VIRGINIA DEPARTMENT OF TRANSPORTATION

LOCATION AND DESIGN DIVISION

INSTRUCTIONAL AND INFORMATIONAL MEMORANDUM

GENERAL SUBJECT: POST-DEVELOPMENT STORMWATER MANAGEMENT	NUMBER: IIM-LD-195.8
SPECIFIC SUBJECT: MINIMUM REQUIREMENTS FOR THE ENGINEERING, PLAN PREPARATION AND IMPLEMENTATION OF POST-DEVELOPMENT STORMWATER MANAGEMENT PLANS	DATE: JULY 15, 2014
	SUPERSEDES: IIM-LD-195.7
APPROVAL:	B. A. Thrasher, P.E. State Location and Design Engineer Approved July 15, 2014

CURRENT REVISION

- Changes have been made throughout this IIM to reflect changes in the Virginia Stormwater Management Program Law and Regulations. Stormwater Program Advisories SWPA 12-01 thru 12-04 have been incorporated into this IIM.
- Shading has been omitted due to the number of changes in this memorandum.
- This IIM addresses the technical criteria contained in Part IIC of the VSMP Regulations which includes, for linear projects, the Performance/Technology Based criteria for water quality and MS19 for erosion and flood control in the downstream receiving channel. The technical criteria contained in Part IIB of the VSMP Regulations, which includes the Run-Off Reduction Method for water quality and Energy Balance Equation for erosion and flood control in the downstream receiving channel, will be addressed in a future guidance document.

EFFECTIVE DATE

- Unless identified otherwise within this IIM, the information contained in this IIM is effective upon receipt.

ACRONYMS

- BMP – Best Management Practice
- BSD – Better Site Design
- CBPA – Cheaspeake Bay Preservation Area
- DCR – (The) Department of Conservation and Recreation
- DEQ – (The) Department of Environmental Quality
- ESC – Erosion and Sediment Control
- EPA – (The) Environmental Protection Agency
- FEMA – Federal Emergency Management Agency
- HUC - Hydrologic Unit Code
- IIM – Instructional and Informational Memorandum
- LID – Low Impact Development
- MS – Minimum Standard
- MS4 – Municipal Separate Storm Sewer System
- PAC – Pre-Advertisement Conference
- R&B – Road and Bridge
- RFP – Request for Proposal
- R/W – Right-of-Way
- SWM – Stormwater Management
- SWCB – Soil and Water Conservation Board
- SYIP – Six Year Improvement Program
- TMDL – Total Maximum Daily Load
- SWPPP – Stormwater Pollution Prevention Plan
- VAC – Virginia Administrative Code
- VDOT – (The) Virginia Department of Transportation
- VPDES – Virginia Pollutant Discharge Elimination System
- VSMP – Virginia Stormwater Management Program
- WQV – Water Quality Volume

DEFINITIONS

- Adequate Channel – A channel that meets the technical criteria contained in Section 5.2 and 5.3 of this IIM.
- Average Land Cover Condition – A measure (in percent) of the average amount of impervious area within a watershed. For regulatory purposes, this value is assumed to be 16% statewide.
- Channel – A natural or manmade waterway (includes culverts and storm sewer systems).
- Discharge Point – The location at which stormwater and/or a pollutant leaves the project area.
- Department – The Virginia Department of Transportation.
- HUC6 - A watershed unit established in the most recent version of Virginia's 6th Order National Watershed Boundary Dataset.

- Impervious Surface or Cover - A surface composed of any material that significantly impedes or prevents natural infiltration of water into soil. Impervious surfaces include, but are not limited to, roofs, buildings, streets, parking areas, and any concrete, asphalt, or compacted gravel surface.
- Impervious Area – The area (square feet or acres) of the site composed of an impervious surface.
- Land-Disturbing Activity or Land Disturbance - A manmade change to the land surface that potentially changes its runoff characteristics including any associated clearing, grading or excavation.
- Linear Development Projects – Those land-disturbing activities linear in nature such as, but not limited to, highway construction/maintenance projects/activities, construction/maintenance of stormwater channels and stream restoration projects.
- MS4 General Permit - General Permit For Discharges Of Stormwater From Small Municipal Separate Storm Sewer Systems.
- Non-Linear Projects – Those land-disturbing activities not considered linear in nature such as, but not limited to, parking lots, rest areas and District/Residency/Area Headquarter complexes.
- Offsite – Areas located outside of the VDOT right of way, easement or property boundary.
- Onsite - Areas located inside of VDOT right of way, easement or property boundary.
- Outfall – The location where concentrated stormwater leaves the project area.
- Pre-development - Those conditions that exist prior to commencement of the proposed land-disturbing activity/project.
- Pre-development Impervious Area - The amount of impervious area within the site prior to commencement of the proposed land-disturbing activity/project.
- Pre-development Percent Impervious - The amount of pre-development impervious area within the site divided by the total area of the site times 100.
- Post-development - Those conditions that will, or are expected to, exist after completion of the proposed land-disturbing activity/project.
- Post-development Impervious Area - The amount of impervious area within the site that will or is expected to exist after completion of the proposed land-disturbing activity/project.
- Post-development Percent Impervious - The amount of post-development impervious area within the site divided by the total area of the site times 100.
- Receiving Channel – The drainage facility that receives the stormwater run-off from the proposed land-disturbing activity.
- Regulated Land Disturbance Activities – Those activities that disturb one (1) acre or greater except in those areas designated as a Chesapeake Bay Preservation Area in which case the land disturbance threshold is 2500 square feet or greater (unless the activity is specifically exempted by the VSMP Law and/or Regulations).
- Roadway Section – The traveled way and associated shoulders, ditches, sidewalks, multi-use/shared use paths, back (cut) slopes and fore (fill) slopes
- Site – The area of proposed land disturbance (e.g., the construction limits) plus any R/W acquired in support of the proposed land disturbance activity/project. Any support areas within existing or proposed VDOT R/W associated with the proposed land disturbance activity/project and identified in the pre-construction SWPPP for the proposed land disturbance activity/project shall also be considered a part of the site. Permanent easements and/or other property acquired through the R/W acquisition

process in conjunction with the proposed land disturbance activity/project may be considered a part of the site and utilized in the determination of the post-development water quality requirements provided such property will remain under the ownership/control of the VDOT and providing such property is so identified/designated on the proposed land disturbance activity/project plans and is legally encumbered for the purpose of stormwater management.

- Traveled Way – That portion of the roadway section, exclusive of shoulders, designated for vehicular use.
- Watershed – The surface area, measured in a horizontal plane, draining to a specific point in a channel, stream, river or other such watercourse. Also referred to as "Drainage Area" or "Drainage Basin".

REFERENCES

The following editions apply when referenced in this IIM:

- Virginia SWM Handbook – First Edition (1999) Volume I and II.
- Virginia ESC Handbook – Third Edition (1992).

1.0 PROGRAM BACKGROUND

1.1 Acts of the General Assembly, the SWCB and DCR in 2011 and 2012 have resulted in the issuance of revised/update Virginia Stormwater Management Program Law and Regulations and Virginia Erosion and Sediment Control Law and Regulations. The general application of the VSMP Law and Regulations to VDOT operations is addressed in this IIM. The general application of the ESC Law and Regulations to VDOT operations is addressed in the current version of IIM-LD-11.

1.2 Effective July 1, 2013, the DCR Stormwater Program was transferred to DEQ. This included the regulatory areas of ESC, post-development SWM, construction permitting, MS4 permitting and Chesapeake Bay preservation. The sections of the Virginia Administrative Code (VAC) referenced herein reflect new numbering as a result of the program transfer.

1.3 Further information regarding the various law and regulations may be obtained from DEQ at: http://www.deq.state.va.us/Programs/Water/StormwaterManagement.aspx .

2.0 PROGRAM OBJECTIVE

2.1 Post-development Stormwater Management

To inhibit the deterioration of the aquatic environment by instituting a post-development SWM program that maintains both the water quantity and quality post-development runoff characteristics, as nearly as practicable, equal to or better than pre-development runoff characteristics.

2.2 Erosion and Sediment Control

To effectively control soil erosion, sediment deposition, and post-development runoff in order to protect downstream properties from erosion and flooding, and to minimize onsite soil erosion and transportation of sediment off the project site.

3.0 PROGRAM ADMINISTRATION

3.1 VDOT requests an annual approval of its ESC and SWM Standards and Specifications from DEQ. By its annual approval of VDOT's ESC and SWM Standards and Specifications, DEQ authorizes VDOT to administer its ESC and SWM Program in accordance with the approved ESC and SWM Standards and Specifications on all regulated land disturbance activities performed by or for VDOT (see Section 21.0 of this IIM for further information on VDOT's Approved ESC and SWM Standards and Specifications).

