The “Road” to Stormwater Management: MDOT’s MS4 Permitting

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Outline

• MS4 Definition
  – MDOT’s Uniqueness as an MS4
• EPA Requirements
• Features of Existing Stormwater Management Plan
• Features of New Stormwater Management Plan
• New Activities (Focus on Post-Construction)
• Conclusions: Improved Stormwater Management and design tools
What is an MS4?

A Municipal Separate Storm Sewer System (MS4) is a conveyance or system of conveyances

- Collects or conveys stormwater (storm drains, pipes, ditches, etc.)
- Not a combined sewer
- Not part of a Publicly Owned Treatment Works
Why Do MS4’s Exist?

- MS4’s are regulated by the EPA to address water quality issues
- Regulated via a National Pollutant Discharge Elimination System (NPDES) permit
- Goal: Improve and maintain water quality in waters of the state
How is MDOT Different?

- Roads
- Buildings
- Garages
- Maintenance Facilities
- Laboratories
- BMPs
- Welcome Centers
- Rest Areas
- Scenic Turnouts
EPA Requirements

• Six Minimum Measures
  – Public Education
  – Public Involvement and Participation
  – Illicit Discharge Elimination Plan
  – Post Construction Stormwater Management for New Development and Redevelopment Projects
  – Construction Stormwater Runoff Control
  – Pollution Prevention/Good Housekeeping for MDOT Operations

• Current permit utilizes Maximum Extent Practicable (MEP) for six minimum measures
Existing SWMP

• Public Education and Outreach
  – Stormwater Information on MDOT Website
  – Partner with MDEQ’s Public Education Program
  – Work with MDEQ for Early Coordination
  – Training Modules
  – Pesticide/Fertilizer Certification

• Illicit Discharge Detection and Elimination
  – Dry Weather Screening
  – Notify MDEQ of Illicit Discharges
  – Map Outfalls (statewide)

• Public Participation/Involvement
  – Public Review of SWMP
  – Identify and Coordinate with MPOs with Stormwater Quality Control Programs

• Construction Site Runoff Control
  – QAQC for Construction Storm Water Control

• Post-Construction Runoff Control
  – TMDL Compliance
  – Update Drainage Manual
  – Select, Apply, Maintain BMPs

• Pollution Prevention/Good Housekeeping
  – Maintenance Requirements for MDOT BMPs
  – Document Road Maintenance Activities
  – BMP Inspections
  – Garage Inspections
Revised SWMP

• Public Education and Outreach
  – Stormwater Information on MDOT Website
  – Partner with MDEQ’s Public Education Program
  – Work with MDEQ for Early Coordination
  – Training Modules
  – Pesticide/Fertilizer Certification

• Illicit Discharge Detection and Elimination
  – Dry Weather Screening (Pilot Project)
  – Notify MDEQ of Illicit Discharges
  – Map Outfalls (statewide)
  – Maintain List of Construction Projects
  – Determine IDEP Effectiveness

• Public Participation/Involvement
  – Public Review of SWMP
  – Identify and Coordinate with MPOs with Stormwater Quality Control Programs

• Construction Site Runoff Control
  – QAQC for Construction Storm Water Control

• Post-Construction Runoff Control
  – TMDL Compliance
  – Update Drainage Manual
  – Select, Apply, Maintain BMPs
  – BMP Mapping
  – Water Quality/Channel Protection

• Pollution Prevention/Good Housekeeping
  – Maintenance Requirements for MDOT BMPs
  – Document Road Maintenance Activities
  – BMP Inspections
  – Garage Inspections
Structural BMP Map

Initial BMP Map, Updated Annually
Water Quality & Channel Protection

- Performance Criteria
  - WQv – Treat runoff from 90% (non-exceedance) storm events.
  - Channel Protection – maintain runoff volume for 2-yr, 24-hr event.
- Developing MDOT specific design standards for numerous BMP’s.
- Anticipate development of tools to assist designers.
- MDOT looking to address water quality and quantity standards within project limits.
BMP Screening Tool

