Virginia Stormwater BMP Clearinghouse Committee Meeting

Date: January 13, 2009
Location: Odum Room, Clark Hall, UVA
Charlottesville, Virginia

Sponsored by Virginia Department of Conservation and Recreation (DCR) and Virginia Water Resources Research Center (VWRRC)

Minutes by Jane Walker, VWRRC

Virginia Stormwater BMP Clearinghouse Committee Members Present
Lee Hill (Committee Chair), DCR
Rishi Baral, County of Stafford, Planning Department, E & S Plan Review
Joseph G. Battiata, Williamsburg Environmental Group, Inc.
W. Douglas Beisch, Jr., Williamsburg Environmental Group, Inc.
Larry Coffman, Filterra
Joanna Curran, University of Virginia, Department of Environmental Engineering
David J. Hirschman, Center for Watershed Protection
Gregory Johnson, Patton Harris Rust & Associates
Roy Mills, Virginia Department of Transportation, Location & Design Division
Douglas H. Moseley III, GKY & Associates, Inc.
David B. Powers, Michael Baker Jr., Inc.
David Sample, Virginia Tech, Department of Biological Systems Engineering
James S. Talian, City of Lynchburg

Virginia Stormwater BMP Clearinghouse Committee Members Not Present
Gary Boring, New River Highlands RC&D Council
Michael Gerel, Chesapeake Bay Foundation
Mary E. Johnson, Thomas Jefferson Soil and Water Conservation District
David W. Rundgren, New River Valley Planning District Commission
Scott J. Thomas, James City County Environmental Division
Kevin D. Young, Virginia Tech, Dept. Of Civil and Environmental Engineering

Virginia Department of Conservation and Recreation (DCR) Staff Present
Eric Capps
Chuck Dietz
Lloyd Edwards
John McCutcheon
Ved P. Malhotra

Virginia Water Resources Research Center (VWRRC) Staff Present
Stephen Schoenholtz
Jane Walker

Others Present
Mike Bumbaco, Kerr Environmental Services Corp.
Brad Gianotti, Bay Saver Technologies, Inc.
Gene LaManna, Terre Hill Stormwater Systems
C. Shawn Luton, Kristar Enterprises, Inc.
Maita Pang, Imbrium Systems
Glen Payton, Filterra
Scott Reed, Earthsource Solutions, Inc.
Brian Rusha, StormTech LLC
David Scott, Hydro International

Lee Hill, DCR, called the meeting to order at 10:15 a.m. Everyone introduced herself or himself. There was one correction to the minutes of the Clearinghouse Committee meeting held September 11, 2008; the date of the December meeting was corrected to December 11, 2008 (the draft sent to the committee members incorrectly listed the date; the minutes posted on the Virginia Regulatory Town Hall web site included the correct date).

Stormwater Regulations Update

Lee Hill reported that the Virginia Soil and Water Conservation Board approved the proposed stormwater regulations at its September 2008 meeting. DCR is currently waiting for the completion of the study by Virginia Tech on the economic impacts of the proposed regulations. Lee Hill expects that the regulations that are being proposed, the BMP specifications, and a draft of the handbook will be posted on the website in April 2009 or May 2009, and public comment will be welcomed at that time. Lee Hill offered that information regarding the stormwater regulatory action is posted on the Town Hall Regulatory website (Meeting minutes at http://www.townhall.virginia.gov/L/ViewMeeting.cfm?Meetingid=10384). [NOTE: Additional information regarding the regulations may also be found on DCR's website at http://www.dcr.virginia.gov/lawregs.shtml.]

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From the minutes of the Virginia Soil and Water Conservation Board, Wednesday, September 24 and Thursday, September 25, 2008, p. 6-7:

> **Regulatory Process**
> Regulatory actions are comprised of three primary steps: the Notice of Intended Regulatory Action, the Proposed Regulations, and the Final Regulations.
> The NOIRA stage is complete for the two actions before you today and the Department is advancing proposed regulations to the Board for consideration.
>
> Potential Timetable for the Remainder of this Regulatory Action
> - Take proposed regulations to the Board at the September 24, 2008 meeting.
> - Target mid October for completion of an Economic Analysis.
> - Target early November to file the regulations on the TownHall.
> - Review by the Administration – conservatively November 2008 thru April 2009 (January if expedited).
>   - Official OAG review – 3 days

    - 45 days DPB fiscal analysis review – Mid Dec. 2008
    - 14 days SNR – Jan. 2009
    - No deadline Governor – April 2009 (might be expedited)
    - Submit to Registrar – Early April 2009
    - Registrar publication – Late April 2009
- 60-day public comment period – May - June 2009 (earlier if Admin review completed); public hearings; concurrent EPA review.
- Make Regulation refinements; EPA review – by September 1, 2009.
- Take final regulation to the Board at the September 2009 meeting (when we have resolved concerns to the best of our ability).
- Final Regulation Review by DPB, SNR, Governor – by November 15, 2009.
- File with Registrar and publish for 30 days - Dec. 31, 2009.
- EPA final approval by Dec. 31, 2009.

* * * * *

Lee Hill announced that four more design charrettes are planned to receive input concerning the runoff reduction method. The first is scheduled for February 5, 2009 in Winchester in cooperation with the local Soil and Water Conservation District A second charrette, co-sponsored by ASCE, is set for March 18, 2009 and will be held in Lynchburg. DCR expects to hold a third charrette in the New River Valley, but no specific location or date has been set. The fourth charrette will be co-sponsored by the Hampton Roads Planning District Commission and is expected to cover two days (possibly in March). One day will be aimed at planners, and the other day will be for engineers.

David Hirschman, Center for Watershed Protection (CWP), commented that based on past charrettes, CWP has updated the runoff reduction method spreadsheet. The new version more accurately reflects the results expected for BMPs in series. David Hirschman added that the spreadsheet automatically calculates an adjusted curve number for water quantity computations in runoff reduction practices. They also clarified and provided guidance concerning land cover. The spreadsheet has been delivered by the CWP to DCR and will soon be available on DCR's regulatory portion of its website.

Lee Hill provided an update on the proposed changes to the General Permit for Discharges of Stormwater from Construction Activities. Public hearings have been held, and the public comment period ended in December. DCR received many comments and is in the process of reviewing and responding to the comments. The new permit must be approved by EPA and will be effective July 1, 2009.

Status of Virginia Technology Assessment Protocol

Jane Walker provided a brief history of the work of the Research Protocol Subcommittee in developing a technology assessment protocol for manufactured treatment devices (MTDs). She noted that the subcommittee had met three times since the last Clearinghouse Committee

meeting and had discussed many issues identified in the first five sections of the Virginia Technology Assessment Protocol (VTAP).

Each Clearinghouse Committee member had received two documents – a draft version of the first five sections of the VTAP (Appendix A) and a summary of the written comments by the subcommittee members regarding the draft product (Appendix B). These documents were used to guide the discussion. Jane Walker noted that highlighted sections in the draft document indicate topics in which additional discussions and/or decisions are expected.

One member suggested that DCR could use committees similar to the Clearinghouse Committee as a model for the agency in its decision-making process. Lee Hill commented that while DCR welcomes the recommendations of the Clearinghouse Committee, the agency and ultimately the Virginia Soil and Water Conservation Board are responsible for final decisions. The member suggested that the Soil and Water Conservation Board could come to rely on committees with experts to assist in making decisions.

Section 1 -- Introduction

Section 1.3 -- Applicability (Appendix A), "(2) directing and distributing stormwater runoff flows; (3) reducing stormwater runoff erosive velocities." One member commented that these two items indicated to him channel protection, not water quality issues. A member of the Research Protocol Subcommittee explained that these designations were included because future manufactured devices may address them.

Section 1.4.3 – Clearinghouse Committee (Appendix A), "The Clearinghouse Committee:

- Meets quarterly to provide oversight review of use level designation applications and technology engineering reports;
- Provides recommendations and assessments to the DCR of the appropriate use level designations for stormwater manufactured treatment devices; and
- Interacts with the DCR staff to assess how well the VTAP process satisfies the DCR's stormwater treatment BMP selection objectives."

One member suggested that the third bullet be elevated in the list because it is most important in his mind. He commented that the first two bulleted responsibilities may be too technical for the committee. He asked what purpose the committee serves if the DCR has a contracted evaluator (or group of evaluators) and the proponent is working with a technical advisor. He added that some vendors will be serving on the Clearinghouse Committee and reviewing other vendors' products. He suggested that it would be more effective and efficient for the evaluator to report directly to DCR and let DCR make decisions. Lee Hill commented that the role played by the Clearinghouse Committee is to ask questions and provide general review. The committee will not be expected to review details.

Section 1.4.6 – Proponent's Technical Advisor (Appendix A)
One member asked how DCR would know if the proponent's technical advisor is qualified. Jane Walker replied that the application requests documentation of the advisor's qualifications. Another member added that this is a self-correcting program. It is to the manufacturer's

advantage to hire the best advisor; otherwise, many questions will be raised, resulting possibly in delays. One member asked if the DCR could supply a list of approved advisors. Lee Hill added that as a state agency, DCR could not recommend or endorse one advisor over another. It was suggested that the VTAP should address the conflict of interest issue because the advisor will be being paid by the manufacturer.

Section 2 – BMP Performance Goals

Jane Walker noted that section two has received many written comments from the Research Protocol Subcommittee members (Appendix B), and that the subcommittee recommended that this section be rewritten by a group of experts. Several comments and questions were raised in reference to this section.

One member asked if pre-treatment credit would be granted. Lee Hill offered that DCR is considering allowing credit for pre-treatment but still needs to make a decision. Lee Hill believes that pre-treatment acceptance can be granted at a later time; deciding on the requirements of the other designation levels (pilot, conditional, and general use designations) is more important.

One person commented that pretreatment affects both the maintenance cycle of the BMP and the longevity of the BMP. A discussion on the importance of proper maintenance followed. Lee Hill added that maintenance is already in the regulations and does not need to be added to the VTAP.

