (Fairfax County)	How will the percentage of fees that are to be transferred to the state be determined? Currently the regulations provide that "no more than 30% of the total revenue…will be remitted to the state treasury". Can this flexibility be used to adjust the funding and remittance levels in order to help compensate localities with higher than average local economies and expenses?	Through evaluation of the costs of operating local programs that will be experienced by localities and the costs of tasks that DCR will retain even where there is an adopted qualifying local program (including oversight, program review, technical assistance, etc.), it was determined that 28% of the fees collected by a qualifying local program should be submitted to DCR. The remaining 72%, however, does still include amounts deemed to be sufficient for the local program to be fully funded by the fees. Fee amounts will be periodically assessed over time in accordance with 4VAC50-60-700.
Fred Koch (Fairfax County Public Schools)	With the new permit fee schedule, we would be impacted with higher fees every time we build a new school. But instead of 70% of the fees returning to us for use in running our MS4 program, they instead would go to the county and only serve to hurt our program as this would leave us less money to run our program.	It is understood that payment of permit fees impacts permittees. The proposed fees, however, are based on the estimated actual costs of permit administration for each project. The fees are scaled in relation to the size of each project.
Mike Flagg (Hanover County)	The proposed regulations will have an impact on small businesses. In particular on single family home builders. This regulation notes that the state intends to establish a fee for any construction activity exceeding 2500 sq. ft. in Chesapeake Bay Preservation Act localities. Issuance of a VSMP permit to land-disturbing projects of less than 1 acre was added as an additional state requirement. This was not required by the federal regulation or the previously existing regulations of DEQ, DCR or CBLAD prior to adoption of HB 1177 and legislative presentation of HB1177 indicated that the bill consolidated regulatory requirements but did not add new requirements. This requirement is inconsistent with those presentations.	Section 10.1-603.4(6) of the Code of Virginia specifies that statewide stormwater management standards adopted by the Board will apply to projects exceeding 2500 square feet in size in areas designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations (9VAC10-20 et seq.). Likewise, subdivision (5) of that section directs that a fee, at a reduced level, be established for these projects.
Mike Flagg (Hanover County)	It is not clear that the legislative action of HB1177 intended for the delegation of collection of state permit fees to localities.	Section 10.1-603.3(E)(3) indicates that localities that are either required or elect to adopt a qualifying local program will adopt an ordinance that includes fee payment provisions. As was discussed during the technical advisory committee process, fee payments are intended to be handled through a DCR-developed enterprise website, which will eliminate much of the administrative responsibility associated with fee processing from the standpoint of localities.
Mike Flagg (Hanover County)	There is no documented relationship between the proposed 70 percent allocation of a yet to be determined fee and the necessary administrative and	The 72 percent of the permit fees that is proposed to be allocated to qualifying local programs is based upon a determination of the costs of administering a qualifying local program that was developed using data gathered from localities and from DCR staff. It

	overhead cost to local governments to implement this mandate.	is believed that these fees will result in adequate funding for qualifying local programs.
Mike Flagg (Hanover County)	The proposed regulations will have an impact on small businesses. In particular on single family home builders.	It is recognized that increased fees will have an impact on all permittees, including builders of single family homes (where these homes are not exempt from the requirement to obtain permit coverage due to the overall size of the site not meeting permit thresholds). The fees, however, are based upon the estimated costs of permit administration for each site, and are scaled based upon site acreage so that those sites requiring less administration pay a lesser fee.
Ingrid Stenbjorn (Town of Ashland)	Localities need to understand how the program will be funded both during the implementation and during start up.	As the proposed fees do not take effect until a qualifying local program is adopted, they will not be available to localities prior to adoption. Imposing a larger fee prior to program adoption would not be justified, as permittees will not be receiving the services of a qualifying local program prior to its adoption. Once a qualifying local program is adopted, however, the proposed fees are estimated to provide sufficient funding for the operation of a qualifying local program.
Ingrid Stenbjorn (Town of Ashland)	How will localities pay to have staff trained, record keeping systems set up, and hire additional personnel?	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are expected to provide sufficient funding for a properly staffed program.
Ingrid Stenbjorn (Town of Ashland)	How will program fees from the program be used to fund the program?	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are expected to provide sufficient funding for a properly staffed program.
Ingrid Stenbjorn (Town of Ashland)	Why would localities not be entitled to 100% of the fees collected for the program (NOIRA indicates that at least 70% of the fees would be shared with localities to implement the program)?	Through evaluation of the costs of operating local programs that will be experienced by localities and the costs of tasks that DCR will retain even where there is an adopted qualifying local program (including oversight, program review, technical assistance, etc.), it was determined that 28% of the fees collected by a qualifying local program should be submitted to DCR. The remaining 72%, however, does still include amounts deemed to be sufficient for the local program to be fully funded by the fees.
Ingrid Stenbjorn (Town of Ashland)	How would the program be funded if these fees are insufficient?	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are expected to provide sufficient funding for a properly staffed program.
Ingrid Stenbjorn (Town of Ashland)	Localities will need to understand the state auditing system.	Section 4VAC50-60-157(B)(4), which is proposed as a part of a separate regulatory action that is being held in conjunction with this action, specifies that review of a qualifying local program by the Board will include “an accounting of the receipt and of the expenditure of fees received.” All fee amounts received by qualifying local programs are to be used in the administration of those programs.

Jack Larson (Lancaster County)	Localities will be required to set and collect the fees placing us in the unenviable position of being viewed by our citizens as being directly responsible for raising the cost of government.	The proposed regulations establish permit fees as required by §§10.1-603.4(5) and (9) of the Code of Virginia, thus, localities will not be responsible for setting fee amounts. Fee payments are intended to be handled through a DCR-developed enterprise website. Qualifying local programs will direct permittees to use the website for making payments.
Jack Larson (Lancaster County)	The 30% of fees retained by the state seems excessive (i.e. what is the value added to our citizens by the state for revenues received).	Through evaluation of the costs of operating local programs that will be experienced by localities and the costs of tasks that DCR will retain even where there is an adopted qualifying local program (including oversight, program review, technical assistance, etc.), it was determined that 28% of the fees collected by a qualifying local program should be submitted to DCR. The remaining 72%, however, does still include amounts deemed to be sufficient for the local program to be fully funded by the fees.
Joe Lerch (Chesapeake Bay Foundation)	Given the legislation provides that "fee schedule shall also include a provision for a reduced fee for land disturbing activities between 2,500 square feet and up to 1 acre…" in Chesapeake Bay Preservation Act localities, then consideration should also be given to a graduated fee schedule that takes into account the staff time necessary for reviewing, issuing, and monitoring permits for larger land disturbing activities.	Section 820 of the proposed regulations sets forth fees associated with construction activities. These fees are scaled based upon the acreage of the land disturbing site being permitted, which, as noted by the comment, bears a relationship to the amount of staff time and resources necessitated by a project.
Joe Lerch (Chesapeake Bay Foundation)	As set forth in the enabling legislation of 2004, it is clear that the purpose of the fee schedule is to cover administration of the program. Our support of this legislation in 2004 was in large part due to the fact that oversight of the program would not be dependent upon general fund appropriation.	Fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts.
Robin Markham (Northumberland County)	Additional cost will be put on property owners for single family residences because an engineered site plan will be required.	The proposed regulations do not alter the sizes of sites regulated under the VSMP program. Specific exceptions related to certain single family homes are contained in §10.1-603.8(B) of the Code of Virginia.
Robin Markham (Northumberland County)	In the Tidewater area, this will mean all those building homes (modular and single or double wides) will be required to have a stormwater plan (2500 sq. feet disturbance).	The proposed regulations do not alter the sizes of sites regulated under the VSMP program. Specific exceptions related to certain single family homes are contained in §10.1-603.8(B) of the Code of Virginia.
Conley Taylor (City of Roanoke)	Are 70% of the fees going to localities?	In jurisdictions where a locality-operated qualifying local program exists, section 780 of the proposed regulations specify that 28% of permit fees shall be remitted for deposit in the Virginia Stormwater Management Fund, meaning that the remaining 72% will be retained by the qualifying local program. In localities where there is no qualifying local program and DCR is administering the full local stormwater management program, the locality will not be entitled to any of the fees.
Conley Taylor	Are localities collecting the fees?	Fee payments are intended to be handled through a DCR-developed enterprise website.

(City of Roanoke)		Qualifying local programs will direct permittees to use the website for making payments.
Steve Kayser (Loudoun County)	In regard to fees, that seems to be important to our County Administration. I have already been asked a question as to how this will impact our existing program. How can I estimate long-term enhancements and set up budget estimations a year in advance? I do not have anything to tell them at the present time until we define inspection requirements and more issues of that nature and we have time to set up schedules and work out logistics.	The separate regulatory action that is being conducted in conjunction with this action includes proposed amendments to Part III of the VSMP Regulations, which deals with the necessary components of a qualifying local program. Section 10.1-603.3(A) of the Code of Virginia specifies that those localities required to adopt a local program are not required to do so immediately; rather, a period of no less than 15 months will be provided following the effective date of the Part III regulations. This time is intended to be used to design and begin the establishment of qualifying local programs in accordance with that Part.
Steve Kayser (Loudoun County)	I think time will be critical in setting up fee collection systems and schedules. This will take major modifications to programs like we have, and to add management information computer based systems, which control everything that we do. It is not going to be an easy thing to just set up a different type of account. It is going to take a long time to think about it, staff it and then work out the technical logistics to get that incorporated into existing programs as well.	Fee payments are intended to be handled through a DCR-developed enterprise website, which will eliminate much of the administrative responsibility associated with fee processing from the standpoint of localities.
Steve Kayser (Loudoun County)	One of the issues I am sure people are going to be concerned about is how long are the fees going to be set for?	As fees are established by regulation, changes require a regulatory action under the Administrative Process Act (§2.2-4000 et seq.). Thus, any fees established will remain effective until a separate regulatory action is undertaken. The proposed regulations do, however, allow for minor adjustments to be made annually based upon the Consumer Price Index for All-Urban Customers (CPI-U) without a regulatory action. Additionally, the Department will periodically assess fee levels in accordance with 4VAC50-60-700 to determine if regulatory adjustments are necessary.
Steve Kayser (Loudoun County)	How can they [fees] change?	As fees are established by regulation, changes require a regulatory action under the Administrative Process Act (§2.2-4000 et seq.). The proposed regulations do, however, allow for minor adjustments to be made annually based upon the Consumer Price Index for All-Urban Customers (CPI-U) without a regulatory action.
Steve Kayser (Loudoun County)	Is the state going to come in and audit our accounting records?	While the processes anticipated by the use of the word "audit" are not implicated by the regulations, section 4VAC50-60-157(B)(4), which is proposed as a part of a separate regulatory action that is being held in conjunction with this action, specifies that review of a qualifying local program by the Board will include "an accounting of the receipt and of the expenditure of fees received." All fee amounts received by qualifying local programs are to be used in the administration of those programs.
Steve Kayser (Loudoun County)	Will we have some sort of general accounting of that system separate from erosion and sediment control?	As stormwater management and erosion and sediment control programs do remain separate programs, reviews of accounting for funds received and utilized in the

		operation of a qualifying local program is intended to be handled separately from reviews related to erosion and sediment control.
Bill Johnston (City of Virginia Beach)	One thing that I am glad of is that you are going to be setting the fees because localities are notoriously shortsighted and shoot themselves in the foot setting fees for inspections and review way too low. In that respect, I would say that I am very happy the state is going to establish the fee.	It is recognized that local Erosion and Sediment Control programs often do not have fees (which are set by the localities under that program) which sufficiently fund the programs. In this action, fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are expected to provide sufficient funding for a properly staffed program.
Bill Johnston (City of Virginia Beach)	As it currently stands, the $500, the $300, and the small CBPA area fees are woefully inadequate.	It is recognized that existing fee levels are insufficient to adequately fund a stormwater program as required by §10.1-603.4(5) of the Code of Virginia. In this action, fees are proposed to be established at a level sufficient to support the administration of stormwater management programs by localities and DCR. Data concerning amounts of staff time necessary to complete tasks associated with the operation of a program was gathered from both localities and DCR staff in developing these fee amounts. The proposed fees are expected to provide sufficient funding for a properly staffed program.

Family impact

Please assess the impact of the proposed regulatory action on the institution of the family and family stability including to what extent the regulatory action will: 1) strengthen or erode the authority and rights of parents in the education, nurturing, and supervision of their children; 2) encourage or discourage economic self-sufficiency, self-pride, and the assumption of responsibility for oneself, one's spouse, and one's children and/or elderly parents; 3) strengthen or erode the marital commitment; and 4) increase or decrease disposable family income.

It is not anticipated that this regulation will have a direct impact on the institution of the family or family stability. However, the improvement of water quality and control of water quantity does have public health and safety benefits that have an indirect impact on families.

Detail of changes

Please detail all changes that are being proposed and the consequences of the proposed changes. Detail all new provisions and/or all changes to existing sections.

If the proposed regulation is intended to replace an emergency regulation, please list separately (1) all changes between the pre-emergency regulation and the proposed regulation, and (2) only changes made since the publication of the emergency regulation.

The following chart provides a summarization of the changes to the existing regulations:

Current section number	Proposed new section number, if applicable	Current requirement	Proposed change and rationale
4VAC50-60-700		This section notes that the Stormwater Management Act authorizes the establishment of a statewide fee schedule for stormwater management, and that Part XIII of the VSMP regulations (4VAC50-60-700 through 4VAC50-60-840) establishes the fee assessment and collection systems.	Additional explanatory language is proposed to be added to this section to describe the elements that were considered in developing the revised fees proposed for Part XIII. These elements include plan review, permit review and issuance, inspections, enforcement, program administration and oversight, and database management. Fees are also established for permit maintenance, modification, and transfer. Language is also proposed to be added to this section that would allow the Board to authorize a qualifying local program (i.e., a locality that is authorized to administer a stormwater management program within its jurisdiction) to charge fees lower than set out in this Part if it can be demonstrated that the qualifying local program can carry out its responsibilities under a lower fee level. Finally, language is proposed to be added explaining that the Department will periodically assess the revenue generated by the fees established to determine if adjustments (in addition to those authorized by proposed section 4VAC50-60-840) are necessary.
4VAC50-60-710		This existing section contains definitions for the terms “permit applicant” and “permit application.”	This section is proposed to be deleted in its entirety. The terms “permit applicant” and “permit application” are no longer proposed to be used in Part XIII, and any terms needing definitions are proposed to be defined in Part I of

			the VSMP regulations, which includes defined terms applicable to all parts of the regulations.
4VAC50-60-720		This section states the legal authority for the fees established in Part XIII.	No substantive change is proposed. The words "pursuant to" are proposed to be deleted in order to improve sentence structure, and a Code of Virginia citation to §10.1-604.4 is proposed to be corrected to §10.1-603.4.
4VAC50-60-730		This section describes who the fees established in Part XIII apply to. Under the current language, it is generically related that the fees apply to all non-exempt applicants for a new permit, as well as all non-exempt requests for a modification to a permit.	Additional explanatory language is proposed to be added to this section. This language would separate out persons seeking permit coverage (or modifications of existing permits) for municipal separate storm sewer systems (MS4s) and those seeking coverage for construction activities. An explanatory note is also proposed to be added relating that persons whose coverage under the General Permit for Discharges of Stormwater from Construction Activities has been revoked must reapply for an individual permit.
4VAC50-60-740		This section explains that permittees who request minor modifications to their permits (as defined in 4VAC50-60-10), as well as those who have their permits modified or amended at the initiative of the permit-issuing authority, are exempt from permit fees.	Additional language is proposed to be added to this section explaining that the exemption for modification or amendment at the initiative of the permit issuing authority does not apply to situations where there are errors in the registration statement identified by the local stormwater management program or errors related to the acreage of a site (which could cause a different level of fee to be due). Likewise, permit modifications that are made at the request of the permittee and that could result in additional plan review by a local stormwater management program are not exempt.
4VAC50-60-750		This section states that all permit application fees are due on the day a permit application is submitted, and no application will be processed without payment of the required fee. Likewise, a fee for a major modification to a permit is due at the time that the application for the modification is submitted. Finally, permit maintenance fees are due by October 1 of each year.	Clarifying language is proposed to be added to this section explaining that requests for a permit, permit modification, or general permit coverage shall not be processed until the required fees are paid. In a change from the current practice, maintenance fees for all permits to which they apply will now be due on the anniversary date of the permit, rather than on each October 1 (although MS4 operators who currently pay a fee that is due by October 1 will continue to pay their maintenance fee on this date until their current permit expires). Maintenance fees will continue to apply to a permit until a Notice of Termination is effective as to a permit or permit coverage.
4VAC50-60-760		As all permits and permit coverages are currently issued by the Department on behalf of the Board, this section explains that all fees shall be made payable to the Treasurer of Virginia and submitted to the Department. Subsection B of this section sets out information that must be included with every payment that is submitted.	To reflect the future scenario whereby construction activity operators will receive permit coverage from qualifying local programs, a new subdivision (A)(2) is proposed to be added allowing for required fees for coverage under the General Permit for Discharges of Stormwater from Construction Activities to be submitted to the qualifying local program. In addition to the information currently required to be submitted with a fee, it is proposed that other information required by the local stormwater management program also be required to be included in any submittal.
4VAC50-60-770		This section explains that all incomplete payments will be treated as nonpayments. Interest may be charged on any late payments, and a 10 percent late	A statement is proposed to be added to this section explaining that the Department or the qualifying local program, as applicable, shall provide notification to the applicant of any late payment. As opposed to the current

		payment fee may be charged to any delinquent account. The permit issuing authority (under current circumstances, the Department on behalf of the Board) is entitled to all remedies available under the Code of Virginia in collecting any past due amount and may recover attorney's fees and other administrative costs.	language stating that a 10 percent late payment fee may be charged to any delinquent account, the proposed section specifies that such a late payment fee shall be charged to any delinquent account. Finally, the proposed section states that both the Department and the qualifying local program are entitled to all remedies available under the Code of Virginia in collecting any past due amount. The allowance for collection of attorney's fees and administrative costs has been removed.
4VAC50-60-780		This section states that all fees collected by the Department or the Board shall be deposited into the Virginia Stormwater Management Fund. Whenever the Board has delegated the administration of a local stormwater management program to a locality, no more than 30% of the total revenue generated within that locality shall be remitted to the State Treasurer for deposit in the Virginia Stormwater Management Fund.	Additional language is proposed in this section requiring that all fees collected by a qualifying local program be subject to accounting review and be used solely to carry out the qualifying local program's responsibilities under the Stormwater Management Act and regulations. Instead of the current statement regarding the percentage of funds that are to be remitted to the Treasurer of Virginia by a local program, the proposed language for this section requires that 28% of the total revenue generated within a qualifying local program's jurisdiction be submitted on a monthly basis to the State Treasurer, unless that amount is otherwise collected electronically. This 28% was developed based on data compiled regarding the actual costs of the Department's responsibilities associated with oversight of and technical assistance to a qualifying local program. Finally, it is noted that if a qualifying local program reduces or waives any fee due, the qualifying local program shall still be responsible for submitting the 28% portion that would be due if such a reduction or waiver did not occur.
4VAC50-60-790		This section explains that each permit application, application for reissuance of a permit, application for a major modification to a permit, or revocation and reissuance of a permit is treated as a separate action and will be assessed a separate fee.	While the intent of this section remains the same, amendments are proposed to simplify the language utilized. The proposed language simply relates that the fees for individual permits, general permit coverage, permit or registration statement modification, or permit transfers are considered separate actions and shall be assessed separate fees, as applicable.
4VAC50-60-800		This section sets out fees for MS4 permits. There is no statement as to whether MS4s applying for joint permits must each pay the full required fee.	Fees for MS4s are proposed to be amended. Large and Medium MS4s will pay a reduced fee, while fees for Small MS4s will increase. A statement is proposed to be included that all MS4s that apply for joint coverage must each pay the appropriate fee. These changes are based upon the actual workload incurred by the Department associated with these permits.
4VAC50-60-810		This section sets out fees for major modifications to MS4 permits.	Fees for major modifications for Large and Medium MS4 permits are proposed to be reduced by over 50 percent. Fees for major modifications to Small MS4 permits are proposed to be increased. These changes are based upon the actual workload incurred by the Department associated with such modifications.
4VAC50-60-820		This section sets out fees for coverage under the Board's General Permit for Discharges of Stormwater from Construction Activities. Since the Board has received responsibility for the Virginia	The revised section leaves the current permit fee structure in place until a qualifying local program is adopted in a jurisdiction or until the Department has developed an approved program that it will administer within the jurisdiction, except that a fee of $200 is proposed for sites under 1 acre in size. The current

		Stormwater Management Program (VSMP), all permitted construction activities have received coverage under this permit. Currently, sites of a size greater than 5 acres pay a fee of $500, sites between 1 and 5 acres pay a fee of $300, and there is no fee for sites of a size less than 1 acre.	fees will also remain in place for a state agency that is administering a program in accordance with approved annual standards and specifications. Upon adoption of a qualifying local program or a Department-administered program within a jurisdiction, a new set of fees would become applicable to regulated construction activities within that jurisdiction. These fees are based on the calculated workload associated with each type of permit, and 50% of the fee would be due at the time that a plan is submitted for review, with the other 50% being due prior to the issuance of coverage under the General Permit for Discharges of Stormwater from Construction Activities. The total fee can be determined by reviewing the chart contained in this section and ranges from $290 for sites of a size between 2,500 square feet and ½ of an acre to $9,600 for sites where land disturbance is equal to or greater than 100 acres. In addition, a fee of $15,000 is proposed for any individual permit for construction activities. Such a permit would be specifically drawn to a particular site, as opposed to the General Permit, which contains terms applicable to all sites.
	4VAC50-60-825	The current regulations do not establish fees for the modification or transfer of permits associated with construction activities.	This proposed section establishes fees for modification and transfer of permits associated with construction activities. These fees will not become applicable until a qualifying local program or a Department-administered local program is in place within a jurisdiction, and further will not apply to a state agency which is administering a project in accordance with approved annual standards and specifications. Fees are calculated based upon the actual estimated workload associated with modification and transfer, and range from $20 for permits applicable to sites of a size between 2,500 square feet and ½ acre to $700 for sites where land disturbance is equal to or greater than 100 acres. Additionally, the fee for modification or transfer of an individual permit for discharges associated with construction activities is proposed to be set at $5,000.
4VAC50-60-830		The current regulations establish fees for permit maintenance. Initial permit fees alluded to above provide funding for permit administration for the first year for which a permit is held. Maintenance fees provide funding for administration during additional years in which permit coverage is still needed. Currently, fees are set for MS4 permits, but no maintenance fee is due for a permit for construction activities.	The proposed section increases maintenance fees for MS4 permits based upon estimates of the actual workload incurred in the administration of these permits during years subsequent to permit issuance. Additionally, maintenance fees are proposed to be established for permits applicable to construction activities, again based upon actual workload estimates. These fees will not become applicable until a qualifying local program or a Department-administered local program exists within a jurisdiction, and they likewise do not apply to a state agency that is administering a project in accordance with approved annual standards and specifications. As with other fees proposed in Part XIII, these fees are graduated based upon the size of the involved project, and for sites covered under the Board's General Permit, range from $50 for a site of 2,500 square feet to ½ acre to $1,400 for sites where land disturbance exceeds 100 acres. A maintenance fee of $3,000 is proposed for Individual Permits for Discharges from Construction Activities.

	4VAC50-60-840	This section is currently reserved for future use. The current regulations do not contain any provision allowing for an increase in fees aside from a separate regulatory action.	The proposed section would allow for minor adjustments (not to exceed 4%) to be made to all permit fees on an annual basis according to the consumer price index for all-urban consumers published by the United States Department of Labor. The revised fee schedule will be posted to the Department's website and distributed to each qualifying local program. This will allow fees to keep pace with increasing administration costs without the need for a separate regulatory action, although such an action would be necessary for any larger changes to the fee structure.
	FORMS	A number of forms are associated with the regulations for use by permit applicants and permittees.	This action proposes a revised Permit Application Fee Form (DCR199-145) to reflect changes in the permit fee structure proposed by this regulatory action.

APPENDIX A

Number of Local Programs, Permit Issuance, Effort, Fee Establishment, and Revenue Calculations

Table of Contents

Overview

Since the proposed regulation is statewide, the regulation will impact a wide variety of individuals, businesses, or agencies, particularly Virginia's localities, developers, and the Department of Conservation and Recreation. To estimate the total extent to which this regulation would apply, the Department has estimated the number of local stormwater management programs to be administered by localities or the Department of Conservation and Recreation, the number of Construction General Permit coverages issued and expected to be issued statewide annually, the amount of time and effort associated with administering a stormwater management program and associated permit issuance, the level fees should be established at, and the amount of revenue necessary to meet those staffing needs.

Number of Local and State Stormwater Programs

Virginia has 325 localities comprised of 39 Cities, 95 Counties, and 191 Incorporated Towns. Of these, any locality located within Tidewater Virginia as defined by the Chesapeake Bay Preservation Act (§ 10.1-2100 et seq.) [17 cities, 29 counties, and 38 towns], or any locality that is partially or wholly designated as required to obtain coverage under an MS4 permit under the provisions of the federal Clean Water Act [27 cities, 15 counties, and 8 towns], (there is overlap between the two groups) shall be required to adopt a local stormwater management program for land disturbing activities (§ 10.1-603.3). The following 103 programs [27 cities, 33 counties, and 43 towns] represent those localities required to adopt a stormwater management program:

Cities (27):			
Alexandria **	Falls Church **	Newport News **	Suffolk **
Bristol *	Fredericksburg **	Norfolk **	Virginia Beach **
Charlottesville*	Hampton **	Petersburg **	Williamsburg **
Chesapeake **	Harrisonburg *	Poquoson **	Winchester *
Colonial Heights **	Hopewell **	Portsmouth **	* MS4 only
Danville *	Lynchburg *	Richmond **	** MS4 &CBA
Fairfax **	Manassas *	Roanoke *	
	Manassas Park *	Salem *	

Counties (33):			
Accomack ***	Gloucester ***	Mathews ***	Stafford **
Albemarle *	Hanover **	Middlesex ***	Surry ***
Arlington **	Henrico **	New Kent ***	Westmoreland ***
Botetourt *	Isle of Wight **	Northampton ***	York **
Caroline ***	James City **	Northumberland ***	* MS4 only
Charles City ***	King & Queen ***	Prince George ***	** MS4 &CBA
Chesterfield **	King George ***	Prince William **	*** CBA only
Essex ***	King William ***	Richmond ***	
Fairfax **	Lancaster ***	Roanoke *	
	Loudoun *	Spotsylvania **	

Towns (43):			
Ashland **	Christiansburg *	Herndon **	Onley ***
Belle Haven ***	Claremont ***	Irvington ***	Painter ***
Blacksburg *	Clifton ***	Kilmarnock ***	Parksley ***
Bloxom ***	Colonial Beach ***	Leesburg *	Port Royal ***
Bowling Green ***	Dumfries ***	Melfa ***	Quantico ***
Bridgewater *	Eastville ***	Montross ***	Saxis ***
Cape Charles ***	Exmore ***	Nassawadox ***	Smithfield ***
Cheriton ***	Hallwood ***	Occoquan ***	Surry ***
	Haymarket ***	Onancock ***	Tangier ***

Tappahannock ***	Vinton *	White Stone ***	** MS4 &CBA
Urbanna ***	Warsaw ***	Windsor ***	*** CBA only
Vienna **	West Point ***	* MS4 only	

The Code also specifies that "[i]n the absence of the delegation of a stormwater management program to a locality, the Department will administer the responsibilities of this article within the given jurisdiction". The Department estimates that there could be as many as 222 localities that do not adopt a program [12 cities, 62 counties, and 148 towns]. The Department would collectively administer these programs as 74 local programs (towns would be handled as part of counties) as outlined below:

Cities (12):	Covington	Galax	Norton	Waynesboro
Bedford	Emporia	Lexington	Radford	
Buena Vista	Franklin	Martinsville	Staunton	

Counties (62):	Carroll	Giles	Montgomery	Russell
Alleghany	Charlotte	Goochland	Nelson	Scott
Amelia	Clarke	Grayson	Nottoway	Shenandoah
Amherst	Craig	Greene	Orange	Smyth
Appomattox	Culpeper	Greensville	Page	Southampton
Augusta	Cumberland	Halifax	Patrick	Sussex
Bath	Dickenson	Henry	Pittsylvania	Tazewell
Bedford	Dinwiddie	Highland	Powhatan	Warren
Bland	Fauquier	Lee	Prince Edward	Washington
Brunswick	Floyd	Louisa	Pulaski	Wise
Buchanan	Fluvanna	Lunenburg	Rappahannock	Wythe
Buckingham	Franklin	Madison	Rockbridge	
Campbell	Frederick	Mecklenburg	Rockingham	

Towns (148):	Charlotte Court House	Duffield	Hurt	Narrows
Abingdon	Chase City	Dungannon	Independence	New Castle
Accomac	Chatham	Edinburg	Iron Gate	New Market
Alberta	Chilhowie	Elkton	Ivor	Newsoms
Altavista	Chincoteague	Farmville	Jarratt	Nickelsville
Amherst	Clarksville	Fincastle	Jonesville	Orange
Appalachia	Cleveland	Floyd	Keller	Pamplin City
Appomattox	Clifton Forge	Fries	Kenbridge	Pearisburg
Berryville	Clinchco	Front Royal	Keysville	Pembroke
Big Stone Gap	Clinchport	Gate City	La Crosse	Pennington Gap
Blackstone	Clintwood	Glade Spring	Lawrenceville	Phenix
Bluefield	Coeburn	Glasgow	Lebanon	Pocahontas
Boones Mill	Columbia	Glen Lyn	Louisa	Pound
Boyce	Courtland	Gordonsville	Lovettsville	Pulaski
Boydton	Craigsville	Goshen	Luray	Purcellville
Boykins	Crewe	Gretna	Madison	Remington
Branchville	Culpeper	Grottoes	Marion	Rich Creek
Broadway	Damascus	Grundy	McKenney	Richlands
Brodnax	Dayton	Halifax	Middleburg	Ridgeway
Brookneal	Dendron	Hamilton	Middletown	Rocky Mount
Buchanan	Dillwyn	Haysi	Mineral	Round Hill
Burkeville	Drakes Branch	Hillsboro	Monterey	Rural Retreat
Capron	Draper	Hillsville	Mount Crawford	Saint Charles
Cedar Bluff	Dublin	Honaker	Mount Jackson	Saint Paul

Saltville	Stanardsville	Tazewell	Victoria	Waverly
Scottsburg	Stanley	The Plains	Virgilina	Weber City
Scottsville	Stephens City	Timberville	Wachapreague	Wise
Shenandoah	Stoney Creek	Toms Brook	Wakefield	Woodstock
South Boston	Strasburg	Troutdale	Warrenton	Wytheville
South Hill	Stuart	Troutville	Washington	

Note: Those 15 localities that are highlighted in grey are geographically located (or partially located) in a locality that is required to adopt a program. It is anticipated that those towns will be administered under the respective county's program through an agreement. Should that not occur, DCR would administer a program in those specific towns. (Scottsville straddles two localities, one of which is a mandatory locality and one not.)

