CT DOT MS4 Program
and
MS4 Mapping Schema

Southeast CT Stormwater Collaborative
April 24, 2019
Agenda

- **CTDOT MS4 Team**
- DOT MS4 Permit Overview
- Mapping Schema
- Impaired Waters & USGS Water Quality Model
CT DOT: Process and Procedure Changes for Documenting Storm Water Quality Improvements
Agenda

• CTDOT MS4 Team

• DOT MS4 Permit Overview

• Mapping Schema

• Impaired Waters & USGS Water Quality Model
CTDOT is considered as a non-traditional municipality

- The DOT MS4 permit
  - based on the Small MS4 General Permit
  - a General Permit for one permittee
• Six Minimum Control Measures (MCMs)
  1. Public Outreach & Education
  2. Public Involvement / Participation
  3. Illicit Discharge Detection & Elimination
  4. Construction Site Stormwater Runoff Control
  5. Post Construction Stormwater Management
  6. Pollution Prevention / Good Housekeeping

• Outfall Monitoring Requirements
DOT MS4 Permit Overview

MS4 Priority Areas

- Urban Areas
- Areas that Discharge to Impaired Waters
- Areas with Greater than 11% DCIA

Directly Connected Impervious Area

Disconnected DCIA

Retrieved from UCONN NEMO “What Type of Impervious Cover do you Have?”
https://nemo.uconn.edu/ic-guide/step2-type.htm
• Disconnect 2% of *mapped* DCIA by 2024
• DCIA reductions to come from BMPs incorporated into projects
• Must document DCIA on every project
• Annual Reporting Requirement
• Projects that add DCIA will need to be offset by another
• Long-term: Stand alone retrofit projects
### Designer Worksheet

- Maximum Extent Practicable (MEP)
- Engineering Directive
  - Designer Worksheet
  - Instructions
  - Examples
  - BMP Matrix
  - BMP One-Pagers
- Google **CTDOT-MS4**

---

#### CT DOT MS4 Project Design

**Maximum Extent Practicable (MEP) Worksheet**

**Section 1: Project Information**
- Number:
- Title:
- Location:

**Section 2: Existing Conditions**

<table>
<thead>
<tr>
<th>EC1</th>
<th>Total DOT-Owned Project Area</th>
<th>acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC2</td>
<td>Pre-construction DOT-Owned Directly Connected Impervious Area (DCIA)</td>
<td>acres</td>
</tr>
<tr>
<td>EC3</td>
<td>Soil Infiltration Potential</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Data Source: Parking Report / Soils Map Field Verified</td>
<td></td>
</tr>
<tr>
<td>EC4</td>
<td>Depth to groundwater Table</td>
<td>TBD</td>
</tr>
<tr>
<td>EC5</td>
<td>Depth to Bedrock</td>
<td>TBD</td>
</tr>
</tbody>
</table>

**Section 3: Designed Conditions**

<table>
<thead>
<tr>
<th>Water Quality Calculations</th>
<th>30% Design</th>
<th>60% Design</th>
<th>90% Design</th>
<th>FDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC1 WQV retention design goal</td>
<td>ac-ft</td>
<td>TBD</td>
<td>ac-ft</td>
<td>ac-ft</td>
</tr>
<tr>
<td>DC2 WQV goal retained (refer to page 2)</td>
<td>ac-ft</td>
<td>ac-ft</td>
<td>ac-ft</td>
<td>ac-ft</td>
</tr>
<tr>
<td>DC3 WQV goal treated (refer to page 2)</td>
<td>ac-ft</td>
<td>ac-ft</td>
<td>ac-ft</td>
<td>ac-ft</td>
</tr>
<tr>
<td>DC4 Total WQV retained or treated</td>
<td>ac-ft</td>
<td>ac-ft</td>
<td>ac-ft</td>
<td>ac-ft</td>
</tr>
<tr>
<td>DC5 Post-construction DCIA(acres)</td>
<td>ac</td>
<td>TBD</td>
<td>ac</td>
<td>ac</td>
</tr>
<tr>
<td>DC6 Pre-construction DCIA (refer to EC2 above)</td>
<td>ac</td>
<td>ac</td>
<td>ac</td>
<td>ac</td>
</tr>
<tr>
<td>DC7 Change in DCIA from pre- to post-construction</td>
<td>ac</td>
<td>TBD</td>
<td>ac</td>
<td>ac</td>
</tr>
</tbody>
</table>

- Can be positive (DCIA gained) or negative (DCIA lost)

- Date completed
- Completed by (Initials)
- Reviewed by (Initials)

---

CT DOT: Process and Procedure Changes for...
• Permit:
  • Half the system must be mapped within 5 years
  • Map 100% within 10 years
• Goal: map 10% of system every year
  • Digitization of older plans
  • Field mapping/verification
  • CADD → GIS
Agenda

• CTDOT MS4 Team
• DOT MS4 Permit Overview
• **Mapping Schema**
• Impaired Waters & USGS Water Quality Model
Mapping DOT’s Stormwater System

- Starting from scratch
- Mapping Standardization
  - COG’s GIS Standards Committee
  - DOT schema will be the basis of the State Standard
  - Will be available for sharing as a geodatabase
- Long-term: Sharing MS4 interconnection data with municipalities
What physical assets are being collected?

