Virginia Stormwater BMP Clearinghouse Committee Meeting

Date: June 12, 2008
Location: Odum Room, Clark Hall, University of Virginia
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
Scott Crafton (substitute Committee Chairperson for Lee Hill), Virginia Department of Conservation and Recreation
Joseph G. Battiata, Contech Stormwater Solutions Inc.
Larry Coffman, Filterra
Gregory Johnson, Patton Harris Rust & Associates
Mary E. Johnson, Thomas Jefferson Soil and Water Conservation District
Steve Kindy (substitute for Roy Mills), Virginia Department of Transportation, Location & Design Division
Douglas H. Moseley III, GKY & Associates, Inc.
James S. Talian, City of Lynchburg
Kevin D. Young, Virginia Tech, Dept. Of Civil and Environmental Engineering

Virginia Stormwater BMP Clearinghouse Committee Members Not Present
Rishi Baral, County of Stafford, Planning Department, E & S Plan Review
Brian Benham, Virginia Tech, Department of Biological Systems Engineering
W. Douglas Beisch, Jr., Williamsburg Environmental Group, Inc.
Gary Boring, New River Highlands RC&D Council
Dean R. Bork, Virginia Tech, Department of Landscape Architecture
Joanna Curran, University of Virginia, Department of Environmental Engineering
Michael Gerel, Chesapeake Bay Foundation
David J. Hirschman, Center for Watershed Protection
Roy Mills, Virginia Department of Transportation, Location & Design Division
David B. Powers, Michael Baker Jr., Inc.
David W. Rundgren, New River Valley Planning District Commission
Randy Sewell, Vanasse Hangen Brustlin, Inc.
Scott J. Thomas, James City County Environmental Division

Virginia Department of Conservation and Recreation (DCR) Staff Present
Eric Capps
John McCutcheon

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

Others Present
Sean Darcy, Contech Stormwater Solutions Inc.
Tom Fitzpatrick, Hydro International
J.P. Morris, City of Lynchburg
Glen Payton, Filterra
Scott Perry, Imbrium Systems, Inc.
David Scott, Hydro International

Scott Crafton, DCR, called the meeting to order at 10:10 a.m. Everyone introduced herself or himself. There were no corrections or additions to the minutes of the Clearinghouse Committee meeting held March 13, 2008.

Jane Walker stated that since the March meeting, Tracey Sherman at VWRRC has made a few changes to the draft website. Tracey has updated the design to make it look more like a site for statewide access and not a program at Virginia Tech. The web contents will be created once Tracey receives updated documents related to stormwater regulations from DCR. Photos to be included on the website can be sent to Scott Crafton. Photos should be of good quality (in the range of 72-300 dpi). Also, as follow-up from the last meeting, anyone with information about localities developing new low impact development (LID) regulations are requested to send the information to Scott Crafton.

Research Protocol Subcommittee Meeting

Jane Walker provided a summary of the Research Protocol Subcommittee meeting held May 8, 2008 (Appendix A). In reference to the following statement under section 1-b, "DCR can call for the marketing to cease," one member asked if the group had discussed how this would work and who has the authority to do it. Scott Crafton replied that DCR has the authority under the Virginia Stormwater regulations to determine what BMPs will be approved for use in Virginia, but that the process has not been discussed. Scott Crafton envisions that calling a halt to the BMP marketing would occur on a case-by-case basis. Scott suggested that Virginia's guidance document should include general guidelines and procedures for how decisions will be made. Similarly, the same member suggested that the protocol document explain how and when DCR would limit the number of installations for products seeking conditional use designation (CUD) and asked how DCR would know how many had been installed and where they were installed. Scott Crafton and Eric Capps offered that DCR would know how many and where the BMPs are being installed because of the requirements of the permits. Quarterly reports with monitoring data are expected for the products being tested, and through these reports, DCR will be able to see if there are trends that warrant the loss of the product's CUD status. Another member offered that DCR would want to limit the number of installations for products that have undergone limited lab or field testing. It was offered that these untested products would receive a pilot level designation (PLD). In summary, Virginia needs to clearly define the process but still allow for flexibility.