Number of Permits

These local stormwater programs (whether administered by localities or the Department) will be responsible for overseeing the issuance of coverage under the Construction General Permit for an estimated 5000 land disturbing activities per year. This is arrived at through the following computations and assumptions:

Actual DCR Permit Numbers

Data obtained from DCR's existing stormwater permitting database was used as the starting point to estimate the historical extent of the number of general permit coverages issued on a calendar year basis. The history of the program's Construction General Permit coverage issuance and the size distribution of those permits are outlined in Tables A-1 through A-4. Table A-1 outlines those coverages issued that are not VDOT permits while the VDOT permits are tabulated separately in Table A-2.

Table A-1: Construction General Permit Coverages by Month (Non-VDOT Permits)

CY	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
2005	4	1	230	128	136	193	84	223	165	137	214	199	1714
2006	165	244	278	207	201	247	229	220	225	261	134	158	2569
2007	139	178	243	234	146	319	230	308	164	221	147	135	2464
2008	174	186	222	223	192	228	180	182	183	211	178	107	2266
2009	94												94

It is evident in Table A-1 that the first year of DCR's program administration is not fully reflective of what permit numbers should have been, as this year was a transition period and DCR spent considerable time informing the regulated public of the program changes and the permit requirements. The table also indicates a slowing of permit numbers over 2006 through 2008, although the effort to ensure permit compliance was increasing through this same time period.

Table A-2: Construction General Permit Coverages Issued by Month (VDOT Permits)

CY	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
2005	0	25	0	15	10	16	19	22	53	24	10	14	208
2006	9	12	27	35	6	14	30	22	22	6	20	11	214
2007	9	24	14	17	17	15	20	10	15	22	16	10	189
2008	10	16	13	18	21	12	13	27	18	24	8	3	183
2009	8												8

Table A-3: Total Number of Construction General Permit Coverages Issued by Calendar Year

Calendar Year	Non-VDOT Permits	VDOT Permits	Total
2005	1714	208	1922
2006	2569	214	2783
2007	2464	189	2653
2008	2266	183	2449
	9013	794	9807 (Average = 2,452)

Table A-3a: Type of Entity Seeking Construction General Permit Coverage

Entity	Non-VDOT Permits (2005-2008)	Percentage	Average coverages per year
State	306	3.4	76
Federal	214	2.4	53
Public/ Local	1080	12.0	270
Other	7413	82.2	1853
Totals	9013	100.0	

Table A-4: Size Distribution of Construction General Permit Coverages Issued (as of Jan 31, 2009*)

Project Size	Non-VDOT Permits	VDOT Permits	Total	Percentage
< 0.5 acre	878	93	971	9.9
≥ 0.5 acre, < 1acre	692	37	729	7.4
≥1 acre, < 5 acres	3793	454	4247	43.3
≥5 acres, < 10 acres	1430	125	1555	15.9
≥10 acres, < 50 acres	1834	84	1918	19.6
≥50 acres, < 100 acres	251	6	257	2.6
≥100 acres	129	2	131	1.3
Totals			9,808	100.0

* - For all projects where size information was available

Virginia Tech's Computations of Permit Numbers

The Virginia Tech Report (Appendix C, pages 7- 11) suggested, based on discussions with localities, that the state permitting data under-reported the number of land disturbing projects and the amount of disturbed acres recorded under local Erosion and Sediment Control Programs. Accordingly, the number of Construction General Permit coverages issued under-represented the universe of land disturbing projects that should have required permits. Virginia Tech utilized statistical procedures to estimate the extent of the "under-counting" of the number of land disturbing permits. A sampling process was used to identify counties and cities (localities) where more detailed local data would be collected on permit coverage and disturbed acres. To ensure that

a representative cross-section of localities was sampled, counties and cities across the state were initially grouped based on a variety of characteristics. Permit and land disturbing data were collected on a sample of localities. Based on observed under-reporting, state permit and disturbed acreage data were adjusted to estimate the potential number of permit coverages for the state.

Cluster analysis was used by Virginia Tech to form the localities into similar groups based on various characteristics. DCR permits were classified as one of four types: residential, commercial/industrial, roads, or other. The number of permits for each category and the number of disturbed acres for each category were used as the primary characteristics describing the localities. Other characteristics used in the cluster analysis included population, land area, and location in the Chesapeake Bay Preservation Area. Initial clustering indicated a strong tendency to distinguish between localities in the Chesapeake Bay Preservation Area (CBPA) and those that were not. Therefore, to improve the performance of the clustering process, two groups were formed based on this division. K-means cluster analysis was then used to group the 29 counties and 17 cities in the eastern portion of the Bay watershed into 10 clusters, with the remaining counties and cities grouped into 14 clusters.

Individual localities within each cluster group were selected to participate in a spot check survey. Appropriate local officials were contacted to determine the number of permits and disturbed acreage under permit from their local Erosion and Sediment Control programs. At least one locality from each of the 24 clusters was contacted by the researchers, totaling 32 contacts in all. Sixteen contacts provided data for an effective response rate of 50%. The response rate within the CBPA and non-CBPA areas were identical, with five of 10 contacts providing responses within CBPA localities and 11 of 22 contacts responding from localities outside of the CBPA. In addition to these data, preliminary data from an additional seven localities (two within CBPA, five outside) were provided by DCR based on local data collected at regional DCR offices. Thus, sample data of permit numbers were obtained from 23 localities representing the majority of the program clusters (17 of the 24 clusters).

It was understood through this process that comparing state stormwater general permit coverage to local erosion and sediment control permit issuance was not a direct relationship due to a variety of factors, particularly threshold differences (10,000 sq. ft. Erosion and Sediment Control vs. 1-acre Stormwater in non-CBPA localities) but that it was a reasonable approach to exploring the magnitude of potential under-reporting.

Local program data of permits were paired with its corresponding DCR registry data. [Overall, 174 observations were used for the annual disturbed acreage relationship, and 144 observations were used for the number of annual permits relationship. It should be noted that less than 10% of the observations were from within the CBPA.] After considering different methods and models, and the removal of statistical outliers, a simple linear relationship between DCR and local data was found to be the most intuitive and robust estimator.

A linear relationship of the form $y = mx + b$ was calculated for the number of permits. In the equation, y is the reported quantity (of permits) from the locality, x is the corresponding quantity from DCR database, m is the slope of the line, and b is the vertical intercept. Interpretation of the linear model is straightforward. If the data collected from the localities had matched the data from DCR perfectly, the intercept (b) would be zero and the slope of the line (m) would be one.

The actual results of the regression are shown in Figure A-1. The intercept (15.911 for permits) represents an average value of missed data for all DCR observations. The slope (1.4458 for permits) of the estimated line shows the additional change in the quantity from the localities for each additional unit shown in the DCR data.

- This relationship was used to estimate the number of permits ($\hat{y}_i$) in each of the i localities.
  $\hat{y}_i = f(x_i) = mx_i + b$

- To get the total number of permits for the state, we would need to sum the individual estimations ($\hat{y}_i$).
  $$\sum_{i=1}^{n} \hat{y}_i = \sum_{i=1}^{n} f(x_i) = \sum_{i=1}^{n} (mx_i + b)$$

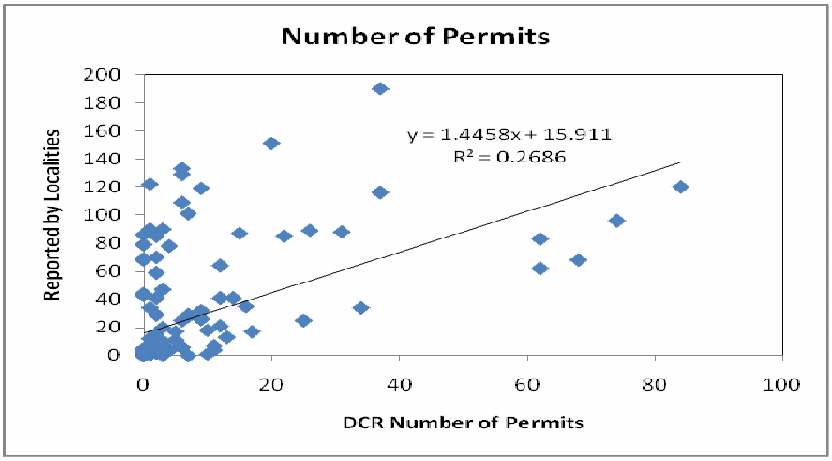

Figure A-1: Linear Regression for Number of Permits

The linear model described above was used to produce state-wide estimates of permit numbers based on the DCR data (as computed by Virginia Tech). Although the correlation coefficient (R^2) was very low, annual totals from DCR data were used to provide a preliminary estimate of the number of permit coverages that might be expected when the permit coverage issuance is administered at a local level. Summary results, compared with the original DCR data are shown in Table A-5. The average percentage of potential land disturbing activities occurring in a locality that the Department had issued general permit coverage for was 42.2%.

Table A-5: Estimates of Permits (Calendar Year)

	Permits			
	2005	2006	2007	Averages
VT Total of DCR Permitting Data	1,904	2,733	2,482	2,373
VT Estimated Permit Total	4,917	6,115	5,752	5,595
Percentage	38.7%	44.7%	43.2%	42.2%

Similar computations were also performed to generate acreage comparisons. Computations run supported the assumption that small developments (less than 5 acres) would be the most under-reported permit group in the state DCR data base. The under-reporting of small projects could have a large impact on permit totals, but a relatively smaller impact on total reported disturbed acres. In areas outside the Chesapeake Bay Preservation Act area, however, local erosion and sediment

control permit data might also contain projects that are less than an acre (but greater than 10,000 ft^2). Thus, the local data from these areas may over-estimate the total amount of stormwater permits because projects under one acre would not be required to obtain stormwater permit coverage (only Erosion and Sediment Control). Additionally an over-estimate could occur due to local reporting of individual building permits that may be covered by fewer stormwater permits under a common plan of development. The extent of such potential bias could not be assessed with the available data. It should also be noted that the comparison between the local data and DCR database data in this analysis did not compare individual projects between the two datasets to identify discrepancies. The analysis only compared the total numbers in each data set for the defined period and assumed that all permits in the smaller set were represented in the larger set. This could lead to an underestimate of the number of permits. It also appears that the permit numbers include VDOT permits for which we do not see any significant under-reporting for and have been handled differently in DCR's computations. This could also lead to an over-estimate of permits.

The permit coverage computations outlined above, although preliminary in nature, suggested an area where DCR should perform additional research to better refine the estimates.

DCR Computations of Permit Numbers

Data is periodically provided to the Department's regional Soil and Water Conservation offices from localities pursuant to § 10.1-566.1 that states that each local erosion and sediment (E&S) control plan-approving authority shall report to the Department a listing of each land-disturbing activity in the locality for which a plan has been approved. Utilizing a subset of those E&S datasets that allowed for a direct comparison to the construction general permit data in DCR's data, the Department performed comparisons. This process was time consuming, but was expected to provide a more refined estimate than that provided in the Virginia Tech analysis.

DCR's analysis involved the use of January – September 2008 data provided by the localities and from DCR's permit coverages database. As DCR's database does not include a locality field for the land disturbing activity, we used zip codes, and where necessary, project addresses to delineate project sites by locality using Microsoft MapPoint. As some localities appeared to be reporting building permits or small E&S projects that did not appear to be part of a common plan of development and that would not be regulated under stormwater, adjustments to the local data was periodically made. Specifically, where a locality reported permits for projects less than an acre, the projects did not appear to be part of a common plan of development, and the locality was not a Bay Act locality, then those reported projects under the one acre and above threshold were removed from the analysis.

Once a list of projects for the given time period were established for both the localities dataset and for DCR's, we compared the projects on both lists by project address, operator name, project name, and project size. As discrepancies in project size commonly occurred between the sets, the acreage recorded in the state database was utilized for computations. Additionally, where projects were present in both the databases with either the same address or name but with very different acreages, we counted them as the same project.

DCR recognizes that using data for a set time period could have lead to an underestimate of the percent comparability between the datasets as there could be a time delay between local project approval and DCR permit coverage issuance. Localities have also suggested that some developers, more so in today's declining economy, are getting plan approvals but not initiating the project until

the economy improves. In our Stormwater TAC discussions, it was noted that around 5% of all site plans are never built.

A total of 18 localities were sampled with the results presented in Table A-6. The percentage of potential land disturbing activities occurring in a locality that the Department had issued general permit coverage for ranged from a low of 5% to a high of 89% with an average of 36.4%. This value is similar but slightly lower than the Virginia Tech estimate of 42.2%. However, as noted previously, it is anticipated that a percentage of projects not permitted by DCR were not actually missed projects, but were projects for which no general permit coverage was sought, as the project did not advance to the construction stage. If we assume that this was 5% of the projects and add this amount back to our estimate of 36.4%, we arrive at an estimated permit coverage issuance value of 41.4%.

Table A-6: Estimate of the Percentage of Reported Applicable Land Disturbing Projects in Each Locality that has been Issued Construction General Permit Coverage as Required

Locality	% of permits	% of acres
Alexandria*	31%	86%
Amherst	23%	32%
Arlington*	21%	16%
Campbell	42%	49%
Charlottesville	89%	57%
Chesterfield*	63%	80%
Colonial Heights*	38%	46%
Fauquier	31%	76%
Dinwiddie	50%	94%
Goochland	21%	43%
Henrico*	49%	75%
James City*	37%	56%
King William*	5%	21%
Loudoun	56%	55%
Lynchburg	22%	44%
Prince William*	60%	64%
Richmond*	6%	32%
Stafford*	12%	65%
Totals	656%	991%
Mean Percent (N=18)	36.4%	55.1%
* - Bay Act locality		

For computational purposes it was also necessary to determine an estimate of the size distribution of the local land disturbing projects (Non-VDOT) for which permits were not being received (Table A-7). These numbers will be utilized later in the computations of the size distribution in Table A-10 below.

Table A-7: Estimated Size Distribution for Local Projects (Non-VDOT) for which DCR did not Issue General Permit Coverage

Project Size	# of Projects	% of Extra Total
≥ 2,500sq ft, < 0.5 acre	451	43.6
≥ 0.5 acre, < 1acre	100	9.7
≥1 acre, < 5 acres	330	31.9
≥5 acres, < 10 acres	77	7.5
≥10 acres, < 50 acres	67	6.5
≥50 acres, < 100 acres	7	0.7
≥100 acres	1	0.1
	1,033	100

Number of Housing Starts

According to the Virginia Tech Report (Appendix C, pages 11- 12), home building comprises a significant portion of the land disturbing activities and may serve as a proxy for the relative level of land disturbing activities. Figure A-2 shows the number of new housing starts from 1980 to 2007. Beyond 2007, the Virginia Home Builders Association projects a decline of 24% in the number of housing starts for 2008 and an increase of only 15% over 2008 in 2009. Given the current turmoil in the credit and housing markets, these numbers may be adjusted downward and the duration of the downturn is uncertain at this time.

Long-term historical trends, however, indicate that private housing starts in Virginia average slightly more than 50,000 units per year. Housing starts also show significant year-to-year variation. During the 1980-82, 1990-91, and 2006-current economic downturns, housing starts dropped significantly (multiple year declines exceeding 20% annually). Average housing starts during the 2005–2007 time period averaged slightly more than 49,000 per year. While housing starts declined over this three-year period, the three-year average is roughly equivalent to the 28-year historical average.

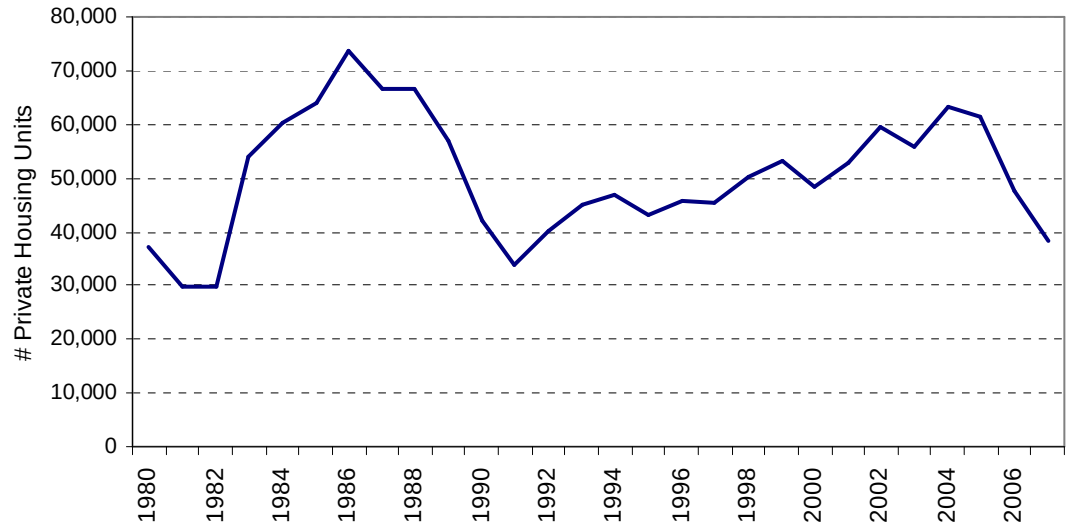

Figure A-2: Total Housing Starts (single and multifamily) in Virginia

Implicitly, one would believe that there should be a significant positive relationship between annual housing starts and the number of construction general permits issued annually (recognizing that not all of DCR's permit coverages are residential related). When this relationship is explored using the data presented in Table A-8 (eliminating 2005 data as an outlier), the linear relationship was of the form $y = 0.01459x + 1884.2$. The R^2 for this relationship was 0.9871. When solving for the number of permit coverages (Non-VDOT) issued associated with the average historical housing units value represented in Figure A-2 (~50,000 per year) the answer was 2,614 permit coverages issued. Taking this number and adding to it the average annual number of VDOT permits for CY05-08 (199) results in an average annual estimate of 2,813 construction general permit coverages.

Table A-8: Number of Housing Units Authorized by Virginia, Valuation of such Construction, and the Number of Non-VDOT Construction General Permit Coverages Issued Annually

	2005	2006	2007	2008
# of Housing Units*	61,518	47,704	38,362	26,788
Valuation	$8.9 B	$7.7 B	$6.3 B	$4.1 B
Mean value per unit	$144,673	$161,412	$164,225	$153,053
# of Non-VDOT Permit Coverages Issued (from Tables A-1 and A-3)	1,714**	2,569	2,464	2,266

*Note: New Privately-Owned Housing Units Authorized by State – U.S. Census Bureau
Housing units - In general, a housing unit is a house, an apartment, a group of rooms or a single room occupied or intended for occupancy as separate living quarters; that is, the occupants live separately from any other individual in the building, and there is direct access from the outside or through a common hall. Transient accommodations, barracks for workers, and institutional-type quarters are not counted as housing units.
** Number not utilized in regression analysis as it was the first year with the program with DCR.

The relationship between the annual housing starts and the number of construction general permits (Non-VDOT) issued annually has a strong correlation and the methodology outlined above might be utilized as a reasonable indicator of the number of permit coverages that may be possible. Additionally, the data in Table A-8 shows the precipitous decline in number of housing units authorized in Virginia annually during this period of a slowing economy as well as it provides an indicator of the value of the homebuilding industry to the Commonwealth of Virginia.

Estimate of Number of Construction General Permit Coverages

Taking the data from each of the sources under consideration (Table A-9) and the significantly slowing economy, and recognizing that an over-estimate of the permits to be expected in the future could lead to severe revenue shortfalls and an inability of both localities and the Department to cover program administration costs (if proposed permit fees were further lowered), the Department selected 5,000 permits as a reasonable estimate of the number of expected permits annually going forward. [Prior to these calculations, 3,000 permits had been utilized and was observed as being too low an estimate by localities.] This calculation is fundamental to both staffing calculations as well as fee calculations both of which shall follow this section.

Table A-9: Comparison of VT and DCR Estimates of Permits (Calendar Year)

	Permits				
	2005	2006	2007	2008	Averages
VT Total of DCR Permitting Data	1,904	2,733	2,482	n/a	2,373
VT Estimated Permit Total (from Table A-5)	4,917	6,115	5,752	n/a	5,595
DCR Non-VDOT Permitting Data (from Tables A-1 and A-3)	1,714	2,569	2,464	2,266	2,253
DCR Estimated Non-VDOT Permit ($E_{1)}$	4,140	6,205	5,952	5,473	5,443
DCR Total Permit Estimate (E_2)	4,348	6,419	6,141	5,656	5,641

Note 1: E_1 = (Actual # of Non-VDOT Coverages / 0.414)
Note 2: E_2 = (E_1 + Actual # of VDOT Coverages)

Taking the DCR Estimated Non-VDOT Permit data (06-08), running a regression of this data [y = (0.03525x + 4,550.7) + 199] with the Virginia housing units data (06-08), and solving for the mean average house starts (50,000), the 1991 low (33,706), and the 1982 low (29,878) results in the following permit coverage estimates respectively 6,512, 5,938, and 5,803.

Table A-10: Estimated Distribution for the 5,000 Construction General Permit Coverages

Project Size	% of DCR Total (from Table A-4)	Average # of DCR permit coverages in 05-08	% of Extra Total (from Table A-7)	# of Extra permits	Total permits	Percentage
< 0.5 acres	9.9	243	43.6	1,111	1,354	27.1
≥ 0.5 acre, < 1acre	7.4	181	9.7	247	428	8.6
≥1 acre, < 5 acres	43.3	1,061	31.9	813	1,874	37.5
≥5 acres, < 10 acres	15.9	390	7.5	191	581	11.6
≥10 acres, < 50 acres	19.6	481	6.5	166	647	12.9
≥50 acres, < 100 acres	2.6	64	0.7	18	82	1.6
≥100 acres	1.3	32	0.1	2	34	0.7
Total # of Permits	100.0	2,452 (from Table A-3)	100.0	$2,548_1$	5,000	100.0

Note 1: 5,000 permits – 2,452 average actual permits = 2,548

Local Program Staffing and Program Oversight Cost Need Computations (for localities and DCR)

Time Estimates for Project Inspections and Re-Inspections

In 2006, DCR surveyed its regional Soil and Water Conservation Office field staff to estimate how long various aspects of stormwater program administration took based on project size. Table A-11 outlines the results of that survey (Variable #1: Site Inspection and SWPPP Review Time). As part of that survey, DCR also estimated the time for various additional administrative activities:

- #2: Travel time per inspection = 1 hr
- #3: Compliance/enforcement per inspection = 1 hr
- #4: Technical assistance per inspection = 1 hr
- #5: Administrative/Permit Issuance = 1 hr

It was determined that typically a project involves one initial inspection and two follow-up inspections per year. Formulas utilized to calculate project Inspection and Re-Inspection times are as follows:

Initial Inspection Time (T) per General Permit
T = (#1 + #2 + #3 + #4 + #5)

Re-Inspection Time (RT) for General Permit
RT = (#1 + #2 + #4)

In addition to these calculations, it was estimated that five BMP inspections per year were necessary for a project 1-acre or greater in size. It was estimated that an inspection took 3 hours. This amounted to 15 hours per year per project 1-acre or greater in size. Lesser times were estimated for projects less than 1-acre in size (Table A-11).

Table A-11: Estimated Annual Total Inspection Time by Project Size

Project Size	Site Inspection (hrs)	SWPPP review (hrs)	Total Inspection and SWPPP review time #1	Initial Inspection Time (T) per General Permit	Re-Inspection Time (RT) per General Permit	Annual Total Inspection Time [T+(2*RT)]	Annual BMP Inspection Time
≥ 2,500sqft, < 0.5 acre	0.25	0.25	0.5	3.5_1	0.0	3.5	0.0
≥ 0.5 acre, < 1acre	1.0	0.6	1.6	5.6	3.6	12.8	3.0
≥1 acre, < 5 acres	1.7	1.3	3.0	7.0	5.0	17.0	15.0
≥5 acres, < 10 acres	2.6	1.6	4.2	8.2	6.2	20.6	15.0
≥10 acres, < 50 acres	3.4	2.1	5.5	9.5	7.5	24.5	15.0
≥50 acres, < 100 acres	4.8	2.6	7.4	11.4	9.4	30.2	15.0
≥100 acres	4.8	2.6	7.4	11.4	9.4	30.2	15.0

Note 1: T = (0.5 + 1 + 0.5 + 0.5 + 1)

This information was shared with localities and they corroborated that the time for the activities in Table A-11 appeared to be reasonable.

Time Estimates for Plan Review and Plan Re-Submittal

Based on DCR's survey information discussed above, Table A-12 contains the results of that survey (Variable #1: Time for Stormwater Management Plan Review). As part of that survey DCR also estimated the time for various additional administrative activities:

- #2: Administrative time associated with plan submission = 1 hr
- #3: Time to determine if a plan is Administratively Complete = 1 hr
- #4 Technical Assistance for plan review = 1 hr

It was determined that typically a project involves one initial inspection and two follow-up inspections per year. Formulas utilized to calculate project Inspection and Re-Inspection times are as follows:

Plan Review Time (PRT) [Unless otherwise noted below]
PRT = (#1 + #2 + #3 + #4)

Re-Submittal Plan Review Time (RPRT) [Unless otherwise noted below]
RPRT = [(½ *#1) + #2 + #4]

Table A-12: Estimated Annual Total Plan Review Time by Project Size

Project Size	Time for Stormwater Management Plan Review (hrs) #1	Plan Review Time (PRT)	Re-Submittal Plan Review Time (RPRT)
≥ 2,500sqft, < 0.5 acre	0	2_1	0.0_2
≥ 0.5 acre, < 1acre	5	7.5_3	4.5
≥1 acre, < 5 acres	10	12.5_3	7.0
≥5 acres, < 10 acres	15	17.75_4	9.5
≥10 acres, < 50 acres	25	28	14.5
≥50 acres, < 100 acres	40	43	22.0
≥100 acres	80	83	42.0

Note 1: PRT = (0 + 1 + 0.5 + 0.5)
Note 2: RPRT = [(½ *0) + 0 + 0]
Note 3: #3: Time to determine if a plan is Administratively Complete = 0.5 hr
Note 4: #3: Time to determine if a plan is Administratively Complete = 0.75 hr

Estimated Costs Per Project

Utilizing the calculations presented above, the Department compiled (Table A-13) and transposed (Table A-14) the estimated time computations into estimated cost figures.

