My experience with Large NPDES MS4s

- Maryland State Highways Administration
- State of Hawaii, Highways Division
MDSHA NPDES Permitted Areas

MDSHA Stormwater Management
- Approx. 2000 SWM facilities

MDSHA NPDES MS4 BMP Inspections

Enterprise GIS system
MDSHA Asset Management

<table>
<thead>
<tr>
<th>SHA rating</th>
<th>Action/response</th>
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<tbody>
<tr>
<td>I</td>
<td>No maintenance</td>
</tr>
<tr>
<td>II</td>
<td>Minor or routine maintenance</td>
</tr>
<tr>
<td>III</td>
<td>Major maintenance</td>
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<tr>
<td>IV</td>
<td>Retrofit / Functional Enhancement</td>
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<tr>
<td>V</td>
<td>Immediate Response</td>
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<td>VI</td>
<td>Abandon</td>
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MDSHA Maintenance & Costs

- Minor maintenance: $200 - $25,000*
- Major maintenance: $1,000 - $75,000*

MDSHA SWM Facilities Retrofits

Retrofit of a failed infiltration basin into a sand filter
MDSHA Lessons Learned

- SWM facilities
  - Design considerations - maintenance access, pre-treatment
  - Infiltration trenches needed periodic inspections and media replacement about every 5 years
  - Use of construction inspector to oversee maintenance contractors

MDSHA - Where are they now?

- Chesapeake Bay and other TMDLs
  - Watershed based approach

- MDSHA Bay WIP II
  - Milestones of annual goals for impervious areas treated from BMPs such as SWM facilities (new and retrofits), stream restoration, urban tree planting etc. until 2025
  - Quantifying load reductions from various BMPs
  - Tracking and verification using geodatabase
HDOT Highways Permitted Areas

Integration with IBM Maximo interface to enable better tracking:
- Inspection forms with IBM Maximo
- Enables compliance based tracking
- Dashboard for PMs to review compliance, work orders etc.

ESRI GIS Centric Geodatabase:
- Inventory using GPS and as-built digitization
- GUI for tracking inspections and cleaning

HDOT Highways AMS

HDOT Highways MS4 Inspections & Cleaning
- Inspect/clean approximately 10,000 drains on a semiannual and annual basis (high and low priority)
HDOT Highways MS4 Inspections & Cleaning
- Inspect 1500 outfalls on a semiannual and annual basis, clean as needed

HDOT Highways MS4 Inspections and Cleaning
- 8,000 pipes and culverts (150 miles) - annual cleaning
- 600 open channel (26 miles) inspections on a semiannual and annual basis, clean as needed

HDOT Highways MS4 Inspections
- Street sweep State routes (320 miles) on a 5 and 15-week basis
• Inspect/clean 12 permanent post-construction BMPs
  ➢ CDS units
  ➢ Bioretention facilities
  ➢ Skimmer Box

HDOT Highways MS4 Inspections

HDOT Highways Maintenance Costs

HDOT Highways Lessons Learned

• Contracts for drain cleaning and street sweeping
  ➢ Use of construction inspector to oversee maintenance contractors
  ➢ Access, erosion and ROW issues with outfall cleaning
  ➢ Pipe cleaning in conjunction with CCTV inspections

• Post-construction BMPs aka SWM facilities O&M
  ➢ Design considerations - maintenance access
  ➢ Need contractors with variable skills
HDOT Highways - Where are they now?

- New Permit Issued October 28, 2013
  - Trash reduction plan
  - TMDL Compliance Schedules

- Working on updating the SWMP (Early 2015)
  - Debris Clearing Assessment Plan – evaluation of street sweeping for WLA reductions
  - Cost per pound of pollutant removal

Thank You