3.2 VDOT's Approved ESC and SWM Standards and Specifications shall apply to all plan design, construction and maintenance activities administered by VDOT and performed either by its internal workforce or contracted to external entities, where such activities are regulated by the Virginia ESC and VSMP Law and Regulations. During any inspections of VDOT land-disturbing activities by DEQ, EPA and other such regulatory agencies, compliance with the VDOT's Approved ESC and SWM Standards and Specifications (and all parts thereof) will be expected.

4.0 POLICY/GENERAL GUIDELINES

4.1 The VSMP Regulations are applicable to all land-disturbing activities where one acre or greater (2,500 square feet or greater in a designated CBPA) of land is disturbed, except routine maintenance operations that are performed to maintain the original line and grade, hydraulic capacity or original construction of the project (see Section 2.5 of the current IIM-LD-242 for additional information on the exemption for routine maintenance activities).

4.2 The VSMP Regulations are applicable to all regulated land-disturbing activities, both construction and maintenance, administered by VDOT and performed either by its internal workforce or contracted to external entities, including those developed/constructed under the Public/Private Transportation Act (PPTA), the Design/Build (DB) process and the Capital Outlay Program.

4.3 For the purposes of compliance with the VSMP Regulations, the following land-disturbing activities are <u>not</u> considered VDOT projects:

1. Roadway projects occurring on non-VDOT R/W, such as subdivision streets, industrial access roads, locality funded/administered projects, etc., which are designed and constructed by other parties and which are eligible for acceptance into the state roadway system for operations and/or maintenance by VDOT after completion of construction.
   The water quality/quantity requirements for the portions of these types of projects that will be operated and/or maintained by VDOT shall comply (at a minimum) with the requirements in Part II of the VSMP Regulations (9VAC25-870-62 et. seq.).

2. Land-disturbing activities occurring within the existing R/W of VDOT owned and/or operated roadway facilities that are a part of an offsite development and which are allowed by agreement and/or the issuance of a VDOT Land Use Permit and which are designed and constructed by other parties.
   Such land-disturbing activities shall be considered a part of overall offsite development plan (i.e., common plan of development) and any SWM requirements for areas inside of VDOT R/W shall be accounted for in the SWM plan for the offsite development.
   The water quality/quantity requirements for the portions of these types of projects that will be operated and/or maintained by VDOT shall comply (at a minimum) with the requirements in Part II of the VSMP Regulations (9VAC25-870-62 et. seq.).
   The plans for the offsite development shall document how and where the SWM requirements for the land-disturbing activities occurring on areas that will be operated and/or maintained by VDOT are being accomplished. This information is to be retained in the appropriate file(s) in the applicable VDOT District or Residency Office, until such time it is no longer valid.

3. Projects involving roadways that are owned and/or operated by VDOT and which include land-disturbing activities occurring inside and/or outside of existing R/W and which are funded by VDOT transportation revenue but whose construction contracts are administered by Federal Agencies, other State Agencies or localities (County, City or Town) and which will be turned over to VDOT for operations and/or maintenance after completion of construction.
   The water quality/quantity requirements for the portions of these types of projects that will be operated and/or maintained by VDOT shall comply (at a minimum) with the requirements in Part II of the VSMP Regulations (9VAC25-870-62 et. seq.).

4.3.1 The design of BMPs to be installed by others on any VDOT R/W, and/or which will be turned over to VDOT for operation and maintenance after construction is completed, shall be subject to the review and approval by VDOT. This process should occur prior to the issuance of a Land Use Permit (where one is required). The construction of BMPs installed by others on any VDOT R/W, and/or which will be turned over to VDOT for operation and maintenance, shall be subject to the review and approval by VDOT prior to the release of the Land Use Permit surety (where applicable) or prior to VDOT's acceptance of the facility for operation and

maintenance. Design and construction information for any BMPs accepted by VDOT for operation and maintenance shall be forwarded to the District Infrastructure Manager and the District Hydraulics Engineer in order to process for inclusion in the L&D and Maintenance Divisions' BMP Databases. The appropriate section of the LD-445D form is to be used for reporting the BMP information.

4.4 Prior to the issuance of a VDOT Land Use Permit for land-disturbing activities occurring inside the R/W of VDOT owned and/or operated roadway facilities or prior to the acceptance of a roadway facility into the state roadway system for VDOT operations and/or maintenance, those activities identified in Section 4.3 of this IIM, and which occur within a designated MS4 area or within a watershed with an approved TMDL plan, shall be reviewed by the appropriate VDOT personnel (typically Central Office or District Location and Design Hydraulics staff) for compliance with the conditions of the VDOT's MS4 Permit and/or the approved TMDL plan and the requirements of the VDOT Implementation Plan for its MS4 Permit conditions. Those activities found not to comply with the conditions of VDOT's MS4 Permit, or an approved TMDL plan, or the VDOT MS4 Implementation Plan requirements, shall not be issued a Land Use Permit, nor be accepted into the state system of roadways, until such compliance is demonstrated to the satisfaction of VDOT.

4.5 The potential post-development impact of any changes to the land surface should be based on the ultimate post-development condition of the site considering a mature vegetative cover where applicable. Impacts should not be based on the temporary surface changes that occur during construction activities. The temporary surface changes occurring during construction activities are addressed by compliance with the Virginia ESC Regulations.

4.6 Milling and/or overlaying or other such rehabilitation of an existing impervious surface is not considered a land disturbance activity in determining compliance with the VSMP Regulations, but any associated shoulder or ditch grading would be considered in the calculation of the total land disturbance quantity for the proposed activity (see Section 4.1 of this IIM for the exemption for routine maintenance operations).

4.6.1 Where a project contains the milling and/or overlaying or other such rehabilitation of an existing impervious surface in conjunction with other improvements (e.g., adding additional lanes to a roadway facility), the milling and/or overlaying or other such rehabilitation of the existing impervious surface can be considered as routine maintenance and not included as a part of the construction "site" for the purposes of defining compliance with the VSMP Regulations provided that:

1. The milling and/or overlaying or other such rehabilitation of the existing impervious surface could be accomplished as a distinct and separate operation, and
2. Any rehabilitation of the existing impervious surface maintains existing horizontal and vertical alignment, and
3. The milling and/or overlaying or other such rehabilitation of the existing impervious surface is, for the most part, continuous throughout the project limits.

- Example 1 - Adding one lane to the outside of the south bound lanes of a 2 mile section of Route 81 and milling and overlaying the existing two south bound lanes within the project limits. In this case, since the milling and overlaying of the existing pavement is consistent throughout the project limits, and since it could have been done independently of the construction of the additional lane, it would be considered routine maintenance and not include as a part of the construction "site" for the purposes of defining compliance with the VSMP Regulations.

- Example 2 – Widening a two mile section of an existing two lane roadway to add another travel lane on each side of the existing pavement with the existing pavement being removed and replaced in some locations (due to minor changes in vertical alignment) throughout the project limits and milled and overlaid in other locations. Since the milling and overlaying is sporadic and not continuous throughout the project limits, its area would not be considered routine maintenance and would need to be included in the construction "site" area for the purposes of defining compliance with the VSMP Regulations.

4.7 When requested by a locality's VSMP Authority, VDOT projects located in jurisdictions that have adopted more stringent SWM technical criteria than that required by the VSMP Regulations (as identified in this IIM) shall be designed, to the largest extent practicable, to meet the locality's more stringent criteria provided such requests are received prior to the completion of the project's plans for use in the public participation phase of a project (or other such phase where no public participation process is required). The local SWM criteria may be part of a locally adopted DEQ approved SWM program or may be part of a watershed initiative related to the protection of a water supply or a TMDL implementation plan. If it is found that the more stringent local SWM requirements are not practicable for the VDOT project, it will be the responsibility of the SWM Plan Designer to provide documentation to the locality's VSMP Authority to demonstrate such. Early coordination should occur between the SWM Plan Designer and the local VSMP Authority, in order to identify any such potential requirements/requests.

5.0 TECHNICAL CRITERIA

5.1 Part II of the VSMP Regulations (9VAC25-870-40 et. seq.) provides technical criteria to address stream channel erosion, flooding and water quality.

5.1.1 Part IIB (9VAC25-870-62 et. seq.) contains the "new" technical criteria that include the Runoff Reduction methodology (for determining compliance with water quality requirements) and the Energy Balance Equation (for determining compliance with stream channel flooding and erosion requirements). Part IIB technical criteria are applicable to non-grandfathered projects (see Section 19.1 of this IIM for additional information on grandfathered projects).

5.1.2 Part IIC (9VAC25-870-93 et. seq.) contains the “old” technical criteria that include the Performance/Technology-Based methodology (for determining compliance with water quality requirements) and MS19 criteria (for determining compliance with stream channel flooding and erosion requirements). Part IIC technical criteria are applicable to grandfathered projects (see Section 19.1 of this IIM for additional information on grandfathered projects).