Another person asked if total suspended solids (TSS) could be used as a surrogate for total phosphorus (TP). Lee Hill offered that TSS could be used to achieve a pilot use designation (PUD) to help get the BMP in the ground for testing. He explained that the pilot level can be achieved based on lab data. At most, five installations are granted for devices with a PUD. The conditional use designation (CUD) can be granted based on appropriate field data from other states. It was suggested that BMPs with conditional use designations could be limited to 10 installations.

Someone mentioned the discussion by the Research Protocol Subcommittee concerning retrofit requirements of sites with poor performance. Lee Hill added that he would be more comfortable allowing more installations if manufacturers are held responsible to retrofit sites with poor performance. If manufacturers are not held responsible for retrofitting, Lee Hill will allow fewer installations.

One member offered that local governments will not want to allow the installation of conditional use devices if they fear having to retrofit. Instead, they will choose to not install it. One member added that DCR and local governments would have more confidence in devices with substantial data from other localities. He added that the subcommittee had proposed requiring a remediation action plan when submitting an application. He asked if the protocol must be written as “one size fits all.” Another responded by asking what entity would make decisions about products on a case-by-case basis.

Someone suggested that MTDs with conditional use designations be allowed to have 10 installations without a remediation action plan, and allow 15 installations if the manufacturer provides a strong remediation action plan. One member suggested a plan where vendors would decide to apply for different conditional use levels: Tier 1 CUDs would have a commitment to retrofit so would allow more installations whereas Tier 2 CUDs would have no commitment to retrofit if found to be performing poorly and thus have fewer installations. Someone suggested bonding, but others offered that bonding is complicated and that bonds are difficult to manage.

One member proposed that the suggested ideas be consolidated and allow the Clearinghouse Committee the opportunity to think about them and decide on the options.

Lee Hill summarized the proposed ideas in the following way:

	Maximum # of Units	**Required Testing**	**Minimum # of Devices to be Tested**	**Retrofit Requirement**
PUD	5*	Lab testing: 80% removal of Sil-Co-Sil 106† (field testing†† also accepted)	? (2-5)	Retrofit not required
CUD	10*	Field testing††: 80% removal of TSS from field tests = 30% TP removal	? (2-10)	?
GUD	No limit	Field testing††	? (3+)	?

*Consider requiring a performance bond for manufacturers wanting to install more than 5 units at the PUD level or 10 units at the CUD level.

†Be sure to define influent concentration and flow rate through system.

††Be sure installations in the field match the requirements of the influent concentration, flow rate, etc.

Other Comments:

- Lee Hill added that MTDs with a PUD can jump to the GUD level without having to undergo testing at the CUD level.

- It was suggested that Section 2 focus only on TP, and remove all other parameters (e.g., TSS, suspended sediment concentration [SSC], oil treatment).

- One member suggested that the protocol be defined as detailed as possible by DCR. Once established to DCR's satisfaction, written comments should be accepted from vendors and members of the Clearinghouse Committee. The Clearinghouse Committee should discuss the proposed protocol at the next meeting.

- One member cautioned that devices tested under certain set parameters could receive a GUD and then applied anywhere in Virginia, including under different land cover, precipitation rates, influent concentrations, etc.

- The Quality Assurance Project Plans (QAPPs) are to be submitted to DCR, and then sent to the Clearinghouse Committee for review.

Set 2009 Meeting Dates

The following meeting dates were set:
Research Protocol Subcommittee Meeting
February 4, 2009 (10 a.m. – 3 p.m.)

Clearinghouse Committee Meetings (second Thursday of each quarter). All meetings will be from 10 a.m. – 3 p.m.
March 12, 2009
June 11, 2009
September 10, 2009
December 10, 2009.

The meeting location will be announced closer to the meeting date.

With no further business, the meeting was adjourned.

Appendix A

Virginia Technology Assessment Protocol (VTAP)
January 2009 DRAFT of Sections 1 – 5

Guidance for Evaluating Stormwater Manufactured Treatment Devices

Virginia Technology Assessment Protocol (VTAP)

Prepared by:

Virginia Department of Conservation and Recreation

Research Protocol Subcommittee of the
Virginia Stormwater BMP Clearinghouse Committee

You can print or download this document from DCR's web site at:
http://www.dcr.virginia.gov

or from the Virginia Stormwater BMP Clearinghouse at:
http://www.vwrrc.vt.edu/swc

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December 2008

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1 -- Introduction

The Virginia Department of Conservation and Recreation (DCR) evaluates and approves manufactured (proprietary) devices deemed to be reasonable methods of prevention, control, and/or treatment of stormwater runoff. Methods under consideration or approved by DCR are listed on the Virginia Stormwater Best Management Practices (BMP) Clearinghouse: http://www.vwrrc.vt.edu/swc. This document, the *Virginia Technology Assessment Protocol* (VTAP), describes the assessment process for listing manufactured treatment devices on the Clearinghouse web site.

Virginia DCR also publishes the *Virginia Stormwater Management Handbook* (DCR 1999). The handbook, currently being revised, provides information for stormwater management programs regarding basic hydrology and hydraulics, stormwater best management practice selection and pollution removal efficiencies, and administrative guidelines to support compliance with state stormwater regulations. A link to the handbook as well as additional information can be found on the Stormwater BMP Clearinghouse: http://www.vwrrc.vt.edu/swc.

1.1 – Authority

Virginia's Stormwater Management Programs are implemented according to the Virginia Stormwater Management Law and Virginia Stormwater Management Regulations. The law is codified at Title 10.1, Chapter 6, Article 1.1 of the *Code of Virginia,* and the regulations are found at Section 4 VAC50-60 of the *Virginia Administrative Code*. The Law provides authority for the Virginia Soil and Water Conservation Board to *". . . establish minimum design criteria for measures to control nonpoint source pollution and localized flooding . . . ."* (§10.1-603.4 2) and to *". . . [delegate to the Department (sic DCR) . . . any of the powers and duties vested in it by [the law] . . . ."* (§10.1-603.2:1.2). By extension, DCR thus maintains the authority to establish, approve and update standards and specifications of the best management practices (BMPs) that may be used within Virginia to control stormwater runoff.

Because treatment technologies are evolving rapidly, the DCR needs to be able to make changes to BMP standards and add new practices as new information becomes available. For this reason, DCR has partnered with the Virginia Water Resources Research Center (VWRRC) to establish the Virginia Stormwater BMP Clearinghouse Committee (Clearinghouse Committee). DCR staff and members of the Clearinghouse Committee have worked together to develop and design the Virginia Stormwater BMP Clearinghouse. The Clearinghouse web site (http://www.vwrrc.vt.edu/swc/) is where the approved list of BMPs – both public domain practices and manufactured treatment devices (MTDs) – and their associated standards and specifications will be found. This document will guide the testing and evaluation of MTDs to determine pollutant removal efficiencies for each device in which DCR has confidence. These approved removal efficiencies will be the ones that state agencies and local stormwater management programs will recognize and approve when the devices are used in specific stormwater management plans.

As new stormwater regulations are developed in Virginia (2008-2009), it is expected that the Clearinghouse will be referenced within the new regulations. This VTAP document was developed by the DCR and the Clearinghouse Committee in anticipation of updated stormwater regulations in Virginia.

1.2 -- Purpose of VTAP

Virginia endorses the Technology Acceptance Reciprocity Partnership (TARP) and thus follows the *TARP Protocol for Stormwater Best Management Practice Demonstrations* (See the "TARP Endorsement" section below). Use of the TARP Protocol, however, does not eliminate state review or approval of projects proposing to use TARP-certified stormwater management technologies, nor does it require Virginia to "rubber stamp" the approval or certification of another state. Those seeking reciprocal certification from Virginia of practices and methods previously certified by another state must still demonstrate consistency with the procedures articulated in this document.

The VTAP is an extension of the TARP Protocol and is specific to Virginia. It provides a means to obtain a reasonable level of statistical confidence in the performance of a manufactured treatment device. The VTAP defines a testing protocol and process for evaluating and reporting on the performance and appropriate uses of manufactured treatment devices that address post-construction stormwater runoff.

By obtaining accurate and relevant data, evaluators can assess performance claims and make informed decisions whether or not to approve manufactured treatment devices for use in Virginia. Local governments statewide can apply the use level designations posted on the Clearinghouse to evaluate the suitability of these devices for use in their communities.

TARP Endorsement

For technology evaluations following the elements of the TARP Protocol, the state partners in California, Massachusetts, Maryland, New Jersey, Pennsylvania, and Virginia have agreed to:

1. Address technology review and approval barriers in policy and regulations that do not advance knowledge of a technology's performance or recognize innovative approaches to meet environmental protection goals;
2. Accept the performance tests and data, and acknowledge the approval results of a partner's review of a technology demonstration, as appropriate, in order to reduce subsequent review and approval time;
3. Increase expertise in the applications and advantages of technologies that may have superior environmental and economic benefits for controlling stormwater pollution;
4. Use the TARP Protocol, as appropriate, for state-led initiatives, grants, and verification or certification programs where the objective is to document performance efficiency and cost of best management practices;
5. Share technology information with potential users in the public and private sectors using existing state supported programs; and
6. Monitor and evaluate the results of using the TARP Protocol, and periodically review and revise the Protocol to maintain its viability.

The TARP Protocol describes a set of uniform criteria acceptable to the endorsing states. However, specific state requirements must be considered when applying for certification or verification of a stormwater BMP in a particular state. Each partner reserves the right to evaluate any application and request specific information in order to satisfy an individual state's requirements.

1.3 -- Applicability

This testing protocol is designed for short detention, flow-based BMPs and may not be suitable for all stormwater treatment practices. The protocol is NOT intended for use in evaluation of erosion and sediment control technologies or products.

The assessment protocol primarily deals with BMPs that are designed for one or more of the following: (1) reducing stormwater runoff volume; (2) directing and distributing stormwater runoff flows; (3) reducing stormwater runoff erosive velocities; (4) removing contaminants such as suspended or dissolved pollutants from collected stormwater through physical, chemical and biological processes; and (5) providing stormwater runoff pre-treatment.