It was clarified that the described process would apply to all BMPs and not only to manufactured BMPs. Only manufactured devices that have gone through the process and have been classified as a PLD, CUD, or general use designation (GUD) will be listed on the Clearinghouse web site

within its designated classification level. A member asked who will maintain the website. Scott Crafton replied that the VWRRC will maintain it at first, and DCR may maintain it in the long run.

Scott Crafton also clarified that the role of the Clearinghouse Committee would be to make recommendations to DCR and the Virginia Soil and Water Conservation Board. The Board and DCR through delegation by the Board are the entities that have the authority in the *Code of Virginia* to approve technologies for use.

Presentation:

Sean Darcy, Pacific Northwest Regulatory Manager for Contech Stormwater Solutions, Inc., gave a presentation. Sean has seven years of experience and has played a major role as the first manufacturer to go through the TAPE and TARP/Tier II evaluation process (in Washington and New Jersey respectively). Sean is familiar with the guidance documents and regulatory framework for both states. The Washington State Department of Ecology (Ecology) worked with a Technical Review Committee (TRC) to develop *Technology Assessment Protocol–Ecology* (TAPE), a guidance document for evaluating emerging stormwater treatment technologies. The New Jersey Department of Environmental Protection (NJDEP) has endorsed the Technology Acceptance Reciprocity Partnership (TARP) Tier II protocol, a protocol for stormwater BMP demonstrations. In the first part of Sean's presentation, he chronicled the history of the TAPE and TARP processes and used this history to explain why each state has chosen the path it has taken. In the second part of his presentation, he gave advice on how Virginia might want to streamline the evaluation process.

Sean described the TAPE and TARP methods from the perspective of his own acronym – "TEASE" – which stands for *technical expertise, accountability, stability, and evergreen*. Sean stressed the need to include different people in the evaluation process with different kinds of expertise: applicants, regulators, generalists, and experts in the fields of physical hydrology, chemistry, biology, and monitoring. He also stressed the need for clear and concise monitoring objectives.

Sean explained that New Jersey and Washington evaluate stormwater technologies using two different approaches but their approaches converge at the decision-making process. New Jersey has very stringent water quality regulations. Washington has comparatively weak water quality regulations but provides extensive guidance (through BMP manuals) that is enforced in the permitting process. Both states rely to some extent on a technical review committee. Sean offered historical summaries of the establishment of the current approval processes for both Washington and New Jersey.

Washington's Process:
Washington's process requires that manufactures use the TAPE guidance manual to demonstrate equivalency to the performance goals in the BMP Manual. Washington's TAPE is not a legal document (it is simply a guidance document), however, manufacturers must follow the guidance to meet local permit requirements.

The stormwater BMP evaluation process relies upon Washington's Technical Review Committee (TRC), made up of representatives from Ecology and local municipalities. The TRC reviews applications, quality assurance project plans (QAPPs), and the required Technology Evaluation Engineering Report.

Lessons Learned from Washington's Process:

- Sean offered that accurately and concisely defining the goals of the removal treatment is important. He cited the Ecology guidance document for its definition of total suspended solids (TSS) as an excellent example to follow. It provides expected effluent levels depending on the influent concentration and has a defined analytical method. In contrast, TAPE's definition for soluble metals is poor, providing only a concentration range and a general goal statement: "significantly better than basic treatment" (no definition of basic treatment goals is given for soluble metals).
- Washington has three classifications: pilot level designation (PLD), conditional use designation (CUD), and general use designation (GUD) (Virginia's Research Protocol Subcommittee is proposing that Virginia establish the same classifications). Washington limits the number of installations depending on the BMP classification. For example, pilot level BMPs can be used in no more than five projects (with multiple devices allowed within each project). BMPs with the conditional use designation can be incorporated in no more than ten projects. Sean suggested that Virginia consider setting benchmarks and rewarding manufacturers that meet the benchmarks, rather than setting rigid limits on the number of installations. For example, a manufacturer could initially be limited to installing a particular CUD BMP device at 10 projects and extend the number of installations to 20 if the monitoring progress reports indicate that the product is working.
- Sean offered that detailing the data quality objectives is most important. He suggested that Virginia consider specifying the storm event criteria (e.g., antecedent times, the minimum number of individual samples to be collected, storm depth, storm duration, storm event coverage, etc.) and the completion objectives (range of the number of storm events, seasonal information, peak operating rate, bypass conditions, etc.)
- Sean explained that Washington has been challenged with a lack of funding and staff turnover within Ecology. Unfortunately, Ecology's staff turnover has corresponded with a change in the leadership of the TRC, so continuity has been a challenge. New interpretations of the TAPE guidance document, pertaining to the history associated with the key criteria, have accompanied these turnovers. These combined changes have hurt the stability and continuity of the program.

<u>New Jersey's Process</u>:

In New Jersey, the design and description for the proper use of BMPs are embedded within the stormwater regulations. A BMP handbook was finalized several months after the regulations were approved. The handbook specifies how BMPs are to meet the regulations. In New Jersey, the New Jersey Corporation for Advanced Technology (NJCAT) is authorized by law to participate in the process in the singular role of verifying the performance claims of manufactured treatment technologies (BMPs). NJCAT considers the data quality objectives, completion objectives, protocol, and performance claim and decides whether or not the performance claim has been satisfied. NJCAT posts the verification for public review and

comment, and if mistakes are identified, the mistakes can be corrected before the product is certified. Following verification, NJDEP either certifies or does not certify the BMP based on the performance claim verification by NJCAT and NJDEP's internal review.

Lessons Learned from New Jersey's Process:

- NJCAT verifies the performance claim, which is published prior to the certification by NJDEP. Sean suggested that Virginia follow this example and furthermore recommended that Virginia establish a 30-day public review period as a part of its checks and balances.
- New Jersey published procedures to follow after several manufacturers had been through the process. Sean suggested that Virginia establish acceptable lab and field protocols before starting the process.
- Because NJCAT is accountable for its verification role, it has been a consistent entity within the program. Even though NJDEP has undergone staff changes, the stability provided by NJCAT has buffered these changes.
- NJCAT is self-sufficient with regards to funding, with the manufacturers paying fees to support the program. Sean suggested that Virginia's review process also be self-sufficient.

Georgia's Process:
Sean briefly described a third program being developed in Georgia called the Georgia Technology Assessment Protocol (GTAP). GTAP plans to utilize and combine the Washington and New Jersey approaches, similarly to Virginia. They have thus far developed a draft protocol and plan to post more information on its website:http://www.northgeorgiawater.com/html/331.htm.

Monitoring BMP Effectiveness
The second component of Sean Darcy's presentation included his advice for monitoring to determine BMP effectiveness. He offered that both applicants and regulators need to know their objectives and plan carefully to know their available resources, budget, and the benefits of what they are trying to accomplish before getting started.

Sean's experience has been that field data is much better than lab data for determining the performance of BMPs and understanding their long-term effectiveness. Understanding the hydraulics (designed operating rate vs. observed operating rate) and maintenance needs are vital to determining the longevity and the effectiveness of BMPs.

Because monitoring is expensive (equipment costs, consultant fees, analytical lab costs), it is imperative that the monitoring objectives be clear and concise. Clear and concise treatment goals are needed for each parameter. Guidance is needed for every step of the monitoring process: data collection, data management, data analysis, and reporting. All of these topics need to be covered in the quality assurance project plan (QAPP). Adequate guidance can increase data precision and accuracy, improve the efficiency in reviewing products, and reduce the total effort. It can also provide the reviewers better continuity between different monitoring studies.