Table A-13: Annual Estimated Total Time by Project Size for General Permit for Construction Activities

Project Size	Plan Review Time (PRT) (from Table A-12)	Re-Submittal Plan Review Time (RPRT) (from Table A-12)	Annual Total Inspection Time [T+(2*RT)] (from Table A-11)	Annual BMP Inspection Time (Q) (from Table A-11)	Total Hours
≥ 2,500 sqft; < 0.5 acre	2.00	0.0	3.5	0.0	5.50
≥ 0.5 Acre; < 1 acre	7.50	4.5	12.8	3.0	27.80
≥ 1 acre; < 5 acres	12.50	7.0	17.0	15.0	51.50
≥ 5 acres; < 10 acres	17.75	9.5	20.6	15.0	62.85
≥ 10 acres; < 50 acres	28.00	14.5	24.5	15.0	82.00
≥ 50 acres; < 100 acres	43.00	22.0	30.2	15.0	110.20
≥ 100 acres	83.00	42.0	30.2	15.0	170.20

For the purposes of calculating annual project costs in Table A-14, staff salary values used for computations are as follows:
$42 per hour: plan review, plan re-submittal
$36 per hour: site inspections, BMP inspections

Table A-14: Annual Estimated Costs ($) by Project Size Associated with General Permit Administration for Construction Activities

Project Size	Plan Review Cost (PRT*$42)	Re-Submittal Plan Review Cost (RPRT*$42)	Annual Total Inspection Cost {[T+(2*RT)]*$36}	Annual BMP Inspection Cost (Q*$36)	Total Fees to Cover Program Administration (without DCR Oversight costs added)
≥ 2,500 sqft; < 0.5 acre	84	0	126	0	$210
≥ 0.5 Acre; < 1 acre	315	189	461	108	$1,073
≥ 1 acre; < 5 acres	525	294	612	540	$1,971
≥ 5 acres; < 10 acres	746	399	742	540	$2,427
≥ 10 acres; < 50 acres	1,176	609	882	540	$3,207
≥ 50 acres; < 100 acres	1,806	924	1,087	540	$4,357
≥ 100 acres	3,486	1,764	1,087	540	$6,877

During the Technical Advisory Committee meetings it was recognized that an additional cost to both the localities and the Department may be the long-term inspections of BMPs after the land disturbing activity has ended. For discussion purposes it was suggested that the fees be increased to partially address these costs. A suggestion was an additional $2,700 (3 hrs x 25 yrs x $36). Although these costs are real, it was determined by the TAC that adding this fee on to the construction general permit coverage fee did not appear fair to the developers. Localities may utilize stormwater utility fees pursuant to § 15.2-2114 of the Code of Virginia to cover a portion or all of these costs as well as localities have the authority for certain proffers that may assist with stormwater. The Department will not have these same fees available to it and may need to seek an additional source of revenue to cover these costs.

The amounts outlined in Table A-14 reflect the revenue per general permit coverage that will be generated per project. From this information, later in these computations, the permit fees are established to cover both local program and DCR program administration costs as well as DCR program oversight costs.

DCR Staffing and Cost Need Computations

This section estimates the number of DCR staff that will be necessary to administer as many as 74 local stormwater management programs and to provide statewide program oversight and the revenue that will be necessary to support these staff from permit fees.

DCR Administered Local Programs – time/staff estimates

All localities where DCR will be administering a program are outside of the Bay Act localities. As such, generally regulated land disturbing activities (excluding common plans of development) in these areas will be 1-acre and above. As such, utilizing Table A-10 as the basis, the percent distribution of projects 1-acre or greater are presented in Table A-15.

Table A-15: Estimated Distribution for Construction General Permit Coverages 1-Acre or Greater

Project Size	Total permits (from Table A-10)	Percentage (from Table A-10)	Total Permits ≥1 acre	Revised Percentage
< 0.5 acres	1,354	27.1		
≥ 0.5 acre, < 1acre	428	8.6		
≥1 acre, < 5 acres	1,874	37.5	1,874	58.2
≥5 acres, < 10 acres	581	11.6	581	18.1
≥10 acres, < 50 acres	647	12.9	647	20.1
≥50 acres, < 100 acres	82	1.6	82	2.5
≥100 acres	34	0.7	34	1.1
Total # of Permits	5,000	100.0	3,218	100.0

The next step in the computation process is to estimate the number of projects that DCR will be annually administering per locality. It has already been discussed previously that it is estimated that DCR may administer 74 local programs (12 cities and 62 counties). Utilizing DCR's general permit coverages database, it was estimated that in these localities an estimated average of 8.83 projects per locality are initiated per year (Table A-16).

Table A-16: Actual Number of General Permit Coverages Issued in Localities that DCR May Administer

Locality	06-08 permits	08 permits		Locality	06-08 permits	08 permits		Locality	06-08 permits	08 permits
Bedford	18	6		Charlotte	7	2		Montgomery	110	26
Buena Vista	4	2		Clarke	28	10		Nelson	23	4
Covington	6	1		Craig	3	1		Nottoway	16	7
Emporia	12	4		Culpeper	50	8		Orange	56	14
Franklin	14	3		Cumberland	4	1		Page	17	7
Galax	14	4		Dickenson	15	4		Patrick	16	7
Lexington	12	1		Dinwiddie	17	7		Pittsylvania	30	12
Martinsville	22	6		Fauquier	100	13		Powhatan	50	12
Norton	10	2		Floyd	4	1		Prince Edward	21	6
Radford	21	4		Fluvanna	24	7		Pulaski	38	7
Staunton	21	10		Franklin	54	11		Rappahannock	1	0
Waynesboro	20	5		Frederick	85	15		Rockbridge	9	1
Alleghany	2	1		Giles	13	1		Rockingham	39	10
Amelia	17	3		Goochland	36	7		Russell	37	10
Amherst	25	12		Grayson	4	1		Scott	9	1
Appomattox	7	3		Greene	45	8		Shenandoah	54	5
Augusta	38	12		Greensville	0	0		Smyth	30	8
Bath	5	2		Halifax	27	8		Southampton	13	5
Bedford	59	15		Henry	21	3		Sussex	4	0
Bland	5	1		Highland	5	3		Tazewell	25	6
Brunswick	12	1		Lee	10	2		Warren	25	4
Buchanan	34	7		Louisa	130	25		Washington	94	23
Buckingham	4	3		Lunenburg	2	2		Wise	42	11
Campbell	31	13		Madison	9	1		Wythe	27	3
Carroll	30	11		Mecklenburg	39	12		**Total**	**1961[1]**	**474[2]**

Note 1: (1961 / 74 localities)/3 years = 8.83 coverages/ locality/year [Using 06-08 data]
Note 2: (474 / 74 localities) = 6.41 coverages/ locality/ year [Using 08 data]

Scaling up by the 06-08 data figure of 8.83 coverages/ locality/ year by the 41.4% permit correction factor provides a working estimate of 21.3 projects per locality per year. Multiplying this by 74

results in an estimate of 1,576 land disturbing activities DCR may be overseeing. Table A-17 takes the number of land disturbing activities per size category and multiplies it by the total plan review and inspection times calculated in Table A-13.

Table A-17: Analysis of Land Disturbing Projects that DCR May Administer

Project Size	% of Total (from Table A-15)	# of permits	Hrs/ project[2] (from Table A-13)	Hours
≥1 acre, < 5 acres	58.2	917	51.50	47,225
≥5 acres, < 10 acres	18.1	285	62.85	17,912
≥10 acres, < 50 acres	20.1	317	82.00	25,994
≥50 acres, < 100 acres	2.5	40	110.20	4,408
≥100 acres	1.1	17	170.20	2,893
		1,576[1]		98,432

Note 1: Expected project load (74 localities * 21.3 projects/locality)
Note 2: From Table A-13 (total plan review and inspection times)

The resulting hours per project category are then summed and the number of staff members and the amount of revenue necessary to support them are calculated (Table A-18).

For computational purposes the number of hours per employee (FTE) was based on a full time employee 2080 hours (52 weeks * 40 hrs/week) reduced by average sick, holiday, and annual leave to arrive at a value of 1,832 hrs/FTE/year.

Table A-18: Staff and Cost Computations for DCR Administered Local Programs

- Staff Estimate for program administration (from Table A-17) = 98,432 hrs / 1,832 hrs per FTE = 53.7; FTE = 54.
- DCR Staffing Costs (based on current average salary and benefits translated to an hourly wage) = 54 FTE * $35.46 per hour * 2,080 hours per year = $3,982,867
- 54 FTE x $8,000 for administrative expenses including rent, utilities, computers, training, travel, printing expenses, etc. = $432,000
- Total cost = $4,414,867

DCR Local Program Oversight – time/staff estimates

The Department of Conservation and Recreation will have substantial management responsibilities associated with implementation of the Commonwealth's new statewide stormwater management program. Although not a comprehensive list, key responsibilities will generally include:

- Review of all local program approval packages submitted to the Virginia Soil and Water Conservation Board for consideration.
- General training and educational outreach.
- Ordinance development and review.
- Local program technical assistance including local plan review, inspection, and BMP questions.
- Response to complaints not resolved at the local level.
- Enforcement responsibilities as deemed necessary.
- Response to issues related to permit issuance and fee accounting.
- BMP Clearinghouse and the enterprise website development and maintenance and maintenance of the stormwater management handbook.

- Statewide program oversight responsibilities for the auditing of all local programs on a periodic cycle to insure compliance.
- Oversight of state stormwater management projects

A detailed explanation of DCR oversight activities for the stormwater management program is outlined below. This list includes both existing positions and those new staff needed to implement new responsibilities under these regulations, as the total funds generated from the fees must be sufficient to cover all positions. The following list includes 7 program functions and outlines the need for 33 staff (Table A-19), a substantial portion of which we already have positions for or filled, to carry out these functions as follows:

1. Program Audits – 4FTE

DCR staff will conduct program audits on all local and DCR administered stormwater management programs. The audits will evaluate compliance with the Stormwater Management Act and attendant regulations. The audit will evaluate the following:

- Local program ordinance and procedures
- Stormwater plan reviews
- Inspections of active projects
- Inspections of completed projects and associated stormwater BMPs
- Compliance and enforcement efforts
- Complaint responses
- General Permit coverage

A 3-year review cycle would utilize two 2-member teams. The review effort will be as follows:

- 3-year cycle – 60 programs reviewed per year [103 local programs + 74 = 177 programs]
- Each team to review 30 programs per year
- Time for one program review – 1 week
- Time for one program Corrective Action plan and Technical Assistance for program development – 0.5 week
- Program Audit Staffing need = 4 FTE

2. Program Technical Assistance – 5FTE

DCR staff will provide technical assistance to local programs regarding plan reviews, inspections, BMPs, and interpretations of the Stormwater Management Act and attendant regulations. DCR staff presently provide this assistance in the Erosion and Sediment Control Program and staff records indicate an average assistance to each program of 6 days per year. DCR field staff or contractors implementing the program locally will need equivalent support.

- 177 programs x 6 days = 1062 days x 8 hrs/day = 8,496 hrs
- Staff estimate for technical assistance = 8,496 hrs / 1,832 hrs/staff = 4.6
- Program Technical Assistance support need = 5 FTE

3. Complaint Resolution by DCR – 3FTE

DCR staff will respond to complaints regarding stormwater management issues that are not resolved satisfactorily by the locally run programs and in support of regional DCR implementing staff. Based on DCR staff records, approximately 212 complaints are received annually. Time estimates for complaint response varies from 1 day to several weeks. The average time for complaint resolution is approximately 3 days.

- 212 complaints x 3 days/complaint = 636 days x 8 hrs/day = 5,088 hrs
- Staff estimate for complaints = 5,088 hrs / 1,832 hrs/staff = 2.8 Staff
- Program Complaint Resolution Assistance support need = 3 FTE

4. DCR Program Coordination and Development by DCR – 12FTE

For DCR run local programs, DCR staff will spend considerable time and effort in coordinating with localities and in ensuring the proper integration of the DCR run stormwater management program with the locality's related permitting programs. Staff will have to meet regularly with local staff to properly integrate project submissions, reviews, approvals, and permitting. Also, there is the initial workload associated with assisting localities in preparation of their program submittals for the Virginia Soil and Water Conservation Board and then on-going to assist with corrective actions following program reviews, etc.

- 74 DCR-run programs x 3 weeks/locality = 222 weeks x 40 hrs/week = 8,880 hrs
- 103 local-run programs x 1.5 weeks/locality = 154.5 weeks x 40 hrs/week = 6,180 hrs
- Staff estimate for program coordination = 15,060 hrs / 1,832 hrs/staff = 8.2 Staff
- Program management, EPA coordination, record oversight, permit tracking, reporting, regulatory coordination, and financial management = 4 Staff
- Total Program Coordination and Development support need = 12 FTE (8+4)

5. DCR Enforcement Actions – 7 FTE

DCR may become involved in enforcement where compliance is not achieved at the local level. The majority of enforcement actions are successful in their initial stages. However, some compliance issues are not resolved locally and require more significant enforcement responses in order to achieve compliance or extract penalties.

- 5,000 permits will be issued annually
- Enforcement actions equate to an average of 2.5 hours per permit
- Enforcement time = 12,500 hrs / 1,832 hrs/staff = 6.8 Staff
- Program Enforcement Action support needs = 7 FTE

6. Enterprise Website – 1FTE

DCR will develop and implement an enterprise website related to the implementation and tracking of the consolidated stormwater management program. The enterprise site will allow for online payment of fees, distribution of the fees paid to localities and DCR, general permit application and issuance, educational outreach and training, and program reporting. After the initial development and testing costs, DCR will have costs associated with the operation and maintenance of the enterprise site. These operation and maintenance costs are expected to total $100,000 per year to cover annual server and network costs.

- Enterprise Website support needs = 1 FTE and annual server and network costs

7. BMP Clearinghouse and Website – 1FTE

DCR will develop and oversee a BMP Clearinghouse and website to provide up-to-date information related to stormwater management practices and program guidance. The clearinghouse will require development and maintenance contracts with the Virginia Water Resources center at Virginia Tech. The anticipated costs associated with the oversight and maintenance of the clearinghouse is approximately $100,000 per year.

- BMP Clearinghouse and Website support needs = 1 FTE plus annual contract costs

Table A-19: Staff and Cost Computations for DCR Program Oversight

- Staff estimate for program oversight = 33 FTE * $35.46 per hour * 2080 hours per year = $2,433,974
- 33 FTE * $8,000 for administrative expenses including rent, utilities, computers, training, travel, printing expenses, etc. = $264,000
- Annual contract costs associated with enterprise website and BMP Clearinghouse = $200,000
- Total cost = $2,897,974

Total Revenue Needs for DCR Staffing and Program Implementation Related to the Municipal Separate Storm Sewer System (MS4) Program

In addition to the construction general permit that has been the focus of the calculations, DCR is also required to provide regulatory oversight of localities determined by the federal Clean water Act to be subject to regulation as a MS4. The MS4 program administration also requires significant effort on the part of DCR and cost estimates associated with the effective administration of the program may be found to Table A-20. The MS4 program permits 11 Phase I localities with individual permits and covers 86 entities under the Phase II general permit. The 86 entities include 44 localities (39 county, cities and towns and 5 public schools), 20 federal (military bases, medical centers, research centers, and a park), and 22 state (18 universities, colleges and community colleges, DMHMRSAS, medical schools, training centers, and VDOT).

Under today's fees, a Phase I locality pays $3,800 per year. That will increase to $8,800 per year under the proposed fees. Additionally, under the Phase II General Permit, an entity will pay $600 every five years. The proposed fee will be $4,000 per year.

Table A-20: MS4 Individual and General Permit Cost Estimates

Cost Estimates Required to Have an Effective and Responsive MS4 Program	
MS4 Phase I Individual Permits	
Description	Estimates
MS4 Phase I Program Estimated Annual Hours (5 staff x 2080 x 0.22)	2,288
Annual MS4 Program Cost Per Hour	$42.31
Annual MS4 Program Costs	$96,805.28
Total Number of Phase I Individual Permits	11
Amount Per Permit Necessary to Recoup Costs	$8,800.48
Proposed Annual Maintenance Fee	$8,800
MS4 Phase II General Permit	
Description	Estimates
MS4 Phase II General Permit Program Estimated Annual Hours (5 staff x 2080 x 0.78)	8,112
Annual MS4 Program Cost Per Hour	$42.31
Annual MS4 Program Cost	$343,218.72
Total Number of Phase II General Permit Registration Statements	86
Amount Per Registration Statement Necessary to Recoup Costs	$3,990.92
Proposed Annual Maintenance Fee	$4,000
MS4 Phase II Individual Permits	
Description	Estimates
MS4 Phase II Program Estimated Annual Hours	140
Annual MS4 Program Cost Per Hour	$42.31
Annual MS4 Program Cost	$5,923.40
Total Number of Phase II Individual Permits (Estimated cost per permit. No individual Phase II permits have been issued to date.)	1
Amount Per Permit Necessary to Recoup Costs	$5,923.40
Proposed Annual Maintenance Fee	$6,000
Total Revenue Needs for 5 MS4 Staff	$445,947
Total Annual Revenue Generated from Fees	$446,800

These calculations resulted in the MS4 permit maintenance fees found in 4VAC50-60-830. Under the current procedures in these regulations, these fees will be paid annually by an MS4 once it is established.

Should new MS4s be developed, these entities would be subject to the MS4s fees associated with new permit issuance in 4VAC50-60-800 and modifications pursuant to 4VAC50-60-810.

Table A-20a: MS4 Individual and General Permit Cost Estimates for new permits

Coverage Type	Today's issuance fee	Proposed issuance fee[5]	Today's modification fee	Proposed modification fee[4 and 5]
VSMP Municipal Stormwater/ MS4 Individual (Large and Medium)	$21,000	$16,000[1]	$10,650	$5,000
VSMP Municipal Stormwater/ MS4 Individual (Small)	$2,000	$8,000[2]	$1,000	$2,500
VSMP Municipal Stormwater/ MS4 General Permit (Small)	$600	$4,000[3]		

Note 1: 240 hours * $42 /hr. = $10,080 (permit development) + $5,600 (annual report review, audit, tech. assist., admin. assist., and permit redevelopment) = $15,680 (rounded to $16,000)
Note 2: 120 hours * $42 /hr = $5,040 (permit development) + $3,000 (annual report review, audit, tech. assist., admin. assist., and permit redevelopment) = $8,040 (rounded to $8,000)
Note3: This is the same as the annual maintenance fee calculated in Table A-20.
Note 4: Proposed modification fees were based on ½ of the permit development fee.
Note 5: For comparative purposes:

- DEQ's VPDES Industrial Major is $24,000 for issuance and $12,000 for modifications.
- DEQ's VPDES Industrial Minor/ No Standard Limits is $10,200 for issuance and $5,150 for modifications.
- DEQ's VPDES Industrial Stormwater is $7,200 for issuance and $3,600 for modifications.

As no new MS4s are known at this time, no revenue from this source has been included in these computations.

Total Revenue Needs for DCR Staffing and Program Implementation related to Construction and MS4 Activities

The combined computations associated with DCR stormwater management program oversight and DCR local program administration are presented in Table A-21 and indicate that DCR will require a total of 92 staff (FTE) and $7.7 million. If the administration of local programs is contracted out as is being considered, the cost may rise to $8.2 million.

Table A-21: DCR Total Staffing and Revenue Needs

Category	Staff (FTE)	Total Projected Cost per year
Construction: Program Oversight (From Table A-19)	33	$2,897,974
Construction: Administration of 74 local programs (From Table A-18)	54	$4,414,867
10% increase for contracting		$441,487
MS4: Program Oversight (From Table A-20)	5	$445,947
Totals	92	$8,200,275

Of the 92 stormwater staff identified above, DCR currently has 18 filled positions allocated solely to stormwater paid out of the existing revenue generated by fees and has another 8 stormwater allocated positions vacant. Insufficient fee revenue currently exists until the new fees are implemented to allow for the full filling of the currently authorized 26 positions in total. Once the

revenue stream begins, DCR will over several years need to request in the budget additional positions found necessary to fully implement the program as outlined in Appendix A, contract out with other entities to administer the programs, or both. (Contracting may be DCR's preferred alternative in order to better manage the implementation of the program.) DCR will also evaluate staffing in other related portions of the Agency and see where resources may be allocated to stormwater implementation at least in the short-term to allow a reasonable phase-in of program personnel. It should also be noted that should permit loads not meet the estimate, DCR would not require as many individuals to administer the program and would have lower costs (and commensurately less revenue would be generated). Out of the projected $8.2 million, DCR currently generates from fees about $1 million per year of this amount (See Table A-27).

Locality Staffing and Cost Need Computations

If 5,000 permits are issued annually and it is estimated that DCR will be administering 1,576 of these projects, the balance of 3,424 construction general permit coverages will be administered through locality administered local programs. The distribution of these permits by project size is presented in Table A-22. Additionally, Table A-22 takes the number of land disturbing activities per size category and multiplies it by the total plan review and inspection times calculated in Table A-13 to estimate the total number of hours for localities for program administration.

Table A-22: Estimated Distribution for Locality Construction General Permit Coverages and Calculations of Project Time

Project Size	Total permits (from Table A-10)	Percentage (from Table A-10)	Total Permits for localities	Hrs/ project (from Table A-13)	Hours
< 0.5 acres	1,354	27.1	928	5.50	5,104
≥ 0.5 acre, < 1acre	428	8.6	294	27.80	8,173
≥1 acre, < 5 acres	1,874	37.5	1,284	51.50	66,126
≥5 acres, < 10 acres	581	11.6	397	62.85	24,951
≥10 acres, < 50 acres	647	12.9	442	82.00	36,244
≥50 acres, < 100 acres	82	1.6	55	110.20	6,061
≥100 acres	34	0.7	24	170.20	4,085
Total # of Permits	5,000	100.0	3,424		150,744

The resulting hours per project category are then summed and the number of staff members and the amount of revenue necessary to support them are calculated (Table A-23).

For computational purposes the number of hours per employee (FTE) utilized was the same used for DCR. It was based on a full time employee 2080 hours (52 weeks * 40 hrs/ week) reduced by average sick, holiday, and annual leave to arrive at a value of 1,832 hrs/ FTE/ year.

Table A-23: Staff and Cost Computations for Locality Administered Local Programs

- Staff Estimate for program administration (from Table A-22) = 150,744 hrs / 1,832 hrs per FTE = 82 FTE
- Staffing Costs (based on current average salary and benefits translated to an hourly wage) = 82 FTE * $35.46 per hour * 2,080 hours per year = $6,048,058
- 82 FTE x $8,000 for administrative expenses including rent, utilities, computers, training, travel, printing expenses, etc. = $656,000
- Total cost = $6,704,058

Fee Establishment Computations

Table A-21 outlines DCR's need for approximately $7.3 million in revenue to cover expenses associated with the construction general permit (MS4 expenses removed) and similar calculations for localities in Table A-23 indicate a need for $6.7 million to cover expenses. Taken together, this equates to the need to establish sufficient construction permit fees to cover approximately $14 million in administrative services. The responsibilities associated with implementation of the Statewide Stormwater Management Program driving these cost estimates are summarized in Table A-24.

Table A-24: Summary of Locality and DCR Responsibilities Associated with Implementation of a Statewide Stormwater Management Program

Permit Fee Breakdown	Activity	Locally Required or Adopted Program (103 Programs)	DCR Run Program (74 Programs)
72%	site plan review	local	DCR
	site plan approval	local	DCR
	permit issuance	local	DCR
	site inspection	local	DCR
	enforcement	local	DCR
	permanent BMP approval	local	DCR
	permanent BMP monitoring	local	DCR
	permit reporting and accounting	local	DCR
28% (Oversight and assistance to 177 Programs)	program audit	DCR	DCR
	program technical assistance	DCR	DCR
	complaint resolution	DCR	DCR
	program development & mgmt	DCR with localities	DCR
	permit issuance coordination	DCR with localities	DCR
	enforcement	DCR	DCR
	enterprise website	DCR	DCR
	BMP clearing house	DCR	DCR

The Code of Virginia specifies that fees shall be set at a level sufficient to carry out the responsibilities outlined in Table A-24. Additionally, the Stormwater Management Law allows for DCR to retain funding from the construction general permit coverage fees (no more then 30%) to cover the costs of administering and providing oversight of the statewide stormwater management

program. It should be noted that the proposed fees utilize a 28/72% split between the Department and the qualifying local programs, less than authorized by the Code of Virginia.

Utilizing the per project plan and inspection costs calculated in Table A-14 and adding to this the estimated oversight costs (28%), the necessary fees were calculated. The resulting numbers were then rounded, as it was recommended by the TAC, as rounded numbers were easier for payment management. The resulting fees are presented in Table A-25. The fees have been established commensurate with the services projected to be rendered and are both justifiable and necessary to properly implement a statewide stormwater management program. However, revenue generated by both the localities and the Department will be periodically assessed to ensure that the fees have been appropriately set and the fees may be adjusted (either up or down) through periodic regulatory actions should significant deviations become apparent (specified in proposed fee regulations). At the request of localities, language was also placed in the proposed fee regulations that should a locality be able to demonstrate to the Board that they can successfully implement a program without full implementation of the fees, the Board may authorize for that locality the establishment of a lower fee provided that such reduction shall not reduce DCR's oversight portion.

It should also be noted that the fees collected by the Agency for program oversight (28%) do not reduce in any manner the amount calculated as necessary for a local government to run a qualifying local program as that portion of the fees has been set to cover 100% of the estimated local program costs per calculations outlined in Table A-14. In other words, the 72% retained by the locality should be sufficient for a locality (or DCR) to administer a local program. Additionally, there is nothing in the law or regulations that would preclude a locality from establishing additional fees under other authorities granted to localities.

Table A-25: Proposed Construction General Permit Coverage and Individual Permit Fees including Associated Annual Permit Maintenance and Modification/ Transfer Fees

	Local Program Share (72%) (From Table A-14)	Proposed General Permit Coverage Fee[1] (100%)	Permit Maintenance Fee	Modification or Transfer Fee
VSMP General / Stormwater Management – Small Construction Activity/Land Clearing [Sites within designated areas of Chesapeake Bay Act localities with land disturbance acreage equal to or greater than 2,500 square feet and less than 0.5 acre]	$210	$290	$50	$20
VSMP General / Stormwater Management - Small Construction Activity/Land Clearing [Areas within common plans of development or sale with land disturbance acreage less than 1 acre]	$210	$290	$50	$20
VSMP General / Stormwater Management - Small Construction Activity/Land Clearing [Sites within designated areas of Chesapeake Bay Act localities with land disturbance acreage equal to or greater than 0.5 acre and	$1,073	$1,500	$200	$100

less than 1 acre]				
VSMP General / Stormwater Management - Small Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 1 acre and less than 5 Acres]	$1,971	$2,700	$400	$200
VSMP General / Stormwater Management – Large Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres]	$2,427	$3,400	$500	$250
VSMP General / Stormwater Management – Large Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres]	$3,207	$4,500	$650	$300
VSMP General / Stormwater Management – Large Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres]	$4,357	$6,100	$900	$450
VSMP General / Stormwater Management – Large Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 100 acres]	$6,877	$9,600	$1,400	$700
VSMP Individual Permit for Discharges of Stormwater From Construction Activities		$15,000	$3,000	$5,000

Note 1: This column was calculated by adding DCR's 28% oversight costs to the permit and plan review calculations in the preceding column.

The annual maintenance fees also presented in Table A-25 are generally about 15% of the initial fee and represent the approximate costs associated with continued inspections and enforcement that may be associated with a project that is not completed and terminated within the first year. The modification or transfer fees are accordingly set lower yet to cover the administrative costs associated with this activity except in the case of individual permits where modification or transfer could have a substantial workload associated with it.

The Municipal Separate Storm Sewer System (MS4) program also required a new fee structure to address the costs presented in Table A-21. Table A-26 presents the MS4 related fees contained in the proposed regulations.

Table A-26: Proposed MS4 General Permit Coverage and Individual Permit Fees including Associated Annual Permit Maintenance and Modification Fees

	New Permit Coverage Fee	Permit Maintenance Fee	Major Modification Fee
VSMP Municipal Stormwater / MS4 Individual (Large and Medium)	$16,000	$8,800	$5,000
VSMP Municipal Stormwater / MS4 Individual (Small)	$8,000	$6,000	$2,500
VSMP Municipal Stormwater / MS4 General Permit (Small)	$4,000	$4,000	na

Today's existing fees associated with issuance of construction general permit coverage are $500 for sites or common plans of development equal to or greater than 5 acres and $300 for those sites or common plans of development equal to or greater than 1 acre and less than 5 acres. No fee is currently assessed for projects between 2,500 square feet and less than an acre. No annual maintenance fees or modification/ transfer fee exists. No fee for construction individual permits or associated maintenance fees exists. Under the MS4 portion of the program, existing fees included $21,300 for an individual large and medium permit, $2,000 for an individual small, and $600 for MS4 general permit coverage. As with construction, no annual permit maintenance fee exists except for the MS4 individual (large and medium) that is $3,800 per year.