5.1.3 The requirements for compliance with the Part IIC technical requirements are addressed in this IIM. The requirements for compliance with the Part IIB technical requirements will be addressed in a future guidance document.

5.2 Stream Channel Erosion (Part IIC)

5.2.1 Properties and receiving waterways downstream of any land-disturbing activity shall be protected from erosion and damage due to changes in stormwater flows and hydrologic characteristics, including but not limited to, changes in runoff volume, velocity, frequency, duration, and peak flow rate.

5.2.2 Requirements for stream channel erosion control shall be governed by the Virginia ESC Regulation MS19 for an adequate receiving channel for stormwater discharges.

5.2.3 Receiving channels shall be reviewed for adequacy based upon the following criteria:

1. Natural channels shall be analyzed by the use of a post-development peak discharge from a 2-year storm to verify that stormwater will not cause erosion of the channel bed and banks, and
2. All previously constructed man-made channels shall be analyzed by the use of a post-development peak discharge from a 2-year storm to verify that the stormwater will not cause erosion of the channel bed or banks.

5.2.4 When utilizing an existing culvert or storm sewer pipe as the outfall for stormwater runoff from the project site, the receiving channel at the outlet end of the existing culvert or storm sewer pipe shall be analyzed for adequacy in accordance with Section 5.2.3 based on the type of receiving channel (natural or man-made).

5.2.5 If existing natural or previously constructed man-made receiving channels are not adequate, then one of the following measures must be implemented:

1. Improve the receiving channel to a condition where the post-development peak runoff rate from a 2-year storm will not cause erosion to the channel bed or banks or to the point where the drainage area within the channel complies with the requirements of Section 5.2.9 of this IIM, or

2. Develop a site design that will not cause the pre-development peak runoff rate from a 2-year storm to increase (i.e., post development 2 year peak discharge is equal to or less than pre-development 2 year peak discharge) when runoff discharges into a natural channel or will not cause the pre-development peak runoff rate from a 10- year storm to increase (i.e., post development 10-year peak discharge is equal to or less than pre-development 10-year peak discharge) when runoff discharges into a man-made channel, or

3. Provide a combination of channel improvements, stormwater detention or other measures to prevent downstream erosion.

5.2.6 Where determined necessary by the SWM Plan Designer or requested by DEQ, water quantity control for the 1-year storm may be required if there are existing or anticipated erosion concerns downstream of the project site. Such determination or request shall be made prior to the public participation phase of the project (or other such phase when no public participation process is required). Control of the 1-year storm requires detaining the volume of runoff from the entire drainage area and releasing that volume over a 24-hour period. See the Virginia SWM Handbook, Volume I, Page 1-23 and Volume II, Pages 5-38 thru 5-41 for additional information.

5.2.7 Pre-development conditions for both offsite and onsite areas shall be those that exist at the time when the final receiving channel analysis is performed. All land cover shall be assumed to be in “good” condition regardless of actual conditions existing at the time the analysis is performed.

5.2.8 Post-development conditions for offsite areas shall be determined the same as in Section 5.2.7 of this IIM. Post-development conditions for the on-site areas shall be determined based on the proposed project plans and any known future plans of development within the project site.

5.2.9 One Percent (1%) Rule - If it can be demonstrated that the total drainage area to the point of analysis within the receiving channel is 100 times greater than the contributing drainage area from within the project site, the receiving channel may be considered adequate, with respect to the stability (erosion) requirements, without further analysis.

5.3 Flooding (Part IIC)

5.3.1 Properties and receiving waterways downstream of any land-disturbing activity shall be protected from localized flooding due to changes in stormwater flows and hydrologic characteristics including, but not limited to, changes in runoff volume, velocity, frequency, duration, and peak flow rate.

5.3.2 For non-linear projects, the 10-year post-development peak rate of runoff from the site shall not exceed the 10-year pre-development peak rate of runoff.

5.3.3 For linear projects, requirements for downstream flooding control shall be governed by the Virginia ESC Regulation MS19 for adequate receiving channel for stormwater discharges.

5.3.3.1 Receiving channels shall be reviewed for adequacy based upon the following criteria:

1. Natural channels shall be analyzed by the use of a post-development peak discharge rate from 2-year storm to verify that stormwater will not overtop the channel banks, and

2. All previously constructed man-made channels shall be analyzed by the use of a post-development peak discharge rate from a 10-year storm to verify that the stormwater will not overtop the channel banks, and

3. Existing culvert and storm sewer systems, utilized as stormwater outfalls for the development site, shall be analyzed by the use of a post-development peak discharge rate from a 10-year frequency storm to verify that the stormwater will be contained within the pipe or storm sewer system.

5.3.3.2 When utilizing an existing culvert or storm sewer pipe as the outfall for stormwater runoff from the project site, the receiving channel at the outlet end of the existing culvert or storm sewer pipe shall be analyzed for adequacy in accordance with Section 5.3.3.1 based on the type of receiving channel (natural or man-made).

5.3.3.3 If existing natural or previously constructed man-made receiving channels or existing culvert or storm sewer pipe systems are not adequate, then one of the following measures must be implemented:

1. Improve the channel to a condition where the post-development peak runoff rate from a 10-year storm will not overtop the channel banks or to the point where the drainage area within the channel complies with the requirements of Section 5.3.3.4 of this IIM, or

2. Improve the culvert or storm sewer system to a condition where the post-development peak runoff rate from a 10-year storm is contained within the appurtenances, or

3. Develop a site design that will not cause the pre-development peak run-off rate from a 2-year storm to increase (i.e., post development 2-year peak discharge is equal to or less than pre-development 2-year peak discharge) when runoff from the site discharges into a natural channel or will not cause the pre-development peak runoff rate from a 10-year storm to increase (i.e., post development 10-year peak discharge is equal to or less than pre-development 10-year peak discharge) when runoff from the site discharges into a man-made channel or a culvert/storm sewer system, or

4. Provide a combination of channel/culvert/storm sewer system improvements, stormwater detention or other measures in order to prevent downstream flooding.

5.3.3.4 One Percent (1%) Rule - If it can be demonstrated that the total drainage area to the point of analysis within the receiving channel is 100 times greater than the contributing drainage area from within the project site, the receiving channel may be considered adequate, with respect to the flooding requirements, without further analysis.

5.3.3.5 Pre-development conditions for both the offsite and onsite areas shall be those that exist at the time when the final receiving channel analysis is performed. All land cover shall be assumed to be in good condition regardless of actual conditions existing at the time the analysis is performed.

5.3.3.6 Post-development conditions for offsite areas shall be determined the same as in Section 5.3.3.5 of this IIM. Post-development conditions for the on-site areas shall be determined based on the proposed project plans and any known future plans of development within the project site.

5.4 Water Quality Control (Part IIC)

5.4.1 Unless otherwise exempt, a water quality control plan that provides compliance with the VSMP Regulations Part IIC technical criteria shall be developed for each grandfathered VDOT land-disturbing activity exceeding the land disturbance thresholds noted in Section 4.1 of this IIM (see Section 19.1 of this IIM for additional information on grandfathered projects).

5.4.2 Compliance with the water quality criteria may be achieved by applying the performance-based criteria (recommended) or the technology-based criteria methodology. Discussion and application of each of these methodologies, as they relate to VDOT land-disturbing activities, is found in Sections 5.4.5 and 5.4.6 of this IIM. Additional discussion and application of these methodologies can be found in Volumes I and II of the Virginia SWM Handbook.

5.4.3 Evaluation of water quality requirements may be performed considering the site area at each individual stormwater discharge (outfall) point from the proposed land disturbing-activity/project or may be performed considering the site area for the entire limits of the proposed land-disturbing activity/project.

5.4.4 Where the proposed land-disturbing activity/project drains to more than one HUC6, the required pollutant load reductions shall be applied independently within each HUC6 unless reductions are proposed to be achieved under a project specific or a comprehensive SWM plan developed in accordance with Section 9VAC25-870-92 of the VSMP Regulations.

5.4.5 Performance-Based Criteria

5.4.5.1 The calculated post-development pollutant load from the site shall be compared to the calculated pre-development pollutant load from the site based upon the average land cover condition or the existing site condition as related to the site's percent impervious.

5.4.5.2 The site's percent impervious shall be determined as follows:

- For pre-development conditions - The amount of pre-development impervious area within the site divided by the total area of the site times 100.

- For post-development conditions - The amount of post-development impervious area within the site divided by the total area of the site times 100.