Sean described several key elements of field monitoring: data quality objectives, data collection methods, data management, and data analysis.

a) Data quality objectives – Clear data quality objectives discriminates the qualified data for final analysis. Manufactures need to know what is considered a storm event and the number of storms that should be sampled. Having a wide range of storm intensities is probably the most critical variable to review. Manufacturers should provide information such as what are considered suspended solids and what is considered a representative particle size distribution.
b) Data Collection Methods – Manufacturers also need guidance on what methods to follow. Differences between procedures can lead to different results or information that differs from what is needed or expected. For example, some analytes can be collected with automated samplers while others may require grab samples. Manufacturers need to know the sample population requirements associated with these analytes and these methods prior to sample collection.
c) Site Selection – Manufacturer's need to know if testing is to be performed for specific soil types. For example, Sean stated that Virginia's has two general soil types, a sandy loam and silt loam. (NOTE: DCR disagrees with this generalization; Virginia actually has very diverse soils ranging from sands to clays.) It is important to also provide guidance for site selection. Should the site be on an industrial, commercial, residential or roadway site? Sean recommended focusing on commercial sites, rather than other land uses as the best indicators of BMP performance for statewide application.
d) Data Management – Sean offered that TAPE's single most important tool for understanding the data is its requirement for individual storm reports (record total precipitation, influent peak flow, effluent peak flow, bypass peak flow, total volume, influent volume, effluent volume, bypass volume, etc.). He recommended that DCR require the reporting of such data.
e) Data Analysis – Sean offered that guidance for how to analyze the data is needed. He stated that the TAPE and TARP documents do not cover this issue sufficiently. Manufacturers need to know if they can use parametric and/or non-parametric tests. One of the few parametric statistical tests is using Regression of the Event Mean Concentration (REMC). REMC provides 95% confidence levels, which are helpful with verifying expected vs. observed performance claims. Reporting of the summation of loads is standard, but relies on the use of non-parametric statistics (no 95% confidence levels). Summation of load also requires additional scrutiny, as a majority of the load may come from one or two storm events and thus can bias a data set. Sean recommended also looking at the Performance Expectation Function, which is a graphical representation of the data (Influent Concentration vs. Discrete Removal Efficiency with a performance benchmark; and influent concentration vs. effluent concentration with an effluent benchmark). In the end it may be necessary to use all of these methods and to use best professional judgment to both qualify storms and evaluate the data. The committee needs to evaluate all these aspects in addition to other factors, such as robustness of the BMP (longevity, peak/design operating rate, seasonal conditions, etc.), and these requirements and considerations should be consistent for all manufacturers.

Monitoring will result in lots of data that need to be compiled and condensed in reports to the regulatory agency. A summary of the storm data should be required, as should individual storm

reports. Requiring that the data be presented in a consistent format would be useful in streamlining the data examination process. Contech has developed its own type of summary tables for presenting data, and other manufacturers have likely developed their own tables. However, if everyone reports the data in the same manner, it would make the evaluation process more efficient. Summarizing the data and knowing how or what to report increases the efficiency of the review process. Setting benchmarks and requiring interim progress reports (i.e., semi-annual performance summary) are important indicators of whether or not progress is being made towards achieving the goals in the quality assurance project plan. The 2008 TAPE document update requires progress reports to help the manufacturers relate to the regulatory agency what is happening with the field evaluation process.

Sean explained the need for good communication and understanding. The process could unfold slowly. For example, it may take eight months to find an appropriate site to install a BMP. Monitoring for water quality does not take place until a site has "settled" (i.e., stabilized), which often takes six months. Even though water quality monitoring may not occur during the site stabilization period, milestones could be set for other information. Manufacturers could begin measuring flow data and establishing other information about the site. As noted above, Sean recommended that if the manufacturer is meeting its required milestones and thus making progress, they should be granted additional installations.