The current revenue generated by these existing construction and MS4 fees is presented in Table A-27.

Table A-27: Annual Revenue Generated by Stormwater Management Permit Fees

Fiscal Year	Total Permit Fee Revenue Generated[1]	MS4 Fee Revenue	Construction General Permit Revenue	Penalties
FY2005	$327,393.00	$0.00	$327,393.00	0
FY2006	$1,062,577.93	$41,800.00	$1,020,777.93	0
FY2007	$1,038,014.00	$46,000.00	$992,014.00	0
FY2008	$1,054,558.85	$93,400.00	$961,158.85	0
FY2009 (to date)	$408,784.30	$41,800.00	$366,984.30	$197,739.00
Average Annual Revenue (FY06-08)	$1,051,716.93	$60,400.00	$991,316.93	

Note 1: Total Permit Fee Revenue = MS4 Fee Revenue + Construction General Permit Revenue

As noted, both localities (MS4) and developers (Construction) will pay more under the proposed fees than they pay today under the existing fees. It is estimated that of the annual revenue on average, $60,400 is from MS4 permits and $991,316 from Construction permits.

Comparison of DCR and Locality Revenue Needs Versus Revenue Generation from Proposed Fees

Utilizing the 5,000 permit estimate, the total estimated revenue for construction general permit coverages administered by localities was calculated in Table A-28. The resulting value was $5.8 million from that source that localities would receive (72% of the revenue generated).

Table A-28: Estimated Revenue Generated by Localities Associated with Construction General Permit Coverage Issuance

Project Size	Total permits (from Table A-10)	Percentage (from Table A-10)	Total Permits for localities (from Table A-22)	Cost of permit (from Table A-25)	Revenue Generated
< 0.5 acres	1,354	27.1	928	$290	$269,120
≥ 0.5 acre, < 1acre	428	8.6	294	$1,500	$441,000
≥1 acre, < 5 acres	1,874	37.5	1,284	$2,700	$3,466,800
≥5 acres, < 10 acres	581	11.6	397	$3,400	$1,349,800
≥10 acres, < 50 acres	647	12.9	442	$4,500	$1,989,000
≥50 acres, < 100 acres	82	1.6	55	$6,100	$335,500
≥100 acres	34	0.7	24	$9,600	$230,400
Total # of Permits	5,000	100.0	3,424		$8,081,620
Localities' 72% of Fees to operate 103 programs					$5,818,766

Also using the 5,000 permit estimate, the total estimated revenue for construction general permit coverages administered by DCR was calculated in Table A-29. DCR's data was scaled to only projects greater than 1-acre in size, as that is generally the required size in the non-Bay Act localities. The resulting value was $3.8 million from that source that DCR would receive (72% of the revenue generated).

Table A-29: Estimated Revenue Generated by DCR Associated with Construction General Permit Coverage Issuance

Project Size	% of Total (from Table A-17)	# of permits (from Table A-17)	Permit Cost (from Table A-25)	Revenue Generated
≥1 acre, < 5 acres	58.2	917	$2,700	$2,475,900
≥5 acres, < 10 acres	18.1	285	$3,400	$969,000
≥10 acres, < 50 acres	20.1	317	$4,500	$1,426,500
≥50 acres, < 100 acres	2.5	40	$6,100	$244,000
≥100 acres	1.1	17	$9,600	$163,200
		1,576		$5,278,600
DCR's 72% of Fees to operate 74 programs				$3,800,592

The estimated revenue to DCR for oversight responsibilities was based on 28% of all revenue generated and amounted to $3.3 million (Table A-30).

Table A-30: Estimated Revenue Generated by DCR Associated with Construction General Permit Program Oversight

Project Size	Total permits (from Table A-10)	Cost of permit (from Table A-25)	Revenue Generated
< 0.5 acres	1,354	$290	$392,660
≥ 0.5 acre, < 1acre	428	$1,500	$642,000
≥1 acre, < 5 acres	1,874	$2,700	$5,059,800
≥5 acres, < 10 acres	581	$3,400	$1,975,400
≥10 acres, < 50 acres	647	$4,500	$2,911,500
≥50 acres, < 100 acres	82	$6,100	$500,200
≥100 acres	34	$9,600	$326,400
Total # of Permits	5,000		$11,807,960
DCR's 28% of Fees			$3,306,229

Table A-31 outlines the necessary staff, projected costs to DCR and the revenue expected to be generated by fees for DCR.

Table A-31: DCR Total Costs and Revenue Calculations

Category	Staff (FTE)	Total Projected Cost	Revenue
Construction: Program Oversight	33 (From Table A-19)	$2,897,974 (From Table A-19)	28% = $3,306,229 (From Table A-30)
Construction: Administration of 74 local programs	54 (From Table A-18)	$4,414,867 (From Table A-18)	72% = $3,800,592 (From Table A-29)
10% increase for contracting		$441,487	
Construction: Maintenance Fees Generated	0		$477,768 (From Table A-36)
MS4: Program Oversight (From Table A-20)	5	$445,947	$446,800
Fees generated from the 5% of projects that have plan review but do not seek General Permit coverage (1/2 fee) [1,576 *.05] = 78 * $2,412[1]*.5 = $94,068	0		$94,068
Totals	92	$8,200,275	$8,125,457

Note 1: $3,800,592 (from Table A-29) / 1,576 = $2,412

Table A-32 outlines the necessary staff, projected costs for localities and the revenue expected to be generated by fees for localities.

Table A-32: Locality Total Costs and Revenue Calculations

Category	Staff (FTE)	Total Projected Cost	Revenue
Administration of 103 local programs	82 (From Table A-23)	$6,704,058 (From Table A-23)	72% = $5,818,766 (From Table A-28)
Construction Maintenance Fees Generated	0		$703,792 (From Table A-36)
Fees generated from the 5% of projects that have plan review but do not seek General Permit coverage (3,424*.05) = 171 * $1,699[1] * .5 = $145,265			$145,265
Totals	82	$6,704,058	$6,667,823

Note 1: $5,818,766 (from Table A-28) / 3,424 = $1,699

Table A-33 calculates for all construction projects not completed within a year the percentage distribution of projects by project acreage categories. This information is then utilized in Table A-34 and A-35 to calculate the amount of maintenance fees that localities and DCR would respectively receive. Table A-36 continues this concept and calculates (utilizing an average percentage per year) how much revenue in maintenance fees would be brought in by localities and DCR based on projects continuing for a number of years. The database indicates that almost all projects are routinely expected to be completed within a 10-year period and that 99% are completed within five years and 89% within 2 years.

Table A-33: Estimation of Projects Not Expected to be Completed Within One-Year that would be Subject to Maintenance Fees

Project Size	Permits > 365 days	All Permits[1]	% of projects > 365 days
< 0.5 acres	100	757	13.2
≥ 0.5 acre, < 1acre	117	622	18.8
≥1 acre, < 5 acres	986	3503	28.1
≥5 acres, < 10 acres	606	1347	45.0
≥10 acres, < 50 acres	996	1724	57.8
≥50 acres, < 100 acres	178	244	73.0
≥100 acres	99	121	81.8
Total # of Permits	3082	8318	37.0

Note 1:Based on all permits in the database where an estimated start and completion date have been provided.

Table A-34: Estimated Revenue Generated by Localities Associated with Construction General Permit Coverage Maintenance Fees > 365 days

Project Size	Total Permits for localities (from Table A-22)	Maintenance Permit Fee (from Table A-25)	Revenue Generated	% of projects > 365 days (from Table A-33)	Maintenance Fee Revenue from projects > 365 days
< 0.5 acres	928	$50	$46,400	13.2	$6,125
≥ 0.5 acre, < 1acre	294	$200	$58,800	18.8	$11,054
≥1 acre, < 5 acres	1,284	$400	$513,600	28.1	$144,322
≥5 acres, < 10 acres	397	$500	$198,500	45.0	$89,325
≥10 acres, < 50 acres	442	$650	$287,300	57.8	$166,059
≥50 acres, < 100 acres	55	$900	$49,500	73.0	$36,135
≥100 acres	24	$1,400	$33,600	81.8	$27,485
Total # of Permits	3,424		$1,187,700		$480,505

Table A-35: Estimated Revenue Generated by DCR Associated with Construction General Permit Coverage Maintenance Fees >365 days

Project Size	# of permits (from Table A-17)	Maintenance Permit Fee (from Table A-25)	Revenue Generated	% of projects > 365 days (from Table A-33)	Maintenance Fee Revenue from projects > 365 days
≥1 acre, < 5 acres	917	$400	$366,800	28.1	$103,071
≥5 acres, < 10 acres	285	$500	$142,500	45.0	$64,125
≥10 acres, < 50 acres	317	$650	$206,050	57.8	$119,097
≥50 acres, < 100 acres	40	$900	$36,000	73.0	$26,280
≥100 acres	17	$1,400	$23,800	81.8	$19,468
	1,576		$775,150		$332,041

Table A-36: Estimated Revenue Generated by DCR Associated with Construction General Permit Coverage Maintenance Fees for Life Expectancy of Projects

# of days Project Estimated to Last	# of Permits in Sample	Average % of Sample Exceeding Date	Locality Revenue	DCR Revenue
	8,348		$1,187,700	$775,150
Portion Subject to Maintenance Fees				
> 365	3,092	37.0	$480,505 (from Table A-22)	$332,041 (from Table A-22)
> 730	960	11.5	$136,586	$89,142
> 1095	325	3.9	$46,320	$30,231
> 1460	137	1.6	$19,003	$12,402
> 1825	56	0.7	$8,314	$5,426
> 1950	33	0.4	$4,751	$3,101
> 2555	18	0.2	$2,375	$1,550
> 2920	14	0.2	$2,375	$1,550
> 3285	13	0.2	$2,375	$1,550
> 3650	7	0.1	$1,188	$775
> 4015	3	0	$0	$0
Sub Total			$703,792	$477,768

Comparison of Revenue Generated from Existing Fees Versus Revenue Generation from Proposed Fees

Computations in Table A-27 indicated DCR currently generates on average $1,051,716 per year although there is expectations that revenue will decline this year with the sagging economy. This revenue is comprised of $60,400 from MS4 permits and $991,316 from construction permits

Table A-31 indicates that DCR's projected revenue from the new fees would be $8,131,457 comprised of $446,800 in fees from MS4s and $7,684,657 in fees from construction. Additionally the revenue to localities is estimated in Table A-32 to be $6,667,823 from construction. The total fee revenue generated will therefore be $14,799,280 per year. This represents an increase in fee revenue of $13,747,564. Of this amount, the increase from MS4s is $386,400 and $13,361,164 from construction.

Additional Expenses Associated with Training and Certification Independent of the Fees

Locality and DCR staff implementing the consolidated stormwater management program will require training on stormwater management principles and practices. A certification program will be required for locality and DCR staff. The development and implementation of the training program is expected to cost approximately $250,000 per year. It should be noted the costs of the training and certification program will be covered by fees for class attendance and exams and is not considered to be included in the 28% program oversight fees, nor are the FTE that would be necessary to administer the training program.

Additional Expenses Associated with Development of the Enterprise Website

In order to facilitate smooth transmittal of permit data, permit coverage issuance, reporting, applying for permits, payment and tracking of fees, BMP tracking, training, and the delivery of

other services, the Department is working on the design of an Enterprise website. The cost of developing the database is unknown at this time but could be in the neighborhood of $1 million. The source of this funding is unknown at this time but may require a special appropriation from the General Assembly.

APPENDIX B

Economic Impact Analysis of Revisions to the Virginia Stormwater Regulation

Final Report[1]

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Economic Impact Analysis of Revisions to the Virginia Stormwater Regulation

Outline

Economic Impact Analysis of Revisions to the Virginia Stormwater Regulation

The Virginia Soil and Water Conservation Board (Board), with the assistance of the Virginia Department of Conservation and Recreation (DCR), proposes a comprehensive revision of Virginia's regulations regarding the control and treatment of stormwater runoff from land development activities. The purpose of this document is to review the possible economic impact of the proposed regulation to the state of Virginia. Part I of this analysis will describe the existing stormwater regulation and proposed revisions. The cost of the proposed changes to the private sector, local governments, and state agencies is analyzed in Part II. The types of benefits citizens of the Commonwealth might receive under the proposed changes are also qualitatively described in Part II.

I. Overview of Existing and Proposed Stormwater Regulations in Virginia

1. Summary of relevant existing regulations

Currently local governments administer local erosion and sediment control (E&S) requirements (runoff from construction activities) under 4VAC50-30-30. The regulations list 19 minimum standards that must be met, including some volume control requirements (4VAC50-30-40.19). To protect existing stream channels, the regulations state that if existing natural channels are not adequate, stream channels shall be improved to contain a 10-year storm and to ensure that a 2-year storm does not erode the channel or banks or to meet the pre-development peak runoff rate from a 2-year storm (discharging into a natural channel).

Virginia also has an existing stormwater management program. Local governments identified in the Chesapeake Bay Preservation Act (see below) and localities permitted under the Board's MS4 program are required to adopt a local stormwater management program (§10.1-603.3). As outlined in the existing stormwater regulations, all local stormwater management programs must meet a set of general criteria (4VAC50-60-50 and 60). The general criteria establish general engineering practices, compliance with erosion and sediment control law, and inspection and maintenance plans for all stormwater management facilities. In addition, all stormwater water management programs must contain provisions to prevent flooding of downstream properties, based primarily on preventing the 10-year post development peak flow from exceeding the 10-year pre-development peak flow (4VAC50-60-80).

Existing state stormwater regulations contain provisions to limit channel erosion (4VAC50-60-70) and improve stormwater runoff quality (4VAC 50-60-60). The regulations identify water quality criteria for any land-disturbing activity. The water quality criteria can be met with "performance-based" criteria or "technology-based" criteria. The performance based criteria (4VAC 50-60-60B) are generally as follows:

- No reduction in the after disturbance pollution is required if existing land cover is less than average land cover condition (assumed to be 16% impervious cover or as established by local stormwater management program).
- Pollutant discharge shall not exceed the existing pollutant discharge (average land cover) in situations where the pre-development percent impervious cover is less than the average land cover condition, but post development impervious cover will exceed average land cover condition.
- Pollutant discharge after disturbance must be 10% less than existing conditions in situations where land disturbing activities occur on land with percent impervious cover exceeding average land condition.
- Pollutant discharge after disturbance cannot exceed existing pollutant discharge for land served by an existing stormwater best management practice (BMP).

Compliance with water quality criteria can also be achieved by applying technology based criteria. The technology-based criteria identify a variety of BMPs that can be used to treat post development stormwater runoff (4VAC 50-60-60C). The BMPs must be designed to meet the pollutant removal efficiencies identified in the regulation.

Under both state law and the federal Clean Water Act, the Department also regulates construction activity of size (land disturbing activities of one acre or greater, except in all areas of the jurisdictions designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations, where activities of 2,500 square feet or greater are regulated), statewide through the General Permit for Discharges of Stormwater from Construction Activities. In 2004 the General Assembly assigned state stormwater regulatory responsibility to the Board and DCR and instructed the Board to "protect the water quality and quantity of state waters from potential harm of unmanaged stormwater." (§10.1-603.2:1). Under this legislation, the Board has expanded stormwater water quality and quantity criteria (defined above) and stormwater pollution prevention plan requirements to the rest of the state under the auspices of the general permit coverage (4VAC50-60-1170, Section II.D.2.c.1).[2]

The Chesapeake Bay Preservation Act (§§10.1-2103-2107) and regulations (9 VAC 10-20-10 et seq.) requires local governments to develop plans to protect waters in designated areas (called Chesapeake Bay Preservation Areas) identified as 29 counties, 17 cities, and 38 towns in the eastern portion of the Bay watershed.[3] Stormwater requirements must be consistent with water quality provisions in the stormwater management regulations (described above). The regulations require a no net increase in pollution from predevelopment levels for any new development or redevelopment that has a water quality BMP; or achieve a 10% reduction in NPS pollution from redevelopment lands without an existing BMP (9VAC 10-20-110). The regulation also allows compliance through a "regional stormwater management program" that achieves equivalent water quality results (9 VAC 10-20-120.8(a2)). The regulations also allow localities to designate certain areas as "Intensely Developed Areas".[4] Local government can subject all land within an IDA to the redevelopment stormwater criteria (9 VAC10-20-100). In addition, regulations require riparian buffers in Resource Protection Areas along perennial streams, tidal wetlands/shores, and nontidal wetlands connected to streams. General performance criteria require minimizing land disturbance, preserving indigenous vegetation, and minimizing impervious cover to maximum extent practicable. Land disturbances exceeding 2,500 ft^2 are subject to these requirements.

Some local governments over a certain population size (Phase I) or located in Urbanized Areas as defined by the U.S. Census Bureau(Phase II) that operate a municipal separate storm sewer drainage system (MS4) must also administer a stormwater program under the federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) regulatory program.

Stormwater discharges from Phase I municipal separate storm sewer systems are authorized under individual VSMP permits that require the MS4 owner/operator to implement a collective series of programs to control the discharge of pollutants from its storm sewer system to the maximum extent practicable in a manner that protects the water quality of nearby streams, rivers, wetlands and bays. These programs must include elements to: 1) Operate and maintain structural stormwater controls; 2) Control discharges from areas of new development and significant redevelopment; 3) Operate and maintain public streets, roads, and highways; 4) Identify, monitor and control discharges from municipal waste treatment, storage, or disposal facilities; 5) Control pollutants related to application of pesticides, herbicides, and fertilizers; 6) Implement an inspection program to enforce ordinances, which prohibit illicit connections and illegal dumping into the MS4; 7) Screen the MS4 for illicit connections and illegal dumping; 8) Implement standard investigative procedures to identify and terminate sources of illicit

[2] "(1) The SWPPP shall include a description of, and all necessary calculations supporting, all post-construction stormwater management measures that will be installed during the construction process to control pollutants in stormwater discharges after construction operations have been completed. Structural measures should be placed on upland soils to the degree attainable. Such measures must be designed and installed in accordance with applicable local and/or state requirements."

[3] Counties of Accomack, Arlington, Caroline, Charles City, Chesterfield, Essex, Fairfax, Gloucester, Hanover, Henrico, Isle of Wight, James City, King George, King and Queen, King William, Lancaster, Mathews, Middlesex, New Kent, Northampton, Northumberland, Prince George, Prince William, Richmond, Spotsylvania, Stafford, Surry, Westmoreland, and York. Cities of Alexandria, Chesapeake, Colonial Heights, Fairfax, Falls Church, Fredericksburg, Hampton, Hopewell, Newport News, Norfolk, Petersburg, Poquoson, Portsmouth, Richmond, Suffolk, Virginia Beach, and Williamsburg. Towns within the Tidewater area of the state are also subject to these regulations. Map at:
http://www.dcr.virginia.gov/chesapeake_bay_local_assistance/abtprogram_Tidewater_map.shtml

[4] To be designated IDA, an area one of the following conditions must be met: 1) area is at least 50% impervious, 2) currently served by public water, sewer, or constructed stormwater drainage, or 3) housing density of at least 4 dwelling units per acre.

connections or discharges; 9) Prevent, contain, and respond to spills that may discharge into the MS4; 10) Limit the infiltration of sanitary seepage into the MS4; 11) Identify, monitor and control discharges from municipal landfills; 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 determines are contributing a substantial pollutant loading to the MS4; 12) Control pollutants in construction site runoff; and, 13) Conduct public education regarding stormwater. Phase I covers large and medium size municipalities (populations exceeding 100,000) and includes Arlington County, Chesapeake, Chesterfield County, Fairfax County, Hampton, Henrico County, Newport News, Norfolk, Portsmouth, Prince William County, and Virginia Beach.

The Phase II MS4 regulations require that MS4 programs establish six minimum control measures: 1) public education for stormwater impacts; 2) public involvement/ participation, 3) illicit discharge detection and elimination, 4) construction site stormwater runoff control, 5) post-construction stormwater management in new development and redevelopment, and 6) pollution prevention/good housekeeping for municipal operations. The MS4 program is being implemented in 2 phases. Phase 2 extends permit coverage to smaller jurisdictions with separate storm sewer systems and located in Urbanized Areas (Blacksburg, Bristol, Charlottesville, Danville, Fredericksburg, Harrisonburg, Lynchburg, Richmond, Roanoke, and Winchester areas). The federal program does not establish numeric limits for MS4 permit holders, but rather requires localities to identify actions and practices to reduce discharge of pollutants to the "maximum extent practicable" and to protect water quality. All MS4 programs in Virginia, however, must also ensure that new development and redevelopment projects demonstrate consistency with the technical criteria described in the state stormwater regulations, but are not necessarily required to review site plans for stormwater quality.[5]

2. Summary of proposed regulations

The state proposes modifications to the existing stormwater water quantity and quality requirements that will be applied to every land disturbing activity not exempted by state law (§10.1-603.8B).[6] Land disturbing activity subject to this regulation generally includes disturbances of 2,500 ft^2 or more in the Chesapeake Bay Preservation Act areas and disturbances of an acre or more elsewhere in the state (with some smaller areas included when a part of a larger common plan of development or sale).

The proposed regulations establish statewide water quality design criteria for land disturbing activities. For new land development projects, water quality plans must be designed so that the total phosphorus load shall not exceed 0.28 pounds per acre per year (4VAC50-60-63). The phosphorus load criterion was derived from Chesapeake Bay Tributary Strategies and reductions needed to achieve Bay-wide nutrient reductions derived from the Chesapeake Bay 2000 Agreement. The 0.28/lb/yr phosphorus design criteria represents the average per acre edge of field loading from agriculture, forest and mixed open land uses (estimated from Chesapeake Bay Program watershed model) if the 2005 tributary strategies input deck was fully implemented (DCR 2008). For development that occurs on prior developed land, the designs must allow for the total phosphorus loads to be reduced by 20% below predevelopment levels. While the Chesapeake Bay Tributary Strategies called for phosphorus reductions exceeding 40%, a lower water quality criteria for redevelopment was chosen 1) to achieve additional load reductions from urban areas over existing regulations, and 2) to avoid higher barriers to redevelopment. No explicit sediment or nitrogen water quality design criteria were established because it was determined that the stormwater management practices used to achieve the necessary phosphorus reductions would also result in reductions of nitrogen, sediment, and other potential pollutants.

Compliance is determined by implementing control practices outlined in 4VAC50-60-65. The revisions provide three general ways to reduce phosphorus loads: 1) managing land use conversion (forest, turf, and impervious cover), 2) reducing runoff volumes, and 3) treatment of stormwater runoff. An initial list of best management practices that can be used to achieve the phosphorus criteria are listed in 4VAC50-60-

[5] Personal communication, Doug Fritz, DCR MS4 Program Manager, September 8, 2008.
[6] Exemptions under this regulation include land disturbing activities generally associated with agricultural, forest, and mining activities (§10.1-603.8B). Road projects may also be exempted if certain minimal impacts can be demonstrated.

65B. Other BMPs available to comply with the stormwater requirements are listed on the new Virginia Stormwater BMP Clearinghouse website (http://www.vwrrc.vt.edu/swc). The removal efficiency of each BMP includes phosphorus removal from treating the pollutant concentration in the stormwater as well as the percent removal achieved by preventing runoff from occurring (based upon 1 inch of rainfall, 90% storm). The addition of the runoff reduction potential of individual stormwater control practices reflects a substantive change over the existing regulation. Similar to existing practice, the calculation of phosphorus loads is based primarily on the "simple method" (see Virginia Stormwater Handbook) that relates phosphorus load to total impervious surface. The simple method calculation, however, is modified by adding phosphorus loading coefficients for turf and forest land cover. To assist in determining compliance, DCR has also developed an Excel stormwater compliance spreadsheet.

Water quantity control requirements (4VAC50-60-66) establish minimum standards for downstream flood protection and stream channel protection. The proposed regulation establishes different criteria based on the condition of the existing stormwater conveyance systems. Four general classifications of conveyance systems are identified: 1) man-made conveyance systems, 2) restored streams (designed to restore natural steam channels), 3) stable natural stream channels, and 4) unstable natural stream channels. For stream channel protection, general water quantity criteria are (4VAC50-60-66A):

- Man-made conveyance: stormwater releases following land disturbing activity conveys post-development peak flow from 2-year, 24-hour storm without causing erosion.
- Restored stream channel: runoff following land disturbing activity will not exceed design of the restored stormwater conveyance system or result in instability of that system.
- Stable natural stream channel: will not become unstable as a result of the peak flow from the 1-year, 24-hour storm and provides a developed peak flow rate equal to the pre-developed flow rate times the pre-developed runoff volume divided by the developed runoff volume.
- Unstable natural steam channel: runoff following a land-disturbing activity shall be released into a channel at or below a peak developed flow rate based on the 1-year 24-hour storm where the developed peak flow rate is equal to the peak flow rate from the site in a forested condition times the volume of runoff from the site in a forested condition divided by the developed runoff volume,.

For flood protection, general water quantity criteria are (4VAC50-60-66B):

- Man-made conveyance must confine the post development peak flow rate from the 10-year, 24-hour storm.
- Restored stream channel: Peak flow rate from the 10-year, 24-hour storm following the land disturbance will be confined within the system.
- Natural stream channel that does not currently flood during a 10-year, 24-hour storm: Post development peak flow from the 10-year, 24-hour storm is confined within the system.
- Natural steam channel where localized flooding exists during a 10-year, 24-hour storm: Post development peak flow rate for 10-year, 24-hour storm shall not exceed predevelopment peak flow from the area under forested conditions.

These criteria do not have to be met under certain conditions where the land disturbance is small relative to the size of the drainage area or results in small contributions to overall peak flow (4VAC50-60-66C). It is also possible that runoff volume reduction achieved through the implementation of water quality control practices would be sufficient to reduce or avoid the need for water quantity controls.

The proposed regulation allows, in certain situations, water quality and quantity objectives to be met off-site from the disturbed site. Section 4VAC50-60-65F and G allow land disturbers to meet water quality criteria off-site. Specifically, the proposed regulations provide that off-site controls "shall achieve the required pollutant reductions either completely off-site in accordance with the plan or in a combination of on-site and off-site controls." In localities with an approved comprehensive watershed management plan (4VAC50-60-96), offset activities can occur within the same HUC[7] or any locally designated watershed. Without such a plan, offsite controls may be allowed, but must be located within the same HUC or

[7] "Hydrologic Unit Code" or "HUC" means a watershed unit established in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset. Sixth order HUC range in size from 10,000 to 40,000 acres. See http://www.dcr.virginia.gov/soil_&_water/hu.shtml

adjacent downstream HUC to the land disturbing site (4VAC50-60-65.G.4). In addition, water quantity objectives could also be met offsite if a locality has a Board approved watershed stormwater management plan and equivalent off-site reductions are demonstrated. In areas with approved watershed plans, localities are also permitted to develop a pro rata fee program. Such a program allows land disturbers to pay a per unit fee ($ per pound of P) to meet all or a portion of a regulatory requirement. Fee funds must be used, by Virginia Code requirements (§15.2-2243), to fund actions to achieve equivalent results offsite. Local programs administered by DCR would not have fee system and must confine water quality offset activities within, or adjacent to, the impacted HUC. Additionally, the regulations also provide for a request for an exception that may be granted by a local program in accordance with 4VAC50-60-122.

Linear (road) projects are also subject to the water quality and quantity requirements (VAC 50-60-76). Unless exempt from §10.1-603.8B, linear development projects shall "control post-development stormwater runoff in accordance with a site-specific stormwater management plan or a comprehensive watershed stormwater management plan developed in accordance with these regulations"

The proposed regulations also require a stormwater management plan for land disturbing activities. The plan applies the water quality and quantity technical criteria to the land disturbance (4VAC50-60-93).

*Program Administration and Permitting**:*** The proposed regulation establishes the requirements for local governments that are required to assume the primary authority to administer the provisions of the proposed regulations as well as for those localities that may elect to administer a program (4VAC50-60-104). DCR's aim is to encourage local governments (counties, cities, and towns) that are not required to administer a program to voluntarily assume this responsibility. Local governments developing a qualifying program must administer the stormwater program in accordance with general criteria outlined in Part IIIA. In general, a local qualifying program must provide

- technical criteria to be used in the qualifying local program;
- procedures for the submission and approval of stormwater management plans (4VAC50-60-108)
- assessment and collection of fees;
- inspection and monitoring of land disturbing activities (generally 4VAC50-60-114);
- procedures and policy for long-term inspection and maintenance of stormwater facilities (4VAC 50-60-124);
- reporting and record keeping (4VAC30-60-126); and
- enforcement (4VAC30-60-116).

If the local government elects not to administer a program, DCR is required to assume the basic responsibilities of program implementation and administration described above (Part IIIB).