This protocol is not intended for conducting research on experimental devices or on conventional/traditional (i.e., public domain) BMPs. The protocol is also not intended for use in evaluation of erosion and sediment control technologies or products. Technologies with limited or no data will only be evaluated at the **Pilot Use Designation** (PUD), and installations of PUD

technologies will only be allowed at test sites. The DCR will not consider an application for a **Conditional Use Designation** (CUD) or a **General Use Designation** (GUD) unless the application includes sufficient performance data and demonstrated longevity in real development conditions that clearly demonstrate acceptable feasibility and the likelihood that the device will achieve desired performance levels using the manufacturer's recommended sizing criteria under actual full-scale field conditions. After having submitted an application for certification and time for review of the application, a proponent may request a preliminary meeting with the DCR and the Clearinghouse Committee to discuss which portions of the VTAP would apply for the technology and suggest other testing methods applicable to the technology.

1.4 -- Roles and Responsibilities

1.4.1 -- Virginia Department of Conservation and Recreation

The Virginia Department of Conservation and Recreation is responsible for the Stormwater Management Programs in Virginia (See **Section 1.1 -- Authority**). For this reason, the DCR may obtain recommendations from outside evaluators and the Clearinghouse Committee, but is ultimately responsible for granting or denying use designations.

The Department of Conservation and Recreation:

- Grants use level designations;
- Approves extensions and changes made to use level designations;
- Provides oversight and analysis of all submittals to ensure consistency with the DCR's stormwater management requirements; and
- Reviews new information and updates the VTAP as needed.

1.4.2 – DCR's Contracted Evaluator

The DCR will contract with a qualified and independent individual or entity to assist with the assessment process. Fees paid by the manufacturers will be used to support the assessment process, including payment of the DCR's contracted evaluator.

The DCR's contracted evaluator:

- Reviews all applications for completeness;
- Provides recommendations and assessments to the Clearinghouse Committee and the DCR of the appropriate use level designations for stormwater manufactured treatment devices;
- Reviews all QA Project Plans;
- Provides recommendations to the DCR for approval or denial of QA Project Plans;
- Reviews technology evaluation reports (TERs) for completeness and conformance with Clearinghouse procedures and protocols; and
- Provides recommendations to the DCR regarding pollution removal efficiencies to assign to devices and whether or not to certify/approve devices at requested use designation levels.

1.4.3 -- Clearinghouse Committee

Members of the Virginia Stormwater BMP Clearinghouse Committee will review technology evaluation reports and provide recommendations to the DCR. The reviewers represent both academics and practitioners that have direct experience but are not affiliated with the proponent of the technology or other stormwater BMP manufacturers or vendors.

The Clearinghouse Committee:

- Meets quarterly to provide oversight review of use level designation applications and technology engineering reports;
- Provides recommendations and assessments to the DCR of the appropriate use level designations for stormwater manufactured treatment devices; and
- Interacts with the DCR staff to assess how well the VTAP process satisfies the DCR's stormwater treatment BMP selection objectives.

1.4.4 -- Virginia Water Resources Research Center

The Virginia Water Resources Research Center facilitates the VTAP review process by coordinating with the DCR and the Clearinghouse Committee.

The Virginia Water Resources Research Center:

- Develops and maintains the Virginia Stormwater BMP Clearinghouse web site under the direction of the DCR and the Clearinghouse Committee; and
- May facilitate outside research and evaluations, when requested, by coordinating with stormwater BMP designers, regulators, researchers, and manufacturers regarding the scientific review of existing BMP test data or new monitoring and testing.

1.4.5 -- Proponent of Technology

The proponent of the technology refers to the person(s) who are promoting the project through the VTAP process. The proponent can be the manufacturer, the product vendor, etc.

The proponent:

- Submits the use level designation application;
- Submits quality assurance project plans (QA Project Plan or QAPP) for all test sites;
- Informs the DCR of changes in the QA Project Plan; production, manufacturer standing, key personnel, etc.;
- Submits interim status reports; and
- Submits the technology evaluation report (TER).

1.4.6 – Proponent's Technical Advisor

The proponent's technical advisor provides outside, objective oversight of performance testing. This qualified technical advisor is paid for by the proponent of the technology and is not provided by the DCR, the DCR's contracted evaluator, the Clearinghouse Committee, or the VWRRC.

The DCR *requires* the use of a technical advisor for certain components of the certification request if the project contains field performance testing data, regardless of where these data were collected. Specifically, all applications submitted for **Conditional Use Designation** (CUD) or **General Use Designation** (GUD) by proponents with a financial interest in the technology must utilize objective, outside consultation. Independent consultation must begin at the onset of the field testing program.

The DCR strongly encourages the use of a technical advisor to provide objective oversight regarding the conduct of testing and the preparation of all documentation. The DCR also encourages the involvement of an objective outside technical advisor at the onset of laboratory testing.

At a minimum, the technical advisor:

- Reviews and approves the QA Project Plans;
- Provides oversight of QA Project Plan implementation by periodically inspecting site conditions, sampling equipment, sample handling, etc.;
- Completes the data validation report to validate that monitoring was conducted in accordance with the VTAP and the approved QA Project Plan;
- Prepares a TER executive summary that includes a test results summary and conclusions and compares these with the supplier's performance claims; OR Prepares a Technology Evaluation Report (TER) that includes a summary of test results and research conclusions and compares these with the proponent's performance claims (If go with second option, remove the bulleted item above and the two below since they are part of the TER);
- Provides a recommendation of the appropriate technology use level designation;
- Provides additional testing recommendations, if needed; and
- Provides information to DCR and the Clearinghouse Committee to be posted on the Clearinghouse web site.

1.5 -- Protocol Limitations, Release of Liability, and Disclosure

This protocol has been published for the purpose of evaluating or generating performance claim data for manufactured stormwater treatment technologies for certification in Virginia. Neither the DCR; its contracted partners, including the VWRRC; nor the Clearinghouse Committee accept responsibility or liability for performance of stormwater technologies being evaluated using the VTAP.

1.6 -- Cost Consideration in Conducting the Certification Program

The financial burden for completing a development program, including the laboratory and field testing, lies with the proponent of the manufactured treatment device. Neither the DCR, its contracted evaluator, the VWRRC, nor the Clearinghouse Committee will provide funding for this work.

The DCR recognizes the need to minimize the cost of implementing a certification program. To the extent applicable, the following list provides ways to minimize cost yet provide sufficient validated data:

- The VTAP is an extension of the TARP protocol. A proponent may submit data collected by following the TARP protocol or the VTAP. A proponent may also submit data collected using protocols other than the TARP protocol or the VTAP. The DCR's contracted evaluator will review data collected using other protocols, e.g., data collected by the U.S. EPA's Environmental Technology Verification (ETV) Program, the Environmental Technology Evaluation Center (EvTEC), and the Technology Assessment Protocol – Ecology (TAPE). Data must be consistent with the expectations of the VTAP process.
- Use laboratory and controlled field testing to the maximum extent practical and justifiable.
- Carefully select field test sites so that evaluations based on the VTAP will be efficiently conducted and the results can be applied elsewhere, consistent with other protocols.
- Carefully prepare the Quality Assurance Project Plan to minimize the need to conduct additional sampling.
- Periodically evaluate the results to check for statistical significance and acceptability. For example, the number of sampling events required by this protocol requires at least 15, but preferably 20, storms. Proponents would therefore be prudent to review the data after 15 sample events have been analyzed to see if they are sufficient.
- For determination of statistical significance, consider pooling data from several sites per application or for several applications, if justified. Data from more than one site can be combined (pooled) to meet the 15-20 required sample-event criterion, provided that the contributing drainage areas are from similar land uses and the pollutant concentration variability is reasonably comparable. Data collected from different sized treatment systems must be normalized to reflect the size difference using flow data for this normalization.

2 -- BMP Performance Goals (Rewrite this section)

2.1 -- Stormwater Runoff Volume Reduction

Runoff volume reduction is defined as the total volume of rainfall and runoff reduced through canopy interception, soil infiltration, evaporation, rainfall harvesting, engineered infiltration, extended filtration or evapotranspiration at small sites. Stormwater management experts throughout the United States, participating in a panel of experts for the National Academies of Science during the past two years (2007-2008), have recently recommended that stormwater managers should change our strategies for reducing pollution. Instead of relying simply on the various treatment processes employed in stormwater BMPs, we should focus our compliance criteria on reducing the volume of runoff. In response, the Virginia DCR has developed a **Runoff Reduction Methodology** as part of the draft revisions of the Virginia Stormwater Management Regulations. The intent of Virginia's Runoff Reduction Methodology is to (1) reduce the total volume of runoff carrying pollutants ~~and increasing the stormwater flow to receiving streams~~, and (2) to maintain groundwater recharge rates at development sites sufficient to preserve existing water table elevations and support natural base flows in streams and wetlands.

Pollution treatment is defined as the change in pollution concentration in runoff due to the treatment processes the practice incorporates. However, the **total pollutant load** removed by a practice is the product of the runoff volume reduction and reduction achieved by the practice's pollution treatment process(es). Virginia's new approach to water quality protection will, in fact, provide for enhanced pollution reduction as runoff volume is reduced and, in the process, accomplish a significant amount of groundwater recharge using the same BMPs.

Manufactured treatment devices for which the proponents desire to receive certification for runoff volume reduction must demonstrate the percentage of the total runoff flowing into the device that is removed from the flow prior to runoff exiting the device. Proponents must also demonstrate whether that removed flow is (1) permanently removed from the surface discharge (e.g., through infiltration into a stone base or soil beneath the device), (2) shunted aside temporarily for slower discharge following the storm event, or (3) is subject to some other specified process.

2.2 -- Stormwater Runoff Quality Control

The goal of the VTAP regarding runoff quality control is to determine how much a specific MTD can remove of one or more targeted pollutants (e.g., TSS, SSC, TP, TN, Oil/Grease/Hydrocarbons, Metals, Bacteria, etc.). This is different from other protocol programs, which tend to set specific pollutant removal thresholds that are necessary to achieve in order to qualify for specific use level designations. For the purposes of the VTAP program, the DCR encourages proponents to *aim for* the removal thresholds targeted in other protocol programs, as follows:

- Total phosphorus (TP):
  - 50% TP removal for a range of influent TP of 0.1 to 0.5 mg/L.

