

## Data Reporting Guidelines for Certification of Manufactured Stormwater BMPs

**CE Database:** Stormwater management, best management practice, performance characteristics, water quality, certification

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### Abstract

With the increasing need for the independent field testing of proprietary devices comes the importance of consistent data reporting guidelines to be used when reporting to regulatory agencies. The need for standardized reporting is underscored by the tremendous impact the range of factors can have upon testing results. These factors include the testing environment, experimental design, testing methodologies, statistical analysis, and data presentation. The need for the consistency is underscored by the complex influence these factors have upon performance results. A clear and consistent data reporting approach can ensure that these biases are minimized, well understood, and that representative field testing can be effectively evaluated by the regulatory agency. Data Reporting guidelines presented here were developed as part of the ASCE/EWRI Committee on Guidelines for Certification of Manufactured Stormwater BMPs.

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## ***Introduction***

The need for a strict coherent approach to the testing of manufactured stormwater BMPs is ever-increasing. Stormwater treatment products abound in the marketplace however currently there is limited information on system performance by third-party verification for consumers and stormwater managers to make informed decisions. There is some progress being made on this front in a few states but no recognized consensus in approach. To address this issue requires both prescriptive testing protocols for laboratory and field conditions as well as detailed reporting requirements.

The ASCE/EWRI Task Committee on Guidelines for Certification of Manufactured Stormwater BMPs was convened in 2007 and is comprised of a range of stakeholders from academics, industry, and regulatory communities. The subcommittee on Data Reporting is responsible for preparing the reporting guidelines by 2009 for the presentation of testing results such that they can be readily interpreted by the stormwater regulatory community.

The mission of effective data reporting is that a System Performance Evaluation Report shall present sufficient information ranging from summary data to detailed appendices of experimental data indicating whether systems have met the requisite performance standards within a reasonable level of statistical confidence. A critical review of leading testing protocols will be performed and used as the basis for these guidelines and improved as needed.

## ***Background***

Prescriptive testing protocols are needed because the range of influence upon testing and performance data is wide and not always well understood. Influences include watershed characteristics, storm event characteristics, maintenance, system sizing, and testing methodologies. A testing protocol that allows too much flexibility as to methods introduces biases that are challenging to account for at the least. The function of existing protocols is often to provide both a uniform testing environment and an accelerated review process that aids in the acceptance of stormwater technologies. Arguably the current protocols have had mixed success.

Furthermore, even if the testing protocol adequately addresses these issues the testing results must be presented in such a manner as to not require a committee of scientists to interpret. This last point is significant in that the staff of many regulatory agencies that will be reviewing the test results can not be expected to interpret the range of factors influencing system performance. As such, reporting results must require sufficient information ranging from the detailed appendices of experimental data, to summary data indicating whether systems have met the requisite performance standards within a reasonable level of statistical confidence.

The major technology protocols and reports that will be reviewed as part of this effort will include:

- TARP Tier II Guidance Document: Protocol for Stormwater Best Management Practice Demonstrations. (NJCAT, 2003).
- New Jersey Tier II Stormwater Test Requirements - Amendments To Tarp Tier II Protocol. (NJCAT, 2006).
- TARP (Technology Acceptance Reciprocity Partnership) Tier I Guidance Document. TARP. (2001).
- Edwards Aquifer Technical Guidance Manual. Texas Commission on Environmental Quality. (TXCEQ, 2005).

- ETV Verification Protocol Stormwater Source Area Treatment Technologies. US EPA Environmental Technology Verification Program, Washington DC. (USEPA, 2002).
- Technology Assessment Protocol- Ecology's (TAPE) by the State of Washington, Department of Ecology. (WADOE, 2002).
- Improved Protocol for Classification and Analysis of Stormwater-Borne Solids. Water Environment Research Foundation, Alexandria, Virginia. (WERF, 2007)
- Urban Stormwater BMP Performance Monitoring. (USEPA and ASCE 2002)

### ***Work Plan***

The subcommittee work plan is for year 1 to develop a consensus on a Reporting Framework by review of existing protocols, literature, and technology evaluation reports. The framework will be in the form of an annotated outline and sample mock-up. By year 2, reviews and comments again solicited from subcommittee based on whether additional information is required. Reviewers' comments will then be addressed. The draft Reporting Framework will then be circulated amongst full committee for sign off on reporting criteria. Final Data Reporting Guidelines to be completed by 2009 where full committee guidelines will be presented at the EWRI Annual Meeting.

### ***Reporting Framework***

1. Summary: Executive Summary, Study Summary, Data Collection Summary
2. Definitions
3. Site Conditions: land cover type, land use activities location, site conditions, site elevations and slopes, location of sampling equipment, location of on-site stormwater collection system, and a description of any upstream BMPs.
4. Technology Description:
  - a) The specific device used (model number, size).
  - b) functionality of treatment mechanisms including pretreatment and bypass
  - c) physical description: engineering plans, site installation requirements
  - d) sizing methodology.
  - e) maintenance procedures.
5. Test Methods and Procedures
  - a) Particle size, Mass based, Concentration based
  - b) Types and Locations of the tests, such as Field Test or Lab Test, Prototype Test or Model Test.
  - c) Measurement Accuracy for the observations
  - d) Measuring Instruments and Sampling Frequency
  - e) Sampling Locations and Peak Concentration Timing
6. Testing Condition:
  - a) Consecutive Storms
  - b) Single Storm
  - c) Extreme Cases of Storm after Extreme Dry day condition
  - d) Flow Conditions either Steady Constant Flow or Unsteady Flow
7. Testing Results:
  - a) Accumulated Mass Reductions

- b) Peak Concentration Reduction
  - c) Overall Average Concentration Reduction
  - d) Statistics: Statistic Regression analysis, Error and Confidence Levels
  - e) Data Descriptions by diagram and Analysis tables. Handling the contrary data.
  - f) Individual Storm Reports with event characteristics, system performance characteristics, monitoring details
  - g) Quality Assurance
8. Conclusions
  9. Limitations
  10. Appendices

### ***Conclusions***

Guidelines produced by the Data Reporting subcommittee will be completed over 2008. The reporting guidelines intentions are to facilitate a rapid review in such a manner that emerging technologies can be brought to market with the confidence of both third-party verification and regulatory approval. The challenge is to balance the complex science of technology verification with the need for thorough review and a clear presentation of results. For the next year this will be the task of the stakeholder representation for the subcommittee on Data Reporting.