The regulations also define state oversight responsibilities for the Board and DCR. Section 4VAC50-60-159 describes the general procedure and requirements the Board must use for authorizing a locality to administer a stormwater management program. Once a locality is approved to administer a stormwater management program, section 4VAC50-60-157 describes Board oversight of that program. The Board must review all administered stormwater programs a minimum of once every 5 years (including those administered by DCR). The review will generally consist of reviewing approved site development plans, inspection and enforcement activities, and fee accounting practices. The Board is authorized to pursue corrective actions for noncompliant local programs.

II. Anticipated Economic Impact of the Proposed Regulation

The proposed regulations will generally increase the cost of most land disturbing activities across the entire state. These costs will be incurred by land developers and private landowners for construction and long-term maintenance. Additional costs also will be incurred by local governments and DCR when administering stormwater management programs. Public resources include costs for stormwater plan review and approval, pre and post-construction BMP inspections, tracking/record-keeping, and

enforcement (see Section 4). State administrative and program oversight is also required of locally administered programs (Section 5).

To the extent possible, regulatory impact analysis must evaluate and compare behavioral changes, outcomes, and costs of the proposed regulation to the conditions that would exist without the proposed regulation. Unless otherwise noted, the without (reference) condition is the set of existing Virginia and federal regulations that apply to stormwater management (defined above). Given to the project site-by-site differences related to stormwater control designs, the high degree of variability in costs associated with BMP selection, local program allowances, and off-site alternatives, no comprehensive cost estimate of the proposed regulatory change could be produced. To the extent possible, the analysis compares different stormwater water quality and quantity criteria requirements to the existing regulations in order to illustrate how opportunity costs may change due to the regulatory revisions. Case scenarios are also included that provide examples that illustrate the potential economic scope of the regulations.

1. Description of the individuals, businesses or other entities likely to be affected by the regulation

The proposed regulation revises water quality and quantity control requirements for land disturbing activities. As such, the proposed regulations will primarily impact private land developers, public land developers, businesses, and homeowners. Private land developers across the state may face increased land development costs associated with these new regulations in many situations. A portion of those costs will be passed down to buyers of newly constructed properties, homeowners and businesses. Although maintenance of stormwater control facilities should be conducted under today's regulations, many commercial property owners and some residential property owners across the state may still face higher long-term costs associated with maintenance of stormwater control facilities because of the potential for the installation of a greater number of these facilities to meet the proposed requirements and higher maintenance costs associated with some types of BMPs. Virginia residents will also likely pay for the higher costs associated with local stormwater program requirements (see Section 4).[8]

Public agencies (such as state colleges and universities, state agencies, and municipalities) involved in public works and construction projects will also be required to comply with these requirements. The Virginia Department of Transportation, for example, will be subject to revised runoff control requirements associated with road construction and modification activities.

The direct expenditures (costs) associated with implementing the proposed stormwater requirements may increase upon the current demand for stormwater design and construction services. The comprehensive nature of the regulations and the additional technical requirements will necessitate the greater use of environmental consultants and engineers to design stormwater plans and oversee the implementation of stormwater practices. Businesses providing construction and earthmoving services will also be impacted, although the direction of change is difficult to assess since the type and magnitude of construction and earthmoving activities will change simultaneously.

The general public as a whole also benefits from additional stream channel and flood protection. Additional stream channel protection will provide the public additional assurances that habitat and aquatic diversity will be protected from the impacts of urban land use change. The emphasis on runoff reduction may increase local groundwater recharge and thus protect local stream baseflow during drier parts of the year. The proposed revisions in the water quality criteria will provide reductions in nutrient loads from development activities from what otherwise would have occurred in absence of the revisions.

2. The number of such entities that will be affected

Since the proposed regulation is statewide, the regulation will impact every individual, business, or agency described above. To estimate the total extent to which this regulation would apply, the total historical and projected land disturbance within the state was estimated.

[8] For localities with stormwater utilities, the increase in cost for stormwater control facilities long-term maintenance may be paid for by higher fees. Other localities would have to cover the higher costs through existing local and state revenue sources.

Data obtained from DCR's existing stormwater permitting database was used as the starting point to estimate the historical extent of disturbed acreage and number of general permit coverages issued on a calendar year basis. Preliminary inquiries suggested that the state permitting data under-reported the amount of disturbed acres recorded under local erosion and sediment control programs. Statistical procedures were used to estimate the extent of the "under-counting" of disturbed acreage and number of land disturbing permits. A sampling process was used to identify counties and cities (localities) where more detailed local data would be collected on permit coverage and disturbed acres. To ensure that a representative cross-section of localities was sampled, counties and cities across the state were initially grouped based on a variety of characteristics. Permit and land disturbing data were collected on a sample of localities. Based on observed under-reporting, state permit and disturbed acreage data were adjusted to estimate the total land disturbing activity and number of permits for the state.

Sampling of local programs

Cluster analysis was used to form the localities into similar groups based on various characteristics. DCR permits were classified as one of four types: residential, commercial/industrial, roads, or other. The number of permits for each category and the number of disturbed acres for each category were used as the primary characteristics describing the localities. Other characteristics used in the cluster analysis included population, land area, and location in the Chesapeake Bay Preservation Area. Initial clustering indicated a strong tendency to distinguish between localities in the Chesapeake Bay Preservation Area and those that were not. Therefore, to improve the performance of the clustering process, two groups were formed based on this division. K-means cluster analysis was then used to group the 29 counties and 17 cities in the eastern portion of the Bay watershed into 10 clusters, with the remaining counties and cities grouped into 14 clusters.

Individual localities within each cluster group were selected to participate in a spot check survey. Appropriate local officials were contacted to determine the number of permits and disturbed acreage under permit from their local Erosion and Sediment Control programs. At least one locality from each of the 24 clusters was contacted by the researchers, totaling 32 contacts in all. Sixteen contacts provided data for an effective response rate of 50%. The response rate within the CBPA and non-CBPA areas were identical, with five of 10 contacts providing responses within CBPA localities and 11 of 22 contacts responding from localities outside of the CBPA. In addition to these data, preliminary data from an additional seven localities (two within CBPA, five outside) were provided by DCR based on local data collected at regional DCR offices (DCR is further revising and expanding upon its dataset.). Thus sample data of permit numbers and disturbed acreage were obtained from 23 localities representing the majority of the program clusters (17 of the 24 clusters).

It was understood through this process that comparing state stormwater general permit coverage to local erosion and sediment control permit issuance was not a direct relationship due to a variety of factors but that it was a reasonable approach to exploring the magnitude of potential under-reporting.

Estimation of disturbed acres and permits

Local program data of disturbed acres and permits were paired with its corresponding DCR registry data.[9] After considering different methods and models, and the removal of statistical outliers, a simple linear relationship between DCR and local data was found to be the most intuitive and robust estimator.

A linear relationship of the form $y = mx + b$ was calculated for both disturbed acreage and number of permits. In the equation, y is the reported quantity (of permits or disturbed acres) from the locality, x is the corresponding quantity from DCR database, m is the slope of the line, and b is the vertical intercept. Interpretation of the linear model is straightforward. If the data collected from the localities had matched the data from DCR perfectly, the intercept (b) would be zero and the slope of the line (m) would be one.

[9] Overall, 174 observations were used for the annual disturbed acreage relationship, and 144 observations were used for the number of annual permits relationship. It should be noted that less than 10% of the observations were from within the CBPA.

The actual results of the regression are shown in Figure A-1 and Figure 2.[10] The intercept (15.911 for permits and 28.86 for disturbed acres) represents an average value of missed data for all DCR observations. The slope (1.4458 for permits and 1.06974 for disturbed acres) of the estimated line shows the additional change in the quantity from the localities for each additional unit shown in the DCR data. For example, the slope of 1.06974 for the disturbed acreage suggests that, in addition to the 28 missed acres represented by the intercept there is an additional 0.07 disturbed acres reported by the localities for each acre listed in the DCR data.

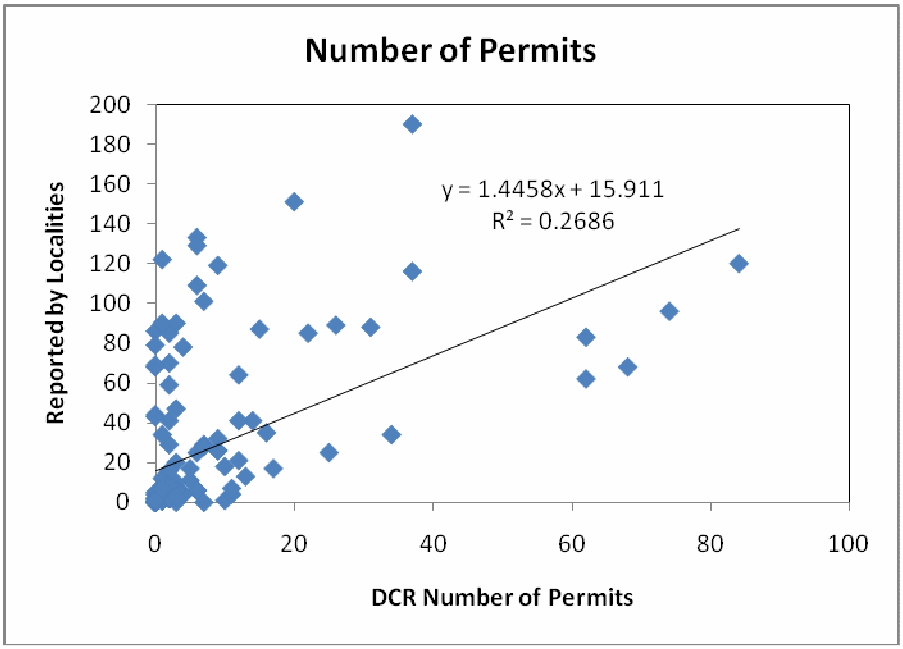


Figure 1: Linear Regression for Number of Permits

[10] Other regressions were considered that included various dummy variables to allow for a difference between the CBPA region and the rest of the state. None of these variables were statistically significant. This could be due, at least in part, to the small representation of the CBPA within the data, as noted in footnote 8 above.

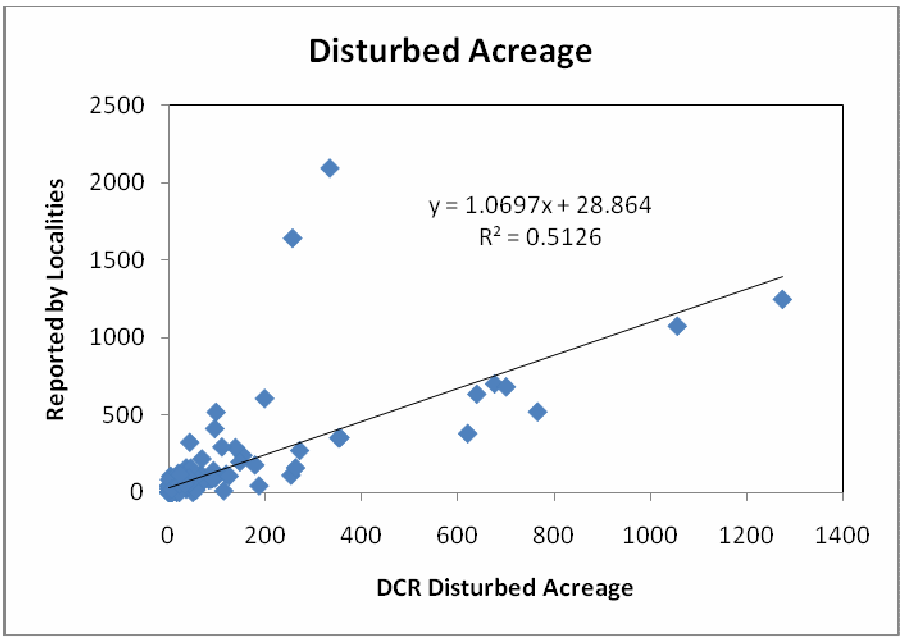


Figure 2: Linear Regression for Disturbed Acreage

Results

The linear models described above were used to produce state-wide estimates of disturbed acres and permit numbers based on the DCR data. Although the correlation coefficients (R^2) were not high, annual totals from DCR data were used to provide an estimate of the number of permits and amount of disturbed acreage for each of the counties and independent cities in Virginia.[11] Summary results, compared with the original DCR data are shown in Table 1.

Table 1: Estimates of Permits and Disturbed Acres (Calendar Year)

	Permits			Disturbed Acres		
	2005	2006	2007	2005	2006	2007
DCR Total for Virginia	1,904	2,733	2,482	24,357	32,331	26,027
Estimated Total for Virginia	4,917	6,115	5,752	31,258	39,713	32,745

The estimated activity at the local level suggests that the undercount permit numbers exceeds the undercount of disturbed acres. These results would be expected under the assumption that small developments (less than 5 acres) would be the most under-reported permit group in the state DCR data base. The under-reporting of small projects could have a large impact on permit totals, but a relatively smaller impact on total reported disturbed acres. In areas outside the Chesapeake Bay Preservation Act area, however, local erosion and sediment control permit data might also contain projects that are less than an acre (but greater than 10,000 ft^2). Thus, the local data from these areas may over-estimate the total amount of stormwater permits because projects under one acre would not be required to obtain stormwater permit coverage (only E&S). Additionally an over-estimate could occur due to local reporting of individual building permits that may be covered by fewer stormwater permits under a common plan of development. The extent of such potential bias could not be assessed with the available data.

[11] A detailed description of the methods used in performing estimates is available in a separate document titled "Discussion of Estimation Issue in DCR Stormwater Project."

However, based on the under-reporting suggested by this analysis, DCR is conducting further analyses to refine the permit estimates that will be included in the Department's regulatory analysis document (see Fee discussion in II.3a).

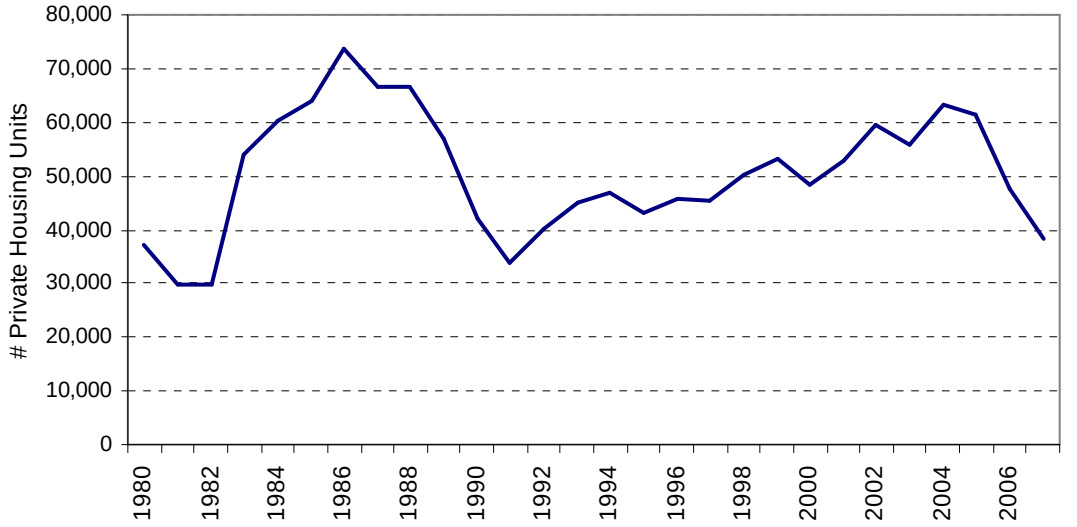
Reliable information about the portion of developed acres that are redevelopment could not be estimated. As part of the survey process, localities were asked about the ratio of new development versus redevelopment within their area. Results are anecdotal; however, in general, areas in the western and southern parts of the state indicate that redevelopment accounts for no more than 10% of their land disturbing activities. On the other hand, more urban areas in the northern and eastern sections report the opposite. One area in northern Virginia estimated approximately 90% of all development is redevelopment.

Future trends

To estimate the entities affected by the regulation, estimates of *future* land disturbing activities is necessary. Making future projections based on historical data and trends on land disturbing activities, however, is difficult due to the limited and incomplete data. To put the land disturbing activity during the 2005-2007 period into perspective, proxy measures or scales of land development activity were sought. Land disturbing activities are generally tied to the overall level of economic activity within the state. Home building comprises a significant portion of the land disturbing activities and may serve as a proxy for the relative level of land disturbing activities. Figure 3 shows the number of new housing starts from 1980 to 2007. Beyond 2007, the Virginia Home Builders Association projects a decline of 24% in the number of housing starts for 2008 and an increase of only 15% over 2008 in 2009. Given the current turmoil in the credit and housing markets, these numbers may be adjusted downward and the duration of the downturn is uncertain at this time.

Long-term historical trends, however, indicate that private housing starts in Virginia average slightly more than 50,000 units per year. Housing starts also show significant year-to-year variation. During the 1980-82, 1990-91, and 2006-current economic downturns, housing starts dropped significantly (multiple year declines exceeding 20% annually). Average housing starts during the 2005–2007 time period averaged slightly more than 49,000 per year. While housing starts declined over this 3 year period, the three year average is roughly equivalent to the 28-year historical average.

Assuming that the 2005-2007 period is, as a whole, roughly representative of the historical level of land disturbing activities in the state, estimates of the level of land disturbing activities during this period might reasonably be assumed to approximate future ranges of land disturbing activity. The average annual estimated disturbed acres in Virginia during the 2005-2007 period was 34,572 acres (27,571 acres using only DCR registry information, see Table 1). The average annual number of permits issued annually during 2005-2007 was 5,595. Once the housing and development market emerges from the current economic downturn, a reasonable estimate of future disturbed acres would be between 30,000 and 40,000 acres per year and the annual number of stormwater permits between 4,000 and 7,000.



Source: U.S. Census

Figure 3: Total Housing Starts (single and multifamily) in Virginia

3. All projected costs of the regulation for affected individuals, businesses, or other entities

3a. On-site stormwater control costs.

Conceptually, the costs of providing stormwater controls are all opportunity costs (EPA, 2000). Opportunity costs are the value of alternatives (next best) given up by society to achieve a particular outcome. Opportunity costs of stormwater control include direct costs necessary to control and treat runoff including construction costs and the present value of annual operation and maintenance costs. Initial installation costs should also include the value of foregone opportunities on the land used for stormwater control, typically measured as land price. Stormwater control costs also include the expertise needed to design stormwater management practices and systems. Private sector costs might include time and administrative cost associated with gaining regulatory approval of stormwater management plans/designs. These costs are exclusive of public costs of administering a stormwater program (see section 4 and 5 below). Opportunity costs also include other values that might be given up as a consequence of stormwater management. For example, the creation of a constructed wetland in a residential area might be opposed because of perceived safety, aesthetic, or nuisance concerns (undesirable insect or animal species). In this case, the diminished satisfaction of nearby property owners is an opportunity cost associated with the constructed wetland. On the other hand, if stormwater controls are considered a neighborhood amenity (e.g., wet pond in a park setting) offsetting benefit would be provided (see discussion below).

The proposed regulation will expand both the scope and intensity of stormwater management activities on land disturbing projects. The proposed regulations would double the phosphorus reductions required for redevelopment and increase phosphorus removal requirements for new development. Additional levels of water quantity control would be required, primarily for discharges to unstable stream channels.

A projection of the incremental private on-site stormwater control costs require 1) estimating the level and type of incremental actions and controls that would occur above what would occur under the existing regulations (assumes existing regulations would apply to future development in absences of proposed regulations), and 2) estimating the unit costs associated with the actions/controls implemented. A total projected cost estimate for the state, however, cannot be reliably projected. The uncertain behavioral responses (both by the land disturber and locality), variation in site specific conditions, and the complexity

of the application of technical requirements make estimation of total state costs unreliable. Rather this analysis will review factors that will likely influence (increase or decrease) compliance costs. To the extent possible, costs for case study examples and applications will be provided.

The proposed regulation places new emphasis on reducing stormwater runoff volume as a means to improving stormwater quality and reflect recent recommendations for improving stormwater management (NRC 2008). Under the existing regulations, stormwater control practices are assigned specific phosphorus removal efficiency (4VAC50-60-60). These efficiencies specify the percentage of phosphorus removed from a total volume of water. The proposed revisions delineate that phosphorus removal can be achieved by both reduction in pollutant concentration and by reduction in runoff volumes. (4VAC50-60-65). For instance, infiltration stormwater practices prevent a percentage of a storm event (of a given size) from ever directly entering a stream system. Reducing runoff volume can reduce P loads simply by reducing the amount of water leaving the site (assuming concentration of P in the runoff remains unchanged).[12] The P reduction achieved through runoff reduction is in addition to any reduction achieved by practices' treatment processes (reducing phosphorus concentration in the remaining runoff).[13] In addition to the runoff volume estimates, the pollutant removal achieved by treatment (lowering P concentration) were also refined and revised for some practices. The net effect of counting runoff reduction and revisions to the pollutant (P) concentration removal efficiencies means that total percent phosphorus removal credited to most stormwater practices (total phosphorus removal efficiencies) is now higher under the proposed regulation.[14]

In addition, the regulations add several new control options available for compliance as well as allowing additional practices to be added through the new BMP Clearinghouse (4VAC 50-60-65B). The additional control options and the acknowledgement of pollutant removal possibilities of runoff reduction increase choice and may reduce the number of structural controls that will be necessary to treat stormwater runoff. Consequently, the addition of control practices and the higher removal efficiencies for most stormwater control practices will tend to reduce the cost of phosphorus control (holding all other cost influencing factors constant).

What type of controls available to land disturbers, however, will depend on which type of stormwater control measures are allowed by a local program (or allowed by DCR in areas without a designated program). Local jurisdictions can limit or specify the type of BMPs available for compliance and there may be a number of valid reasons for doing so. For instance, some infiltration practices may be infeasible or impractical in certain regions of the state, including those areas with karst topography (ex. areas within the Shenandoah Valley) and areas with shallow groundwater tables (ex. areas in the coastal plain). In addition, some local stormwater program managers have voiced concerns about the feasibility and cost of inspection and enforcement of certain types of decentralized practices (see discussion section 4 below). To the extent compliance choices are limited, the cost for land disturbers to comply with the water quality requirements increases.

An important criterion in designing and sizing a stormwater control practice is identifying the volume of water to be treated. The proposed regulations increase the volume of water subject to water quality treatment (§4VAC50-60-65). The existing stormwater regulations require many stormwater control practices to treat of the volume of water associated with the first ½ inch of rain multiplied by the impervious surface of the land development project. Water volume in excess of the design volume would enter water bodies untreated or partially treated. Approximately 70 to 75% of all rain events in Virginia

[12] Under actual field conditions, this assumption may not always hold. For instance, a recent USGS study compared adjacent watersheds with different approaches to controlling runoff. One watershed used a variety of infiltration practices to reduce runoff volume (called low impact development or LID), while the other watershed used mostly conventional practices to capture runoff (ponds). While the runoff volumes in the LID watershed were substantially lower, the total phosphorus loads were higher over a 7 year period in the LID watershed because (presumably) the concentration of P in runoff was higher in some storm events under LID. See Selbig and Bannerman 2008.

[13] In some cases, however, practices that reduce runoff volumes may *increase* the nutrient concentration in runoff. For instance, green roofs are assigned a runoff reduction between 45 and 60 percent in the proposed regulation (4VAC50-60-65C). However, some research finds that nutrient concentrations in the remaining roof runoff will likely increase (see Hunt and Szpir 2006).

[14] There are exceptions. For instance the phosphorus removal percentage of dry extended detention ponds decreases under the proposed regulation

are ½ inch of rain or less. The proposed regulation increases the amount of water that requires treatment from the first ½ inch of runoff from impervious areas to the runoff from the first inch of rain from both impervious and turf areas. Approximately 90% of all rain events in Virginia are 1 inch of rain or less. The additional stormwater treatment volume (from both the larger rain event and the added turf area) will likely increase the size of structural stormwater control practices to treat this additional volume, thus incrementally increasing costs (all other factors held constant).[15]

The proposed regulation also establishes new design criteria and pollutant removal efficiencies for stormwater practices. Design criteria identify the standards used to size and construct stormwater practices. The design criteria can be quite detailed and were revised for all of the stormwater control practices listed in the regulation. It is unclear how the revised design criteria influence costs.

The proposed regulation increases stormwater water quality criteria for new development. Where localities are not already employing more stringent standards, the proposed phosphorus water quality criterion will require the implementation and maintenance of additional stormwater controls. The new water quality criteria establishes a 0.28 lb/ac/yr phosphorus criteria that is more stringent than the current water quality criteria computed under the existing regulation. The reduction requirements under existing regulations are based on preventing an increase in phosphorus load from the pre-development land cover. The existing regulations typically do not face any phosphorus control requirements for development with less than 16% impervious surface (average land cover condition).[16] Finally the existing regulation computes total phosphorus loads based only on total impervious surface. Procedures under the proposed regulation add P contributions from turf and forest areas in order to provide a more comprehensive accounting of phosphorus loads from the developed site.

Figure 4 shows general per acre phosphorus reduction requirements for new development under the proposed and existing regulation. The graph charts total phosphorus reduction requirements for developments with different levels of impervious surface. The total P load reduction required under the existing regulation was computed using the Simple Method as outlined in the *Virginia Stormwater Handbook.*[17] The P reduction requirements under the proposed regulation were calculated using the DCR compliance spreadsheet. Total P load reductions were calculated using different assumptions for nonimpervious (pervious) land cover. One scenario assumes all pervious (nonimpervious) area is turf/lawn and represents the upper bound total P reduction required. Another scenario assumes that 80% of pervious areas remain, or are converted to, a forested cover condition. This scenario approximates a lower bound estimate of total P reduction required under the proposed regulation.