• Excel-based tool for BMP Screening based on:
  – New impervious area
  – Site Conditions (soils, urban v. rural)
  – Site Risks Impacting Cost/Constructability (high GW, utilities, ROW, accessibility)
  – Water Quality Requirements (TSS, metals, P, N, etc.)
# Post-Construction BMP - Scoping Level Planning Tool

## Does your project need BMPs?

<table>
<thead>
<tr>
<th>Total Disturbed Area</th>
<th>Yes</th>
<th>100 acres</th>
</tr>
</thead>
</table>

| Is there a TMDL on the project? (Refer to mapping tool) | Yes | \(\text{CONTINUE}\) |

## Project Summary

This section to provide general housekeeping notes for the project.

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>INSERT PROJECT DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td>INSERT PROJECT DETAILS</td>
</tr>
<tr>
<td>Date:</td>
<td>INSERT PROJECT DETAILS</td>
</tr>
<tr>
<td>Watershed:</td>
<td>INSERT PROJECT DETAILS</td>
</tr>
<tr>
<td>Additional Notes:</td>
<td>INSERT PROJECT DETAILS</td>
</tr>
</tbody>
</table>

## Site Characteristics

This section asks the user to input characteristics about the site in Column C. For guidance, refer to comments in cells in Column B.

<table>
<thead>
<tr>
<th>Project Area Within The Right of Way</th>
<th>1.0 acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proposed Impervious Area (Treatment Area)</td>
<td>1.0 acres</td>
</tr>
<tr>
<td>Existing Impervious Area</td>
<td>0.0 acres</td>
</tr>
<tr>
<td>New Impervious Area</td>
<td>1.0 acres</td>
</tr>
</tbody>
</table>

| Are there existing structural BMPs onsite? | \(\text{SELECT}\) |

<table>
<thead>
<tr>
<th>Hydrologic Soil Group (Refer to mapping tool)</th>
<th>C:ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban or Rural?</td>
<td>(\text{SELECT})</td>
</tr>
</tbody>
</table>
### Water Quality Requirements

This section allows the user to input the water quality requirements the project must meet. Water quality requirements based on runoff/stream impairments. Refer to theモデリング tool.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS removal</td>
<td></td>
</tr>
<tr>
<td>Metals</td>
<td></td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td></td>
</tr>
<tr>
<td>Total Nitrogen</td>
<td></td>
</tr>
<tr>
<td>Petroleum Hydrocarbons</td>
<td></td>
</tr>
<tr>
<td>Bacteria</td>
<td></td>
</tr>
</tbody>
</table>

### Water Quality - Potential BMPs

This section returns the potential BMPs that should be considered in the scoping level analysis to meet water quality standards. BMPs in this section are based upon inputs in site characteristics and water quality requirements.

- Inlet Structural Device - Debris/Sediment/Hydrocarbons (SS)
- Oil Water Separator (SS)
- Underground Detention System (Pipe, Tank/Vault) ($$$$)
- Biofilters (e.g., StormTreat System) ($$$$)
- Bottomless Catch Basin (SS)
- Catch Basin Sump - Deep (SS)
- Delaware Sand Filter (Underground sand filter) ($$$$)
- Infiltration Trench with Perforated Pipe (SSS) (SSS)
- Hydrodynamic Separator (SS) (SSS)
### Water Quality - Scoping Level Cost Estimate

This section asks the user to estimate the risk levels of various conditions. The cost range is a constant value determined by inputs in prior sections. The anticipated cost based on risks value will vary based on the user inputs in this section. The risk level assignment should consider a broad perspective. For example, instead of thinking just about the risk associated with the specific project area, reflect on the risk in relation to similar projects in the state.

