

Oregon's Stormwater Technology Testing Center (STTC)

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AMERICAN ASSOCIATION
of STATE HIGHWAY AND
TRANSPORTATION OFFICIALS
AASHTO

**Sunday July 16th –
Thursday 20th, 2017**



SCOE & SCOD
2017
DES MOINES
AASHTO

**Marriott Des Moines
Downtown**

Joint Meeting of the AASHTO Standing Committee on Environment and Subcommittee on Design

Why a stormwater BMP testing center?

- There has been no systematic protocol or test facility for determining maintenance requirements for stormwater BMPs, particularly proprietary devices.

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The STTC will fill that gap by testing stormwater treatment systems for their effectiveness and maintainability by:

- Providing maintainability data.
- Providing life-cycle cost data.
- Providing a cost effective site for evaluating effectiveness.

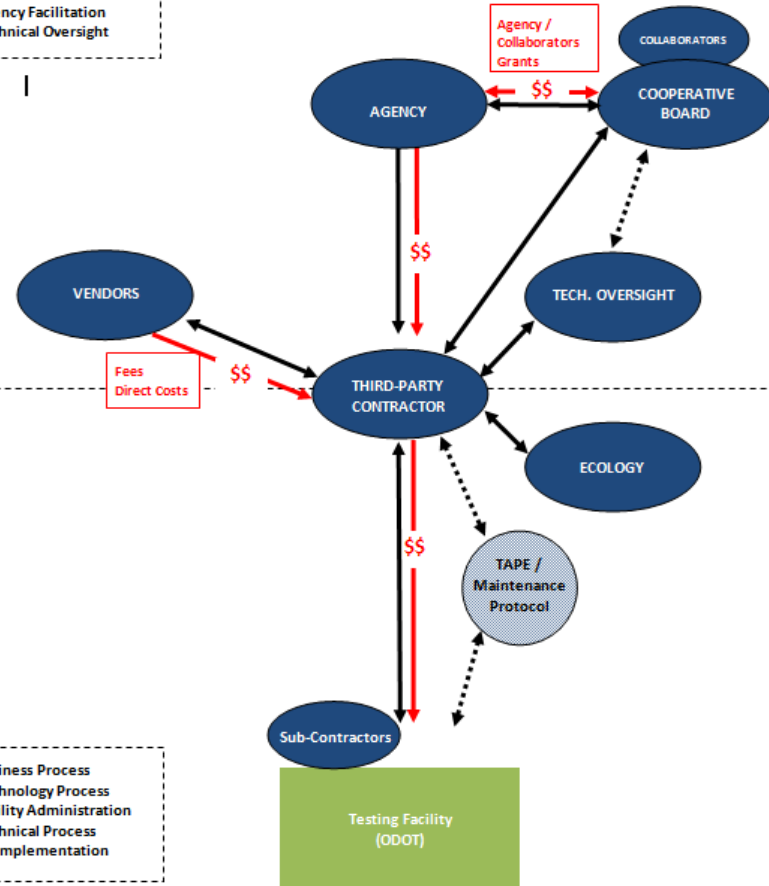




Organizational Structure

The STTC is a collaborative venture between Oregon DOT, other state and local government agencies, the manufacturers' association, and other test protocol organizations

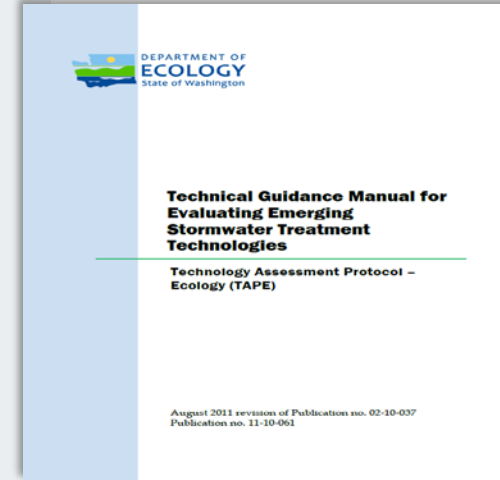
Contract Management
Agency Facilitation
Technical Oversight