Based on past experiences with states struggling to obtain financial support, Sean recommends that Virginia's BMP evaluation process be funded by the manufacturers. He suggests that lower fees could be set for the PLD level. He envisions that the fees could occur incrementally. As a manufacturer reaches a milestone, there should be a fee to assist in the review of information. To address the problem of staff turnover, redundancy within the agency would be helpful. If one person leaves, another with appropriate experience would still be present to carry the program forward. Sean stressed the need for a multi-disciplinary approach and suggested a series of checks and balances be established.

Sean Darcy added that thus far, solids have been the main focus for most states. As Virginia and other states branch out into addressing phosphorus and other parameters, many new challenges will arise. Scott Crafton asked if any other states were considering using parameters other than TSS. New Jersey uses TSS as a surrogate for nutrients but is beginning to look into the use of total phosphorus and soluble phosphorus. One member suggested that because Virginia's regulations focus on phosphorus removal, the guidance should stay focused on this goal and objective for BMP performance. Scott Crafton stated that because other parameters are of interest to localities to meet TMDLs and other needs, the guidance should be flexible enough to include and address other parameters (in addition to TP) as well.

Scott Crafton offered that he is optimistic that Virginia will be able to get good help from academia. Sean Darcy cautioned that academia may not move quickly enough to meet the regulatory timelines. Thus far, the manufacturers have been the primary ones to come up with data in a timely manner.

Scott Crafton opened the floor for comments and experiences from other manufacturers present. Dave Scott with Hydro International offered that he has developed a presentation that highlights

the deficiencies of the process as he sees it. Dave offered that it might be more appropriate to give the presentation at a Research Protocol Subcommittee meeting. Scott Crafton suggested that it would probably be best to present at the next Clearinghouse Committee meeting, since most of the subcommittee members are from the Clearinghouse Committee, and it will be important for the full committee to hear what Dave has to say.

Stormwater Regulations Update

Scott Crafton explained that the plan is still for DCR to propose a final draft of revised stormwater regulations to the Virginia Soil and Water Conservation Board at its September 2008 meeting. He added that a new Technical Advisory Committee was formed that includes some of the old members and some new members with special expertise. Scott Crafton offered to provide a list of the people serving on the TAC to the Clearinghouse Committee members. Scott noted that the Clearinghouse web site needs to be up and running before the September 2008 Board meeting. At least a draft form of the BMP standards and specs section will need to be posted at that time.

Scott Crafton reported that five BMP design charrettes that focused on water quality aspects took place this spring. Approximately 250 people participated and provided excellent feedback and suggestions for refinement. Many expressed not being able to fully understand the practical implications of the worksheet until the water quantity criteria are addressed and included in the methodology. Based on the comments from the participants, the Center for Watershed Protection is developing a beta version of the worksheet that covers both water quality and quantity. The new worksheet will also have adjustments for treatment trains. Three workshops will be held from mid-July to mid-August. By the end of August, DCR should have sufficient feedback regarding the beta version of the spreadsheet methodology.

Scott Crafton reported that due to his work with the design charrettes and Clearinghouse Committee, he has not been working on the Stormwater BMP Handbook as much as he had planned. He has drafts for several chapters and parts of other chapters. The handbook will be posted on the DCR website and a link will be provided on the Clearinghouse website.

Other Items of Business

The next meeting is set for September 11, 2008 in the Charlottesville area.

With no further business, the meeting was adjourned.

Appendix A – Summary notes: Research Protocol Subcommittee Meeting -- May 8, 2008

Good representation from manufacturers

Discussed 3 topics:
1.) Virginia Protocol Document
2.) TARP/TAPE Comparison Table
3.) Documents being Developed by Center for Watershed Protection

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1.) Virginia Protocol Document
Goal: Develop a Virginia Protocol Document that will explain the Virginia process for manufacturers who want their stormwater BMP products approved for use in Virginia. Format the document so it is most useful for the people using the document.