5.4.5.3 A BMP shall be located, designed, and maintained to achieve the target pollutant removal efficiencies specified in Table 1 for the purposes of reducing the post-development pollutant load from the site to the required level based upon the following four applicable land development situations for which the performance-based criteria apply:

1. Situation 1 consists of land-disturbing activities where the pre-development percent impervious cover of the site is less than or equal to the average land cover condition (16%) and the proposed improvements will create a total post-development percent impervious cover of the site which is less than the average land cover condition (16%).

    - Water Quality Requirement: No reduction in the post-development pollutant discharge from the site is required.

2. Situation 2 consists of land-disturbing activities where the pre-development percent impervious cover of the site is less than or equal to the average land cover condition (16%) and the proposed improvements will create a total post-development percent impervious cover of the site which is greater than the average land cover condition (16%).

    - Water Quality Requirement: The post-development pollutant discharge from the site shall not exceed the pre-development pollutant discharge from the site based on the average land cover condition (16%).

3. Situation 3 consists of land-disturbing activities where the pre-development percent impervious cover of the site is greater than the average land cover condition (16%).

- Water Quality Requirement: The post-development pollutant discharge from the site shall not exceed (a) the pre-development pollutant discharge from the site less 10% or (b) the pollutant discharge based on the average land cover condition (16%), whichever is greater.

4. Situation 4 consists of land-disturbing activities where the pre-development impervious cover of the site is served by an existing BMP that addresses water quality.

- Water Quality Requirement: The post-development pollutant discharge from the site shall not exceed the pre-development pollutant discharge from the site based on the existing percent impervious cover of the area being served by the existing BMP. The existing BMP shall be shown to have been designed and constructed in accordance with proper design standards and specifications, and to be in proper functioning condition.

5.4.6 Technology-Based Criteria

- The stormwater runoff from the impervious cover of the land-disturbing activity shall be treated by an appropriate BMP as specified in Table 1 based on the applicable post-development percent impervious cover of the site.

- When the applicable percent impervious cover of the site is less than the statewide "average land cover condition" of 16%, no water quality BMPs are required. (Exception - Where a locality has established a lower "average land cover condition" than the statewide average, the provisions of Section 4.7 of this IIM shall govern.)

5.4.6.1 The applicable post-development percent impervious cover of the site shall be as follows:

- For linear development projects:
  - "Old" criteria - The net increase in impervious area of the site (total post-development impervious area of the site minus the total pre-development impervious area of the site) divided by the total post-development area of the site times 100.
  - "New" criteria – See Section 5.4.5.2 of this IIM.

  See Section 19.3 of this IIM for applicability of "old" and "new" criteria to VDOT projects.

- For Non- Linear Projects – See Section 5.4.5.2 of this IIM.

5.4.6.2 The water quality volume for any required BMP shall be based on the total post-development impervious area draining to the BMP from within the R/W of the proposed project/activity and from within any VDOT R/W adjacent to the proposed project/activity (see Section 19.4 of this IIM for applicability of this requirement to current VDOT projects).

TABLE 1
BMP SELECTION TABLE

Water Quality BMP	Target Phosphorus Removal Efficiency	Applicable Percent Impervious Cover of Site
Vegetated filter strip	10%	16-21%
Grassed swale	15%	
Constructed wetlands	30%	22-37%
Extended detention (2xWQV)	35%	
Retention basin I (3xWQV)	40%	
Bioretention basin	50%	38-66%
Bioretention filter	50%	
Extended detention-enhanced	50%	
Retention basin II (4xWQV)	50%	
Infiltration (1xWQV)	50%	
Sand filter	65%	67-100%
Infiltratration (2xWQV)	65%	
Retention basin III (4xWQV with aquatic bench)	65%	
Manufactured BMP Systems Hydrodynamic Structures *	20%	
Manufactured BMP Systems Filtering Structures *	50%	
Filterra™ Biorention Filter System **	74%	

* See the Virginia SWM Handbook for approved systems. Other systems meeting the definition of a hydrodynamic or filtering structure must be approved by the DEQ prior to use.

** See Technical Bulletin No.6 in the Virginia SWM Handbook.

5.4.7 Alternative BMPs

5.4.7.1 BMPs included on the Virginia SWM BMP Clearing House website http://vwrrc.vt.edu/swc/ may be used with the Performance-Based water quality criteria. Unless otherwise approved by DEQ, the maximum removal efficiency allowed for the BMP will be that shown for phosphorus removal by treatment and any removal efficiency associated with phosphorus removal by runoff reduction will not be allowed.

5.4.7.2 Other alternative BMPs not included in Table 1 of this IIM or the Virginia SWM BMP Clearing House website may be allowed at the discretion and approval of DEQ.

5.4.7.3 Approval to use alternative BMPs is to be coordinated between the VDOT District or Central Office SWM Plan Designer and the DEQ Regional Stormwater Program Manager. The VDOT State Stormwater Management Program Administrator and the DEQ Central Office Director of the Office of Water Permits shall be copied on any correspondence related to a request for approval of the use of any alternative BMPs.

5.4.8 Use of LID and BSD practices are encouraged to the maximum extent practicable in order to reduce the stormwater runoff impacts of the proposed development. LID practices include, but are not limited to, the preservation/protection of riparian buffers, wetlands, steep slopes, mature trees, flood plains, woodlands and highly permeable soils. BSD practices include, but are not limited to, reduction of impervious cover, conservation of natural areas and the more effective use of pervious areas to treat stormwater runoff.

5.4.9 When the 1-year storm is detained for 24 hours (in accordance with Section 5.2.6 of this IIM) there will be no need to provide additional or separate storage for the WQV if it can be demonstrated that the WQV will be detained for approximately 24 hours.

5.4.10 Off-site Water Quality Compliance Options

5.4.10.1 Where the water quality requirements for the land development activity cannot be satisfied onsite, offsite options may be used to achieve compliance with the requirements of the VSMP Regulations.

5.4.10.2 Offsite compliance options allowed for use in meeting required phosphorus load reductions include one or more of the following:

1. Offsite controls utilized in accordance with a comprehensive SWM plan adopted pursuant to Section 4VAC25-870-69 of the VSMP regulations for the local watershed within which a project is located (e.g., a regional SWM facility).

2. A locality pollutant loading pro rata share program established pursuant to § 15.2-2243 of the Code of Virginia or similar local funding mechanism (e.g., a stream restoration fund).

3. The Nonpoint Nutrient Offset Program established pursuant to § 62.1-44.15:35 of the Code of Virginia (i.e., the purchase of phosphorus credits from a Nutrient Credit Bank).

4. Any other offsite option approved by DEQ.

5. When VDOT has additional properties located within the same HUC6 or upstream HUC6 of the land-disturbing activity or within the same watershed as determined by DEQ, SWM facilities located on those properties may be utilized to meet the required phosphorus load reductions from the land-disturbing activity.

5.4.10.3 VDOT may utilize offsite options identified in Section 5.4.10.2 of this IIM if the project meets any one of the following conditions:

1. The activity will disturb less than five acres of land (100% offsite compliance allowed).

2. The activity's post-developed phosphorus load reduction requirement is less than 10 pounds per year (100% offsite compliance allowed).

3. At least 75% of the required phosphorus load reductions can be achieved onsite (up to 25% offsite compliance allowed).

4. If at least 75% of the activity's required phosphorus load reductions cannot be achieved onsite, then the required phosphorus load reductions may be achieved, in whole or in part, through the use of offsite compliance options (up to 100% offsite compliance may be allowed) provided VDOT can demonstrate to the satisfaction of the DEQ that:

   (1) Alternative site designs have been considered that may accommodate onsite BMPs, and

   (2) Onsite BMPs have been considered in alternative site designs to the maximum extent practicable, and

   (3) Appropriate onsite BMPs will be implemented, and

   (4) Full compliance with post-development nonpoint nutrient runoff compliance requirements cannot practicably be met onsite,

5.4.10.4 Offsite options shall not be allowed:

1. Unless the selected offsite option achieves the necessary phosphorus load reductions prior to the commencement of the construction of the proposed project. Where the offsite option will be constructed as a part of the proposed VDOT project, the offsite option must be completed and functional prior to the completion of the VDOT project, or

2. In violation of local water quality-based limitations at the point of discharge that are consistent with the determinations made pursuant to a TMDL Implementation Plan, contained in a MS4 Program Plan approved by DEQ or as otherwise may be established or approved by DEQ.

5.4.11 The following information is taken from Part IIC of the VSMP Regulations and/or the Virginia SWM Handbook.

5.4.11.1 The selected BMP shall be located, designed, and maintained to perform at the target pollutant removal efficiency specified in Table 1 of this IIM. Design standards and specifications for the non-proprietary BMPs in Table 1 that meet the required target pollutant removal efficiency are available in the Virginia SWM Handbook.

5.4.11.2 Extended Detention Basins and Extended Detention Basins Enhanced require a WQV based on 1 inch of runoff from the greater of either the post-development impervious area of the site or the post-development impervious area within VDOT R/W draining to the BMP.