- TSS (For the purpose of evaluating TSS removal, Virginia defines TSS as all particles smaller than 500 microns in diameter):
  - 80% removal of TSS for influent concentrations ranging from 100 to 200 mg/L;
  - > 80% removal of TSS for influent concentrations greater than 200 mg/L; and
  - < 20 mg/L of effluent TSS for influent concentrations less than 100 mg/L.

- Oil Treatment:
  - No ongoing or recurring visible sheen;
  - A daily average total petroleum hydrocarbon concentration no greater than 10 mg/L, and
  - A maximum of 15 mg/L for a discrete (grab) sample.

- Metals:
  - Treat stormwater with influent dissolved copper ranging from 0.003 to 0.02 mg/L to achieve significantly higher removal rates than basic treatment facilities.
  - Treat stormwater with influent dissolved zinc ranging from 0.02 to 0.3 mg/L to achieve significantly higher removal rates than basic treatment facilities.

  NOTE: Data available on basic treatment BMP dissolved metals removal (e.g., from vendors or the ASCE National Stormwater BMP Database) can help determine if the device demonstrates significantly higher removal rates.

- Pretreatment:
  - 50% removal of TSS for influent concentrations ranging from 100 to 200 mg/L; or
  - Effluent quality not exceeding 50 mg/L total suspended solids, for influent concentrations less than 100 mg/l.

  NOTE: Pretreatment practices generally apply to (1) Project sites using filtration or infiltration treatment, or (2) Other kinds of treatment systems where pretreatment is needed to assure and extend performance of the downstream facilities.

[CRAFTON QUESTION: Can experts propose target removals for other pollutants, such as SSC, TN, Bacteria, other metals, etc., along with reasonable influent concentrations for testing, so we can provide a full range of target pollutants in the above list?]

However, it is important to reiterate that the above removals are desirable targets, but the VTAP program goal is to determine how much a specific MTD can remove of one or more pollutants being targeted for that MTD. The VTAP program is open to certifying devices with verfied pollutant reduction efficiencies that are less than the above targets, understanding that the devices will be assigned the pollutant removal efficiencies that are verified by testing pursuant to the VTAP.

2.2.1 -- Total Phosphorus Treatment

The proposed water quality regulatory criteria in Virginia's Stormwater Management Regulations (4VAC 50-60-63) are aimed at removal of Total Phosphorus (TP). The proposed criteria is essentially a load limit or no-net-increase type of standard, stating that after development, the load of phosphorus leaving the development site in stormwater runoff may not exceed 0.28 lb./acre/year. The mean Event Mean Concentration (EMC) of TP in urban/suburban runoff (influent) in Virginia is 0.26 mg/L. These criteria may provide the basis for testing for Virginia certification.

If a proponent can show a reliable 80% removal of TSS using field or laboratory data, a reciprocal TP credit of 40% removal will be granted at the CUD level until field testing is performed for TP removal and device-specific results are obtained. TP removal for the **General Use Designation** will be based on the results of performance field testing of TP, not TSS data.

2.2.2 -- Total Suspended Solids Treatment

Virginia has not established water quality regulatory criteria pertaining to the removal of total suspended solids (TSS) from stormwater runoff. However, Virginia will consider reciprocal certification of devices that have been certified for TSS removal using other protocols if the submitted data is considered to be valid.

2.2.3 – Suspended Sediment Concentration

Virginia has not established water quality regulatory criteria pertaining to suspended sediment concentrations (SSC) in stormwater runoff. However, Virginia will consider reciprocal certification of devices that have been certified for TSS removal using other protocols if the submitted data is considered to be valid.

2.2.4 -- Oil treatment

Virginia has not established water quality regulatory criteria pertaining to the removal of oil from stormwater runoff. However, Virginia will consider reciprocal certification of devices that have been certified for oil removal using other protocols if the submitted data are considered to be valid.

2.3 -- Stormwater Runoff Pre-Treatment

Virginia has not established water quality regulatory criteria pertaining to pre-treatment of stormwater. However, Virginia will consider reciprocal certification of devices that have been certified for pretreatment using other protocols if the submitted data is considered to be valid.

3 -- BMP Certification Designations

Use designations are based on the quality and quantity of performance data and other information that the proponent supplies. There are three use designations for manufactured treatment devices in Virginia: **Pilot Use Designation** (PUD), **Conditional Use Designation** (CUD), and **General Use Designation** (GUD). The goal for the proponent is to obtain a GUD, whereby the technology may be marketed throughout Virginia, subject to conditions that the DCR may apply as a result of the testing and assessment of the practice. The device may not be installed in Virginia unless the DCR grants it the status of PUD, CUD, or GUD.

3.1 -- Pilot Use Designation

For manufactured treatment devices with no performance data or only laboratory performance data, the **Pilot Use Designation** (PUD) allows limited use for the sole purpose of collecting performance data. The DCR's contracted evaluator and the Clearinghouse Committee will review all PUD applications and make recommendations to the DCR. The DCR will grant a PUD certification if it believes the practice has merit and should have field (or laboratory) performance testing conducted.

Devices with PUD certification will be listed as such on the Storwmater BMP Clearinghouse web site. With a PUD certification from the DCR, the practice may only be installed for testing and may NOT be marketed in Virginia beyond the test sites. Before installing a PUD practice in Virginia, the proponent must submit a QA Project Plan for each test site and receive approval from the DCR. The DCR may impose conditions for installations. During the testing period, DCR will limit the number of installations of PUD devices in Virginia to a maximum of five.

Any field data to be included in the assessment process must be derived from testing sites representative of the typical urban stormwater conditions expected in Virginia.

Once the data have been evaluated, the proponent has three options: (1) submit a technical evaluation report (TER); (2) request an extension from DCR for more time to conduct additional testing; or (3) cancel the certification request. The DCR will grant extensions on a case-by-case basis but will not allow additional installations during the extension period. No additional installations are allowed until the TER is approved by DCR and a CUD or GUD is granted. The proponent of a poor performing PUD technology is not required to remove the device because of the poor performance.

3.2 -- Conditional Use Designation

The **Conditional Use Designation** (CUD) is for manufactured treatment devices that have field performance data, but the data are insufficient to adequately evaluate claims and/or the data were not collected in a manner consistent with the VTAP protocol. The proponent of the practice should apply for a CUD if field data were collected but were not obtained under typical urban stormwater treatment conditions expected in Virginia or were obtained by a protocol that is reasonably consistent but does not necessarily fully meet the VTAP.

The DCR's contracted evaluators and the Clearinghouse Committee will recommend that a CUD certification be granted if they believe the practice should have additional field performance testing. The DCR grants CUD certifications based on submission of sufficient performance data, the recommendations from its contracted evaluators and the Clearinghouse Committee, and comments received from peer reviewers. Devices with CUD certification will be listed as such on the Storwmater BMP Clearinghouse web site. Proponents of technologies not granted a CUD may apply for a PUD certification, but they must submit the PUD application and pay associated PUD fees. – OR – will automatically be considered for a PUD (?).

Technologies granted a CUD certification by the DCR are allowed to be marketed and installed in the field while more extensive field (and possibly laboratory) testing occurs. Proponents of CUD technologies must submit a QA Project Plan for each test site and cannot begin performance testing at sites in Virginia until the QA Project Plan is approved. Testing is not necessary at all installations ~~but is required at representative physiographic locations in Virginia where certification is sought (Coastal, Piedmont, Ridge/Valley)~~. The proponent of the technology must notify DCR of all installation sites, and each test site must reflect typical conditions for Virginia (e.g., similar annual rainfall, topography, geology, soils, sediment particle size distribution, etc.). ~~The first installation in any physiographic region of Virginia must be a test site, and the QA Project Plan must be approved before installing the technology at other sites in the region.~~

CUD certification applies for a specified testing period of two years (suggested), after which the practice may NOT be installed in Virginia until monitoring has been completed, and the test data are evaluated. Once the data have been evaluated, the proponent has three options: (1) submit a technical evaluation report (TER); (2) request an extension from DCR for more time to conduct additional testing; or (3) cancel the certification request. The DCR will grant extensions on a case-by-case basis and reserves the right to allow or disallow for the continuation of marketing during the extension period. If the proponent withdraws the certification request or a GUD is not granted because of poor performance, the proponent must implement its established remedial action plan as outlined in the application. The proponent of a poor performing CUD technology is not required to remove the device based on poor performance.

3.3 -- General Use Designation

The **General Use Designation** (GUD) confers a general acceptance for the treatment device based on validated performance claims. At a minimum, a product should have a substantial data set that verifies a specific sizing and the associated performance and longevity for typical urban conditions. To obtain a GUD certification, the field testing and evaluation must conform to the requirements in the VTAP and represent application conditions expected in Virginia.

Devices seeking a GUD certification must have been field tested at sites that are representative of urban conditions expected in Virginia. The easiest way to ensure the testing occurs under the required conditions is to pick field test sites located in Virginia. ~~For the GUD certification, the device must be tested in at least one site within each physiographic region in Virginia where certification is desired (e.g., Coastal, Piedmont, Ridge/Valley).~~ When including test sites outside of Virginia, the proponent must show that the site will represent conditions commonly expected in Virginia. Typical weather must be characterized by Type II rainfall patterns, and the device must be installed in a soil type prevalent in Virginia. Providing storm intensity information and particle size distribution data from the proposed site will help assess how well the site represents conditions in Virginia.

To apply for the GUD certification, the proponent of the technology submits a GUD application, complete with a TER, to the DCR. The DCR's contracted evaluators and the Clearinghouse Committee will recommend to the DCR that a GUD certification be granted if they find the performance claims to be validated. The DCR grants GUD certifications for technologies based on submission of sufficient performance data, the recommendations from its contracted evaluators and the Clearinghouse Committee, and comments received from peer reviewers.

Devices with GUD certification will be listed as such on the Stormwater BMP Clearinghouse web site. Technologies with a GUD certification from the DCR may be used anywhere in Virginia, subject to conditions the DCR may apply as a result of the testing and evaluation of the practice. Technologies that receive a GUD certification have no expiration date. If at a later date, it is discovered that a GUD certified technology is not performing at the level of the approved performance claim, the practice must be revisited so that either the design criteria are improved to achieve the listed performance or the performance claim is corrected.

