MS4 MAPPING INTEGRATION
GUIDANCE DOCUMENT
FOR CMRSWC COMMUNITIES

CENTRAL MASSACHUSETTS REGIONAL STORMWATER COALITION

THE ROAD TO IMPROVED INTEGRATION WITH THE MASSDOT
The intent of this guidance document is to assist CMRSWC municipalities in improving their relationship and data integration with the MassDOT in meeting the requirements of the Massachusetts Small MS4 General Permit.

Created through a case study with 3 CMRSWC municipalities.

Developed as part of an interactive qualifying project at Worcester Polytechnic Institute.

Created by

Christian Chadwick
Aerospace Engineering '22

Fernand Gay
Civil Engineering '22

Zoe Mahoney
Civil Engineering '22
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ACQUIRE MASSDOT DATA

GEODOT: THE MASSDOT'S PUBLIC GIS DATABASE

VISIT THE GEODOT WEBSITE

APPLY "STORMWATER" TAG

Tags

- stormwater
- roads
- highways
- road inventory
- sidewalks
- ADT

NAVIGATE TO HIGHWAY ASSETS

DOWNLOAD THE FILES:
- STORMWATER CONTROL MEASURE
- INLET
- STORMWATER DISCHARGE POINT
- CONVEYANCE
- MISCELLANEOUS STRUCTURE
- MANHOLE

IMPORT FILES INTO ARCGIS

Add Data
## Increase Map Readability

**Step 1:** Condense Infrastructure Symboology

**Step 2:** Color Code Infrastructure by Ownership

<table>
<thead>
<tr>
<th>INFRASTRUCTURE</th>
<th>SYMBOL</th>
<th>TOWN HTML COLOR CODE</th>
<th>STATE HTML COLOR CODE</th>
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<td>Stormwater Control Measure</td>
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<td>Inlet</td>
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<tr>
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<td>Other</td>
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### Infrastructure Symbols

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Symbol</th>
<th>Town HTML Color Code</th>
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<tbody>
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<td>Swale/Ditch</td>
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<tr>
<td>Underdrain</td>
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<td>#FF1616</td>
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<td>Misc. Structures</td>
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<td>Auxiliary Spillway</td>
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<td>Other</td>
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*INCREASE MAP READABILITY*
<table>
<thead>
<tr>
<th>INFRASTRUCTURE DEFINITIONS</th>
</tr>
</thead>
</table>
| **STORMWATER CONTROL MEASURE** | ALL STORMWATER MANAGEMENT PRACTICES OR FACILITIES  
  - BIORETENTION AREAS, CONSTRUCTED STORMWATER WETLANDS, AND GRAVEL AREAS |
| **INLET** | POINT WHERE STORMWATER RUNOFF ENTERS MS4  
  - CATCH BASINS, DROP INLETS, GUTTER INLETS, CURB INLETS, AND YARD DRAINS |
| **OUTLET CONTROL STRUCTURE** | ANY ADDITIONAL DRAINAGE CONTROL STRUCTURES |
| **MANHOLE** | ALL MANHOLES  
  - UTILITY TYPE MUST BE CONFIRMED IF NOT DRAINAGE  
  MANHOLE TYPE |
| **DRAINAGE** | MANHOLE TYPE |
| **COMBINED SEWER** | MANHOLE TYPE |
| **OTHER** | MANHOLE TYPE |
| **STORMWATER DISCHARGE POINTS** | POINT WHERE STORMWATER RUNOFF EXITS MS4  
  END OF DRAINAGE SYSTEM OR DISCHARGE TO WATERBODY |
| **STANDARD OUTFALL** | DISCHARGE POINTS THAT EMPTY INTO SCMS |
| **OUTLET TO SCM** | ADDITIONAL DISCHARGE POINTS FROM OPEN CONVEYANCES  
  - EX: HEADWALLS, FLARED-END SECTIONS, PIPE ENDS, SWALE ENDS, PAVED WATERWAYS, AND SCUPPERS |
<table>
<thead>
<tr>
<th>INTERCONNECTIONS</th>
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</tr>
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<tbody>
<tr>
<td>INTERCONNECTIONS</td>
<td>POINT WHERE MASSDOT AND MUNICIPAL MS4S INTERCONNECT</td>
</tr>
<tr>
<td>CONVEYANCES</td>
<td>CONVEYANCE TYPE</td>
</tr>
<tr>
<td>PIPE</td>
<td>CONVEYANCE TYPE</td>
</tr>
<tr>
<td>SWALE/DITCH</td>
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<tr>
<td>MISCELLANEOUS STORMWATER ASSETS</td>
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<td>CHECK DAM</td>
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<tr>
<td>AUXILIARY SPILLWAY</td>
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<tr>
<td>OTHER</td>
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<tr>
<td>ATTRIBUTES</td>
<td></td>
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<tr>
<td><strong>TIER 1: REQUIRED FIELDS FOR INTEGRATION</strong></td>
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</tr>
</tbody>
</table>

**STORMWATER CONTROL MEASURE**
- SCM TYPE
- OWNED BY
- MAINTBY
- SOURCE OF DATA
- PROJECT NUMBER
- PROJECT NAME

**INLET**
- LOCATION
- INLET TYPE
- COVER TYPE
- DATA SOURCE
- OWNED BY
- MANAGED BY
- DIAMETER

**MANHOLE**
- LOCATION
- COVER TYPE
- UTILITY TYPE
- NUMBER OF INLETS TO MANHOLE
- DATA SOURCE
- OWNED BY
- MANAGED BY

**STORMWATER DISCHARGE POINTS**
- DISCHARGE TYPE
- ELEVATION
- OUTLET TYPE
- OUTLET MATERIAL
- DIAMETER OF OUTLET
- DATA SOURCE
- OWNED BY
- MANAGED BY
- SERVICE STATUS