Business Process
Technology Process
Facility Administration
Technical Process
Implementation

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- The STTC will follow Washington Dept. of Ecology's 2011 TAPE protocol for testing pollutant removal effectiveness
- Protocol for evaluating maintenance requirements has been developed for the STTC



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Testing Protocol

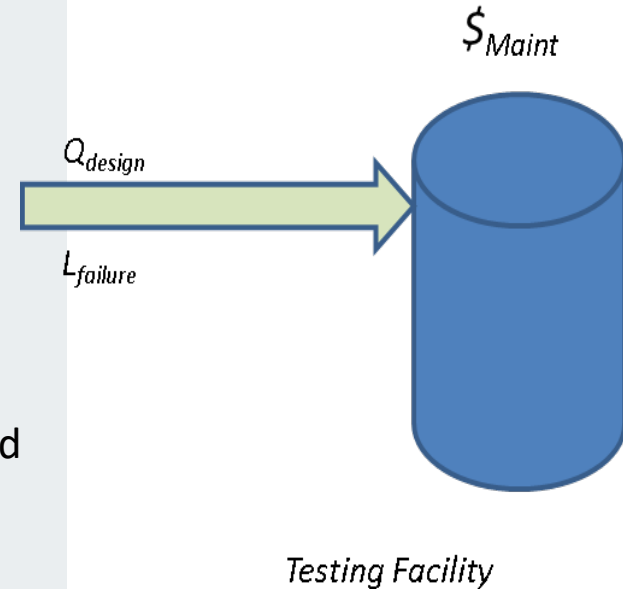
- Step 1: Test Baseline Solids Loading
- Step 2: Determine maintenance needs
- Step 3: Calculate baseline maintenance cycle
- Step 4: Calculate lifecycle maintenance costs



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STEP 1: Test Baseline Solids Loading

- Start with a “clean” installation
- Deliver polluted runoff to the system
 - Monitoring influent discharge and chemistry
- Halt testing at “maintenance threshold”
 - Hydraulic capacity reduced to 80 percent of design capacity
 - Continue testing to lower threshold as needed
- Quantify suspended sediment load delivered at maintenance threshold



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STEP 2: Determine Maintenance Needs

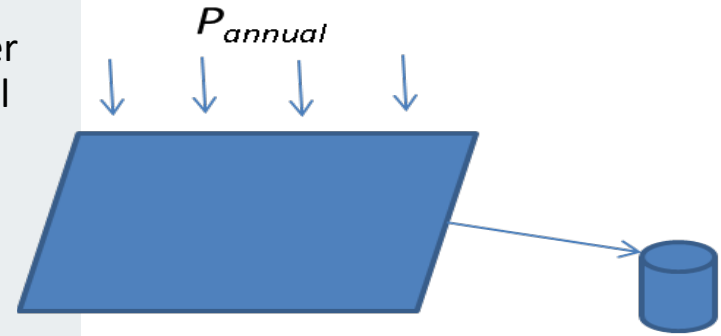
- Routine Inspection
 - Visual inspection, removal of gross solids and debris, sediment depth assessment, inspection of plant health.
- Routine Maintenance
 - Vactoring sediment from settling chambers, replacing prefilter media, trimming vegetation.
- System Recharge
 - Vactoring sediment from settling chambers, replacing primary filtration media, replacing plants.
- Additional Maintenance Actions
 - Unanticipated maintenance procedures (e.g., fixing leaks, adjusting orifice diameters, etc.)