5.4.11.3 Extended Detention Basins and Extended Detention Basins Enhanced require a 30-hr drawdown time for the required WQV. The calculation procedure for the drawdown time and orifice sizing can be found in the Virginia SWM Handbook Volume II, Pages 5-33 through 5-38.

5.4.11.4 In order to facilitate maintenance activities, sediment forebays are to be incorporated into the design of Extended Detention Basins and Extended Detention Basins Enhanced. The volume of the forebay is to be 0.1 inch – 0.25 inches times the impervious area treated by the facility or 10% of the required detention volume. Additional information can be found in the Virginia SWM Handbook Volume I, Pages 3.04-1 through 5.

5.4.11.5 Where the overflow (emergency) spillway is incorporated as a part of the dam/embankment, it shall be stabilized utilizing rip rap, concrete or other non-erodible material.

5.4.11.6 Suggested details for the Extended Detention Basin can be found in the Virginia SWM Handbook Volume I, Pages 3.07-4 and 5. The riprap lined low flow channel through the basin is not recommended due to maintenance considerations.

5.4.11.7 Suggested details for the Extended Detention Basin Enhanced can be found in the Virginia SWM Handbook Volume I, Pages 3.07-6 and 7. The geometric shape of the facility may need to be more symmetrical than that shown in order to facilitate construction of the basin to the dimensions needed.

5.4.11.8 Non-structural practices including, but not limited to, minimization of impervious areas and curbing requirements, open space acquisition, floodplain management, and protection of wetlands may be utilized as appropriate in order to at least partially satisfy water quality requirements. Approval to use such non-structural measures is to be secured in advance from DEQ and is to be coordinated between the VDOT State Stormwater Management Program Administrator and the DEQ Central Office Director of the Office of Water Permits.

6.0 OTHER DESIGN CRITERIA / CONSIDERATIONS

6.1 The analysis to demonstrate compliance with the requirements of Section 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations) shall be performed in accordance with the procedures noted in the DEQ Technical Bulletin No. 1 (Stream Channel Erosion Control Policy Guidance).

6.2 Increased volumes of sheet flow due to the proposed development that may potentially cause erosion and sedimentation on adjacent property shall be diverted to a stable outfall, an adequate channel, pipe or storm sewer system or to an appropriate SWM facility.

6.3 All onsite channels (including culverts and storm sewer systems) must be designed/verified to be adequate in accordance with Sections 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations).

6.4 Impounding structures (dams) that are not covered by the Virginia Dam Safety Regulations shall be designed in accordance with Section 12.0 of this IIM and reviewed for floodplain impacts during the passage of the 100-year storm event.

6.5 Outflows from SWM facilities shall be discharged into an adequate receiving channel as defined in Section 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations).

6.6 Existing swales being utilized as natural or man-made outfall conveyances for pre-development runoff will be considered as channels and, if the swale satisfactorily meets the criteria contained in Section 5.2 and 5.3 of this IIM (MS19 of the Virginia ESC Regulations) for the post-development runoff, it will be considered an adequate receiving channel.

6.7 Construction of SWM impoundment structures within a FEMA designated 100-year flood plain shall be avoided whenever possible. When this is unavoidable, a thorough review shall be made to ensure that the SWM facility will operate effectively for its intended purpose during the passage of the 10-year flood event on the flood plain. All SWM facility construction within a designated 100-year flood plain shall be in compliance with all applicable regulations under the FEMA's National Flood Insurance Program. The SWM facility shall be reviewed for any potential impacts to the 100-year flood event characteristics of the floodplain and designed for structural stability during the passage of the 100-year flood event on the flood plain.

6.8 Construction of SWM facilities within a sinkhole is prohibited. If SWM facilities are required along the periphery of a sinkhole, the design of such facilities shall comply with the guidelines in the latest IIM-LD-228 (Sinkholes) and the DEQ's Technical Bulletin No. 2 (Hydrologic Modeling and Design in Karst) and applicable sections of the Virginia SWM Handbook.

6.9 Design of any SWM facilities with permanent water features (proposed or potential) located within five (5) miles of a public use or military airport is to be reviewed and coordinated in accordance with Section A-6 of the VDOT Road Design Manual.

7.0 VDOT PARTICIPATION IN REGIONAL FACILITIES

7.1 There are many cases where it is more feasible to develop one major SWM facility to control a large watershed area rather than a number of small individual facilities controlling small drainage areas within the large watershed. The concept of regional SWM facilities is endorsed by VDOT provided that certain requirements are met.

7.1.1 Development and/or use of regional SWM facilities must be a joint undertaking by VDOT and the local governing body. The site must be part of a master SWM Plan developed and/or approved by the local VSMP Authority and/or DEQ and any agreements related to the VDOT use of these facilities must be consummated between VDOT and the local governing body. VDOT may enter into an agreement with a private individual or corporation provided the local governing body has a DEQ approved SWM program that complies with the VSMP Regulations and the proper agreements for maintenance and liability of the regional facility have been executed between the local governing body and the private individual or corporation and any such agreements are referenced in the agreement between VDOT and the private individual or corporation.

7.1.2 When VDOT agrees to the use an existing or future VDOT roadway embankment as an impounding structure for a regional facility, the roadway embankment must be designed or retrofitted appropriately for such use. The VDOT R/W line will normally be set at the inlet face of the main drainage structure. The local government would be responsible for the maintenance and liabilities outside of the VDOT R/W area and VDOT would accept the same responsibilities inside the VDOT R/W area.

7.1.3 The design of regional SWM facilities must address any mitigation needed to meet the water quality and quantity requirements of any known future VDOT projects within the contributing watershed. Regional SWM facilities located upstream of a proposed VDOT roadway shall provide sufficient mitigation for any water quality and quantity impacts of runoff from the proposed roadway project which may not pass through the proposed facility.

7.2 Any questions or concerns related to the the use of an off-site regional SWM facility to satisfy the VDOT post-development SWM requirements should be discussed between the SWM Plan Designer and the appropriate DEQ regional office prior to entering into any agreements with either private or public entities.

8.0 MULTI-USE SWM BASINS

8.1 SWM basins may function as both quantity control and quality control facilities. Some basins may only be needed for quality control.

8.2 SWM basins may be utilized as temporary sediment basins during the construction phase of the project, and if so, the design of the SWM basin will need to address this dual function. The design that is needed for a permanent SWM basin may need to be altered to provide additional temporary sediment storage volume that is in excess of the required WQV. For design purposes, the two volumes (WQV and temporary sediment storage volume) should not be added together, but rather the larger of the two should govern the basin's design.

8.2.1 The additional volume needed for temporary sediment storage may be provided by excavating the bottom of the basin lower than that required for the WQV. The basin's permanent outlet control structure can be temporarily altered to serve as the control structure for the temporary sediment basin (see Standard SWM-DR of VDOT's R&B Standards and the Virginia ESC Handbook). When the project is nearing completion, and the basin is no longer needed for temporary sediment control, the basin can be converted to satisfy the permanent SWM basin requirements by regrading (excavating and/or filling) and removing any temporary control structure appurtenances.

9.0 PLAN PREPARATION, IMPLEMENTATION AND CERTIFICATIONS

9.1 Complete (C) and Minimum (M) plan projects shall show SWM measures in the plan assembly as directed in the latest version of IIM-LD-11, the VDOT Drainage Manual and the VDOT Road Design Manual.

9.2 No-plan (N) and other types of projects (including maintenance activities) that have an abbreviated plan assembly must conform to the requirements of the VSMP Regulations and VPDES General Construction Permit where the land disturbance value exceeds the applicable land disturbance thresholds for such. For the definition of these types of projects, and the procedures for addressing the SWM plan details for such projects, see the latest version of IIM-LD-11, the VDOT Drainage Manual and the VDOT Road Design Manual.

9.3 The plan design details for BMPs shall be appropriately sealed and signed by a person registered in the Commonwealth of Virginia as a professional architect, engineer, land surveyor or landscape architect.

9.4 The review and approval of SWM plan designs shall be performed by a person certified through DEQ's SWM Plan Reviewer certification program. The form LD-445C shall be used to certify the plan review and approval process.

9.5 The inspection of SWM BMPs during their construction/installation phase shall be performed by a person certified through DEQ's SWM Inspector certification program. Inspection forms specific to the BMP(s) being constructed/installed shall be used to document the inspection process.

9.5 The certification that the BMP(s) were constructed in accordance with their plan details and that the BMP(s) have been made functional shall be performed by a person registered in the Commonwealth of Virginia as a professional architect, engineer, land surveyor or landscape architect. The form LD-445D shall be used to document this certification process.