The stormwater conveyance system owned and/or maintained by CTDOT;

- Culverts
- Headwalls / Endwalls / Pipe Ends
- Catch Basins / Inlets
- Manholes
- Pipes / Closed Conveyances
- Swales / Open Conveyances
- Stormwater BMPs
- Other Drainage / Miscellaneous
What other information is being collected?

- Blind Ties
- Interconnections
- Screening / Sampling Locations
- Virtual Drain Lines
- Stormwater Mapping Progress Tracker and
- Inspection Information

For Example Purposes Only!

<table>
<thead>
<tr>
<th>Inspection Reason</th>
<th>Inspection ID</th>
<th>Inspection Date</th>
<th>Requires Traffic Control</th>
<th>Erosion</th>
<th>Outlet Protection Condition</th>
<th>Scour</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition Rating</td>
<td>170-HE-000001 2019-03-14</td>
<td>3/14/2019, 2:53 PM</td>
<td>Yes</td>
<td>Minor</td>
<td>Good</td>
<td>None</td>
</tr>
<tr>
<td>Maintenance Activity</td>
<td>170-HE-000003 2019-02-16</td>
<td>3/16/2019, 3:04 PM</td>
<td>No</td>
<td>Moderate</td>
<td>Good</td>
<td>Minor</td>
</tr>
<tr>
<td>Maintenance Activity</td>
<td>170-HE-000001 2019-03-16</td>
<td>3/16/2019, 3:05 PM</td>
<td>Yes</td>
<td>Moderate</td>
<td>Fair</td>
<td>Severe</td>
</tr>
<tr>
<td>Maintenance Activity</td>
<td>170-HE-000004 2019-03-16</td>
<td>3/16/2019, 3:06 PM</td>
<td>Yes</td>
<td>Minor</td>
<td>Good</td>
<td>Minor</td>
</tr>
<tr>
<td>Condition Rating</td>
<td>170-HE-000005 2019-03-16</td>
<td>3/16/2019, 3:07 PM</td>
<td>No</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>
What can the mapping schema be used for?

- Locating and inventory stormwater system assets
- Identifying interconnection points
- Recording inspection information
  - Screening & sampling results
  - IDDE inspections
  - Asset condition
- Identifying assets in need of attention
  - Assets in poor condition
  - Inlet full of sediment
  - BMP in need of maintenance
What do Municipalities need?

- Some amount of GIS/IT assistance
  To set up map
- ESRI membership
- Arc GIS On-Line

To get information into the map/database

- Data from construction plans
  - Arc Pro or Arc Map 10.x to digitize construction plans
- Field collect data
  - ESRI Collector Application
  - ESRI Survey 123
Proposed Interconnections

- Private and municipal development projects seeking to connect parcel drainage to the DOT MS4
  - DOT must document that the Municipality has confirmed that the project meets:
    - the Construction Stormwater GP and
    - the Small MS4 GP (if applicable)
  - Applicants must provide proof of Municipal confirmation through the following mechanisms requiring DOT-approval
    - Office of the State Traffic Administration (OSTA) permits
    - Encroachment Permits
      - Drainage Connection Concurrence
      - Maintenance Agreements
Interconnections: Roadway <-> Roadway

- MS4 General Permits require written agreements between MS4 systems
- Each MS4 system is required by respective General Permits to map, inspect, and correct IDDEs
- MCM’s that have the greatest impact on improving water quality will be DOT’s priority
Agenda

• CTDOT MS4 Team
• MS4 Basics & DOT Permit Development
• DOT MS4 Permit Overview
• Impaired Waters & USGS Water Quality Model
USGS will monitor 9 representative outfalls

- Locations were selected based on land use, impervious area, and traffic
- 2 years of continuous monitoring for each outfall

Parameters:
- precipitation
- snow depth
- air temperature
- water temperature
- flow
- conductance
In addition, each outfall sampled 15 to 18 times
  - 18 constituents listed in the DOT MS4 permit
  - 26 additional analytes

Sampling results will be added to FHWA stormwater runoff database

Monitoring and sampling results to be used in USGS’s model for predicting roadway impacts to water quality
USGS Water Quality Model

- **Stochastic Empirical Loading Dilution Model**
- Highway Runoff Quality Model
- Developed by USGS with the FHWA
- Utilized by other DOTs
  - Washington
  - Oregon
  - Colorado
  - Massachusetts
SELDM: How will it be used?

- SELDM to be run on all mapped outfalls by the end of the permit term
  - Schedule tied to mapping
- Evaluate DOT’s impact on a receiving waterbodies
- Model results will be used as basis for follow up investigations and implementation of BMPs
- Model will be used to develop Retrofit Program
DOT’s Stormwater Management Plan

• Plan can be found here: https://www.ct.gov/dot/CTDOT-MS4

• Comments on the plan can be sent to: DOT.MS4@ct.gov

• Comment Period Ends June 30, 2019
Questions?

DOT.MS4@ct.gov