The proposed revised regulation increases the total phosphorus reduction requirement between 0.14 and 0.45 lbs/ac, depending on assumptions about composition of impervious and pervious surfaces (the difference between proposed and existing reduction curves in Figure 4). The increase is due to a number of factors. First and most obvious, the effective load standard has been lowered to .28 lbs of P per acre. Second, the proposed regulation also calculates P load from two types of pervious areas, managed turf and forest. The existing regulation calculates P load from impervious surfaces only. The effect of including pervious surface will have larger relative impacts for low density developments with significant turf cover (see Figure 4). As an illustration, a new development with 20% impervious cover would be required to remove 0.07 pounds per acre under the existing regulation. If the 80% remaining land was turf, the total P load reduction requirement would 0.52 pounds per acre under the proposed regulation (top line in Figure 4). The load reduction requirement can be reduced considerably, however, by preserving more forest cover on the remaining pervious areas (e.g. middle line in Figure 4). Finally, the proposed regulation tightens the threshold under which new developments must reduce phosphorus

[15] It should be noted that the costs of controlling this additional treatment volume.may be partially offset by the new BMP performance criteria that gives more pollution removal credit for practices that reduce runoff volume.
[16] Recall that the default existing land use condition is assumed to be 16% impervious, although localities are granted discretion to provide a more refined delineation of existing land use condition.
[17] Calculated assuming the default existing land use condition of 16% impervious.

loads. For example, new development with 10% impervious surface and significant turf area would likely face some phosphorus reduction requirement under the proposed regulation.[18]

Figure 4 also illustrates that for both the proposed and existing regulation, the computed P reduction requirement increases with total impervious surface cover. Under the proposed regulation, the P reduction requirement for a development with 10% impervious surface and 90% turf is 0.35 lbs/ac, while the P reduction requirement as a development with 90% impervious surface and 10% turf is 1.72 lbs/ac (a nearly 5 fold increase). Moving from a site-by-site perspective to a watershed perspective, however, may produce different conclusions. Based on this site-by-site method, low density developments would produce less estimated phosphorus runoff than medium or high density areas. Very low density developments (1 dwelling unit per 3 to 5 acres) would unlikely face any water quality control requirements (Figure 4 and Table 2). Yet, on a watershed basis, low density ("sprawl") development increases the overall rate of land conversion to urban uses, creates more impervious area per capita, and increases dependence on auto transport (thus increasing emissions and roadway impervious surfaces). Highly impervious areas accompanied by dense population settlement can produce net water quality improvements, independent of whether stormwater controls are implemented (Bosch et al. 2003; EPA 2006). For example, if high levels of impervious cover are accompanied by higher population densities, the overall watershed effect may be to decrease the rate of urban land conversion, decrease impervious surface per capita, and lower overall urban pollutant loads. As currently conceived, the nutrient load reductions from foregone land conversion are not counted against the calculated on-site loads. Although empirical evidence is limited, on-site effluent treatment costs (expressed on a per pound basis) are expected to be higher for highly impervious areas relative to low impervious areas. Higher phosphorus control costs in high density developments create financial disincentives that may work at cross purposes with larger watershed objectives.[19]

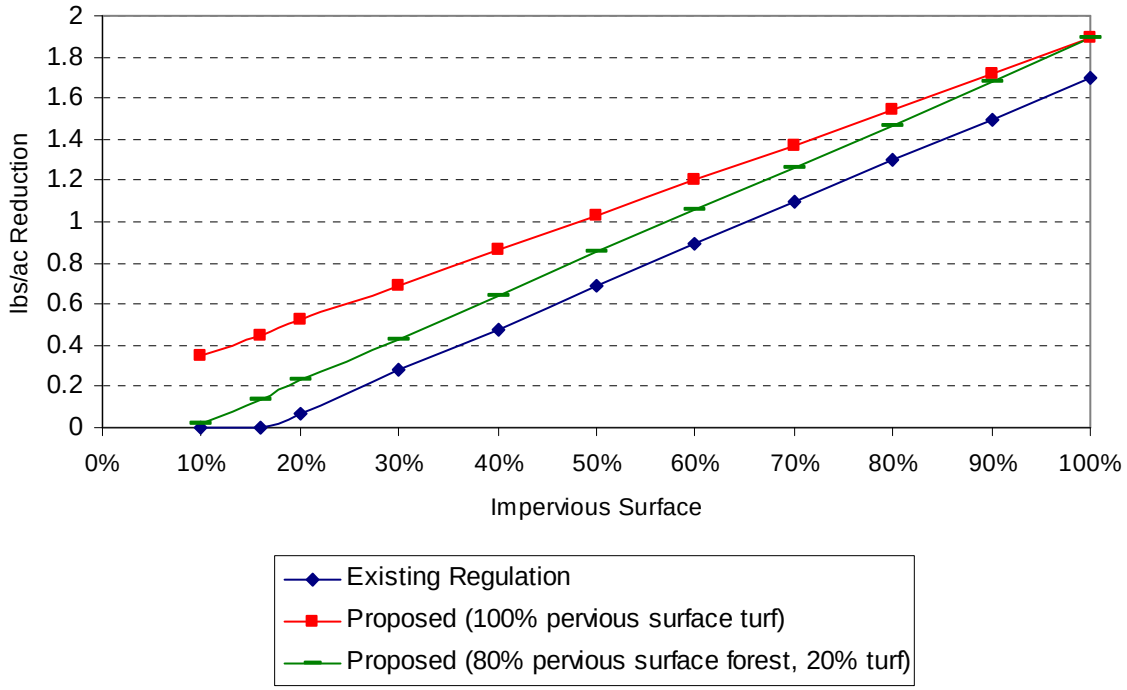


Figure 4: Per Acre Phosphorous Reduction Requirement (New Development)

The proposed regulation doubles the phosphorus requirement for redevelopment from 10% P reduction from predevelopment levels to a 20% reduction. Stormwater control costs (measured on per pound of P reduction) are expected to be higher in redevelopment areas (without stormwater controls) than for new

[18] As a reference, housing developments with 1, 4 or 8 houses per acre might have 20%, 38%, and 65% impervious surface respectively (EPA 2006).
[19] The addition of turf areas to the computation of P load (as described above), however, would somewhat offset this disincentive.

development.[20] However, since the criterion is expressed as a percentage reduction from predevelopment levels, the redevelopment will not usually be as stringent as the 0.28 load standard for new development. For redevelopment with impervious cover ranging from 50 to 100%, the additional 10% reduction would translate into an additional phosphorus reduction ranging from 0.13 and 0.22 lbs/ac.

Stormwater Control Costs

In general, the cost to control and treat stormwater runoff is incompletely understood and gaps exist in the literature. Extrapolating existing empirical cost analysis to field conditions is challenging given that stormwater treatment exhibits considerable site-specific variation resulting from different soil, topography, climatic conditions, development forms, local economic conditions, and regulatory requirements (Lambe et al., 2005).

The literature on stormwater costs tend to be oriented around construction costs of more conventional types of stormwater control practices such as ponds, constructed wetlands, detention basins, sand filters and bioretention areas (Wiegand et al., 1986; SWRPC, 1991; Brown and Schueler, 1997; Wossink and Hunt, 2003; Lambe et al. 2005). These studies generally find that construction costs decrease on a per unit basis as the overall size (expressed in volume or drainage area) of the stormwater BMP increases (Lambe et al., 2005). These within-practice economies of scale are generally found across conventional stormwater controls including wet ponds, detention ponds, and constructed wetlands (Brown and Schueler 1997; EPA 1999; Wossink and Hunt, 2003).

Increasing attention has been paid to small-scale practices (serving small parcels and lots) including efforts to increase infiltration and retain water through such means as green roofs, permeable pavements, rain barrels, and rain gardens. The costs of these practices, in general, are less well understood compared to the other stormwater practices. In general, per unit construction and design costs exceed larger scale conventional stormwater practices. Others have suggested that per unit costs to reduce runoff may be less for these small-scale distributed practices after considering higher infiltration rates and retention rates (MacMullan and Reich 2007). Furthermore, reducing the volume of runoff through the use of such practices may result in lowering the cost of the overall drainage infrastructure, since less water will have to be conveyed. Other classes of small, on-site practices, such as grass swales and filter strips, may also be implemented for relatively low cost.

Almost all stormwater control measures require active long-term maintenance in order to continue to provide volume and water quality benefits (Hoyt and Brown, 2005; Hunt and Lord, 2006). Compared to construction costs, less is known about long-term operation and maintenance costs (Wossink and Hunt 2003; Lambe et al. 2005; MacMullan and Reich 2007). A recent Water Environment Research Federation study (2004, p.5-5) concluded that "there is an urgent need to appraise the frequency and cost (level of activity) of maintenance required to achieve appropriate performance levels of BMP/SUDs in different climates."

Stormwater control maintenance often consists of routine maintenance activities as well as periodic retrofits. The type, frequency, and extent of maintenance requirements differ between stormwater control practices (EPA 1999). The most common stormwater practices implemented in Virginia, extended detention ponds and wetponds, require annual or as-needed maintenance for vegetation control (mowing), clearing debris, and embankment and slope repair. More extensive maintenance (retrofits), such as the removal of accumulated sediment from the pond itself may be needed every 20 years (or when pond loses half of its original storage volume). In areas without adequate upstream stream channel protections, the sedimentation rate can be significantly accelerated, increasing the frequency and cost of maintaining functions of downstream ponds. The dredged material must typically be land-filled because the sediments will contain contaminants. Larger pond structures also carry costs associated with a nonzero probability of structural dam failure, which causes environmental, property, and human health damages downstream.

[20] There may be instances where the costs of providing for the additional 10% removal will not increase because the new BMP performance criteria generally assigns more higher pollution removal credit for each BMP.

Local stormwater programs in Virginia have less experience with filtration and infiltration practices. Bioretention, infiltration, and filtration practices, however, all generally require more frequent maintenance than ponds to maintain performance (EPA 1999). All require annual or regular maintenance. For instance, bioretention areas require regular mulching, trash removal, plant maintenance and replacement, and minor erosion related repairs (Hunt and Lord 2005). More extensive periodic maintenance, however, is required to maintain filtering and infiltration functions. In general, activities to remove excess sediments, remove biofilms, or replace (often partial) filter media must be accomplished on a 3 to 5-year cycle. More extensive excavation may be required in case of severe clogging. Costs may also be incurred to discard soil and filter media.

Based on the limited information available, however, long-term maintenance costs represent a substantial share of stormwater control costs. Based on annual maintenance costs from EPA (1999), the present value of annual maintenance costs is estimated to be between 40 and 85% of construction costs for wet ponds and constructed wetlands and between 70 and 100% for swales and bioretention areas. The total present value of annual maintenance costs for infiltration trenches and sand filters can range from 70 to 280% of total construction costs. Other studies confirm that over the life of many stormwater control practices, maintenance costs may equal or exceed construction costs (Center for Watershed Protection 2000). The very limited evidence above suggests that maintenance of conventional ponds costs less than for other types of stormwater control practices. During interviews with local stormwater managers in Virginia, one local government reported that the annual cost to maintain publicly managed bioretention areas (over $8,000/yr per bioretention facility) was more than five times more expensive than the annual cost to maintain publicly managed ponds.[21]

As outlined in the regulation, these costs will be incurred primarily by commercial, industrial, residential property owners or local governments who manage regional facilities. The evidence on the long-term performance of stormwater BMPs under actual conditions is also limited. Assuring long-term performance, however, will also require expenditure of resources. Private landowners have limited financial incentives to incur the annual and periodic retrofit costs to maintain stormwater practices. Thus, local governments will be required to devote sufficient resources to post-construction inspection and enforcement to ensure that practice performance is maintained over time (see Section II.4).

The proposed regulation offers opportunities to reduce phosphorus by altering the design of any development, independent of the specific control practices imposed. New P calculation procedures assign lower P loads to forest and turf areas. Low to medium density developments can lower phosphorus control requirements by reducing effective impervious cover through cluster development patterns, preserving forest cover, reducing street widths, reducing curb and gutter, and reducing in the number of cul-de-sacs (Center for Watershed Protection 2000).[22] Quantifying the cost of many of these design features is more challenging, and the literature is much less developed or conclusive than the literature on conventional control practices. Many development design features (clustering, reduced setbacks, narrower streets, less curb and gutter, etc.) can lower construction and infrastructure costs. Such features may reduce the capital cost of subdivision development from 10 to 80% (Center for Watershed Protection 2000; EPA 2007b). On the other hand, the evidence is unclear how property owners value these design features. If consumers prefer characteristics associated with conventional developments (large suburban lot, cul-de-sacs, curb and gutter) then removal of these features impose an opportunity cost in the form of reduced amenity value (measured as reduced housing price). For example, most statistical studies in the U.S. housing market find that consumers prefer homes with larger lots and are willing to pay premiums for homes located on cul-de-sacs, presumably for privacy and safety reasons (Fina and Shabman 1999; Song and Knapp 2003; Kopits, McConnell and Walls 2007). These effects, however, might be partly offset by the higher value consumers might place on the proximity of

[21] The fact that construction and long-term maintenance costs may be different may present barriers and disincentives to installing cost effective combinations of stormwater controls. Land developers, for instance, have incentives to minimize the cost of meeting a regulatory obligation. Since the land developer typically does not pay long-term maintenance costs, financial incentives exist to minimize upfront (construction) costs, even if the total life cycle costs are high.

[22] The ability achieve these reductions in effective impervious surface, however, will be limited and constrained to varying degrees by local zoning and subdivision ordinances and state road construction requirements (example those for fire safety).

open space to their homes (Cheshire and Sheppard, 1995; Stephenson et al. 2001; Qiu et al., 2006; Mohamed 2006). Whether the value of open space is sufficient to offset the diminished value of smaller lots in cluster developments remains largely an unresolved issue and one that is probably determined by local market conditions.

Most stormwater control practices listed in the proposed regulation require land to be designated for water treatment, storage, filtration or infiltration. Land for stormwater control represents a significant opportunity cost. Land devoted to stormwater control results in lower development densities and/or loss of other land uses (e.g. loss of recreational or landscaping space to stormwater facilities). While land costs are site specific and exhibit spatial variation, land costs may be the single biggest cost outlay of land-intensive stormwater control practices in highly urban settings (Wossink and Hunt 2003).

Other costs include design and permitting costs. Brown and Schueler (1997) provide general "rule of thumb" estimates that design and permitting cost can range between 25 and 37% of construction costs. Another cost is the time delays in securing the necessary approval to begin development. Time delays are frequently cited as a major cost by the developer community (Randolph et al. 2007). Experience and good plan design would be a critical element in reducing these time costs.

Little systematic research has been conducted on the relationship between stormwater control costs and high-density development/redevelopment. Most stormwater control practices require space. In highly dense development, land costs tend to be high and the space available for storage, treatment, and infiltration of runoff diminishes (Wossink and Hunt 2003). Limited space also reduces available treatment options. Space constraints often require filtration and storage devices to be built underground. In redevelopment areas, construction costs increase as existing infrastructure must be modified, moved, or built around. While little empirical evidence exists, there appears to be a reasonable expectation that the cost of treating a given volume of water increases as the percentage of impervious cover increases (holding the size of the development constant). This relationship between cost and impervious area also highlights the economic importance of being able to spatially target phosphorus and water quantity controls in areas with more cost effective treatment options (see off-site and pro-rata share discussion below).

Randolph et al. (2007) report on the cost of complying with environmental regulations for five residential developments in the northern Virginia (across 3 counties within Chesapeake Bay Preservation Area). The developments represented a mix of greenfield and infill development with densities of 1 to 3.5 dwelling units per acre (approximately 20 to 40 % estimated impervious area). Stormwater control costs included only construction costs for wet ponds. Stormwater costs, however, were separate from erosion and sediment control costs. The findings from these case studies indicate that stormwater costs range from $350 to $7,000 ($1,900 average) per dwelling unit and $500 to $7,000 per acre ($3,900/ac average). These costs reflected in the case studies would likely more than double if land and maintenance costs were included (see discussion above).

As a nutrient management strategy, urban stormwater control tends to be the most costly means for reducing nutrient loads. Considering maintenance, capital construction, and land costs, recent estimates for North Carolina indicate that annual cost for wet ponds and constructed wetlands range between $100 to $3,000 per treated acre (typically less than $1,000).[23] Per acre annual costs for bioretention and sand filters typically ranged between $300–$3,500 and $4,500–$8,500 respectively (Wossink and Hunt, 2003).

The cost of reducing nutrients *on a per pound* basis will typically be hundreds and sometimes thousands of dollars per pound (Aultman 2007; Brown and Schueler 1997). For example, based on removal effectiveness and costs estimates from Brown and Schueler (1997), the annual cost to reduce a pound of phosphorus with wet ponds or bioretention areas ranged from $560 to $1,500/lb/yr.[24] These estimates include construction, land, and operation and maintenance costs for a hypothetical five acre commercial

[23] These costs would then need to be allocated between water quality and water quantity treatment.
[24] Assumes all water quality control costs are allocated to phosphorus removal only.

site and a 25 acre residential site.[25] As an illustration of the unit costs of meeting the current redevelopment criteria, the total capital cost for a small commercial development was $4,500/lb/yr.[26] These estimates are based on the costs for water quality treatment only (water quantity controls represent additional costs), but assume all water quality costs are assigned to phosphorus removal.

These control costs are significantly higher than nutrient control costs from point sources or agricultural nonpoint sources (Chesapeake Bay Commission 2004; Shulyer 1995).[27] A recent Chesapeake Bay Commission (2004) report estimated annual point source phosphorus control costs to be $74/lb. Enhanced nutrient management (currently considered beyond a Tributary Strategy baseline practice) cost an estimated $96 per pound of phosphorus.

Incremental costs: Illustrations applying proposed water quality criteria.

The proposed criteria was tested on a limited number of existing and planned developments to gain a better understanding of what type of incremental actions and costs would be required to meet the new water quality and quantity criteria. The information provided in this section came from three general sources. First, DCR conducted design "charettes" in the fall of 2008. Stormwater design teams proposed plans to meet the revised water quality and quantity test for a small commercial site and a medium density residential development. Second, land developers (permittees) and consulting firms voluntarily supplied alternative stormwater designs for 5 recently completed or planned developments. Finally, one environmental group commissioned stormwater plan designs for 6 developments. These developments do not represent a random sample although they do characterize many types of developments occurring across the Commonwealth. The examples used are drawn mainly from the eastern portion of the state and are provided by the volunteer efforts of a variety of groups. In each case, efforts were made to identify the activities and costs required to meet both the existing and proposed regulation.

With these caveats, the developments evaluated are summarized in Table 2. The developments do represent a broad cross section of different development types. The developments were almost evenly split between residential and commercial development types. Two of the six commercial developments were redevelopment projects (see Comm5 and Comm6, Table 2). All remaining projects were new developments. The residential developments tended to be low to medium density development with only one site above 4 dwelling units per acre. None of the developments occurred in ultra-urban areas (over 75% impervious surface).

All development cases in Table 2 were able to meet stormwater quality and quantity requirements on-site. The two low density residential developments met the revised water quality standard in their existing form (Resid3 and Resid7 in Table 2). Both developments had less than 10% impervious cover and significant forest cover on remaining (pervious) land. This result is consistent with the general result shown in Figure 4. The proposed revisions to the water quantity requirements were the binding regulatory constraint for two of the 13 development projects (Resid 3 and Comm6). For water quality controls, the stormwater development designs reflect a mix of conventional treatment and runoff volume reduction practices. The use of bioretention areas, ponds, and swales were commonly used control practices. The residential development with the highest development density (dwelling unit/ac) was able to meet water quality criteria by upgrading the treatment level of a large stormwater pond (Table 2, Resid2). For this development, compliance was achieved without any reductions in runoff volume and reflected the impact

[25] Construction cost estimates were converted to current 2007 dollars. Operation and maintenance costs were derived from EPA (1999) and assuming land costs of $50,000 per acre. Total costs were annualized using discount rate of 5%. The wetpond cost estimates assume that only a third of the cost of the wetpond is assigned to water quality (the remainder of the cost assigned to water quantity control).

[26] The project was a one acre development, mostly impervious. Two proprietary filtration devices installed at a total cost of $19,370 to achieve the required remove 0.22lbs/P/yr from the site. Maintenance and land costs were assumed to be zero, thus represents a lower bound estimate.

[27] The Chesapeake Bay Commission 2004 succinctly summarized the challenge of managing urban loads: while urban sources are the fastest growing source of nutrient load to the Bay, "the job to reduce stormwater impacts from developed land will be expensive, difficult to measure and effective only over the long-term." (p. 10). In Virginia's tributary strategy document, urban runoff contributes 18% of Virginia's phosphorus load to the Bay, but crude cost analysis estimates that urban runoff controls will make up 75% of the cost to meet Virginia's reduction commitment (Virginia Secretary of Natural Resources 2005).

of revisions to the phosphorus removal efficiencies (75% P concentration reduction for level 2 wetpond). The two redevelopment sites were also able achieve the new water quality and quantity criteria.

Table 2: Descriptions of Developments Used to Evaluate Revised Regulatory Requirements

NAME	Dev Type	Dev Size (ac)	% Land Cover (Imperv/Turf/Forest)	Density DU/ac	Additional Actions Required to Meet Proposed Regulatory Requirements
Comm1	New	0.75	47%/53%/0%	N/A	Reduction in parking spaces, bioretention areas, dry swale, detention facility.
Comm2	New	15.2	43%/57%/0%	N/A	Eight additional biofilters; some substitution of impervious with permeable pavement
Comm3	New	15.6	67%/33%/0%	N/A	New criteria can be met with current underground detention/stormwater filtration and upgrading large wet pond from type 1 to type 2 treatment level.
Comm4	New	11.1	66%/32%/2%	N/A	The current stormwater design utilizes an LID approach with 25,000 ft^2 of bioretention facilities and soil amendments. New requirements could be met with a type 2 wet pond. Meeting new criteria with LID approach would require upgrading the bioretention to meet new design standards but with a similar area.
Comm5	Re Dev	1.65	Imp Predev,65% Imp Postdev,75%	N/A	Existing detention basin is converted to extended detention basin, 1/6^{th} of the new pavement is permeable and 2,000 gallon cistern.
Comm6	Re Dev	54	Imp Predev,58% Imp Postdev,69%	N/A	Water quality redevelopment criteria met with no additional controls (existing 2.4 acre retention pond), but new water quantity criteria requires reconfiguration of piping and addition of rain tank and pump system.
Resid1	New	8.8	25%/42%/33%	3.3	Grass swales, expanded bioretention areas, forest cover preservation
Resid2	New	26.5	50%/50%/0%	7	Upgrade large wet pond from type 1 to type 2 treatment level.
Resid3	New	42.6	9.1%/35%/56%	0.66	Existing cluster development (19 ac disturbed) meets WQual criteria with no additional treatment. Activities to meet WQuant requirement: roof disconnect, grass swales, porous pavement.
Resid4	New	43.3	21%/49%/30%	1.82	Roof top disconnect, porous pavement, added size for infiltration basin. One pond to meet WQuantity requirements.
Resid5	New	55	40%/53%/7%	3.73	Upgrade and expand dry detention basin to type 2 wet pond, in addition to the other planned stormwater facilities.
Resid6	New	14.9	Traditional: 25%/58%/17% Cluster: 20%/63%/17%	1.68	Change from 9.583 s.f. of bioretention and swales to 9,500 s.f. of level 1 dry swale, 700 l.f. of grassed swale, 5,000 s.f. of soil amendments and 50 rain barrels.
Resid7	New	270	5%/16%/79%	0.13	None. No stormwater controls required.

The incremental phosphorus removed from revisions to the water quality criteria, and the added cost to achieve these reductions, are shown in Table 3. Incremental phosphorus reductions achieved is an estimate of the additional annual reductions in phosphorus loads achieved above existing (current) water quality requirements. Incremental upfront costs are construction, material, land and design costs associated with the additional controls needed to comply with the proposed regulations. Incremental annual costs are the annualized cost of incremental upfront costs plus an estimate of the annual operation and maintenance costs. Finally, the incremental (marginal) cost to achieve the additional phosphorus reductions achieved by the revised water quality criterion is reported in the last column of Table 3. In two cases, additional costs were necessary to comply with water quantity criteria, but not the water quality criteria. In these cases, the cost per pound of phosphorus removal measure is not applicable (incremental costs were attributed to water quantity requirements). Data for three developments (Comm1, Resid1, and Resid2) are not reported in Table 3 due to inadequate baseline information or lack of cost data.

The incremental upfront costs to maintain compliance with the proposed revisions ranged from $0 to $750,000 per development project. For residential projects, stormwater BMP upfront costs (construction and land costs) were between $0 and $6,000 per dwelling unit depending on the scenario). For projects requiring additional phosphorus control, the addition reduction in P loads achieved per development site range from 0.23 to 19.2lbs/yr (between 0.14 to 0.41 pounds/ac). The incremental (marginal) phosphorus control costs (including upfront costs and operation & maintenance costs) range from $825 to $15,300 per pound per year (assuming all costs are assigned to P removal and no cost assigned to reductions in other constituents such as nitrogen, sediment, etc). Expressed on a cost per pound basis, phosphorus control costs appear to loosely increase with impervious area. The projects with the highest estimated per unit costs were a commercial development (Comm2) and a redevelopment site (Comm5).

Table 3: Incremental Phosphorus Reductions and Costs of Selected Developments

NAME	Dev Size (ac)	Incremental P Reduction for Site‡	Increase in Incremental Upfront Costs	Incremental Annualized Cost*	Incremental Cost per Pound per Year
Comm2	15.2	3.9	$551,570	$59,657	$15,296
Comm3	15.6	4.4	$40,000 to $70,000	$3,638 (low) $9,867 (high)	$825 $2,237
Comm4	11.1	3	$60,000 to $120,000	$5,457 (low) $16,914 (high)	$1,819 $5,638
Comm5	1.65	0.23	$17,500	$1,592 (low) $2,467 (high)	$6,920 $10,725
Comm6	54	None Needed	$100,000◊	$7,095Δ	Not Applicable
Resid3	42.6	None Needed	$99,600◊	$8,490	Not Applicable
Resid4	43.3	8.3	$206,279	$21,922	$2,641
Resid5	55	19.2	$350,000 to $750,000	$31,833 (low) $105,714 (high)	$1,658 $5,506
Resid6	14.9	5.7 to 6.05	$54,500 to $154,500	$4,956 (low) $21,777 (high)	$868 $3,600
Resid7	270	0	0	0	Not applicable

‡Represents estimated or an approximate additional P reduction. Comparing changes in load from existing and proposed regulations is complicated by the fact that load estimation methods and BMP sizing/design criteria differ between existing and proposed regulations.

*Unless otherwise noted, includes estimates of capital, land, and maintenance costs. Costs annualized over 25 years at 5% discount rate. High and low estimates based on assumptions that annual maintenance costs range from 2% to 7% of incremental upfront costs.

◊ Cost to meet revised water quantity criteria only.

Δ Does not include maintenance costs.

Fees

The regulatory revisions also propose a new stormwater permit fee structure (4 VAC 50-60-800 through 830). The number and size of permits that are expected to be managed under the proposed regulations is important for a number of reasons. The fees will be used by DCR and local stormwater programs to help finance the costs of implementing the stormwater program (as outlined in Section II.4 of this report). As currently calculated based on the original DCR estimate of 3,000 permits issued per year, local governments with an approved stormwater program receive 72% of collected fees, with the remainder (28%) going to DCR through the Virginia Stormwater Management Fund (4 VAC50-60-780). The number of permits will be important for estimating the management workload at both the local and state levels. Furthermore, the distribution of the permits by size determines the stormwater revenue generated under the proposed fee structure. It should be noted, however, that these fees do not represent (and should not be interpreted as) a societal cost from the revised regulations, but rather the fees determine who bears the burden of paying for program implementation costs. To the degree that fees will increase, the higher fees shift responsibility for paying for program implementation from the local/state governments to land disturbers (permit applicants).

The estimation of the total amount of fees that would be collected under the proposed regulation requires not only an estimate of the number of permits that are expected to be issued, but the distribution of those permits by the size of the land disturbance. The estimated total permits issued annually are shown in Table 1 (Section II.2). Information on the distribution of these permits according to size of land disturbing activities, however, was more limited. Specifically, the data supplied by the local governments did not typically contain information on the number of permits and land disturbance size.

Several approaches were used to estimate the distribution of permits according to the size of land disturbance. First, DCR provided an initial estimate of permit distribution and fee revenue in a discussion document dated September 8, 2008 (see Table 4). DCR's estimate of the distribution of permits was based on the DCR state permit registry. DCR also assumed 3,000 annual permits.

Table 4: Initial DCR estimates of revenue from fees

Project Size	% of Permits	# of permits	Fee per permit	Revenue Generated
≥ 2,500sqft, < 0.5 acre	7%	210	$290	$60,900
≥ 0.5 acre, < 1acre	8%	240	$1,500	$360,000
≥1 acre, < 5 acres	40%	1,200	$2,700	$3,240,000
≥5 acres, < 10 acres	17%	510	$3,400	$1,734,000
≥10 acres, < 50 acres	23%	690	$4,500	$3,105,000
≥50 acres, < 100 acres	3%	90	$6,100	$549,000
≥100 acres	2%	60	$9,600	$576,000
				$9,624,900
DCR's 28% of Fees				$2,694,972

Source: "Discussion Document on Department Fees" Virginia Department of Conservation and Recreation, September 8, 2008

The distribution reported in Table 4 can be generalized as a gamma distribution. Gamma distributions are best for data where there are many observations near zero, but progressively fewer as the values increase. Fitting a gamma distribution to the disturbed acreage data resulted in parameters of shape 0.5702 and scale 18.59 (standardized gamma distribution $\Gamma(0.5702, 18.59)$. Defining the distribution in this manner is comparable to fitting a regression line to a set of data: it provides a smooth, standardized description of the data of interest.

Yet, the distributions above are drawn from the state registry database that is thought to under report annual permits (Table 1). Furthermore, based on the discussion in Section II.2, there is reason to suspect that the number of smaller development projects are disproportionately under represented, thus also likely altering the distribution of permits.

To address the issue of permit undercount, DCR is currently conducting a systematic comparison of the state permit registry data with local permit data supplied to their regional offices. DCR compared state permit data with permit data for a select number of local government programs. The comparison was for data available for fiscal year 2008. The local data are sufficiently detailed for some localities to allow for a permit-by-permit comparison of the DCR database with data provided by local programs. The preliminary results suggest a state undercount of permit data with permits less than 5 acres disproportionately under represented. From this preliminary analysis, DCR concurs that their database does indeed reflect fewer permits than have been issued on the local level. Extrapolating DCR's preliminary data over the entire state and for an entire year (estimates may be subject to change). DCR suggests that the total permits could approach 7,000 annually. Upon the completion of their analysis, DCR will incorporate the final refined estimates they are generating into the regulatory discussion form.

Revenue estimates generated by the proposed fee structure are shown in Table 6. The estimates were based on two different distributions of permits: the permit distribution based on the state registry data and a gamma distribution of that data (see Table 5 for a summary). The distributions are then applied to three different assumptions about the number of permits that would be issued annually: 3,000 permits based on the state level DCR historical data, 5,600 permits based on the average annual number of permits projected in Table 1, and 7,000 permits based on upper bound permit estimate (see page 11). Combining the different estimates of number of permits with the different estimates of their distribution provides a matrix of possible revenues under the different assumptions (Table 6). An additional scenario will be developed by DCR upon completion of their data analysis.