10.0 FOUNDATION DATA FOR SWM BASINS

10.1 Foundation data (a soil boring) for the base of the dam should be requested for all SWM basins in order to determine if the native material will support the dam and prevent ponded water from seeping under the dam. An additional boring near the center of the basin should also be requested if:

1. Excavation from the basin may, potentially, be used to construct the dam, or
2. There is potential for rock to be encountered in the area of excavation, or
3. A high water table is suspected that may alter the performance of the SWM basin.

10.2 For large basins, more than one boring for the dam and one boring for the area of the basin may be needed. The number and locations of the borings are to be determined by the VDOT SWM Plan Designer/Hydraulics Engineer and/or the VDOT District Materials Engineer.

10.3 The foundation data for the SWM basin should be requested by the VDOT SWM Plan Designer/Hydraulics Engineer at the same time that the request for culvert foundation data is initiated.

11.0 RIGHT OF WAY/PERMANENT EASEMENTS

11.1 Permanent SWM facilities may be placed in fee R/W or in permanent easements.

11.1.1 It is recommended that all permanent SWM features (dams, risers, storage area etc.) be placed within fee R/W initially. Outfall ditches and similar features may initially be placed in permanent easements.

11.1.2 The final decision on R/W versus permanent easement should be made prior to the R/W (or similar) phase of the project development process based on information obtained at the Field Inspection, Design Public Hearing and/or other such plan review milestones.

11.2 VDOT will generally be amenable to the desires of the affected landowners regarding the fee R/W/permanent easement issue.

11.3 The multiple use of property for SWM facilities and other features, such as utilities, is permissible. The decision on such use must be made on a case-by-case basis.

11.4 Permanent easements and/or other properties acquired through the R/W acquisition process, and which are considered a part of the "site" in determining the post-development SWM requirements for the project, are to remain under the ownership/control of VDOT for the life of the project and such property is to be identified/designated on the plans and legally encumbered for the purpose of SWM.

12.0 DESIGN DETAILS FOR SWM BASINS

12.1 The following details are to be incorporated into the design of VDOT SWM basins in order to be in compliance with the VSMP Regulations and the Virginia SWM Handbook. These details address concerns with seepage through the dam and along the culvert due to the ponding of water in the basins for durations greater than that associated with typical culvert installations.

12.1.1 The foundation material under the dam and the material used for the embankment of the dam shall be an AASHTO Type A-4 or finer and/or meet the approval of the VDOT Materials Division. If the native material is not adequate, the foundation of the dam is to be excavated and backfilled with a minimum of 4 feet, or the amount recommended by the VDOT Materials Division. The backfill and embankment material must meet the soil classification requirements identified previously in this section or the design of the dam may incorporate a trench lined with a membrane (such as bentonite penetrated fabric or an HDPE or LDPE liner). Such designs shall be reviewed and approved by the VDOT Materials Division before use.

12.1.2 The pipe culvert under or through the dam is to be reinforced concrete pipe with rubber gaskets. The pipe and gaskets are to comply with the following VDOT Road and Bridge Specifications:

- Pipe - Section 232 (AASHTO M170)
- Gasket - Section 212 (ASTM C443)

12.1.3 A concrete cradle is to be used under the pipe through the dam in order to prevent seepage. The concrete cradle is to begin at the riser or inlet end of the pipe and extend the full length of the pipe (see Standard SWM-DR of VDOT's R&B Standards).

12.1.4 If the height of the dam is greater than 15', or if the basin includes a permanent water pool, the design of the dam is to include a homogenous embankment with seepage controls or zoned embankment, or similar design in accordance with the Virginia SWM Handbook and recommendations from the VDOT Materials Division.

12.1.5 The top width of the dam is to be 10' minimum in order to facilitate both construction and maintenance operations.

12.1.6 The side slopes of the basin should to be no steeper than 3:1 to facilitate mowing and maintenance inspections/operations.

12.1.7 The longitudinal slope along the bottom of the basin should be no greater than 2%, nor less than 0.5%.

12.1.8 The depth of the basin from the lowest bottom elevation to the primary outflow point (top of riser or invert of orifice or weir) should be no more than 3 feet in order to reduce the hazard potential. If the depth needs to be more than 3 feet, fencing (or other means to limit access) of the basin site should be considered.

12.1.9 The primary control structure (riser or weir) should be designed to operate in weir flow conditions for the full range of design flows. Where this is not possible or feasible, and the control structure will operate in orifice flow conditions at some point within the design flow range, an anti-vortex device, consistent with the design recommendations in the Virginia SWM Handbook, shall be utilized.

12.1.10 The length-to-width ratio (L:W) of the basin should be about 3:1, with the widest part of the basin at the outlet end. If the ratio is less than about 2:1, and if there is concern that the velocity of flow through the basin will be high, consideration should be given to using baffles within the basin, to reduce velocity and increase flow time through the basin.

13.0 PERIMETER CONTROLS

All SWM basins should be reviewed for the needs of fencing, barricades and no trespassing signs in accordance with the following guidelines.

13.1 Fencing

13.1.1 Fencing of SWM basins is normally not required and should not be considered for most basins due to:

1. Insignificant Hazard – For detention basins (no permanent water pool), significant ponding of water in the basin should only occur with very heavy rainfall events and the maximum ponded depth should typically be no more than about 3 feet. Ponds and lakes are almost never fenced, even though they may be located in subdivisions and have deep, permanent water pools.

2. Limits Maintenance Operations – Fencing could hinder the performance of both routine and long term maintenance operations. Fencing could become damaged during major maintenance operations and have to be repaired or replaced.

13.1.2 Fencing of SWM basins may be needed and should be considered when:

1. The basin is deep with a maximum ponded depth greater than about 3' and/or has steep internal side slopes with 2 or more sides steeper than 3:1, or

2. The basin is in close proximity to schools, playgrounds or similar areas where children may be expected to frequent, or

3. It is recommended by the VDOT Field Inspection Review Team (or other such plan reviewing group), the VDOT Residency Administrator or the City/County (where the City/County will assume maintenance responsibility).

13.1.3 Where fencing is proposed, access gate(s) of sufficient size to accommodate maintenance equipment are to be provided. Appropriate security mechanisms for the gates are to be provided to prevent/deter unauthorized entry.

13.2 Barricades - For non-fenced basins, a chain barricade (see Standard CR-1 of VDOT's R&B Standards) or gate may be needed across the vehicular entrance to prohibit non-authorized access if there is a concern with illegal dumping or other undesirable activities at the site.

13.3 Signs - "No Trespassing" signs shall be considered for use on all basins, whether fenced or unfenced, and should be recommended, as needed, by the VDOT Field Inspection Review Team or other such plan reviewing group.

14.0 MAINTENANCE

Requirements for maintenance of SWM facilities, the schedule for inspection and maintenance operations, and the identification of persons responsible for the maintenance will be addressed in the VDOT Maintenance Division's BMP Inspection Manual.

15.0 REPORTING

15.1 The VSMP MS4 and Construction Permits require the VDOT to report information to the DEQ such as the location, type, acres treated and the affected receiving waters of all SWM facilities (BMPs) installed.

15.1.1.1 A database resides on the VDOT Central Office Location & Design Division's internal web site to record the required BMP data for all VDOT owned and/or operated facilities.

15.2.1 It shall be the responsibility of the Central Office VSMP Construction Permit Coordinator to ensure that the required information is logged into the database for all post-development BMPs that are installed on VDOT maintained and/or operated roadways.

15.2.2 BMP information is to be logged into the data base when the VSMP Permit Termination Notice Form (LD-445D) is submitted with the required BMP information (see the latest version of IIM-LD-242 and IIM-LD-246).

16.0 PLAN DETAILS

16.1 Stormwater Management Drainage Structure – R&B Standard SWM-1

- To be used at all applicable locations where a riser type of control structure is desired.

- At locations where a riser type structure is desired, but a Standard SWM-1 structure will not satisfy site specific characteristics, a special design structure is to be utilized with appropriate details developed and included in the construction documents.

16.2 Stormwater Management Dam

- To be used at locations where a wall-type control structure is desired (includes modifications to standard endwalls). Normally used where shallow depths of ponding are desired/required.

- Appropriate details are to be developed and included in the construction documents for individual locations to fit site specific conditions.

16.3 Stormwater Management Details – Road and Bridge Standard "SWM-DR"

- Includes details for debris rack, trash rack, concrete cradle, water quality orifice and modifications for use of SWM facility as a temporary sediment basin.

- Specify at each SWM facility location requiring any of the noted items.

- The location and the size of the water quality orifice or any other required openings in the control structure shall be specified in the description/details for the control structure for each SWM facility.

16.4 Access

- A means of access for inspection and maintenance personnel and equipment shall be provided at each SWM facility location. The Standard PE-1 details shown in VDOT's Road and Bridge Standards should be used for vehicular entrances.