Update: State of Washington revised its TAPE methods in January 2008 (after the Research Protocol Subcommittee had developed its comparison table). New TAPE protocol provides specific instructions for manufacturers.

Group Consensus: Use the revised 2008 TAPE protocol as a basis for Virginia's document and make sure that all the TARP elements are incorporated into the document.

Manufacturers voiced the following primary concerns about the testing process:

a.) **Accept lab testing** as an important component of determining the effectiveness of the product. *Response:* The current thinking for the Virginia document is that lab results are encouraged to get a product to the Conditional Use Designation (CUD) level. A field assessment would be needed to obtain a General Use Designation (GUD) level.

b.) Allow for ease in **marketing the product**; particularly of concern is the length of time that it takes for testing and expenses that incur to the manufacturers during the testing phase. *Response*: The group proposed allowing a two-year window when products at the CUD level would be tested and marketed simultaneously. Monitoring would occur only at selected sites (not all sites were BMP is installed). If undesirable trends became evident during the testing phase, DCR can call for the marketing to cease until the problem is found and fixed.

c.) Provide **flexibility** in the process for extenuating circumstances such as site variability. *Response*: The manufacturers would get to choose where to monitor. DCR is willing to provide extensions to the testing period for extenuating circumstances (e.g., not enough storms, etc.).

2.) TARP/TAPE Comparison Table
Discussed a list of questions developed by Scott Perry and Maita Pang of Imbrium Systems after they reviewed the TARP/TAPE comparison table with notes on the proposed Virginia document.

Several clarifications made:

- The Clearinghouse will cover all BMPs, including volume reduction. Volume reduction will not be a requirement for BMP performance (It's an enhanced BMP feature).

- In the marketing and testing period, the two-year period is to cover the time when data collection is taking place (and not site selection, BMP installation, and finding the third-party overseer).
- Terminology: "third-party" simply means an objective overseer. The oversight will be paid by the manufacturer and not by DCR, VWRRC, or the Clearinghouse Committee.

Several suggestions were made:

- More than one person should review the product, and the reviewers should come from both academics and practitioners that have direct experience and do not have outside influence.
- Equal and fair time-periods need to be established for all parties for evaluating research results and making recommendations
- It may be necessary for DCR to limit the number of installations for products seeking CUD, at least until sufficient data are collected to assess whether or not the BMP is effective.
- Virginia should specify a range of TP influent concentrations, with manufacturers then aiming to determine a percent removal as the BMP's performance.
- Use manufacturers' performance claims to establish "boundaries" for monitoring for a realistic range of hydrologic and pollutant loading conditions.
- Regarding sizing of the test facility, Virginia should allow a choice of several computation methods, as California does. If a vendor makes a claim about the device's sizing, the project plan should explain how to verify that claim. Models should be allowed to help develop the hydrologic picture of the system.
- Follow TAPE requirement to include individual storm reports (record total precipitation, influent peak flow, effluent peak flow, bypass peak flow, total volume, influent volume, effluent volume, bypass volume, etc.). If a system is undersized, it will be evident from such data.
- Virginia should accept data taken in other states, as long as the monitoring conditions (e.g., Type II rainfall, etc.) and objectives meet Virginia's specifications,

3.) Documents being Developed by Center for Watershed Protection

Presentation: Alexi Boado, CWP
Documents to be posted at www.cwp.org.
Suggestion: Clearinghouse web site should link to the documents

"Performance Verification Checklist" provides a series of questions to address when selecting a BMP. Designed for people using a particular product for the first time. The initial feedback from the group was very positive.

"Major Stormwater BMP Evaluation Protocols and Testing Bodies Table" provides background information concerning the larger entities: TARP, TAPE, NJCAT, ASCE BMP database, MASTEP

Funding is needed to modify/up-date documents in the future. Group offered several suggestions for possible sources of new funding (all manufacturers, specific manufacturers, ASTM, ASCE/EWRI)