Proponents of technologies not granted a GUD may apply for a CUD certification, but they must submit the CUD application and pay associated CUD fees. – OR – will automatically be considered for a CUD.

4 -- Assessment Process

The Virginia Stormwater BMP Clearinghouse web site will maintain a vendor list to assist local jurisdictions in identifying stormwater technologies and products. To be approved by the DCR for general use designation (GUD) in Virginia and posted on the clearinghouse web site, a technology must meet the following criteria:

- Meet the stormwater performance goals outlined in the use designation application and demonstrated by testing performed in accordance with the VTAP.

Technologies that do not meet the criteria above may be listed on the clearinghouse web site with either a conditional use designation (CUD) or pilot use designation (PUD). Special restrictions apply to technologies with a CUD or PUD. See **Section 3 -- BMP Certification Designations** for more information about the types of technology designations.

The DCR, along with its contracted evaluators and the Clearinghouse Committee, will evaluate the application package and determine a use designation for each technology. The Clearinghouse Committee will provide a draft use designation document for proponent feedback prior to forwarding the use designation recommendation to the DCR. The DCR will then review the Clearinghouse Committee's recommendations and publish appropriate determinations on its web site for a period of 15 days for peer review and comment. Technologies that have not obtained a proposed or final use designation will not be posted on the web site.

4.1 -- Overview of Virginia Technology Assessment Protocol

The technology performance assessment process consists of the following order of events. Specific timelines are provided in Section 4.3 – Assessment Timeline.

1. Proponent submits PUD, CUD, or GUD application to DCR. (Include application fee: $X for PUD, $Y for CUD, $Z for GUD)
2. DCR's contracted evaluators and the Clearinghouse Committee review the application and provide recommendations to DCR.
3. DCR approves or disapproves the application.
   If approved, DCR lists the technology on the clearinghouse web site under the appropriate category (PUD, CUD, or GUD).
   If disapproved, proponent may modify and resubmit application.
4. If approved at the PUD or CUD levels, proponent must contract with a technical advisor (an objective outside party) to develop and submit a Quality Assurance Project Plan (QA Project Plan or QAPP) to DCR for testing sites. (Include $X QA Project Plan review fee)
5. Evaluators contracted by DCR review the QA Project Plan for PUD and CUD technologies and provide recommendations to DCR.
6. DCR approves or disapproves the QA Project Plan for PUD and CUD technologies.
   If approved, proponent may begin performance testing.
   If disapproved, proponent must modify and resubmit QA Project Plan.
7. Once performance testing begins, the proponent provides quarterly status reports to DCR.
8. At the end of the testing period, proponent submits a technical evaluation report (TER) to DCR. (Include TER review fee: $X for PUD, $Y for CUD, $Z for GUD)

9. The DCR's contracted evaluators and the Clearinghouse Committee review the TER and provide recommendations to DCR.
10. If recommended by the DCR's contracted evaluators and the Clearinghouse Committee, an interim TER is posted on the Clearinghouse web site for peer review.
11. DCR approves or disapproves the TER.

    If approved, DCR posts its official acceptance letter and the final TER on the clearinghouse web site under the appropriate category (CUD or GUD).

    If disapproved, DCR will notify proponent of decision. DCR may then grant permission for the proponent to conduct additional testing and allow for resubmission of a TER at the completion of the testing.

4.2 -- Requesting/Revising Use Level Designations

The first step for a proponent wishing to market a manufactured treatment device in Virginia will be to amass the product information and data (if available) and determine the use designation level for which to apply. The proponent will need to ask a fundamental question:

Does the technology have field data that represents stormwater conditions in Virginia and meets the VTAP requirements?

To determine the answer to this question, the proponent of the technology must be familiar with the VTAP as described in this document. If field data have not been not collected, the proponent should prepare to submit an application for a PUD. If field data were collected but were not obtained under conditions found in Virginia or were collected by a protocol that is reasonably consistent but does not necessarily fully meet the VTAP, the proponent of the BMP should apply for a CUD. If both conditions are met – field data have been collected at sites representing stormwater conditions in Virginia and conform to the VTAP -- the proponent should submit a GUD application to the DCR.

Proponents seeking a technology use level designation by the DCR will need to submit an application fee of $X to Y. Proponents should mail their submission to the following addresses:

Stormwater Management BMP Clearinghouse
Virginia Department of Conservation and Recreation
Division of Soil and Water Conservation
203 Governor Street, Suite 206
Richmond, VA 23219-2094
E-mail: xxx@xxx.xxx

Evaluator
Affiliation
Street Address
City, State, Zip
E-mail: XXX@XXX.XXX

Send submittals to both the DCR and the evaluator contracted by the DCR. They will provide initial review of the application for completeness. Submit four paper copies and an electronic version (E-mail attachment or CD) to the addresses above. Submit quality assurance project plans, interim status reports, requests for extensions, and other correspondences to these addresses as well.

For assistance, please contact:

Ved P. Malhotra, P.E.
Stormwater Compliance Engineer
Virginia Department of Conservation and Recreation
Email address: Ved.Malhotra@dcr.virginia.gov
Phone: (804) 786-1863
Fax: (804) 786-1796

4.3 -- Assessment Timeline

The evaluators will review submittals as quickly as possible and will communicate with the proponent of the MTD if delays or problems arise.

4.3.1 -- Pilot use designation Assessment Timeline

1. PUD application is reviewed for completeness – at least one month
2. PUD application is reviewed by DCR's evaluators and Clearinghouse Committee – at least three months
3. **Submit project-specific QA Project Plan that meets the VTAP's requirements within six months of receiving the PUD.**
4. Project-specific QA Project Plan is reviewed – at least three months
5. Submit site-specific QA Project Plan amendments
6. Monitor field installations – two years. Quarterly progress reports are due to DCR on April 15th, July 15th, October 15th, and January 15th for the preceding three-month period.
7. **Submit TER that meets the VTAP's requirements within six months of completing testing. PUD certification expires 30 months from the time when testing begins.** This timeframe allows for 24 months of monitoring and 6 months for writing the TER.
8. DCR's contracted evaluators review the TER – at least two months
9. Peer-review comments accepted on the TER – 15 days
10. DCR's contracted evaluators review peer comments – 15 days
11. Clearinghouse Committee reviews the TER
12. DCR issues a CUD or a GUD, revokes the PUD, or allows for an extension.

Failure to submit the project-specific QA Project Plan within 6 months of receiving a PUD results in a cancellation of the PUD on the Clearinghouse web site and requires reapplication. Failure to submit progress reports, failure to demonstrate satisfactory progress during the testing period, or failure to submit a TER within 6 months risks suspension or cancellation of the PUD on the Clearinghouse web site. A suspension limits the additional installations to one in Virginia during the suspension period. The DCR will remove the suspension when the proponent demonstrates satisfactory progress in completing the required component. A cancellation requires the proponent to resubmit an application for the desired use level designation.

If proponents of PUD technologies require extensions on use level designation components (QA Project Plans, TER), they must submit a request to the DCR at least 2 weeks before the due date. The DCR will grant extensions only if the proponent shows that progress is being made.

4.3.2 -- Conditional Use Designation Assessment Timeline

1. CUD application is reviewed for completeness -- at least one month

2. CUD application is reviewed by DCR's evaluators and Clearinghouse Committee – at least three months
3. **Submit QA Project Plan that meets the VTAP's requirements within six months of receiving the CUD.**
4. Project-specific QA Project Plan is reviewed – at least three months
5. Submit site-specific QA Project Plan amendments
6. **Implement QA Project Plan or communicate reason for delay – within 12 months**
7. Monitor field installations -- two years. Quarterly progress reports are due to DCR on April 15th, July 15th, October 15th, and January 15th for the preceding three-month period.
8. **Submit TER that meets the VTAP's requirements within six months of completing testing. CUD certification expires 30 months from the time when testing begins.** This timeframe allows for 24 months of monitoring and 6 months for writing the TER.
9. DCR's contracted evaluators review the TER – at least two months
10. Peer-review comments accepted on the TER – 15 days
11. DCR's contracted evaluators review peer comments – 15 days
12. Clearinghouse Committee reviews the TER
13. DCR issues a GUD, revokes the CUD, or allows for an extension.

Failure to submit the project-specific QA Project Plan within 6 months of receiving a CUD results in a cancellation of the CUD on the Clearinghouse web site and requires reapplication. Proponents with a CUD have a maximum of 12 months to begin implementation of the project-specific QA Project Plan or communicate why. Failure to submit progress reports, failure to demonstrate satisfactory progress during the testing period, or failure to submit a TER within 6 months risks suspension or cancellation of the CUD on the Clearinghouse web site. A suspension limits the additional installations to one in Virginia during the suspension period. The DCR will remove the suspension when the proponent demonstrates satisfactory progress in completing the required component. A cancellation requires the proponent to resubmit an application for the desired use level designation.

If proponents of CUD technologies require extensions on use level designation components (QA Project Plans, TER), they must submit a request to the DCR at least 2 weeks before the due date. The DCR will grant extensions only if the proponent shows that progress is being made. The DCR reserves the right to allow or disallow for the continuation of marketing during the extension period.

4.3.3 -- General Use Designation Assessment Timeline

1. GUD application and TER are reviewed for completeness -- at least one month
2. GUD application and TER are reviewed by DCR's evaluators and Clearinghouse Committee – at least two months
3. Peer-review comments accepted on the TER – 15 days
4. DCR's contracted evaluators review peer comments – 15 days
5. Clearinghouse Committee reviews the application and TER – at least three months
6. DCR issues a GUD or a CUD, or revokes the GUD.

The proponent must submit an application package that includes a technical evaluation report (TER) that meets the VTAP requirements for general use designation (GUD). GUD review by the Clearinghouse Committee will be considered four times a year. For BMPs approved at the GUD level, DCR will post an interim TER on the Virginia Stormwater BMP Clearinghouse Web Site for review and public comment. Corrections and comments to the report are accepted at

that time. Barring no unforeseen problems, DCR will post a final certification of the GUD on the Virginia Stormwater BMP Clearinghouse Web Site after a 15-day public comment period. review by the DCR's contracted evaluators and Clearinghouse Committee, and internal review.