- A turnaround area is to be provided at or near the terminus of each vehicular entrance.

- An appropriate all weather surface material shall be provided for each vehicular entrance.

- See Section 13.0 of this IIM for requirements for access control.

17.0 METHOD OF MEASUREMENT – BASIS OF PAYMENT

17.1 Stormwater Management Drainage Structure – Road and Bridge Standard SWM-1 and other similar types of control structures.

- Basis of payment to be linear feet (LF) measured from invert of structure to top of concrete. Price bid includes cost of trash rack, debris rack and holder, temporary dewatering device and temporary metal plates.

17.2 Stormwater Management Dam

- Basis of payment to be cubic yards (CY) of Concrete Class A3 Miscellaneous and pounds (LBS) of Reinforcing Steel.

17.3 Concrete Cradle

- Basis of payment to be cubic yards (CY) of Concrete Class A3 Miscellaneous.

17.4 Excavation for SWM facilities will be measured and paid for as cubic yards (CY) of Stormwater Management Basin Excavation.

17.5 Fill material needed for dams or berms will be measured and paid for as cubic yards of Regular Excavation, Borrow Excavation or Embankment, as appropriate.

17.6 The Grading Diagram and/or the Grading Summary is to reflect how the cubic yards of Stormwater Management Basin Excavation and cubic yards of Embankment or Borrow, if needed, are to be distributed.

18.0 STORMWATER MANAGEMENT SUMMARY

18.1 All drainage items related to the construction of SWM facilities shall be summarized, by location, in the Drainage Summary for the project.

18.2 All incidental items related to the construction of SWM facilities shall be summarized, by location, in the Incidental Summary for the project.

18.3 Stormwater Management Excavation and Borrow or Embankment, if needed, are to be included in the totals on the Grading Diagram and/or Summary.

19.0 SPECIAL CONSIDERATIONS

19.1 GRANDFATHERING

19.1.1 For those land disturbance activities regulated under of the VSMP Regulations, Part II of the regulations (9VAC25-870-40 et. seq) contains both the “new” technical criteria (Part IIB) and the “old” technical criteria (Part IIC) for water quality and stream channel erosion and flood protection (water quantity) requirements (see Section 5.0 of this IIM for information on the old and new technical criteria).

19.1.2 Section 9VAC 25-870-48 in Part II of the VSMP Regulations provides provisions for locality, state and federal projects to be grandfathered under the “old” technical criteria provided certain conditions are met. For the purposes of grandfathering, projects are defined as activities (construction or maintenance) with defined limits and designated PE, RW and/or Construction accounts. Location studies, coordinator studies and other such studies and lump fund accounts are not considered projects and are not eligible for consideration under the grandfathering provisions.

19.1.3 For a VDOT project/activity to be grandfathered it must fit into one of the following two categories:

1. Project specific bonds must have been issued prior to July 1, 2012. Projects/activities meeting this requirement may be grandfathered indefinitely and can use the “old” technical criteria (VSMP Regulations - Part IIC – 9VAC25-870-93 et. seq.) to satisfy VSMP compliance requirements for water quantity and quality.

2. Funding (PE, RW or Construction) must have been allocated to the project/activity prior to July 1, 2012 (i.e., allocation in SYIP in FY13 or prior) and construction activity on the project must physically begin prior to July 1, 2019 (beginning the installation of erosion and sediment perimeter controls will be considered beginning the construction activity).

   Projects/activities meeting these requirements may be grandfathered and can use the "old" technical criteria (VSMP Regulations- Part IIC - 9VAC25-870-93 et. seq.) to satisfy VSMP compliance requirements for water quantity and quality.

   Note: Grandfathered projects may use the "new" technical criteria (VSMP Regulations- Part IIB - 9VAC25-870-62 et. seq.). However, in doing so, the design details and efficiency of the BMPs must be in accordance with the information on DEQ's BMP Clearing House Website.

19.1.4 For Design/Bid/Build (D/B/B) projects, the beginning of construction activity (as defined in Section 19.1.3 of this IIM) typically occurs within five to six months after advertisement; therefore, those D/B/B projects with an advertisement date of January 1, 2019 or after should not be considered a candidate for grandfathering.

19.1.5 For Design/Build (D/B) projects, beginning of construction activity (as defined in Section 19.1.3 of this IIM) typically occurs within 18 months following issuance on a Request for Proposal (RFP); therefore, those D/B projects with an RFP issuance date of January 1, 2018 or after should not be considered a candidate for grandfathering.

19.1.6 The construction schedule for projects/activities being considered for grandfathering and the use of the "old" technical criteria (VSMP Regulations – Part IIC - 9VAC25-870-93 et. seq.) should be carefully evaluated to make certain that the beginning of construction (as defined Section 19.1.3 of this IIM) can/will occur prior to July 1, 2019, as there will be no exceptions granted by DEQ for this requirement.

19.1.7 If a project/activity is grandfathered and the post-development SWM plan for the project/ activity is based on the "old" technical criteria (VSMP Regulations- Part IIC - 9VAC25-870-93 et. seq.) because it is anticipated that the beginning of construction (as defined Section 19.1.3 of this IIM) will be prior to July 1, 2019 but for some reason the schedule "slips" and construction will not begin by that date, the post-development SWM plan for the project/activity must be revised to incorporate any additional BMPs or offsite drainage system improvements to satisfy the "new" technical criteria (VSMP Regulations - Part IIB - 9VAC 25-870-62 et. seq.) requirements for both water quality and water quantity. Additional BMPs or offsite drainage system improvements necessary to satisfy the requirements of the "new" technical criteria may require the project/activity to have to revisit the public participation and/or the environmental review process.

19.1.8 The status of a project/activity with regards to the grandfathering provision shall be noted using the appropriate note(s) in Section IV of the SWPPP General Information Sheets. A list of all projects/activities within each District Office designated to be grandfathered shall be maintained by each respective District L&D Engineer and shall be available upon request by the State L&D Engineer, the Assistant State L&D Engineers, the State PMO Director or the State Stormwater Management Program Administrator. The "Grandfathered Project List" shall include the following information for each project:

- County or City
- Project Number
- UPC Number
- Type of Project (D/B/B, D/B, etc.)
- Brief Description of Project
- Potential or actual Construction Advertisement (D/B/B) or RFP issuance (D/B) date

19.1.9 Upon the publication of an updated SYIP, each District L&D Engineer shall have all projects/activities on their "Grandfathered Project List" reviewed to verify the validity of the grandfathered status of each project based on the most current date of the anticipated beginning of construction (as defined in Section 19.1.3 of this IIM) and/or advertisement or RFP issuance date. The "Grandfathered Project List" and the appropriate notes in SWPPP General Information Sheets shall be updated/revised to reflect any changes to the grandfathered status of a project/activity.

19.2 LINEAR PROJECT OUTFALLS

19.2.1 The exemption in the VSMP Law for "less than one acre of land disturbance per outfall" for linear projects was eliminated on July 1, 2012. As a result, all land disturbing activities where the total land disturbance is one acre or greater (2,500 square feet or greater in a designated CBPA) requires compliance with the water quality criteria in the VSMP Regulations and requires VSMP Construction Permit coverage, if applicable (see Section 4.1 of this IIM for the exemption for routine maintenance activities).

19.2.2 Land-disturbing activities previously qualifying for the "less than one acre of land disturbance per outfall" exemption typically were those activities where the total amount of land disturbance was small or where the total amount of land disturbance was distributed among multiple outfalls and where there was minimal impact anticipated to downstream receiving waters. Because of this, the following guidance has been agreed to by VDOT and DEQ for VDOT regulated linear development projects/activities where less than one acre of land disturbance will occur per outfall or watershed and where there will be insignificant increases in peak flow rates as a result of the proposed activity and where there are no existing or anticipated flooding or erosion problems downstream of the discharge point(s):

1. Water quality requirements shall be achieved within the proposed land-disturbing activity/project limits provided such can be accomplished without the acquisition of additional R/W or easement.

2. Any water quality requirements not achieved within the land-disturbing activity/project limits may be achieved offsite in accordance with Section 5.4.10 of this IIM provided such can be accomplished without the acquisition of additional R/W or easement.

3. For any applicable land-disturbing activity/project where the total water quality requirements (pollutant load reductions) cannot be achieved utilizing the provisions of 1 and 2 of this Section, the activity/project may be granted an exception by DEQ, in accordance with the provisions of Section 9VAC 25-870-57 of the VSMP Regulations and Section 20.0 of this IIM for that portion of the water quality requirements determined to be unachievable.