Table 5: Comparison of permit size distributions under different assumptions

Permit Size	Original DCR	Gamma Distribution
> 2,500sqft, < 0.5 acre	7%	10.7%
> 0.5 acre, < 1acre	8%	6.9%
>1 acre, < 5 acres	40%	28.6%
>5 acres, < 10 acres	17%	18.1%
>10 acres, < 50 acres	23%	33.1%
>50 acres, < 100 acres	3%	2.5%
>100 acres	2%	0.1%

Table 6: Fee Revenues under Different Assumptions of Number and Distribution of Permits

No. of Permits / Distribution by size	3,000 (Original DCR)	5,600 (Table 1)	7,000 (Upper Bound)
Original DCR	$9,624,900	$17,966,480	$22,458,100
28% to DCR	*$2,694,972*	*$5,030,614*	*$6,288,286*
Gamma Distribution	$9,523,284	$17,772,888	$22,216,110
28% to DCR	*$2,666,520*	*$4,976,409*	*$6,220,511*

Given the compelling evidence of undercounting of permits in the registry database, an annual estimate of 3,000 permits is probably low for a typical year. The future number of permits during normal economic conditions would more likely be in the 4,000 to 7,000 range. The total annual permit fees collected assuming 3,000, 5,600 and 7,000 permits would be approximately $9, $18 million, and $22 respectively. Of total fees collected, DCR would collect 28% for overall program administration (assuming percentages remain the same as currently specified under 4VAC50-60-780). According to Table 6, fee revenue for DCR program oversight would be between $2.7 and $6.3 million per year (assuming 3,000 and 7,000

permits respectively).[28] Given the uncertainty of the current economic environment, however, the impact on program revenue from fluctuations in the number of permits issued is also worth noting.

According to DCR, it also should be noted that should DCR's final permit computations substantiate a significant under-reporting of permits, then the Department will need to reassess needed staff to support an increased permit load as well as revisit the fee amounts and DCR's percentage of the fees.

3b. Off-site options and pro rata programs

The offsite provisions and the pro rata system is an important and critical feature of the regulation. In highly urban settings (particularly redevelopment),some local programs report that on-site compliance is difficult and costly under the existing regulations. The more stringent water quality and quantity criteria and their focus on onsite runoff volume management will likely mean additional projects will face compliance challenges and increased costs for on-site control. Other land disturbances may face other types of site constraints (topography, soils, high groundwater tables, etc).

The off-site provisions in the proposed revisions offer needed compliance options and may allow greater opportunity to get more water quality protection for every dollar spent. Allowing land disturbers and local program administrator's flexibility to determine how and where water quality can be addressed may improve compliance opportunities and significantly reduce overall costs. Land disturbers would treat on-site up to the point that it is cost effective to do so (or as required by the local program) and then either pay a fee or achieve regulatory obligations off-site. The lower off-site control costs, the greater the cost-savings would be from a pro rata program or the off-site compliance option. An effective off-site/pro-rata program may be a necessity for highly impervious areas.

The magnitude of the cost savings, however, is uncertain at this point. Part of the uncertainty arises on the degree of flexibility localities will have in designing and implementing these programs. It is also uncertain how many localities will offer off-site compliance options.

A number of factors influence the cost reducing potential of the off-site/pro rata fee option. Three factors, in particular, will influence total stormwater control costs: sequencing preferences, allowable geographic area of off-site controls, and allowable off-site control options.

Sequencing refers to whether the local stormwater program would require land disturbers to undergo a process that gives preferential treatment to on-site controls before being allowed to consider off-site options (including payment of in lieu fees). Strict preferences for on-site control typically require the regulated party to demonstrate that on-site controls are either technically infeasible or prohibitively expensive. Strict sequencing rules will limit opportunities for lower cost and perhaps (in some circumstances) more environmentally effective off-site options (see discussion below). The proposed regulations are silent on regulatory preference for on-site controls.

The geographic area where off-site controls can be applied also influences the degree to which cost effective controls can be implemented. Greater flexibility on where off-site controls can be located will reduce costs and possibly improve environmental outcomes (other factors constant). For localities without a comprehensive watershed management plan, the regulation allows limited offset options for water quality criteria only. With a Board-approved watershed management plan, a local program can secure off-site reductions for either water quality or quantity within or adjacent to the impacted HUC or within "designated watersheds".[29] The watershed management plan requires consideration of the existing conditions and creates a plan to target and plan for future economic growth and environmental improvement. The cost effectiveness of off-site controls applies only if outcomes are achieved offsite that

[28] In addition, DCR would also receive 72% of all fees collected in areas without a delegated stormwater program. Roughly one quarter of all stormwater permits are estimated to be these nondelegated areas (assuming current estimates of 62 counties and 12 independent cities hold). Based on these assumptions, DCR could collect an additional $1.7 to $4.0 million in fees for local program administration (based on a range of 3,000 to 7,000 permits respectively). The remainder of all fee revenue ($5.2 to $12.1 million) would go to local delegated stormwater programs (assuming percentages specified in 4VAC50-60-780 do not change).

[29] In the event that a local water body is impaired by phosphorus, local programs can limit off-site options.

would be equivalent to those required on-site. Stormwater control programs, in general, provide three general sets of services; flood protection, channel/habitat protection, and water quality services. Each may be somewhat separable and each may have different spatial impacts and a watershed management plan can allow flexibility in how these impacts are offset. For example, flood protection is typically provided in close proximity to the impact in order to protect properties immediately downstream. Yet, flood protection can be provided without significant reductions in pollutant loads. Nutrient management to improve water quality offers more opportunity to move controls further off-site.[30] The flexibility and cost-saving potential of the off-site and pro rata provisions will depend partly on how broadly or narrowly "designated watershed" is interpreted by DCR in allowing off-site controls.

Finally, the way in which the water quality and quantity impacts can be offset off-site will also determine cost effectiveness. Existing pro rata programs in the Chesapeake Bay Preservation Area have been allowed to construct regional stormwater ponds, undergo stream restoration projects, and preserve open space as a way to offset phosphorus loads from land development activity. Such fees typically range from $5,000 to $8,000 per pound (or if expressed as an equivalent annual cost, $250 to $400/lb/yr). In localities where such programs exist, land disturbers are frequently willing to pay these fees rather than build additional onsite phosphorus control, suggesting that on-site phosphorus control costs are higher than these fees (this is consistent with empirical research on costs, see discussion above). The cost savings achieved by these programs support cost research that finds significant economies of scale for regional or larger scale projects. Several local officials interviewed during this analysis, however, indicated that these fees are likely to increase over time. Reasons for this increase include a decrease in the number of favorable and low cost offset sites, an increase in administrative and permitting costs of working in and around perennial streams (particularly for regional pond construction), and less willingness of state and federal regulatory officials to allow construction of regional stormwater facilities on perennial streams.

Conceptually, cost effectiveness will be enhanced if programs focus on achieving and maintaining a desired outcome (e.g., pound of P removed for example), rather than proscribing the means to achieve the outcome. The differences in per unit control costs across sources suggest that there are numerous options to lower compliance costs. Creating opportunities to secure phosphorus reductions (above and beyond reductions outlined in the state Tributary Strategies) from sources other than the construction of stormwater BMPs could lower costs. The following list of actions is only illustrative of the types of ways that could conceivably be available to reduce the cost of complying with the phosphorus control requirement.

- Biomass Harvest. The harvest of algal biomass could also be used to remove nutrients from ambient waters. One such system, Algal Turf Scrubber, grows filament algae using ambient water pumped over a flat prepared growing area. Water is then discharged back into receiving water and total nutrients removed from water can be measured as biomass weight and nutrient concentration. This technology is currently used in Florida to remove phosphorus from ambient waters and studies estimate the cost of phosphorus removal at $16 and $50/lb/yr (Hydromentia 2005). Advocates claim such a facility can remove over a thousand pounds of P per acre per year. Operated in conjunction with a municipal wastewater treatment plant, such a system could serve as a nutrient compliance offset for both municipal point and nonpoint nutrient control requirements. Currently, a biomass harvesting project is being piloted on the Susquehanna River in Pennsylvania (Crable 2008).

- Density Credits: From a watershed perspective, land settlement patterns may have the largest overall potential to reduce the impact of urban runoff on water quality (see discussion above). Localities in other states waive stormwater water quality criteria (grant exemptions) for high density developments or for brownfield redevelopment based on the premise that such

[30] Not all pollutant discharge will necessarily adversely impact local water quality. For instance, nutrient loads may not necessarily be a water quality concern in the immediate vicinity of the development impact, but rather may have adverse water quality consequences further downstream (in a reservoir or estuary). In the Chesapeake Bay watershed, tributary strategies focus on achieving nitrogen and phosphorus goals within entire river basins. Municipal waste water treatment plants and industrial point sources operating under the Virginia trading program may reallocate phosphorus and nitrogen within tributaries.

development has lower overall watershed impacts than low density development (NRC 2008; Lemoine 2007).[31] Such designations may offer localities additional flexibility in lowering compliance costs while at the same time providing watershed-wide water quality benefits. The logic is that total water quality can be improved on a watershed basis by settling more people on less land, even if the onsite runoff (or load) from the relatively small impacted area may be high.

- Under Virginia's Chesapeake Bay Watershed Nutrient Credit Exchange (§62.1-44.19:12-19) point source discharges (municipal wastewater treatment plants and industrial dischargers) must meet stringent nitrogen and phosphorus annual load limits, called wasteload allocation (WLA). Existing point sources that exceed their annual wasteload allocation have a number of options to remain in compliance. One option offered by the state includes securing nonpoint source reduction credits from Virginia's Water Quality Improvement Fund. Credits are documented reductions in nonpoint source loads that exceed reductions required by any regulatory requirements or by the Virginia Chesapeake Bay tributary strategies. Currently Virginia charges $11.06/lb for nitrogen credits and $5.04/lb for phosphorus credits (9VAC 25-820-70j3). These fees were based on state estimates of the annual cost of nutrient removal from agricultural BMPs. A similar type of program could be offered to land disturbers to offset stormwater impacts. Conceptually, land disturber could make a lump sum payment of $168 into a financial trust or foundation that would generate a stream of annual $5 payments in perpetuity (assuming a modest 3% growth). Even if the cost of these offset fees increased 10 fold (to account for uncertainty, rising control costs, etc) the cost would still be significantly lower than existing pro rata fees or on-site stormwater control costs.

- Chemical treatment. Several localities in the U.S. use chemical treatment processes (e.g. alum) to remove phosphorus and nitrogen from urban stormwater. For example, one regional stormwater treatment facility serving a 1,160 acre urban drainage was designed to remove 14,000 pounds of phosphorus per year in Florida (Herr and Harper 2000). Costs using such processes are reported to be only 30% of the cost of a wet detention system (Herr and Harper 2000).

- Wetlands are often noted for their nutrient cycling services. The regulation identifies constructed stormwater wetland as an acceptable stormwater practice, but constructing small scale treatment wetlands in urban environments is expensive (similar in cost to stormwater ponds). In comparison, large scale restoration of degraded or former floodplain wetlands may be a less expensive way secure phosphorus reductions. [32] Restoring former flood plain wetlands may involve simply restoring hydrologic function and wetland vegetation to drained flood plain agricultural land (which were often wetlands themselves before being converted). Restored floodplain wetlands can increase the capacity of aquatic ecosystem to remove nutrients because the represent new nutrient removal capacity to the system.

It is unclear at this time the extent to which localities administering their own stormwater program can pursue different (nonstormwater) types of phosphorus offsets.

One challenge to pro-rata programs, however, is that state law only allows localities to use such pro-rata fees to pay for design and construction costs (§15.2-2243). Since long-term maintenance costs may not be paid with pro-rata fees, the fees do not reflect the total cost of the offset. As noted above, long-term maintenance costs are a significant cost of stormwater management. Long-term maintenance costs may be paid by private owners of stormwater controls, shared between private landowners and the local stormwater management program, or incurred by the local stormwater management program (in the case of publically owned regional stormwater treatment facilities). These legislative restrictions place incentives for localities to narrow the range of possible offset activities to those that are more capital

[31] The comprehensive watershed management provision of the regulation (4VAC 50-60-96) does not grant authority to alter water quality criteria in specifically designated areas.
[32] The Wetlands Initiative. Undated fact sheet. "Can Wetlands Cost Effectively Manage Nutrients"

intensive. However, under the provisions of law, a locality may establish stormwater utility service fees to address, among other things, maintenance and inspection of BMPs in accordance with §15.2-2114.

Development projects located in state-managed areas or local areas without a pro rata program have much more limited opportunities to reduce costs off-site. For example, land disturbers in areas with a DCR administered programs will not have the advantages of a pro-rata program. One option the state may wish to consider in the future is the development of a state-wide urban offset program. North Carolina, for example, administers a state-wide in lieu fee program called the Ecosystem Enhancement Program (NCEEP). A regional state administered offset program option is also offered under Virginia's point source program (see above). A state-wide or regional program may be able have more opportunities to target fee resources to areas and sites where water quality improvements can achieve more reductions with higher probabilities of success. A state-wide program could serve a significant portion of the state where pro-rata systems are not available and also achieve administrative economies of scale by being able to more effectively consolidate management activities across more disturbed acres. Finally, such a program may be able to expand the cost reducing offsite options to a greater number of regulated parties.

3c. Benefits

The benefits of the proposed regulation are the additional improvements to the state's water bodies that would be achieved in the future with the proposed regulation as compared to what would be achieved with the existing regulation. Given the complexity of stormwater impacts and the comprehensive nature of the regulation, quantitative estimates are not possible. However, the range of possible benefits and indicators of the relative magnitude of possible benefits from the proposed regulation are summarized.

Conceptually, stormwater benefits are represented in Figure 5. As outlined in the proposed regulation, stormwater control practices alter flow and runoff quality stemming from land use change. These changes could then change a number of man-made and water-related services that are of value to people. These services include reductions in flood risk, avoided infrastructure costs, aquatic life support, recreation, and aesthetics (Braden and Johnston 2004). Commercial fisheries may also benefit from additional stormwater controls. Economic benefits are the value of these service changes to people.

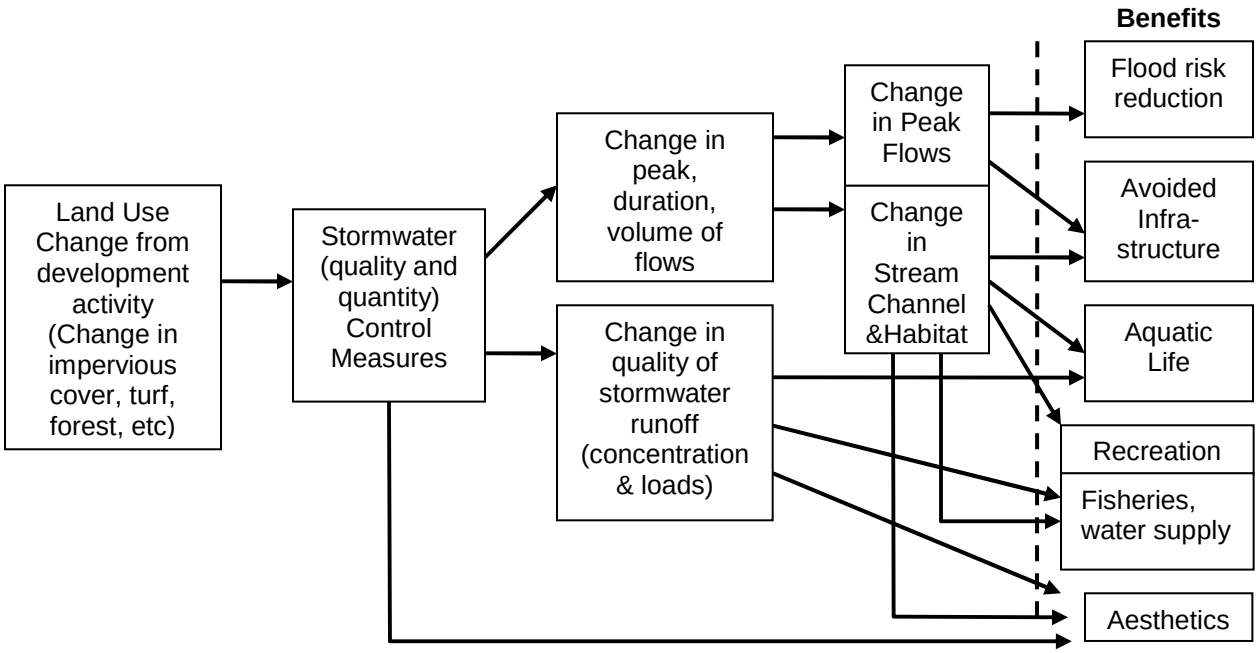


Figure 5: Benefits of Stormwater Control

Stormwater management also reduces the peak, duration and volume of stormwater runoff. The control of flows have significant consequences on stream habitat, flood related property damages, downstream infrastructure, and aesthetics (Streiner and Loomis 1995; Johnston, Braden and Price 2006). Virginia's current erosion and sediment and existing stormwater control programs provide some level of runoff control, primarily associated with control of peak flows. Johnston, Braden, and Price estimate differences in flood damage and infrastructure costs (primarily culverts) from conventional residential stormwater designs (stressing stormwater detention) versus conservation design (greater emphasis on infiltration and disturbed practices). The additional volume control achieved under conservation design was estimated to provide additional flood risk reduction benefits (between 0.4% and 2.5% of the value of downstream properties) and a reduction in infrastructure (culvert) costs for the developed area. In other cases, some elements of conservation design may directly improve the aesthetic environment for surrounding property owners (see Figure 5). For instance, the property owners are willing to pay more for properties adjacent to riparian areas and to open space (Qiu, Prato, and Boehm 2006).

Numerous studies have established a statistical correlation between urban land cover (as measured by impervious cover, effective impervious cover, road density, etc) and different measures of in-stream biotic diversity (ex. indices of biological integrity, measures of diversity of benthic macroinvertebrate life, etc). Studies overwhelmingly report an inverse relationship between measures of urban land cover (measured as impervious surface, road density, etc) and downstream biotic measures/indices (Davies and Jackson 2006; Center for Watershed Protection 2003; Wang et al. 2001; NRC 2008). Many studies report measures of biotic diversity begin to be reduced for relatively small amounts of impervious cover (~10%).

Empirical research of the extent to which these impacts might be reduced or avoided by various stormwater control practices is still emerging. Some existing studies suggest that control of peak flow alone has minimal impact on improving aquatic conditions (Maxted, J. R., and E. Shaver 1997; Roesner, Bledsoe and Brashear 2001). The proposed regulation, however, provides incentives to reduce runoff volume and imposes new water quantity criteria on controlling energy input to the stream. The proposed regulations requires more stringent requirements for unstable streams to energy inputs approximating forested conditions (§4VAC 50-60-66.A.3). The incentives to implement runoff reduction practices can also assist in efforts to more closely approximate the hydrology of predevelopment conditions. Reducing the volume, duration, and magnitude of flows will increase the probability of maintaining and improving biotic diversity in streams (NRC 2008). However, as the percentage of impervious cover increases in a watershed; the possibility that management efforts can restore biological conditions to pre-urban conditions in these watersheds is likely to diminish (Booth and Jackson 1997). Thus, the achievable stream restoration benefits (specifically aquatic diversity) may be small for new development or redevelopment in sub-watersheds with high percentages of impervious surfaces. The pro rata share provision of the regulation, however, offers some opportunities to redirect and target financial resources to other areas that have a higher probability to improve and maintain overall stream conditions.

It should be noted that many of the aquatic benefits from management of the runoff volumes generally accrue in relatively close geographic proximity to the stormwater control measures. Thus, the local citizens and governments incurring the higher stormwater control costs are also likely to be the same group of citizens that benefits most from these efforts.

Water quality benefits

While the proposed regulation focuses on nutrients (specifically phosphorus), many of the practices and strategies to control phosphorus will also lower the discharge of other pollutants associated with urban stormwater discharge. A number of chemical constituents are commonly found in stormwater runoff including a variety of heavy metals (zinc, copper, lead, chromium, etc), pathogens, suspended solids, oil/grease, and organics (BOD) that are commonly found in stormwater (Burton and Pitt 2002; Center for Watershed Protection 2003; Lee and Jones-Lee 2004; NRC 2008). It is reasonable to expect that the concentration of many of these contaminants increases with the level of urban activity (measured by population density, economic activity, or impervious surface). In sufficient quantities, these constituents can adversely impact aquatic life, human health, and possibly recreational activities. The proposed

regulations place new emphasis on runoff reduction and infiltration practices and can reasonably be expected to provide ancillary reductions of these other pollutants.

A significant analytical challenge in estimating the benefits of stormwater management is identifying the incremental improvement that can be achieved through the variety of stormwater controls. Tracing out this incremental impact requires identifying stormwater control practices used to control stormwater runoff, establishing the relationship between practices and pollutant removal, linking changes in pollutant loads to changes in water quality/quantity conditions, and then relating water quality and quantity conditions to physical and instream biological conditions of concern to people. For example a variety of studies have noted that people place a higher value on properties located along water bodies with improved water quality (Leggett et al 2000; Poor et al. 2001). However, these studies typically do not establish causal linkages between water quality and urban stormwater runoff. Conceptually, the value of stormwater management to water quality would require assessing the contribution of stormwater control practices to water quality improvements.

Water quality benefits from nutrient reductions

The proposed water quality criteria were established based on meeting Virginia's nutrient reduction requirements under the Chesapeake Bay Agreement. In 2000, Virginia along with the federal government and other Bay states signed the *Chesapeake 2000* Agreement. The agreement renewed commitments to lower nutrient and sediment loads to improve Bay water quality. Water quality standards were then established for different segments of the Chesapeake Bay and tributaries. The standards established criteria for dissolved oxygen and water clarity. Modeling conducted by Chesapeake Bay Program then analyzed the relationship between total nitrogen and phosphorus loads delivered to the Bay and the probability and frequency of attainment with water quality standards. The final annual load target agreed upon was 175 million pounds of nitrogen and 12.8 million pounds of phosphorus. At these load levels, the model estimated attainment with the dissolved oxygen criteria in most areas, but with some probability of occasional nonattainment (EPA 2003). As with any modeling of natural systems, uncertainty surrounds these estimated effects. Published estimates of the response to dissolved oxygen levels for incremental changes to the 175 and 12.8 million pound nitrogen and phosphorus load target could not be located.

Virginia's portion of this overall load target is 51.4 million pounds of nitrogen and 6 million pounds of phosphorus (delivered load to the Chesapeake Bay from all tributaries) (Chesapeake Bay Program Office 2008). Through the Virginia's Tributary Strategy planning process, plans were devised to achieve nutrient load targets. The plans (not part of a regulatory process) allocated nutrient load reduction targets to specific types of discharge sources (Virginia Secretary of Natural Resources 2005). Urban phosphorus loads from all urban land was estimated to be 1.86 million pounds in 2007. Of these pounds, the Chesapeake Bay Watershed Model estimates that 87% of the urban phosphorus load originates from pervious urban surfaces, with the remaining share of urban load from impervious surfaces. The state Tributary strategies aim to reduce urban loads to 1.04 million pounds (817,000 pound reduction from 2007).[33] While urban stormwater loads are not the largest source of nutrients to the Bay, as a group they are the only major class of sources where loads have increased over time (EPA 2007; Chesapeake Bay Program Office 2008).

The achievement of the Chesapeake Bay goals has been an important water quality goal for the state for over 20 years. The Chesapeake Bay makes numerous and fundamental contributions to the economy and the citizens of the Commonwealth. The Bay supports a variety of commercial and recreational fisheries. The benefits (measured primarily as the increased recreational benefits) from state and federal policy efforts through 1996 was estimated to be between $360 million to $1.8 billion (Morgan and Owen 2001). These benefits were confined only to recreational benefits and to those currently living within the Bay watershed.

[33] Chesapeake Bay Program Office. "Loads and Land Use Acreage" Excel Spreadsheet. Accessed on-line at http://www.chesapeakebay.net/tribtools.htm#allocations.

The contribution to those benefits from this proposed regulation could not be estimated. However, a crude estimate of the additional reductions that might be obtained beyond what is achieved under the existing regulations is possible. Beginning with the Chesapeake Bay Preservation Act areas, the new proposed stormwater water quality criteria would achieve additional (modeled) phosphorus reductions ranging from 0.15 to 0.45 lbs/ac/yr (see Figure 2 and Table 3). Land disturbance on new development would achieve reductions of 0.13 to 0.22 lbs/ac/yr.[34] Based on available evidence, slightly more than half of all disturbed acres in the state occur within the Chesapeake Bay Preservation Area. Assuming that 17,500 acres will be disturbed each year in the Chesapeake Bay watershed (estimated average land disturbance in CBPA area between 2005-2007) total phosphorus reductions achieved beyond the existing regulations would be 2,480 and 7,470 lbs/yr in the Chesapeake Bay Preservation Act areas. These estimates assume redevelopment acres range for 10 to 40% of total disturbed acres. The total site reductions achieved over the course of a decade would be between 27,300 and 411,000 lbs over what would be achieved under the existing regulation. These figures are changes in estimated loads leaving the development site but not delivered to the Chesapeake Bay. Phosphorus load reaching the Chesapeake Bay would need to be adjusted for fate and transport using attenuation ratios. Furthermore, it should be stressed that these estimates are *not* changes in phosphorus loads that stem from a change in land cover/use, but rather the additional reductions that could occur from more stringent water quality criteria.[35]

While the water quality criteria in the proposed regulation were derived to meet Chesapeake Bay Tributary strategies, the same phosphorus criteria are proposed for the entire state. Watersheds outside the Bay include Chowan, Roanoke, New River, Holston, Clinch and Big Sandy. In general, these areas are less densely populated than the eastern portions of the Chesapeake Bay watershed and nutrient related contributions from urban runoff would be expected to be much smaller. Furthermore, many of these areas of Virginia do not yet face the same regional water quality issues related to nutrient enrichment as those found in the Chesapeake Bay. Establishing differential stormwater water quality criteria based on the differential local and regional benefits that could be achieved from additional nutrient reductions can improve the economic efficiency of the proposed regulation.[36]

Watersheds beyond the Chesapeake Bay have yet to apply the same level of nutrient control requirements across a wide range of nutrient sources. If localized nutrient issues occur or are a possible water quality concern in these non-Bay watersheds, more cost effective and larger nutrient reductions could be achieved by securing reductions from sources other than incremental reductions from urban stormwater. Achieving additional phosphorus removal through the application of more stringent water quality criteria (effectively lowered from 0.45 lbs/ac to 0.28 lbs/ac) are achieved at estimated costs of $900 to $15,000 per pound of phosphorus (see Table 3). Agricultural and regulated point sources can achieve nutrient reductions at significantly lower unit costs. Given the relatively small scale of urban development in most parts of the non-Chesapeake Bay region, the more stringent phosphorus criteria would likely achieve modest phosphorus reductions relative to other sources. In areas where nutrient impairments may occur and are substantively related to urban development, a number of policy options already exist. For instance, urbanized areas regulated under the MS4 program may face different water quality concerns and apply different standards. In rural areas, local governments always have the option (and some incentive) to adopt programs and land use controls to protect any local water deemed to have special importance to the local economy (trout waters for instance).

The Virginia General Assembly has acted in ways that acknowledge the efficacy and fairness of differential nutrient control requirements across to the Commonwealth. Through the Chesapeake Bay

[34] Load changes based on procedures in DCR's compliance spreadsheet.
[35] The distinction is not trivial. The 0.28 standard for new development achieves additional reductions from what would be achieved under the existing regulation, but if the new development was built on land previously forest (P load rate 0.03lb/ac), the development would increase loadings to the Bay *regardless* of what water quality criteria is adopted (the issue the regulation addresses is how large the increase will be). Conversely, if the new development occurred on former agricultural cropland, the conversion to an urban use would likely lower total P loads from that area (the issue addressed by the proposed regulation is how large the decrease will be).
[36] This discussion mainly applies to the application of stormwater water *quality* criteria. The local benefits from the application of water *quantity* criteria would be unaffected by this discussion.

Preservation Act, the General Assembly required restrictions on land use (e.g. buffers) for only landowners in the 29 Tidewater counties. The Virginia General Assembly has imposed more stringent nitrogen and phosphorus requirements on municipal and industrial point sources located within the Bay watershed through the 2005 Chesapeake Bay Watershed Nutrient Credit Exchange Act §62.1-44.19). Through these actions the General Assembly has authorized and legitimized the appropriateness of more stringent nutrient controls for areas within the Chesapeake Bay watershed. Furthermore, the General Assembly has not stipulated that phosphorus water quality criteria established by the Board must be uniform across the state.

Implementing different stormwater water quality criteria across different watersheds would represent a minimal change in administrative costs. The stormwater design, evaluation, and permitting process would remain unchanged. The DCR stormwater compliance spreadsheet would require only minor changes. The type of stormwater practices offered and the design criteria of those practices would not need to be modified.

4. Projected cost of the regulation on local governments

The proposed regulation will require local governments to spend additional resources on administering stormwater control. The proposed regulation aims to extend federal authorization for administering the Virginia Stormwater Management Program General Permit for Discharges of Stormwater from construction activities (4VAC40-6-102) to local governments. The proposed regulation establishes standards and procedures of a locally administered stormwater management program. In delegated program areas, this proposed change will consolidate permitting of land disturbing activities into a single permitting process with the potential of streamlining the permitting process for regulated entities.