**INTERCONNECTIONS**
- FLOW DIRECTION
- INTERCONNECTION STRUCTURE
- DATA SOURCE
- NON-MASSDOT SYSTEM OWNER

**CONVEYANCES**
- LINE TYPE
- MATERIAL
- DIAMETER OF OUTLET (IN)
- DATA SOURCE
- OWNED BY
- MANAGED BY
- SERVICE STATUS

**MISC. STRUCTURES**
- ASSOCIATED SCM ID
- LOCATION
- FEATURE TYPE
- DATA SOURCE
- OWNED BY
- MANAGED BY
- SERVICE STATUS
## Tier 2: Optional Fields for Integration

### Stormwater Control Measure
- WBID
- SCM Status
- Is SCM Lined?
- Has Underdrain?
- Has Staff Gauge?
- Access Notes
- SCM Notes
- Install Date
- Soil Type
- Storage Volume (ft^3)
- DOT Watershed to SCM (Acres)
- IC Watershed to SCM (Acres)
- Treatment Depth (in)
- Annual IC Percent Reduction (%)
- Effective IC Reduced by SCM (Acres)
- Annual P Percent Reduction (%)
- P Reduced by SCM (lbs/year)
- Annual TSS Percent Reduction (%)
- TSS Reduced by SCM (lbs/year)

### Inlet
- Does it Lock?
- Has Hood?
- Has Valve?
- Sump Depth
- Notes
- Service Status
- Material

### Interconnections
- Permitted?
- Permit Number
- Notes

### Conveyances
- Notes

### Manhole
- Is it Bolted?
- Does it Have a Sump?
- Does it Have a Valve?
- Casting Depth (in)
- Notes
- Service Status

### Miscellaneous Structures
- Does it Lock?
- Notes

### Stormwater Discharge Points
- WBID
- TS4 Regulated?
- Nutrient Impaired Waterbody?
- Has Gate?
- Notes
Attributes

IN OUR CASE STUDY, THE MUNICIPALITIES HAD A NUMBER OF ADDITIONAL FIELDS DESCRIBING THE CONDITIONS OF THE INFRASTRUCTURE THAT MAY BE USEFUL FOR MAINTENANCE. OTHER COMMON FIELDS THAT COULD BE USEFUL IN IDENTIFYING INFRASTRUCTURE INCLUDE:

- DEPTH (INTERCONNECTIONS)
- MATERIAL
- INSTALL DATE

IT IS ALSO IMPORTANT TO INCLUDE A UNIQUE IDENTIFIER (ASSET ID) FOR EACH PIECE OF INFRASTRUCTURE TO TIE BACK TO ANY TYPE OF ASSET MANAGEMENT DATABASE

Helpful Tips

- REMOVE UNUSED FIELDS
- IF RELUCTANT TO CHANGE FIELDS, KEEP A LIST OF ALL FIELD NAMES AND THEIR MASSDOT EQUIVALENCIES

Note: Field suggestions may change as needs are clarified.
CONTACTING THE MASSDOT
WHO & HOW

YOUR POINT OF CONTACT

HUNG PHAM
STORMWATER PROGRAM COORDINATOR

EMAIL:
HUNG.PHAM@STATE.MA.US
EDUCATIONAL RESOURCES
LEARNING ARCGIS

THE BASICS
- THE BASICS OF ARCGIS PRO
- MAPPING & VISUALIZATION IN ARCGIS PRO
- ANALYSIS IN ARCGIS PRO
- USING ARCGIS PRO IN 3D

ADVANCED LESSONS
- GIS FOR POPULATION AND DEVELOPMENT STUDIES: DATA ANALYSIS AND VISUALIZATION
- PUBLIC TRANSIT
- RESOURCES FOR TEACHING WITH ARCGIS PRO

STORMWATER EDUCATION

STORMWATER HANDBOOK
- STORMWATER HANDBOOK INCLUDES:
  - WHAT STORMWATER IS, WHY IT IS MANAGED, MASSACHUSETTS' GOALS FOR STORMWATER MANAGEMENT, AND INFRASTRUCTURE INVOLVED

STANDARDS & PERMITS
- PERMIT INFORMATION
- STORMWATER STANDARDS/POLICIES
- RESOURCES AND TOOLS FOR MS4 COMPLIANCE

INFORMATIVE VIDEO
- ADDRESSES THE INFRASTRUCTURE THAT HELPS MANAGE STORMWATER
THIS REPORT WAS DESIGNED BY THE MASSDEP TO HELP TOWNS NAVIGATE SOFTWARE POSSIBILITIES FOR MAPPING INFRASTRUCTURE IN THE FIELD.

THINKBLUE MASSACHUSETTS

THINKBLUE IS A STATEWIDE EDUCATIONAL CAMPAIGN AIMING TO SPREAD AWARENESS ABOUT HOW STORMWATER POLLUTION AFFECTS LOCAL WATER BODIES & WETLANDS.

EPA REGULATION

THIS PAGE DESCRIBES THE PROBLEMS WITH STORMWATER POLLUTION AND THE NPDES STORMWATER PROGRAM.

THE TEAM FROM WORCESTER POLYTECHNIC INSTITUTE

MEET SWMAPS

CHRISTIAN CHADWICK

FERNAND GAY

ZOE MAHONEY

CONTACT - EMAIL

MORE INFO ON OUR PROJECT - WEBSITE