Maintainability Evaluation Program for Stormwater Treatment Systems

John Lenth
Herrera Environmental Consultants
(206) 787-8265
jlenth@herrerainc.com

Business Plan, Test Facility, Test Protocol, Evaluation Protocol
Background

- 2002 – TAPE program established
- 2008 – Revised TAPE protocol
- 2011 – Revised TAPE protocol *

* Revised TAPE protocol did not address maintainability issues despite concerns expressed by the Stakeholders Advisory Group (SAG)
2011 TAPE protocol

- Applicant must provide available data on O&M requirements
- Testing must evaluate bypass frequency if possible
  - Verify sizing correct
  - Verify applicants claims regarding maintenance
- Accumulated sediment sampling where feasible
Background

- 2011 TAPE protocol
  - No evaluation of maintenance and life-cycle costs
  - No evaluation of required level of effort for maintenance
Maintainability Evaluation Program for Stormwater Treatment Systems

Program Goals

- Identify meaningful maintainability metrics for stormwater treatment technologies
- Establish objective testing and evaluation protocols
- Provide applicants with credible third-party for verifying of maintainability
- Disseminate results from testing
- Coordinate efforts with TAPE testing
Maintainability Evaluation Program for Stormwater Treatment Systems

Project components

1. Develop business plan to ensure the long-term viability of the program
2. Design test facility
3. Develop protocols for testing
4. Develop evaluation protocol
Maintainability Evaluation Program for Stormwater Treatment Systems

- Stakeholder Involvement
  - ODOT
  - Clean Water Services
  - Portland Bureau of Environmental Services
  - Other state and local governments
  - Other testing protocol organizations
    - Washington State Department of Ecology
    - Washington Stormwater Center
Maintainability Evaluation Program for Stormwater Treatment Systems

Business Plan
Business Plan

Development

- ODOT – in partnership with CWS – initiated project in 2011
- Examined 12 existing business and service models for product or technology testing
- Facilitated a stakeholder meeting - January 26. 2012
- Draft business plan – February 2013
- Final Business plan – April 2013
Business Plan

Contents

- Organization
- Market Analysis
- Service / Operational Plan
- Financial Plan
**BUSINESS PROCESS**

1. **Initial Application**
   - YES
   - Technology Commercialization Review
     - NO Additional Development Required
     - YES
   - Formal Application
     - NO
   - Contract Agreement
     - NO
   - Fee Payment
     - YES Advance to Technology Process

2. **YES** Fee Payment Verification Testing Completed

3. **NO** Contract Agreement

4. **NO** Technology Commercialization Review

5. **NO** Initial Application
Develop Technology Testing Plan (QAPP)

Install, Operate, and Monitor Technology at ODOT Site

Testing Complete? NO

Elaboration of Testing Plan and Testing Implementation

Review by Technical Review Committee

Compilation of Results, Prepare Technical Evaluation Report

Report Complete? NO

Final Review of Data and Technical Evaluation Report

Review by Technical Review Committee

Publication

YES
Maintainability Evaluation Program for Stormwater Treatment Systems

Test Facility
Test Facility

**Design Goals**

- **Flexible** to test a range of stormwater treatment BMP types, starting with proprietary devices
- **Expandable** to test more facilities in the future, including potentially testing the effectiveness of traditional stormwater BMPs
- **Representative** of hydrologic and water quality conditions in urban stormwater
- **Convenient** and cost-effective for agencies and equipment manufacturers to evaluate BMP effectiveness
SITE SELECTION

- Adequate water supply
- Representative water
- Adequate site area and treated water discharge point
- A feasible way to convey stormwater from the storm drain to the testing facility without changing water quality characteristics
- Safe access to the site for monitoring, operation, and maintenance personnel
Test Facility

**SITE DESIGN**

- Intake
- Flow Control
- Bypass
- Flow Measurement
- Discharge
- Monitoring Systems
SITE DESIGN

- Divert flows from 5’ x 9’ rectangular box culvert running along I-205 at Columbia Slough
  - Drainage area: ~1,000 acres
  - Land use: high traffic highway and mixed urban
  - Flows: average = 3.5 cfs; max = 29 cfs
- Simultaneously test three systems
- Discharge to adjacent Columbia Slough
Test Facility

Proposed Facility Location – I-205 at Columbia Slough
Proposed Facility Location – I-205 at Columbia Slough
Maintainability Evaluation Program for Stormwater Treatment Systems

Test Protocol
CONCEPTUAL APPROACH

- Test systems can be prematurely “aged” using controls built-in to the test facility
- Quantify maintenance requirements as a function of influent loading
  - Decreased hydraulic capacity
  - Breakthrough
HYDRAULIC CAPACITY

Total Suspended Solids Loading

Flow Rate at Bypass

Design Flow Rate

Fictional data provided for example purposes only
Fictional data provided for example purposes only
Maintainability Evaluation Program for Stormwater Treatment Systems

Evaluation Protocol
Evaluation Protocol

- Developed system for tracking costs associated with BMP maintenance activities based on:
  - Technician hours
  - Technician skill requirements
  - Required equipment
  - Disposal costs
  - Materials costs
  - System life expectancy