<table>
<thead>
<tr>
<th>Risk of...</th>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Groundwater Table</td>
<td>[2] = Medium Risk</td>
</tr>
<tr>
<td>Additional ROW Required ([If required, must talk to Real Estate])</td>
<td>[1] = Low Risk</td>
</tr>
<tr>
<td>Additional Site Constraints (wetlands, floodplain, physical structures, archaeology, threatened and endangered species, protected areas)</td>
<td></td>
</tr>
<tr>
<td>Accessibility for construction &amp; maintenance</td>
<td></td>
</tr>
<tr>
<td>Soil Conditions (permeability, stability, contamination)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scoping Level Cost Range</th>
<th>Anticipated Cost Based on Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2,500.00 - $25,000.00</td>
<td>$2,500.00</td>
</tr>
</tbody>
</table>

### Channel Protection - Potential BMPs & Anticipated Costs

This section returns the potential BMPs that should be considered in the scoping level analysis to meet channel protection standards. There are BMPs that address both Water Quality and Channel Protection including: bioslope, roadside bioswale, roadside infiltration trench, vegetated swale, bioretention, and infiltration basin. If these BMPs are chosen, the costs between water quality and channel protection are not additive.

<table>
<thead>
<tr>
<th>Potential BMPs</th>
<th>Permeable Pavement, Bottomless Catch Basin, Infiltration Trench w/ Perforated Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infiltration Area (Area Needed to Infiltrate New Impervious Area)</td>
<td>0.20 acres</td>
</tr>
<tr>
<td>Scoping Level Cost Range</td>
<td>$5,000.00 - $50,000.00</td>
</tr>
<tr>
<td>Anticipated Cost Based on Risk</td>
<td>$5,000.00</td>
</tr>
<tr>
<td>List of Potential Water Quality BMPs</td>
<td>Associated Maintenance</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Inlet Structural Device - Debris/Sediment/Hydrocarbons (SS)</td>
<td>Biannual inspection and removal of litter/debris. Quarterly inspection and removal of sediment, remove inserts. Quarterly inspection, changing of filters, inserts, or sorbent media.</td>
</tr>
<tr>
<td>Catch Basin Sump - Deep (SS)</td>
<td>Biannual inspection and removal of sediment. Visible sediment should be frequently removed.</td>
</tr>
<tr>
<td>Hydrodynamic Separator (SS)</td>
<td>Quarterly inspection and removal of sediment and debris.</td>
</tr>
<tr>
<td>In-Line Structural Device (baffle box, screen, hood) (SS)</td>
<td>Quarterly inspection and removal of sediment and debris.</td>
</tr>
<tr>
<td>Oil Water Separator (SS)</td>
<td>Quarterly inspection, removal of sediment, debris, oil/grease.</td>
</tr>
<tr>
<td>Delaware Sand Filter (Underground sand filter) (SSSS)</td>
<td>Quarterly inspection and removal of debris and sediment, rake top 1 inch of sand, replace sand as needed.</td>
</tr>
<tr>
<td>Underground Detention System (Pipe, Tank, Vault) (SSSS)</td>
<td>Annual inspection and removal of sediment as required.</td>
</tr>
<tr>
<td>Biofilters (e.g. StormTreat System) (SSSS)</td>
<td>Biannual moving and removal of edge sediments/debris.</td>
</tr>
</tbody>
</table>

![Graph showing anticipated costs for water quality and channel protection BMPs](image-url)
PCBMP Design Manual

- Supplemental Manual to Aid in Design of Structural BMPs
- Augmented List of BMPs, compared to previous Drainage Manual
- “Cook book” approach to design
PCBMP Design Manual

- Incorporates: pollutant removal, water quality and channel protection design equations, maintenance procedures, design details, etc.)

- Draws from SEMCOG manual and BMP manuals for other states

Pennsylvania DOT Drainage Manual

Ohio BMP Manual
Conclusions

– Through a combination of ongoing MDOT activities developed in the previous permit cycle and new commitments in our upcoming permit, MDOT will strive to meet the requirements for stormwater water quality and channel protection.

– Through this process, new deliverables will be available for not only MDOT but also the general public, “paving” the way for cleaner water.
Questions?

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