4.4 -- Approving a QA Project Plan

A project-specific quality assurance project plan (QA Project Plan) *must be submitted to DCR within six months of* obtaining a PUD or CUD and *before* initiating performance testing. A site-specific QA Project Plan is needed for each testing site. When a substantive change to the QA Project Plan is warranted, the author of the plan must revise it to document the change and submit the revised plan to the DCR for approval.

Development of the QA Project Plan should be a collaborative effort between the proponent of the device and the proponent's technical advisor. **Section 6 -- QA Project Plan** outlines the requirements of the QA Project Plan.

The DCR will contract with evaluators to review and provide recommendations concerning approval of the QA Project Plan. DCR will make the final decision concerning QA Project Plan approval. Proponents should expect that the review of the QA Project Plan and approval of the plan should last at least three months. The proponent should not begin performance testing until the plan is approved.

4.5 -- Requirements of Performance Testing

A QA Project Plan must be approved by the DCR before initiating any performance testing. Performance testing must follow the procedures outlined in the approved QA Project Plan. Performance testing should be designed to meet all requirements of the VTAP, with the goal of obtaining the **General Use Designation**. Data used in the assessment must be derived from field testing sites of the typical urban stormwater conditions expected in Virginia. Proponents of PUD technologies must perform testing at all field installations in Virginia. Proponents of CUD technologies do not have to test at all installations.

4.6 -- Granting a Use Level Designation

The DCR grants a use level designation based on the information submitted and best professional judgment. Submitting the appropriate amount of data does not guarantee that the DCR will grant a use level designation. The DCR bases decisions on system performance. The DCR may place restrictions on the use of the technologies granted a GUD. Technologies not granted a GUD will automatically be considered at the CUD level, and technologies not granted a CUD will automatically be considered at the PUD level.

For approved technologies, the manufacturer shall provide design standards and specifications and operations/maintenance specifications for the technology, consistent with the accepted research findings, to be posted on the Clearinghouse web site. The evaluators contracted by the DCR for PUD technologies or the technical advisor for CUD and GUD technologies will provide to DCR and the Clearinghouse Committee qualifying information about the technology to be posted on the Clearinghouse web site.

5 -- Use Level Designation Application

For efficient review of the application for a pilot use designation (PUD), conditional use designation (CUD), or general use designation (GUD), use the format described below. In addition to providing the information requested in this document, DCR, the Clearinghouse Committee, and/or other evaluators contracted by DCR may request additional information on a case-by-case basis.

- At a minimum, a **Pilot Use Designation** application *must* include:
    - Use Designation Application Form
    - Performance Claim
    - Theory/Technology Description
    - Technical Evaluation Report
    - Certification Statement

  Any additional information or data required for the **General Use Designation** will help support the PUD application.

- At a minimum, a **Conditional Use Designation** application *must include*:
    - Use Designation Application Form
    - Performance Claim
    - Theory/Technology Description
    - Technical Evaluation Report
    - Research Business Plan
    - Certification Statement

  Any additional information or data required for the **General Use Designation** will help support the CUD application.

- At a minimum, a **General Use Designation** application *must include*:
    - Use Designation Application Form
    - Performance Claim
    - Theory/Technology Description
    - Technical Evaluation Report
    - Certification Statement

5.1 -- Use Designation Application Form

Complete the use designation application form in Appendix A.

- Develop a title for the technology assessment project and use this title in all submittals associated with the project (e.g., QA Project Plan, Status Reports, Technical Evaluation Report).
- Be sure to check the desired designation level for which the technology is to be evaluated: Pilot Level Designation, Conditional Use Designation, or General Use Designation (See **Section 3 -- BMP Certification Designations**).
- If either the Pilot Level Designation or the Conditional Use Designation has been certified previously by Virginia DCR or certification has been granted in another state,

the applicant shall indicate that this designation has been achieved, along with the date of approval.

5.2 -- Performance Claim

The performance claim will be reviewed to evaluate use designation as well as to determine specific pollutants to be analyzed during field testing. Stormwater BMP technologies are typically evaluated for contaminant removal efficiency, although pollution prevention claims also are possible. Performance claims should be objective, quantifiable, ~~replicable~~, and defensible. Performance claims may be qualitative (e.g., advantages over other technologies, operations and maintenance, etc.) and/or quantitative (e.g., load reductions and removal efficiencies for specific pollutants or categories of pollutants). Because the Virginia stormwater management (SWM) regulations focus water quality compliance criteria on reduction of total phosphorus (TP), the DCR will be particularly interested in phosphorus reduction claims. Wherever possible, include information about anticipated performance in relation to climate, design storm, and/or site conditions. Claims that are overstated should be avoided, as they may not be achievable.

The performance claim should include the following descriptions:

- List of pollutant constituents that will be used to evaluate performance.
- Reduction of pollutants from stormwater runoff and what those reductions are based upon (i.e., reduction of the event mean concentration (EMC) through the device's treatment processes, reduction of runoff volume, a combination of both, etc.). See Appendix B [A in TAPE—minus Method #4] for calculation methods. –
- The conditions under which those reductions were achieved; e.g., the specific influent and effluent concentrations of pollutants in tests (mean/median/range), the particle size distribution of sediments in tests (entire distribution, specify D_{50}), the flow volumes treated versus volumes that by-passed the device, etc.
- Application limitations of technology if known to exist.
- Uses of the technology (pretreatment, retrofit, stand alone)
- The basis for sizing of the technology (e.g. hydraulic loading at a specific head, concentration of influent, etc.).

An example of a stormwater treatment BMP performance claim could be:

> "The Model X system can be used as basic treatment of stormwater runoff from commercial sites. It can capture and treat the first half-inch of a 24-hour storm from a 10-acre contributing drainage area. Under these conditions, a total suspended solid (TSS) removal rate of 85%± 5% (at a 90% confidence level) can be achieved with inflow TSS concentrations greater than 100 mg/l for a particle size distribution of XX – XX."

5.3 -- Theory/Technology Description

The description should ensure that the reader can understand completely how the technology works. Use level designation applications should contain as many of the elements from the list below as applicable. At a minimum, all topic headings should be addressed. The standard and specifications information for non-proprietary, post-construction BMPs listed on the Virginia Stormwater BMP Clearinghouse Web site can be used as examples for the types of information to provide and the format to use in presenting the information (www.vwrrc.vt.edu/swc).

Begin this section by listing the title of the practice and include a photograph of the BMP.

5.3.1 -- Description of Practice

Provide a detailed description of how the device works and include the purpose of the BMP:

- Summarize the underlying scientific and engineering principles for the technology. Describe the physical, chemical, or biological treatment processes ~~such as filtration, adsorption/absorption, settling, or inertial separation that may be involved in the treatment process.~~
- Describe significant modifications and technical advancements in the technology design.
- Include details on the relevant treatment mechanisms such as those in Table 1:

Table 1. Measurements to describe for various BMP mechanisms.

Mechanism	Measurement
Exchange Capacity (dissolved nutrients)	Each medium's anion or cation exchange capacity.
Adsorption (dissolved nutrients or metals)	Each target pollutant's adsorption isotherms (capturing typical range of stormwater pollutant concentrations).
Hydrocarbon Sorption	Capacity -- Pollutant mass absorbed or adsorbed per mass (mass/mass). Absorbent type -- Each medium's percent organic matter or organic carbon.
Gravity Separation	Detention time, length to width ratio, hydraulic loading rate for design flow, removal efficiency versus flow rate, particle size distribution, and specific gravity for each system type or size.
Filtration	Filter media grain size distribution, clean media hydraulic conductivity, hydraulic conductivity versus sediment loading (provide sediment grain size distribution and dry density used in analysis), provide typical and maximum operational hydraulic gradient.
Biological	Describe target pollutant's specific degradation mechanisms and estimated half-life versus temperature, provide estimated stormwater contact time (or detention time) for design flow, and provide target pollutant's estimated treatment efficiency versus flow rate.

5.3.2 -- Performance Criteria

List the expected treatment performance capabilities. Describe the following information:

- Advantages of the technology compared to conventional stormwater systems providing comparable stormwater control.
- Secondary impacts.

5.3.3 -- Practice Applications and Feasibility **(Possibly combine with 5.3.8)**

- Site Installation Requirements -- Factors to consider include: contributing drainage area, available space needed, site topography requirements, available hydraulic head, hydraulic capacity, depth to water table, proximity of underground utilities, overhead wires, setbacks from buildings, hotspot land uses, vehicle loading.
- Technology limitations, such as performance limits for control of certain water quality parameters,
- Disadvantages of installing the BMP, such as physical constraints and limitations, weight and buoyancy, transportability, durability, energy requirements, and consumable materials.
- Predicted impacts from construction, operation, and maintenance of the technology.

5.3.4 -- Community and Environmental Considerations

This section should include any possible community or environmental concerns and should address safety risks and liability issues, local codes, winter operation, mosquitoes, aesthetics, etc.

5.3.5 -- Design Applications and Variations

Describe any alternative technology configurations. Include a generic remediation action plan that specifies what actions will be taken by the proponent if the device is found to perform at a substandard level. (Alternatively, this could be a separate section).

5.3.6 -- Sizing ~~and Testing~~ Guidance (Possible combine 5.3.6, 5.3.7, and 5.3.9)

Provide a detailed description of the overall sizing methodology. Include a discussion of technology hydraulics and system sizing to meet performance standards and goals (e.g., to handle the water quality volume, rate of runoff, type of storm, or recharge requirements). When applicable, include the structural design, hydraulic design, soil infiltration rate testing, etc.

5.3.7 -- Design Criteria

Describe the following information --

- Siting and design specifications to achieve stated performance, include:
  - Pollutants that should and could be addressed;
  - Pollutants that will not be addressed;
  - Pollutants that may be increased;
  - Range of operating conditions for the technology, including minimal, maximal, and optimal influent conditions to achieve the performance goals and standards, and for reliability of the technology;
  - Description of bypass process; and
  - Description of pretreatment and preconditioning of stormwater, if appropriate to achieve stated performance of the BMP.
- Physical description of each treatment system component:
  - Engineering plans/diagrams showing each of the functional components;
  - Equipment dimensions; and
  - Description of each component's capacity.