19.3 DETERMINATION OF PERCENT IMPERVIOUS AND WATER QUALITY REQUIREMENTS

19.3.1 Effective October 1, 2012, all proposed VDOT regulated land-disturbing activities/projects that had not begun the construction advertisement stage (e.g., PAC for Design/Bid/Build (D/B/B) projects or Request for Proposal (RFP) for Design/Build (D/B) projects) were required to have their post-development SWM plan evaluated or re-evaluated using the total post-development impervious area of the site (new criteria), in lieu of the post-development net increase in impervious area of the site (old criteria), to determine the activity/project's percent impervious and corresponding water quality requirements.

19.3.2 If using the new criteria results in an increase in the water quality requirements for the proposed land-disturbing activity/project from that determined using the old criteria, the additional water quality requirements shall be incorporated into the post-development SWM plan for the proposed land-disturbing activity/project based on the following:

1. Category 1 activities are those proposed land-disturbing activities/projects that had not completed the public hearing/willingness notice stage of plan development as of October 1, 2012. These activities/projects are required to fully incorporate any additional water quality requirements into their proposed post-development SWM plan.

2. Category 2 activities are those proposed land-disturbing activities/projects that had completed the public hearing/willingness notice stage of plan development but had not begun the construction advertisement stage as of October 1, 2012. These activities/projects are required to incorporate any additional water quality requirements into their proposed post-development SWM plan to the maximum extent practicable without impacting (increasing) the existing or proposed R/W footprint and without impacting (delaying) the construction schedule.

19.3.3 For Category 2 land-disturbing activities/projects, any revisions to the proposed post-development SWM plan to address additional water quality requirements should be reasonable and practicable and be applied in a logical and common sense approach. Any additions or modifications to the proposed post-development SWM plan should utilize standard BMPs typically associated with the specific type of project (i.e., rural or urban). For example, proposing to install a large number of manufactured BMPs on a rural secondary roadway project may, theoretically, satisfy the water quality requirement "numbers" but, in reality, may be neither reasonable nor practical.

19.3.4 The following steps are to be followed in the evaluation or re-evaluation process for Category 2 land-disturbing activities/projects:

1. Determine the additional water quality requirements in accordance with the procedures and guidance in this IIM, then
2. Explore all reasonable BMP alternatives to achieve any additional water quality requirements within the existing or proposed R/W footprint for the proposed land-disturbing activity/project or within adjacent/other VDOT R/W, or through the use of an offsite option (see Section 5.4.10 of this IIM), then
3. Determine/select which BMP alternatives can be feasibly incorporated into the activity/project's proposed post-development SWM plan without impacting (delaying) the construction schedule, then
4. Incorporate the selected water quality BMPs into the project's proposed post-development SWM plan, then
5. After completing steps 1 through 4, any activities/projects not able to achieve 100% of the required pollutant load reduction shall have their activity/project files and SWPPP documented with the following information:
    - The total water quality requirements for the activity/project based on the new criteria (as defined in this section)
    - The additional water quality requirements for the activity/project based on the difference between the old and new criteria (as defined in this section)
    - The BMP alternatives investigated
    - The BMP alternatives selected
    - The reasons why certain BMPs were selected or not selected
    - The amount/percent of the total water quality requirements achieved and/or not achieved.

19.4 BMP WATER QUALITY VOLUME

19.4.1 The effective date for implementing the criteria contained in Section 5.4.6.2 of this IIM regarding water quality volume of the BMP was November 12, 2010. The extent of the implementation of this criteria was to be based on the type of project and the project development status (stage) as of the implementation date in accordance with the following:

1. Design/Bid/Build Projects

    - Full implementation for projects that had not been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required).

    - Full implementation for projects that had been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required) but which had to repeat that process because of reasons other than changes related to Section 5.4.6.2 of this IIM.

    - Implementation to the extent practicable within the identified R/W requirements except where the project construction schedule would have been compromised in doing so for projects that had been advertised for a Public Hearing/Willingness or progressed beyond a similar phase (where no Public Hearing/Willingness is required) but which had not progressed to the PAC or similar phase (based on the normal time schedule for such).

    - Projects that were at the PAC or similar phase as of the implementation date were exempt from any type of implementation.

2. PPTA Projects

    - Full implementation for projects that had not been advertised for a Public Hearing/Willingness and where a contract had not been executed with the selected Concessionaire.

    - Full implementation for projects where a contract had not been executed with the selected Concessionaire and the project had been advertised for a Public Hearing/Willingness but which had to repeat that process because of reasons other than changes related to Section 5.4.6.2 of this IIM.

    - Implementation to the extent practicable within the identified R/W requirements except where the project construction schedule would have been compromised in doing so for projects that had been advertised for a Public Hearing/Willingness but where a contract with the selected Concessionaire had not been executed.

    - Projects where a contract had been executed with the selected Concessionaire were exempt from any type of implementation.

3. Design Build Projects

    - Full Implementation for projects that had not been advertised for a Public Hearing/Willingness and where an RFP had not been advertised.

- Full Implementation for projects where an RFP has not been advertised and the project has been advertised for a Public Hearing/Willingness but which had to repeat that process because of reasons other than changes related to Section 5.4.6.2 of this IIM.

- Implementation to the extent practicable within the identified R/W requirements except where the project construction schedule would have been compromised in doing so for projects that had been advertised for a Public Hearing/Willingness but where an RFP had not been advertised.

- Projects where an RFP had been advertised were exempt from any type of implementation.

19.4.2 There may have been projects that did not exactly fit into any one of the categories identified in Sections 19.4.1. In those situations, a project by project decision on implementation of the water quality volume requirements contained in Section 5.4.6.2 of this IIM was to have been made. The State Hydraulics Engineer or the respective District Hydraulics Engineer should have been consulted for assistance, as needed. The expectation was that VDOT would implement the revised water quality volume requirements contained in Section 5.4.6.2 of this IIM on all current projects as of the implementation date where it was reasonable and feasible to do so.

20.0 EXCEPTION PROCESS

20.1 For those land-disturbing activities where it is determined that water quality requirements cannot be totally achieved utilizing onsite BMPs and/or offsite options (see Section 5.4.10 of this IIM), an exception for the pounds of phosphorus removal (load reduction) unachievable may be granted by DEQ provided that VDOT submits a written request to DEQ requesting the exception. Form LD-445G is to be used for this purpose. The request shall include documentation of the need for the exception. The documentation shall describe all means and methods evaluated for meeting the water quality requirements and the reasons why specific methods were determined not feasible. The documentation must also state that the exception being requested is the minimum necessary to afford relief.

20.2 Economic hardship alone is not sufficient reason to request an exception.

20.3 Any approved exception is to be documented in the SWPPP for the project/activity. The appropriate SWPPP General Information Sheet notes are to include the date the exception was approved, by whom it was approved and the amount of the exception (pounds of phosphorus).

20.3.1 Information regarding any approved exception (i.e., date approved, by whom approved and for what amount) is to be noted and included with other registration information when applying for coverage for the proposed land-disturbing activity/project under the VPDES General Construction Permit.

21.0 ANNUAL STANDARDS AND SPECIFICATIONS

21.1 VDOT submits annually its standards and specifications for ESC and SWM (the Annual ESC and SWM Standards and Specifications) to DEQ for review and approval. Upon DEQ approval, VDOT is authorized to design, construct, inspect and maintain its roadways and facilities in accordance with the Approved ESC and SWM Standards and Specifications. The annual approval covers the calendar year (January 1 to December 31). DEQ reserves the right to randomly review VDOT design plans and construction activities to ensure compliance with the Approved ESC and SWM Standards and Specifications.

21.2 VDOT's Approved ESC and SWM Standards and Specifications is a compilation of all VDOT documents related to the design, construction, inspection and maintenance of ESC measures and post-development BMPs including, but not limited to, all or a portion of the following:

- R&B Standards
- R&B Specifications, Supplemental Specifications and Special Provisions
- IIMs
- Drainage Manual
- BMP Design Manual of Practice
- Road Design Manual
- BMP Inspection Manual

21.3 VDOT's Annual ESC and SWM Standards and Specifications are housed in an on-line electronic data base which includes both current and previously approved ESC and SWM Standards and Specifications. The data base is dynamic and items within the data base may be added to, deleted or revised at any time to reflect changes or updates to VDOT's ESC and SWM Program. VDOT will notify DEQ, in writing, when changes are made to the content of the data base. DEQ will have 30 calendar days to provide any written comments they might have regarding the change. If VDOT does not receive any written comments from DEQ within the 30 calendar days after notification, the change shall be deemed approved and may be used on VDOT projects/land-disturbing activities as appropriate.

21.4 VDOT's Approved ESC and SWM Standards and Specifications are for use in the design, construction and maintenance of VDOT projects/land-disturbing activities only. Approval to use any portions of VDOT's Approved ESC and SWM Standards and Specifications on non-VDOT projects/land-disturbing activities (see Section 4.3 of this IIM) must be secured from DEQ by the project authority.