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Step 3: Calculate baseline maintenance cycle

- Estimate sediment loading rate from hypothetical basin
 - Iteratively size basin using WWHM to deliver design flow for water quality treatment goal
 - Calculate annual runoff volume
 - Estimate annual sediment load using Representative TSS concentrations
- Derive annual maintenance cycle
 - Annual sediment load from hypothetical basin divided by measured load at maintenance threshold

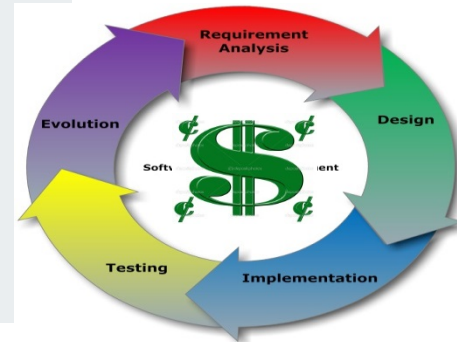


Hypothetical Basin

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Step 4: Calculate lifecycle maintenance costs

- Estimate annual costs for maintenance activities over a facility life cycle of 20 years.
- Apply inflation rates for each activity, convert to present values by applying a discount rate.
- Calculate lifecycle maintenance costs as the net present value (NPV) of total maintenance costs incurred over the facility life cycle of 20 years.



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No “Certification” or “Approval”

- The STTC will **NOT** certify or approve systems
- WA Dept. of Ecology certifies technologies thru its TAPE protocol
- The STTC will only report data