Divide this section into specific subsections that adequately describe the design criteria. The use of tables can be helpful to convey information.

5.3.8 -- Regional and Climate Design Adaptations

Explain site installation requirements, such as necessary siting location, soil characteristics, hydraulic grade requirements, depth to groundwater limitations, utility requirements, as well as land use and land activity limitations or restrictions. When applicable, this section should address special instructions or limitations to installing the BMP within karst terrain, steep terrain, flat terrain, clay soils, sandy soils, sites with shallow water tables, linear highway sites, etc. Also address any considerations for installing the BMP in cold climates, including expected winter performance, etc.

5.3.9 -- Typical Graphic Details

Show standard drawings, including a schematic of the technology and a process flow diagram. Photographs may also be useful.

5.3.10 -- Material Specifications

When applicable, include a table that lists each construction material. For non-proprietary and patented materials, include specifications. Include raw material specifications for all non-proprietary treatment media.

5.3.11 -- Construction Sequence and Inspection

List the steps to construction in chronological order. Begin with protection during site construction.

5.3.12 -- Operation and Maintenance

Describe special operation instructions and maintenance needed to sustain performance, include:

- Preventative maintenance procedures to be implemented during the course of the field test as well as long-term maintenance;
- Personnel, supplies, replacement materials and/or parts availability (e.g., filter media) and equipment needed to operate and maintain the facility;
- Recommended maintenance schedule;
- Maintenance checklist;
- Access ports and dimensions provided to facilitate maintenance;
- Generation, handling, removal, and disposal of discharges, emissions, and waste byproducts in terms of mass balance, maintenance requirements, and cost;
- Special licensing or hauling requirements, safety issues, and access requirements associated with operation or maintenance of the technology; and
- Projected operational and maintenance (O&M) costs.

5.3.13 -- References

List any sources of published information, including web sites, cited in the theory/technology description section. List sources alphabetically. Follow the formatting used for the following citation examples:

ASTM International. 2006. Standard Guide for Selection, Installation and Maintenance of Plants for Green Roof Systems. Standard E2400-06. ASTM International, West Conshohocken, PA, Available online: http://www.astm.org/Standards/E2400.htm (accessed October 22, 2008).

Gowland, D. and T. Younos. 2008. Feasibility of Rainwater Harvesting BMP for Stormwater Management. Special Report SR38-2008. Virginia Water Resources Research Center, Blacksburg, VA. Available online: http://www.vwrrc.vt.edu/special_reports.html (accessed October 22, 2008).

Schueler, T. 2008. Technical Support for the Baywide Runoff Reduction Method. Chesapeake Stormwater Network, Baltimore, MD. Available online: www.chesapeakestormwater.net (accessed October 22, 2008).

Schueler, T., D. Hirschman, M. Novotney and J. Zielinski. 2007. Urban Stormwater Retrofit Practices Manual 3: Urban Subwatershed Restoration Manual Series. Center for Watershed Protection, Ellicott City, MD. Available online: http://www.cwp.org/Store/usrm.htm (accessed October 22, 2008).

5.3.14 -- Appendices

Include any additional information requested by the evaluators in appendices.

5.4 -- Technical Evaluation Report

A Technical Evaluation Report (TER) should be submitted as part of the application once laboratory and/or field testing have been completed. A TER is required for technologies seeking a PUD, CUD or GUD certification. Information about developing the TER is described in **Section 8 -- Technical Evaluation Report.**

5.5 -- Research Business Plan

The financial proponent (i.e., the company or organization that is providing the financial backing of the technology) must demonstrate the financial ability to complete performance testing. **If a proponent cannot demonstrate that sufficient funding is available to complete testing of the technology, the application should NOT be submitted.**

The purpose of the research business plan is to demonstrate the financial ability to complete performance testing. This section must be completed by proponents of technologies seeking the **Conditional Use Designation** because the proponents of these technologies acknowledge that performance testing is necessary. This section is not required of proponents seeking a **General Use Designation** if performance testing has been completed. The proponent of a technology seeking a GUD, however, should complete this section if the proponent believes the evaluators may request additional performance testing.

Financial proponents submitting a research business plan as part of the use designation application package could include the following information:

- **Description of Financial Proponent** – Provide the proponent's registered name; brief history of the organization; mission, vision, and/or goals; and the business structure.
- **People** – Give a brief description of founders, owners, key managers, and/or board members and provide qualifications of key personnel and their contact information.
- **Statement of Intent** – The financial proponent should provide a statement of intent to finance the performance testing. Supplement the statement of intent with any letters of commitment from third-parties helping with the performance testing, e.g., property owners, engineers, laboratories, etc. If possible, provide copies of any contracts and scopes of work with third-party entities.

5.6 -- Certification

Include both the signature of a company representative and date of certification. Use the following certification statement:

> "I certify that all information submitted is true and correct. The information was accumulated using approved methods specified in the Virginia Technology Assessment Protocol, unless otherwise noted. I understand that any misrepresentation or misuse of information will result in immediate denial of the technology being demonstrated and may prohibit me or the company I represent from seeking future approvals."

Appendix A

Use Designation Application Form
For Manufactured Treatment Devices

JW Comment: Intend to update application based on “Proprietary BMP Performance Verification Checklist” developed by Center for Watershed Protection.

Complete the following form for each technology seeking a use designation certification in Virginia and submit an electronic version and four print copies of the completed form as part of the application package. Insert additional columns and rows as needed.

Project Title _____

Technology Name _____ Date _____

1. Desired Designation Level

☐ Pilot Use ☐ Conditional Use ☐ General Use

2. Contact Information

Proponent Name (e.g., Company Name) _____
Company Address (Street, City, State, Zip) _____
Contact Name (to whom questions should be addressed) _____
Address (Street, City, Sate, Zip) _____
Phone Number _____
Fax Number _____
E-mail Address _____

(If applicable)

Technical Advisor Name _____
Address (Street, City, State, Zip) _____
Phone Number _____
Fax Number _____
E-mail Address _____

3. Function
(e.g., control hydrodynamics, TSS, TP, TN) _____

4. Technology Category

☐ Manufactured ☐ Structural ☐ Non-Structural

BMP Type
(e.g., hydrodynamic separator, filter, etc.) _____

5. Previous Certifications for this Technology

Virginia Certification ☐ PUD - Date _____ ☐ CUD - Date _____

Other Certifications: State _____ Certification _____ Date _____
State _____ Certification _____ Date _____

6. Interim/Pending Certifications in Other States for this Technology

State _____ Desired Certification _____
State _____ Desired Certification _____

7. Notes or Comments (if applicable):

Appendix B

Treatment Efficiency Calculation Methods

From Tape (Appendix A) – Include?

Treatment Efficiency Calculation Methods

Calculate several efficiencies, as applicable. Consider lag time and steady-state conditions to calculate loads or concentrations of effluents that represent the same hydraulic mass as the influent. State the applicable performance standard on the table or graph.

For technologies sized for long residence times (hours versus minutes), the proponent must consider cumulative performance of several storms – wet season or annual time periods. For short residence times (several minutes), Ecology recommends event mean comparisons. For discrete short-time step residence times (few minutes), the proponent should consider lag times for influent/effluent comparisons.

Method #1: Individual storm reduction in pollutant concentration.

The reduction in pollutant concentration during each individual storm calculated as:

$$\frac{100[A - B]}{A}$$

Where: A = flow-weighted influent concentration;
B = flow-weighted effluent concentration

Method #2: Aggregate pollutant loading reduction.

Calculate the aggregate pollutant loading removal for all storms sampled as follows:

$$\frac{100[A - B]}{A}$$

Where: A = (Storm 1 influent concentration) x (Storm 1 volume) + (Storm 2 influent concentration) x (Storm 2 volume) +… (Storm N influent concentration) x (Storm N volume)

B = (Storm 1 Effluent concentration) x (Storm 1 volume) + (Storm 2 effluent concentration) +…(Storm N effluent concentration) x (Storm N volume)

Concentrations are flow-weighted and flow = average storm flow or total storm volume

Method #3: Individual storm reduction in pollutant loading.

$$\frac{100[A - B]}{A}$$

Where: A = (Storm 1 influent concentration) x (Storm 1 volume)
B = (Storm 1 effluent concentration) x (Storm 1 volume)

Appendix B

Summarized Comments from the
Research Protocol Subcommittee Meetings
Regarding VTAP

The following represents a compilation, to the extent practicable, of written comments received through the BMP Performance Verification Protocols Subcommittee of the BMP Clearinghouse Committee. It should be noted that some input was provided in the form of extensive edits and re-writes of the DRAFT Technology Acceptance Protocol (VTAP). These edits are not necessarily reflected as they are too detailed to reproduce. However, every effort was made to capture the essence of the input.

Draft October 29, 2008 version:

Section 2 – BMP Performance Goals

1. Should add Runoff Peak Rate Control: Some vendors have a product that creates a hydraulic control through a vortex action. It allows a larger orifice to be used but still restricts the flow without as great a potential for clogging. Also, there are versions of optimizer type detention products that minimize the detention by maximizing the available hydraulic head immediately upon runoff entering the system. There needs to be guidance on where these types of devices can and can't be used.

Section 2.2.1 Total Phosphorus Treatment

2. Discussion of treatment levels: the TP performance in the current regulations is a range. Different BMPs are rated differently based on capabilities: varying degrees of performance based on load removal, or volume reduction. Technologies should likewise be awarded a performance comparable to what can be achieved; not a set number such as "A technology must demonstrate 50% reduction in TP".

3. The field testing performance benchmark for TP is extremely difficult, complex, and subjective based on analytical capabilities and variability in stormwater. Several comments focused on the use of TSS performance serving as a surrogate for TP. In that light, one commenter asked: What, if any, value will VA place on an approval for 80% TSS in the NJ and WA? Does having gone through either of those programs (assuming a WA approval can be transferred in terms of sizing), at the expense of both time and money, provide a vendor any additional value.