In general, local administration of a stormwater program involves a number of activities including:

- Stormwater BMP plan review and approval
- Stormwater BMP construction inspection
- Stormwater BMP record keeping/tracking
- General Permit coverage issuance
- General Permit enforcement
- Stormwater BMP long-term post-construction compliance monitoring & enforcement
- Receipt of permitting and program administration fees

This analysis below draws upon two data sources. First, DCR conducted a survey of local stormwater and erosion and sediment control programs in the summer of 2007. Thirty-three counties (more than a third of all counties) and 9 cities completed or partially completed the survey. Second, during the fall 2008, interviews were conducted with staff for 7 large stormwater programs within the Chesapeake Bay Preservation Act area (jurisdictions representing about a third of Virginia's total population).

The analysis identifies possible ways the proposed changes will impact program administration costs to state and local government. The expenditure of additional resources to implement the proposed changes represents a societal cost that is in addition to practices and actions associated with constructing and maintaining stormwater control practices. Any changes in program administration cost, however, must be distinguished conceptually from those who will pay the cost. Although program costs are expected to increase for state and local governments in ways described below, the proposed fee structure will mean that a portion of those costs will be paid by the regulated community.

Based on available information, most localities with stormwater management programs rely primarily on conventional stormwater control practices (e.g. extended detention basins and wetponds) to meet existing water quality and quantity criteria. These conventional practices can also be used to capture and treat runoff from a larger land area. Some local governments have expressed concern that the emphasis on runoff reduction and the more stringent water quality criteria will increase the use or need of less conventional and smaller scale stormwater control practices. The expected change in the number and

composition of stormwater BMPs is expected to increase local government administration costs in several ways. During interviews, some local stormwater managers estimated that five to ten smaller scale stormwater BMPs may be needed to treat a given land disturbance that would have been treated with a single conventional best management practice under the existing regulations. The increase in the number and type of BMPs needed to treat any given acre of disturbed land may increase local stormwater program administration costs.

Stormwater plan review costs are expected to increase. Plan review will require more hours and perhaps the acquisition of additional expertise or training of existing personnel as the complexity of stormwater designs increase. Depending on the complexity of the smaller scale distributed infiltration and filtration BMPs, construction inspection costs may increase. First, localities may not have expertise to inspect for the proper installation of practices such as green roofs, porous pavement, and practices that require subsurface infiltration and drainage structures. Some local programs have suggested that they may need to either hire additional expertise or contract out for inspections for certain types of practices. DCR also plans to offer certification and training programs designed to provide training necessary to appropriately assess these practices. Similar to some conventional stormwater controls, additional inspections may be required during construction for some practices – for example infiltration and filtration practices currently available for use that require subsurface drains and specific soil mixes that should be inspected during construction. Finally, use or reliance on smaller scale BMPs (often collectively referred to as LID) increases the number of facilities needed to treat a given land development, thus increasing the number of inspections and the related costs.

An effective stormwater program also requires a system to inventory and track BMPs, long-term compliance monitoring (inspection), and enforcement against noncompliance. Such a system is essential to ensure that practices continue to provide water quality and quantity control services over time. A long-term compliance system requires developing a BMP tracking system, system of inspection, administration and follow-up for violations, and initiation of enforcement actions if deficiencies and violations are not corrected. Recent reports conclude that a major challenge confronting stormwater programs across the United States is inadequate plans and resources to ensure the long-term maintenance of stormwater infrastructure (GAO 2007; NRC 2008).

A long-term inspection and compliance program is typically the last programmatic phase to be developed in most stormwater management programs. In fact, many localities interviewed indicated that many long-term inspection/compliance programs have just recently been actively implemented. The inspection programs include efforts to identify and cooperatively correct any observed deficiencies or violations of maintenance agreements. Active enforcement in terms of pursuing legal remedies against persistent instances of noncompliance has not been confronted for many active stormwater programs. Some general estimates of stormwater annual inspection and enforcement costs provided by local program administrators range from $100 to $500 per stormwater practice. Based on limited evidence from stormwater programs, approximately 1 full time staff equivalent is required for long-term inspection/compliance for every 400 to 450 stormwater practices in the local stormwater inventory (assuming inspections occur every 1 to 2 years).[37] Given that the number of practices needed to treat any given area may increase significantly, long-term compliance and enforcement costs will be expected to increase as the rate of new stormwater BMPs added to the existing stormwater inventory increases. The stormwater infrastructure inventory represents a long-term regulatory responsibility and growing cost obligation to local stormwater programs. The new emphasis on run-off reduction, however, may offset some of these costs because of avoided future administration and remediation costs from local drainage problems.

Proposed regulations, however, offer opportunities to manage these additional costs of a long-term inspection and maintenance program. The proposed regulation requires local stormwater programs to develop an inspection program. The inspection program, however, includes a priority system that would allow a locality to target inspections (frequency, type, etc.) based on a number of factors including the

[37] Based on limited evidence, local stormater programs in Virginia average about 400 to 450 stormwater BMPs per 100,000 people under the existing regulation.

type of stormwater practice, contributing drainage area, and downstream conditions (4VAC50-60-114D). In concept such a priority system could target inspection in relation to the relative contribution of any given practice to water quality improvement or the probability of failure. DCR is also considering developing a stormwater practice tracking and reporting system that could help reduce inspection administration costs.

Local stormwater programs can also rely on the private sector to carry out some of the inspection activities. Private inspections are allowed if conducted by a licensed professional and paid for by the owner of the stormwater facility (4VAC 50-60-114C and 114.D4) and in accordance with the inspection schedule outlined in the stormwater facility maintenance agreement (4VAC50-60-124). Although such provisions do not avoid the social cost of inspections, it does allow the local stormwater program to shift some inspection costs to the private sector.[38]

Local government programs might face higher long-term costs associated with maintaining BMPs. The proposed regulations encourage the assignment of long-term maintenance costs to private landowners. The regulation states that the responsibility for long-term operation and maintenance of stormwater facilities shall remain with property owner or other legally established entity, unless assumed by a government agency (4VAC50-60-124). In many local programs, however, the responsibility of long-term maintenance is frequently assumed or partially assumed, particularly in residential areas, by the local government. Often the landowner or homeowner association will assume responsibility for routine maintenance while the local program will assume responsibility for major retrofits and repairs. Local programs will elect to assume partial responsibility for some types of stormwater practices in some situations because of a perceived inability of the private landowner to effectively carry out the long-term maintenance requirements (Ruppert and Clark).[39] Furthermore, as the number of stormwater BMPs proliferate, particularly in residential developments, the probability that some responsible parties will not have the financial means to maintain the BMPs increases. In cases where the legally responsible party does not have the financial ability to pay for maintenance or BMP repair, the local government may face the choice of whether to let the practice fail or assume the long-term cost obligation itself. The precise magnitude of the increase, however, is uncertain since most local programs have limited long-term experience with the maintenance and performance of nonconventional best management practices (the relatively few number of nontraditional practices implemented have been done so only recently) and it is unclear how prevalent the sharing of maintenance responsibility will be.

Some of the proposed stormwater management practices may also present unique monitoring and enforcement challenges. For example, rain gardens, porous driveways, cisterns, green roofs, grass swales, and some types of land use easements (to preserve forest cover for example) are distributed small scale stormwater treatment options that may be located on individual residential properties. The proposed regulations require local stormwater programs to require right-of-entry agreements or easements from the property owner for purposes of inspection and maintenance (4VAC50-60-124C). Placing BMPs on individual parcels, however, can result in management challenges because residents are often unaware of the maintenance requirements or obligations for practices on their property (Ruppert and Clark 2008). Furthermore, local governments may be reluctant to require small scale practices due to privacy and political expediency concerns, particularly in residential situations (Ruppert and Clark 2008). Consequently, local stormwater management programs in Virginia often prohibit or restrict the use of stormwater practices on individual residential lots.

In addition, verifying compliance may be difficult for some nonconventional stormwater control practices listed in the regulation. Most compliance inspections are done through visual inspection. Maintenance of conventional systems, such as ponds, can be done through checks of trash/sediment and, periodically,

[38] The use of private third party contractors, however, would also require a separate set of oversight costs. The use of private inspectors to verify performance create incentive compatibility issues because neither the private inspector or the regulated party have an inherent interest in the public's interest in maintaining BMP performance (Ruppert and Clark 2008). The private inspector has a primary interest in paying clients and the client has an interest in a quick and favorable inspection. Thus, private inspections still require cost to certify and spot check private inspectors.

[39] The proposed stormwater revisions also allow local governments to conduct necessary repairs or maintenance on negligent stormwater facility owners and then recover the costs from the owner (4VAC50-60-124A).

dam structure. The performance of many nonconventional practices (some practices referred collectively as LID) can be more difficult to verify (Ruppert and Clark 2008). For example porous pavement requires scheduled vacuuming/sweeping to prevent fine particles from decreasing water infiltration. Cisterns require active draw-downs after storm events in order to maintain runoff reduction capacity. Such behavioral actions necessary for maintenance are more challenging to verify. The proper functioning of infiltration or filtering practices may be more difficult to verify except during storm events.

Given the implementation costs and challenges noted above, local stormwater programs may have legitimate reasons for limiting the use of some types of stormwater treatment practices in their jurisdiction. For example, small scale distributed practices may be discouraged by local governments out of legitimate concerns about the public acceptability, long-term cost obligations, or out of concerns of documenting/maintaining performance over time. Restricting BMP options available for land disturbers, however, may make compliance more difficult and costly. Given the stringency of the proposed stormwater quality criteria, it is unclear whether conventional treatment options alone can achieve compliance in some circumstances. Thus, local stormwater programs may face a trade-off between private compliance costs and local government implementation cost. Limiting the number of stormwater practices that can be used to achieve compliance may reduce local government implementation costs but increase private stormwater compliance costs because some lower-cost stormwater control options have been eliminated. If the local program fails to offer enough control options, land developers may find it more difficult to achieve compliance on-site.

4a. Existing Local Stormwater Programs: Program Administration Costs

All counties and cities covered by the Chesapeake Bay Preservation Act (29 counties, 17 cities, and 38 towns) and counties and cities covered by MS4 permits are required by statute to administer a local stormwater management program. Non-CBPA localities required to operate delegated stormwater programs include the cities of Bristol, Charlottesville, Danville, Harrisonburg, Lynchburg, Roanoke, Salem, Winchester, and Christiansburg/Blacksburg area and the counties (partial or total) of Albemarle, Botetourt, Roanoke and Loudoun. These areas represent approximately three quarters of the state population and cover roughly the same percentage of all disturbed acres (2005 to 2007).

The cost to these jurisdictions to implement the new regulations is subject to considerable uncertainty for reasons highlighted above. Most local governments interviewed were reluctant or unable to provide an estimate of the amount of new resources needed for implementation. All agreed that additional staffing and budgetary resources would be necessary.[40] The challenge of estimating future costs are compounded by the fact that many localities felt that additional resources were needed to adequately implement *existing* stormwater and erosion and sediment control programs. For example, the 2007 DCR survey found that less than half of local stormwater programs had adequate staffing to implement *existing* stormwater requirements. In addition, staff and budgetary resources for erosion and sediment control, zoning, and public work functions are often shared with stormwater management programs, thus making it challenging to isolate costs attributable to just stormwater management. The overlapping responsibilities of program implementation (E&S, stormwater, public works) and the challenge of separating costs across existing and new proposed activities further complicate estimating the increase in costs associated with proposed regulation.

Either through the interview process or the DCR survey, eleven local stormwater programs provided an estimate of the increase in costs or staff needed to comply with the proposed regulations. These programs represented almost one fourth of all disturbed acres in the set of localities identified above. These localities estimated 31 to 41 additional staff in total would be needed to administer the proposed regulation. Three localities provided a minimum estimate of additional staffing needs (e.g. “need at least 2 additional staff”). A rough estimate of the incremental staffing costs for these 11 localities would be between $2.6 and $3.4 million per year.[41] Assuming the remaining localities with existing stormwater programs would have to increase in the roughly the same proportion as this sample, total estimated local

[40] These additional costs would be fully or partially covered by new stormwater fees.
[41] Assumes full time equivalent staff paid at $36/hour (wage + fringe) plus 10% overhead costs.

government staffing costs may be between $10.6 and $14.2 million per year.[42] These totals exclude increases in long-term maintenance and repair costs that may be assumed by the local programs as a result of the implementation of the proposed regulation. These cost estimates do not include additional educational and technical materials that must be developed to successfully implement the new program (discussed below). Finally, these costs also exclude the annual increase in inspection, tracking, and enforcement costs that will occur as the stormwater infrastructure inventory grows.

4b. Administration of Local Stormwater Programs in Areas without Existing Stormwater Program

The proposed regulation would also require all areas outside the Chesapeake Bay Preservation Act and MS4 programs to comply with the proposed revisions to the regulation. These localities have the option for DCR to administer the stormwater program or applying to assume responsibility for local program administration. These localities include the remaining 62 counties as well as 12 independent cities.[43] Towns in these counties also have the option to develop their own program. While representing almost two-thirds of the land area in the state, less than one quarter of the citizens live in these areas. An estimated one quarter of all land disturbed acres in the state between 2005 and 2007 were located here.

It is uncertain what percentage of these local governments will elect to administer a stormwater program. Most of these local governments currently only administer erosion and sediment control programs. Furthermore, state and local programs are struggling to adequately implement the existing E&S program. Of the twenty counties and independent cities responding to DCR's 2007 stormwater survey, only 15% indicated they had sufficient staff resources to administer the existing erosion and sediment control programs. Given the limited existing resources for E&S implementation and almost no experience with stormwater programming, the expectation is that DCR will initially administer the majority of these programs. Regardless of administrative agency, the stormwater programs in these areas will need to be built up from a minimal programmatic foundation.

For purposes of this analysis, it will be assumed that the cost to implement local stormwater management programs in these areas will be incurred (at least initially) by DCR (see next section). To the extent local governments in these areas assume responsibility for program administration, estimates of local government costs can derived from the discussion in Section II.5a.

5. Projected cost to the state to implement and enforce the proposed regulation

5a. DCR Administration of Local Stormwater Programs in Nondelegated Areas

For purposes of this analysis, it is assumed that DCR will administer local stormwater programs in 62 counties (and towns within) and 12 independent cities. These local governments do not currently administer a local stormwater program and are not required to assume this responsibility. The activities DCR must implement in the administration of these programs are the same as described in section 4.

Estimates of the cost to administer these local stormwater programs are derived using two data sources. First, DCR provided an estimate of the staffing requirements and administrative costs. Second, program staffing in the nondelegated areas was estimated based on the current staffing requirements from operating local stormwater programs in Virginia. Staffing requirements for a sample of existing local stormwater programs was obtained from the 2007 DCR survey of local stormwater programs. Coupled within information on disturbed acres, these staffing estimates could be expressed as stormwater staff requirements per unit of disturbed acres and applied to the nondelegated area.

[42] These represent estimates of the increase in social cost. How these costs are shared between local government programs and the private sector (who pays) depends on the amount of stormwater fees collected. See the discussion of fees (pages 22-24) for estimates of total fee revenue.

[43] Includes all counties outside the CBPA and without a MS4 program and the cities of Bedford, Buena Vista, Covington, Emporia, Franklin, Galax, Lexington, Martinsville, Norton, Radford, Staunton, and Waynesboro.

DCR originally estimated that 24 full time staff would be required to administer the local stormwater program in nondelegated areas (it should be noted that this estimate was based on the issuance of 3,000 permits per year and DCR plans to revise their staffing needs and costs upon finalization of their revised permit computations). Including administrative expenses and staffing costs, DCR initially estimated the total cost to pay and support this staff would be $1.962 million.[44] It should be stressed that this cost estimate does not represent the incremental cost of the proposed regulation. Some of these staff resources are also required to administer the existing regulations. Thus, the incremental cost to administer the proposed regulatory revisions is some portion of these costs.

Another estimate of local stormwater staffing requirements for these nondelegated areas was made based on the staffing requirements of existing local stormwater programs. Stormwater program staff estimates for 12 local stormwater programs were obtained primarily from the 2007 DCR survey. Based on DCR estimates of disturbed acres, these 12 stormwater programs administer approximately the same number disturbed acres as the total area DCR is expected to administer (62 counties, 12 independent cities). The 12 local programs estimated that approximately 27 full time staff are devoted to stormwater management activities, but need an additional 13.5 staff to fully implement the existing regulation. Using these estimates of the staffing needs from existing local stormwater programs, then DCR may need between 27 and 40.5 full time staff to implement stormwater programs in nondelegated areas at a cost ranging from $2.2 to $3.3 million. The lower estimate is similar to the initial staff estimate calculated by DCR. Such calculations will be revised by DCR.

Several caveats are necessary. The staff estimate based on the staff of existing stormwater programs might be viewed as an underestimate because local programs also indicate the need for additional resources to implement the proposed regulations (see Section 4a above). DCR, however, may be able to achieve some administrative economies of scale by consolidating administrative activities across larger geographic regions in their regional offices.

5b. DCR oversight costs[45]

Under program oversight, DCR will be responsible for the auditing of all local programs on a periodic cycle to insure compliance. A large initial workload will exist in program development including DCR support of the development and review of local program submittals to the Virginia Soil and Water Conservation Board. Associated program development issues will shift through time, but remain indefinitely. Other technical assistance will include supporting local plan review, oversight inspections, and BMP questions. Further, DCR will be required to respond to complaints not resolved at the local level and will need to address issues related to permit issuance and fee accounting. In addition, DCR will develop and maintain the BMP Clearinghouse and the enterprise website and maintain the stormwater management handbook. DCR's initial estimates of staffing needs and computations are based on the issuance of 3,000 permits per year and are subject to revision upon finalization of the permit computations. Initial calculations were as follows:

- 30 FTE x current average salary and benefits of $35.46/hr x 2080 hrs/yr = $2,212,704
- 30 FTE x $8,000 for administrative expenses including rent, utilities, computers, training, travel, printing expenses, etc. = $240,000
- Annual contract costs associated with enterprise website and BMP Clearinghouse = $200,000
- Training costs, $250,000/yr
- Minimum total annual cost = $2,902,704

It should be recognized that the estimated program oversight cost of $2.903 million is not an estimate of the new costs required to meet the proposed revisions to the stormwater regulation. A number of the

[44] Assumes hourly salary and benefit rate of $35.46/hr and $8,000 in administrative expenses (overhead, travel, etc) per staff position.

[45] This section draws text and estimates directly from "Discussion Document on Department Fees" (pp. 3-6), Virginia Department of Conservation and Recreation (September 8, 2008).

staff included in the estimate above (including those needed for oversight and program administration collectively) are already on staff at DCR and do not represent new positions. A detailed explanation of DCR oversight activities for the stormwater management program is as follows:

Program Audits – 4FTE

DCR staff will conduct program audits on all local and DCR administered stormwater management programs. The audits will evaluate compliance with the Stormwater Management Act and attendant regulations. The audit will evaluate the following:

- Local program ordinance and procedures
- Stormwater plan reviews
- Inspections of active projects
- Inspections of completed projects and associated stormwater BMPs
- Compliance and enforcement efforts
- Complaint responses
- General Permit coverage

A 3-year review cycle would utilize two 2-member teams. The review effort will be as follows:

- 3-year cycle – 60 programs reviewed per year
- Each team to review 30 programs per year
- Time for one program review – 1 week
- Time for one program Corrective Action plan and Technical Assistance for program development – 0.5 week

Program Audit Staffing need = 4 FTE

Program Technical Assistance – 5FTE

DCR staff will provide technical assistance to local programs regarding plan reviews, inspections, BMPs, and interpretations of the Stormwater Management Act and attendant regulations. DCR staff presently provide this assistance in the ESC Program and staff records indicate an average assistance to each program of 6 days per year. DCR field staff or contractors implementing the program locally will need equivalent support.

179 programs x 6 days = 1074 days x 8 hrs/day = 8,592 hrs

Staff estimate for technical assistance = 8,592 hrs / 1,832 hrs/staff = 4.7
Program Technical Assistance support need = 5 FTE

Complaint Resolution by DCR – 3FTE

DCR staff will respond to complaints regarding stormwater management issues that are not resolved satisfactorily by the locally run programs and in support of regional DCR implementing staff. Based on DCR staff records, approximately 212 complaints are received annually. Time estimates for complaint response varies from 1 day to several weeks. The average time for complaint resolution is approximately 3 days.

Complaint Response – time/staff estimates:

212 complaints x 3 days/complaint = 636 days x 8 hrs/day = 5,088 hrs

Staff estimate for complaints = 5,088 hrs / 1,832 hrs/staff = 2.8 Staff
Program Complaint Resolution Assistance support need = 3 FTE

DCR Program Coordination and Development by DCR – 12FTE

For DCR run local programs, DCR staff will spend considerable time and effort in coordinating with localities and in ensuring the proper integration of the DCR run stormwater management program with the locality's related permitting programs. Staff will have to meet regularly with local staff to properly integrate project submissions, reviews, approvals, and permitting. Also, there is the initial workload associated with assisting localities in preparation of their program submittals for the Virginia Soil and Water Conservation Board and then on-going to assist with corrective actions following program reviews, etc.

73 DCR-run programs x 3 weeks/locality = 219 weeks x 40 hrs/week = 8,760 hrs
106 local-run programs x 1.5 weeks/locality = 159 weeks x 40 hrs/week = 6,360 hrs

Staff estimate for program coordination = 15,120 hrs / 1,832 hrs/staff = 8.3 Staff

Program management, EPA coordination, record oversight, permit tracking, reporting, regulatory coordination, and financial management = 4 Staff

Program Coordination and Development support need = 12 FTE

DCR Enforcement Actions – 4FTE

DCR may become involved in enforcement where compliance is not achieved at the local level. The majority of enforcement actions are successful in their initial stages. However, some compliance issues are not resolved locally and require more significant enforcement responses in order to achieve compliance or extract penalties.

If we assume that 3,000 permits will be issued annually and that the occasional significant enforcement actions equate to an average of 2.5 hours per permit issued, then enforcement time will require 7,500 staff hours per year or 4.1 staff.
Program Enforcement Action support needs = 4 FTE

Enterprise Website – 1FTE

DCR will develop and implement an enterprise website related to the implementation and tracking of the consolidated stormwater management program. The enterprise site will allow for online payment of fees, distribution of the fees paid to localities and DCR, general permit issuance and program reporting. After the initial development and testing costs, DCR will have costs associated with the operation and maintenance of the enterprise site. These operation and maintenance costs are expected to total $100,000 per year to cover annual server and network costs.
Enterprise Website support needs = 1 FTE plus annual server and network costs

BMP Clearinghouse and Website – 1FTE

DCR will develop and oversee a BMP Clearinghouse and website to provide up-to-date information related to stormwater management practices and program guidance. The clearinghouse will require development and maintenance contracts with the Virginia Water Resources center at Virginia Tech. The anticipated costs associated with the oversight and maintenance of the clearinghouse is approximately $100,000 per year.
BMP Clearinghouse and Website support needs = 1 FTE plus annual contract costs

Training and Certification Costs

DCR will face significant transition costs in implementing these regulations. More than half of all local governments and local developers across the Commonwealth have little or no experience or expertise in stormwater management. For local programs with stormwater programs, the state is also introducing new

compliance tools and the regulations encourage a variety of stormwater practices which many local programs have not yet (to date) promoted or have little experience with reviewing design specifications or inspecting. This transition will require investments by DCR in stormwater program education and dissemination of technical information. A certification program will be required for locality and DCR staff. DCR expects that the development and implementation of the training program will cost approximately $250,000 per year.

5c. Local Program Costs and Fee Revenues

DCR expects to pay for the majority of state stormwater program operating costs (oversight as well as operating local programs) with permit fee revenue (Table 6). These fees are based on the number permits managed each year by DCR or by the designated local stormwater programs. Fee revenue would appear sufficient to pay for the majority or all of the incremental program administration costs in an "average" or typical year. Yet, program revenue will be largely dependent on the level of economic activity in the construction industry. Furthermore, fee revenue would be expected to show more variation over the business cycle than other revenue sources (e.g. general tax revenues or general stormwater utility fees). For example, consider housing starts as one proxy measure for the possible variation in fee revenue (see Figure 1). The historical record shows that housing starts can change dramatically around the business cycle. For instance, 2 to 3 years during an economic recovery, housing starts can more than double in number. The downside risk is similar in magnitude. Between 1989 and 1992 housing starts fell by half. Similar or greater drops were experienced in the early 1980s. The extent to which housing starts and construction activity will drop in the current recession is yet to be seen. Assuming building permits track closely with stormwater permit applications in terms of relative volatility, such data give a sense of the relative magnitude of revenue variability that could be faced by the state stormwater program.

Some program costs (program oversight costs, long-term inspection/enforcement, maintenance costs) must be incurred annually, and are mostly independent of the level of current development activity. Given that DCR and local program activities under this proposed rule face a highly variable revenue source, DCR and local governments should develop clear plans to manage its variable revenue stream in a way that does not disrupt monitoring and enforcement of these regulations.

5d. VDOT compliance activities and costs

The cost of road construction will increase as a result of the proposed regulation. While costs will increase, a total annual estimate of the increased cost to comply with the proposed standards, however, could not be estimated at this time. Between 2005 and 2007, Virginia Department of Transportation road construction projects obtained permits to cover slightly more than 1,000 disturbed acres per year for the state.

The proposed regulation will increase both road construction and post construction maintenance costs. The redevelopment water quality criteria would apply for road construction and improvement projects to existing roads. New road or major expansions of existing roads will likely be subject to the proposed 0.28lb/ac phosphorus water quality standard. Under current regulations, the vast majority of stormwater control structures constructed for road projects are extended dry detention basins. To achieve compliance with the new water quality criteria will require greater reliance on filtration and infiltration types of BMPs. As noted in the cost discussion above, such practices are often more costly to both construct and maintain. Furthermore, new road construction will likely require wider right-of-ways in order to install stormwater control practices, thus increasing land acquisition costs.

VDOT expects achieving the redevelopment water quality criteria for projects located in urban areas and rural secondary roads will be more technically challenging and costly than for new road projects. Urban areas and rural secondary roads typically have narrow right-of-ways. Urban streets may face additional challenges to treating water in high percentages of impervious surface and curb-and-guttered streets. All limit the suitable land areas for treating stormwater runoff. In many cases, VDOT expects to rely on some off-site controls to achieve compliance.

6. Summary

The proposed revisions to Virginia stormwater regulations will likely produce improvements in the condition of receiving waters. The new emphasis on reducing runoff volumes can produce important benefits related to the condition of aquatic habitat by reducing the energy pulses produced during storm events. New water quantity control requirements also provide benefits in terms of additional flood protection and instream aquatic protection. Acknowledging and accounting for the runoff reduction potential of many types of stormwater control practices will increase compliance options and increase the effectiveness of state stormwater regulations.

The proposed regulatory revisions also impose more stringent stormwater water quality criteria. The proposed stormwater regulatory revisions will produce additional reductions in phosphorus and other effluent loads produced from urban land conversion (land use change to impervious cover and turf). Achieving additional improvements in the quality of stormwater will impose new costs on land development activities. In development case examples, the new water quality and quantity standards could be achieved on the development site. The cost of incremental reductions in nutrient loads from the application of stormwater controls, however, is high relative to other nutrient removal options. Uncertainties exist over the long-term cost and effectiveness of many stormwater control practices. The cost of achieving additional nutrient reductions in highly urban settings and other areas with site specific constraints is still uncertain but potentially high. The off-site and pro-rata provisions in the regulation offer opportunities to lower costs and enhance benefits to affected watersheds if properly implemented. The total incremental costs to the state of implementing additional stormwater control practices to meet the proposed regulatory changes could not be estimated at this time.

The proposed revisions apply the same water quality and quantity criteria across the entire state. New proposed stormwater water quality criteria was based on estimates of the nutrient reductions needed to achieve reductions called for in the Chesapeake Bay Tributary Strategies. Economic efficiency of the proposed regulation could be improved by applying differential water quality criteria in watersheds across the state based on the relative water quality benefits that can be achieved.

The proposed regulation will produce improvements in the stormwater permitting structure and will strengthen the administrative tools localities need to implement stormwater programs. While the proposed changes will increase the number and type of control practices that can be used, these changes will also increase the sophistication and resources needed for stormwater design and program administration. The greater expected use of smaller scale distributed practices could increase the costs of local stormwater management, particularly in terms of ensuring the long-term maintenance and performance of stormwater control practices over time. The local and state government cost to administer local stormwater programs will increase (rough estimates range between $13 and $17.5 million, but estimates are not final). State agency cost (DCR) for overall program administration will be a minimum of $3 million per year (estimates are not yet final). These costs are expected to be partially to fully covered by additional fees imposed on land disturbing permit applicants.

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