STTC Location: I-205 at Columbia Slough



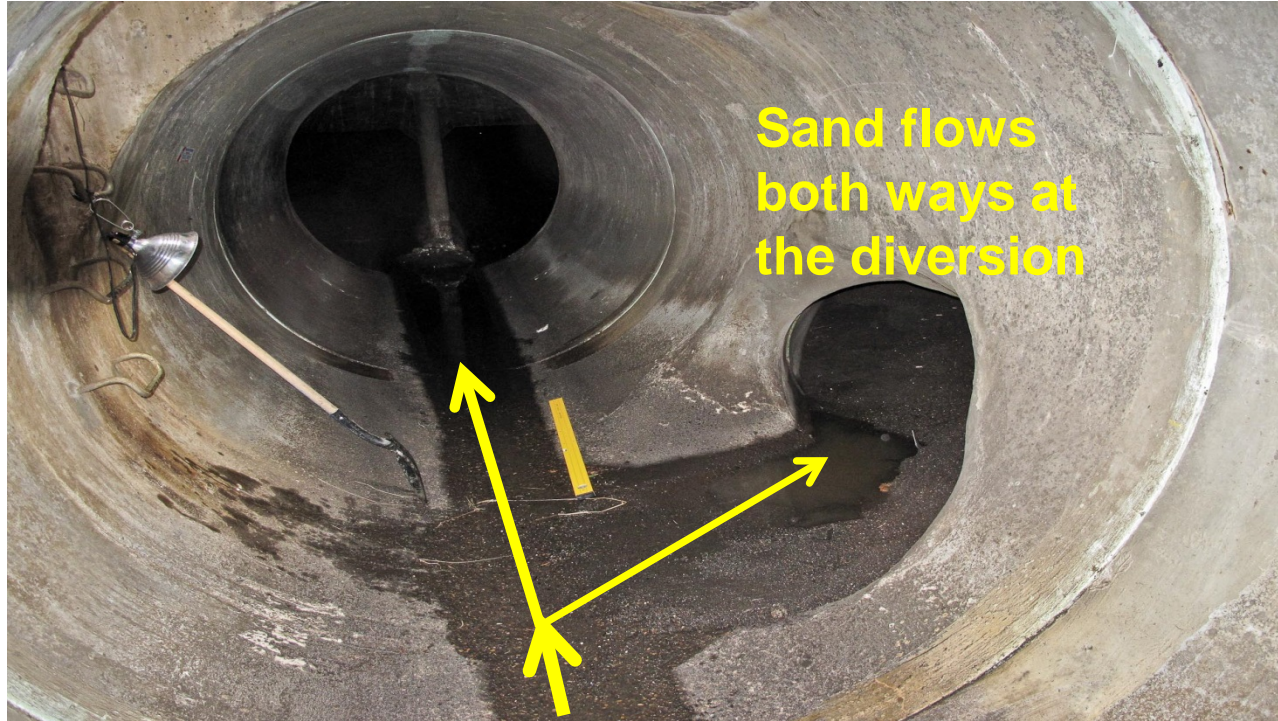
STTC Location: I-205 at Columbia Slough

An aerial photograph showing a large industrial area with several white warehouse-like buildings, parking lots filled with vehicles, and various pieces of equipment. To the left of the industrial area is a multi-lane highway (I-205) with several lanes of traffic, including cars and large trucks. To the right of the industrial area is a body of water (Columbia Slough) and a curved road. A red oval is drawn around a portion of the industrial area, and a red arrow points from this oval to a specific location marked with a red star.

1.5 Acre
Expansion
Area

- Flexible
- Representative
- Cost Effective
- Expandable

Diversion Structure – flowlines match !

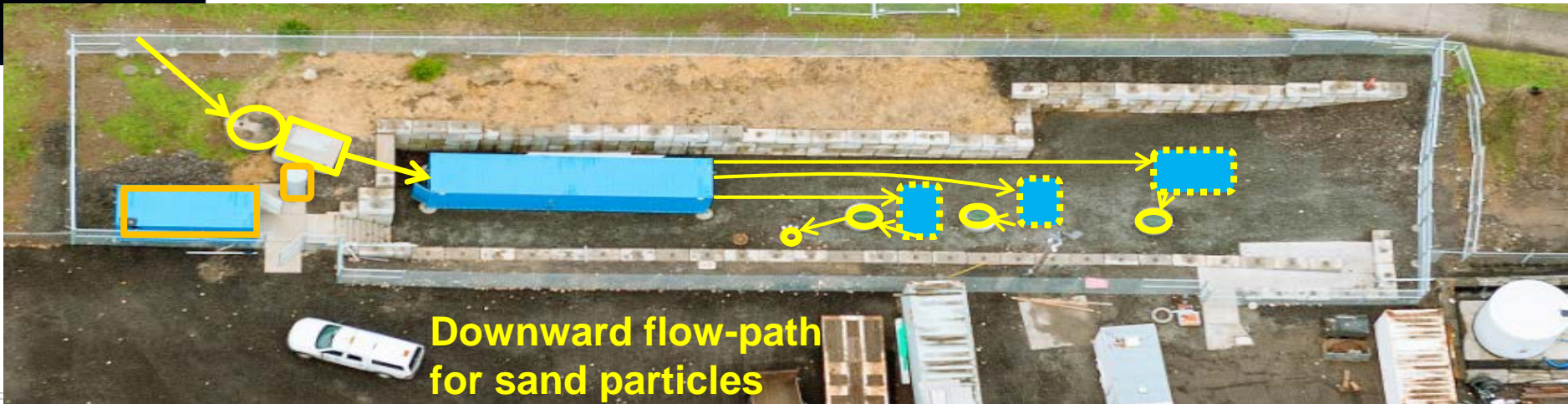


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Final Site – Design Features

- Simultaneously test three systems
 - Three 14 x 17 foot test bays
- Both Gravity and Pumped Conveyance!
- Air Operated Double Diaphragm Pumps = Flow Meters!
 - Positive Displacement
 - Programmable Logic Controller counts pump cycles to calculate flow rate

Site Layout – Stormwater flow path



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Why is the STTC Important?

- Assists end-users of stormwater treatment technologies
 - NPDES compliance
 - Life-Cycle information
- Independent evaluation of technologies

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Why Become a STTC Partner Agency ?

- Immediate access to maintenance metrics
- Access to maintenance cost estimating tools
- Contribute to independent evaluations
- Opportunity to influence STTC operations
- FHWA TPF-5(355)

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Questions?

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