4. Therefore, critical questions to be addressed:

    a. Is a surrogate (TSS) performance acceptable for Conditional use? (The issue becomes less critical if the number of installations for CUD technologies is limited to a set number that is within the tolerance of "discovery".
    b. If a surrogate performance is acceptable, can it be:
        i. A laboratory test demonstrating 80% removal of sil-co-sil 106 (not sure how this is different from a PUD);
        ii. Field testing demonstrating 80% removal of a TSS; or
        iii. NJCAT/NJDEP; TAPE Certified field data demonstrating 80% removal of a TSS and system longevity.

c. Depending on the answer to (b) above: is there a sliding scale for the number of installations that would be granted while the vendor continues to pursue TP performance?

5. There was no specific discussion of TP credit for non filtration technologies such as hydrodynamic devices or catch basin inserts that would likely not achieve 80% TSS of sil-co-sil 106 in the lab, and thus very unlikely to achieve 80% TSS in the field. Studies demonstrate highly variable performance based on the site: NC State has published data that shows negative performance (even though systems were cleaned out multiple times during the study), while others have published surprisingly good data from sites where the load consisted on heavy sands. Several comments refer to pre-treatment credit (see below) and the possibility for a similarly reduced TP credit of 10 to 20% based on the ability to remove some level of sediment.

Section 2.2.3 Oil Treatment

6. The use of "no visible sheen" as a performance benchmark: a sheen is possible with concentrations as low as 10 ppm, conflicting with the numeric standard of this section. Is there an influent standard (i.e.: < 60 mg/l) Most technologies will not be able to meet the standard if the influent is higher than 60.

Section 2.3 Stormwater Runoff Pre-Treatment

7. There is currently no standard for pre-treatment performance. Will the protocol deal with pre-treatment devices the same as primary treatment: PUD, CUD, GUD? Can any device be considered for pre-treatment? If so, it should be stated: "a device not able to achieve 80% TSS and at least xx%TP removal, still can obtain PUD, CUD or GUD approval and function as an effective pre-treatment device."

8. Similarly, will pre-treatment be considered with a performance standard (% removal of sediment) in the proposed technical criteria (Part II) and calculation formula's, or will there be a performance standard required for demonstrating effectiveness, and then technologies or practices (forebays, etc.) simply be designated as an acceptable component of the required BMP "system". Suggest referencing types of BMPs, specifically infiltration and filtration BMPs, where pre-treatment should be a minimum criterion.

Section 3.1 Pilot; and 3.2 Conditional Use Designations

9. Both of these Use Designations include language that encourages local governments to require vendors to provide a performance guarantee stating that PUD facilities will be retrofit or upgraded as necessary, to the maximum extent practical, to ensure compliance with the Virginia Stormwater Management Regulations. This should be eliminated in both designations as it will discourage use of the program. As an alternative:
    a. The acceptance into the program and subsequent use on a project should not place the owner in jeopardy of non-compliance with VSMP Permit.

b. All product applications should include remedial action plans that identify what actions can be taken to improve performance. You don't want over sized systems being tested, but since most viable products are filters, there can be various modifications: design flow rate, filter media, filter surface area, etc.
c. The number of installations of the PUD should be limited to a number that acknowledges an acceptable liability if the technology fails to perform.
d. The criteria for CUD should be very rigorous in order to ensure adequate performance (in terms of TSS since TSS is the clogging/performance limiting parameter) and longevity, thus limiting the potential liability for non-performance. Again, the number of installations should be established based on the confidence in acceptable performance and longevity (which is a function of the criteria for acceptance as a CUD technology - # 3 above).

10. Should "require" vendors and localities to notify Clearinghouse of candidate technology installations. This is part of the need for effective communication and strong management of the process in order to pull a quick trigger for lack of compliance with the program rules: timeline for initiating testing, regular Quarterly Performance Summaries (QPS), etc. Lack of reporting of progress should be considered a 2 strike issue: 1= warning, 2= cancel designation.

11. Numerous comments about how a technology would be considered if demoted during application review from a CUD to a PUD. Suggestions include a tiered application fee schedule that allows for initial review and designation, and a second fee based on which designation is considered appropriate (based on increased complexity going from PUD to a GUD).

Section 3.1 Pilot; 3.2 Conditional; and 3.3 General Use Designations

12. Recommend requiring only 1 field test (not 3 – 1 in each physiographic region). The cost per TARP level field study ranges from $100,000 to $300,000 (depending on who you ask). A requirement of 3 field studies is not sustainable. Differing physiographic regions will not significantly drive results. If alternate test conditions are of interest, using laboratory conditions to evaluate different PSDs is recommended, not the high cost of additional field studies.

OR

13. Possibly consider a continuation of testing since TP performance should not be established on 1 site with 1 set of data (15 storms – or whatever the final number is determined to be). TP performance data will be extremely variable, and a large data pool over several seasons, on potentially several types of sites is necessary in order to establish real statistical confidence. Consider the NC model – "encouraging" results in the initial testing allows additional installations, along with a requirement for continued testing. This can get expensive, but there is likely going to be a need to test traditional BMPs as well since overall SWM program effectiveness is being questioned.

14. The range and characteristics of the data needs to be considered in order to ensure that data represents typical conditions. The testing goals should bracket performance to eliminate data collected through abnormal conditions, such as very high influent sediment loads: average > 300 mg/L; very coarse particles average > 100 microns (or agreed upon number); very high influent TP levels non-typical of stormwater, etc. These are the things that would "falsify a field study", not soil types and topography. (1)

15. All products of any designation should have a specific maintenance provision, possibly including a pre-purchased maintenance contract with an acceptable contractor (or the vendor).

4 – Assessment Process

16. This section should include a simple timeline and step by step description of the process. Utilizing the quarterly meeting schedule of the full committee, a chronology of events along with the anticipated fee triggers would help establish the basic framework and capacities of the process.

17. One commenter provided a timeline flow chart that addresses the timeline for any designation by creating a tiered QAPP submittal process:
    a. 6 months from the Use Designation to submit a Product specific QAPP. This is a QAPP that reflects any particulars of the specific technology that would influence how a sampling protocol would be implemented (sheet flow vs pipe flow, etc.).
    b. 90 days from the technology being listed on a VSMP Construction Gen. Permit Registration Statement to submit a Project specific QAPP. This would identify particular site specific issues that may influence sampling different from the standard or generic sampling protocol.
    c. No deadline for submitting a Site specific QAPP. This would reflect preliminary hydrology (rainfall/runoff) and hydraulic (pipe flow, lag time, etc.) monitoring that is necessary in order to effectively set up a monitoring plan. The Site specific QAPP should be required before monitoring begins. Monitoring can't start until the site is stabilized. The initial hydrology & hydraulic monitoring can begin earlier, resulting in the site specific QAPP.
    d. Regular Quarterly Progress Reports (QPRs) help keep vendor and DCR on track and on the same page. Quarterly Performance Summaries (QPSs) keep track of performance and provide early warning of problems.
    e. Reasonable progress towards monitoring must be demonstrated within 24 months of Use Designation, or explanation through QPRs should provide ample documentation of effort. Lack of progress should not be a surprise at 24 months.

4.3.1 – Pilot Use Designation Assessment Timeline

18. One comment indicated a maximum review time of 1 month (admittedly requiring dedicated staff/resources to accomplish) for PUD, while others utilized the quarterly schedule of committee meetings (90 days) to frame a Clearinghouse contracted review, a Committee meeting discussion, and recommendation to DCR.

19. Comments expressed concern over the requirement to start testing within 12 months of QAPP approval. Recommended 18 to 24 months.
20. Several comments recommended different methods of extending approval timelines for starting testing. Recommended a process to grant extensions or allow for delays based on circumstances out of vendors control.

4.3.2 – Conditional Use Designation Assessment Timeline

21. Similar comments as PUD - referencing timeline: 9 to 12 months (instead of 6) for a QAPP after the use designation. Similarly, 18 to 24 months to commence testing.
22. In response to a DCR question re: time for reviews, one commenter noted that the use of the clearinghouse committee meeting schedule is too long. Recommended an electronic review versus meetings and keep reviews to 3 months maximum. Commenter went on to note that TAPE has effectively disbanded due to attrition, and that VDCR should ensure adequate funding and resources to prevent this from happening. Commenter also noted that NJCAT generally performs reviews within 3 months with far less resources than the full Clearinghouse Committee.

4.4 – Approving QA Project Plan

23. Comments regarding time line for review: Commenter believes 1 month is sufficient for QAPP review (instead of 3).

4.5 – Requirements of performance testing

24. Comments re: 3 studies per physiographic regions. Recommend 1. Physiographic region is not the key variable since most sites are impervious (vs ESC practices where sediment characteristics are very important).

5.2 – Performance Claim

25. Comment referring to the use of statistics included in Draft Appendix B: The TAPE protocol only recommends the use of non-parametric statistics. Important to note that parametric statistics (specifically 95% confidence limits) have provided a better format for analyzing performance claims (see NJCAT/NJDEP recommendations). Also utilize graphical representation of the data to make it easier for those members of a committee that are not statistical experts (performance expectation function is a great example). Recommend using all three – non-parametric, and parametric (with 95% confidence limits) statistics, and graphical representation.

26. Note that coefficient of variation should only be used in estimating the sample population requirements in developing the QAPP (pre-monitoring). Neither the TAPE nor Tier II protocol accurately describe the appropriate use of this statistical tool. This has been a real challenge to get resolved once it has been published.

27. Commenter recommends using full PSD test data, not just the average, mean, and range.

5.3.1 – Description of Practice

28. Table 1: Cation and Anion exchange can be combined as “exchange capacity”.

29. Table 1: Adsorption and Absorption can be combined as “Hydrocarbon sorption”.

30. Table 1: “Vortexing” separation or “Vortex” in general should be eliminated as it is misleading. Stormwater baffle box swirly gig screen contraptions operate on gravity settling only for sediment, and screening based on aperture size for trash.

5.3.3 – Practice Applications and Feasibility; 5.3.8 – Regional and Climate Design Adaptations

31. Sections 5.33 and 5.38 can be combined.