Building a Stormwater BMP Maintenance Program from the ground up.

May 4-6, 2016
APWA Mid-Atlantic Presentation
Agenda

• Post-Construction Stormwater Facility BMP Inspection and Maintenance Programs
• Daily Standard Operating Procedures (SOPs)
• Funding
City Overview

• About 15.2 square miles
• Independent City
• Population approx. 150,000
• Phase II MS4
  • First permit in 2003
  • Approx. two-thirds of the City
Environmental Initiatives

- Alexandria Supplement to the NoVA BMP Handbook
- Water Quality Management Supplement to the Master Plan
- Eco-City Alexandria Charter
- Eco-City Action Plan 2030
- City’s Strategic Plan
- MS4 Program Plan
- Chesapeake Bay Total Maximum Daily Load (TMDL) Action Plan
Stormwater Program
Objectives

• Improvement of water quality by the reduction of non-point source pollution
• Prevention of stream bank erosion
• Protection of people and property from flood hazards
• Prevention of infrastructure failures
• Meet regulatory mandates – MS4 and CSS permits
BMP Database

- Revised to include VDEQ “Urban BMP Reporting” spreadsheet items
- Capturing TP removal
BMP Database → Cityworks™
Schedule of Maintenance and Guidelines

Bioretention Area Maintenance Schedule and Guidelines

This document must be recorded as an addendum to the stormwater management/ BMP facilities operation and maintenance agreement

First Year Maintenance Guidelines
Successful establishment of bioretention areas requires that the following tasks be undertaken in the first year following installation:

- Initial inspections. For the first 6 months following construction, the bioretention area should be inspected at least twice after storm events that exceed 1/2 inch of rainfall.
- Spot reseeding. Inspect for bare or eroding areas in the contributing drainage area or around the bioretention area, and make sure they are immediately stabilized with grass cover.
- Watering. Watering is needed once a week during the first 2 months, and then as needed during first growing season (April-October), depending on rainfall.
- Remove and replace dead plants.

Routine Maintenance Guidelines
Bioretention areas must be inspected to ensure that they operate in good working condition and in accordance with the approved design and specifications. Items in need of repair must be immediately addressed.

<table>
<thead>
<tr>
<th>Routine Maintenance Tasks</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove trash and debris</td>
<td>As needed</td>
</tr>
<tr>
<td>Check and repair eroded areas</td>
<td>Annually</td>
</tr>
<tr>
<td>Inspect for and remove excess sediment</td>
<td>Annually</td>
</tr>
<tr>
<td>Mow grass filter strips and bioretention turf cover</td>
<td>At least four times per year</td>
</tr>
<tr>
<td>Weed and rake mulch</td>
<td>Twice during the growing season</td>
</tr>
<tr>
<td>Inspect plant composition for consistency with approved plans and correct any deficiencies</td>
<td>Annually</td>
</tr>
<tr>
<td>Remulch to maintain a three inch layer</td>
<td>Annually</td>
</tr>
<tr>
<td>Prune trees and shrubs</td>
<td>Annually</td>
</tr>
<tr>
<td>Inspect for clogging or ponding water in the filter bed</td>
<td>Annually</td>
</tr>
<tr>
<td>Remove invasive plants</td>
<td>As needed</td>
</tr>
<tr>
<td>Replace dead or damaged plant material</td>
<td>As needed</td>
</tr>
</tbody>
</table>
Inspection Forms

• Originally based on state and EPA guidelines (Alexandria Supplement to NoVA Handbook)

• Some revisions for consistency with Virginia Department of Environmental Quality (VDEQ) inspection forms (VA BMP Handbook and Clearinghouse)
# Inspection Forms

## Appendix 2 - Inspection Forms

**City of Alexandria, Virginia**

**BMP Inspection - Bioretention**

<table>
<thead>
<tr>
<th>Project Name:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td></td>
</tr>
<tr>
<td>Project #:</td>
<td></td>
</tr>
<tr>
<td>BMP Type:</td>
<td></td>
</tr>
<tr>
<td>BMP Info:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inspection Date:</th>
<th>Inspection Time:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Inspector:</td>
<td>Time since last precipitation:</td>
</tr>
<tr>
<td>Secondary Inspector:</td>
<td>Amount of last precipitation:</td>
</tr>
</tbody>
</table>

| Flow condition: |  |
| Structural condition: |  |
| Overall condition: |  |

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contributing Drainage Area</td>
<td></td>
</tr>
<tr>
<td>Adequate vegetation</td>
<td></td>
</tr>
<tr>
<td>No excessive trash or debris</td>
<td></td>
</tr>
<tr>
<td>No evidence of erosion</td>
<td></td>
</tr>
<tr>
<td>Pre-treatment</td>
<td></td>
</tr>
<tr>
<td>No excessive trash or debris</td>
<td></td>
</tr>
<tr>
<td>No evidence of erosion</td>
<td></td>
</tr>
<tr>
<td>Adequate vegetation</td>
<td></td>
</tr>
<tr>
<td>Inlet</td>
<td></td>
</tr>
<tr>
<td>Inlet is stable</td>
<td></td>
</tr>
<tr>
<td>No excessive trash, debris, or sediment</td>
<td></td>
</tr>
</tbody>
</table>
Educational Materials

WHY ARE BMPS NECESSARY, WHO MAINTAINS THEM, AND WHY DOES THE CITY INSPECT THEM?

The City of Alexandria Environmental Management Ordinance implements the City’s stormwater management program in compliance with the Virginia Stormwater Management Act and Chesapeake Bay Preservation Act. These regulations require the City to control the level of pollutants entering waterways such as the Potomac River and the Chesapeake Bay.

BMPS are designed to reduce pollutants such as sediments, oil, grease and nutrients. Examples of urban stormwater BMPs are wet and dry ponds, bioretention areas, sand and storm filters, and hydrodynamic separator devices. Regular maintenance is necessary for proper function and long-term viability.

Ultra urban areas such as the City of Alexandria are densely developed areas with scarce open space and pervious surfaces. Underground stormwater storage and treatment practices such as sand filters and hydrodynamic separators are well suited because they require very little surface space.

As a requirement of development approval, the City requires BMP owners to maintain their facilities (Article XIII, Section 2.04).

ADDITIONAL INFORMATION

Links to the following resources can be found at: http://alexandriava.gov/tes/DFQ/deppublications.html

- Alexandria Supplement to the Northern Virginia BMP Handbook
- City of Alexandria BMP Maintenance Agreement
- City of Alexandria Environmental Management Ordinance
- City of Alexandria Master Plan Water Quality Management Supplement
- “Stormwater Pollution and Management” brochure

MAINTENANCE SERVICE PROVIDERS

The City’s Division of Environmental Quality can provide BMP owners with a list of vendors who have experience in maintaining stormwater management facilities.

Please note that the City makes no representation or warranties regarding the qualifications or suitability of any particular vendor, nor does a vendor’s inclusion or non-inclusion on this list constitute any such representation or warranty. You should retain a maintenance company only after making a thorough review of that company’s qualifications and its ability to service your particular needs.

Urban Stormwater Best Management Practices (BMPs) Inspection Program
City of Alexandria, Virginia

A stormwater “Best Management Practice” (BMP) is a facility or structure that reduces the water quality impacts of stormwater runoff from developed areas.

Wet pond treating stormwater from a shopping center
Trash inside an overflow riser
Maintaining an underground BMP

This brochure was developed to help individuals and property owners understand what BMPS are, their maintenance requirements, and the role of...
Post-Construction Stormwater BMP Inspection and Maintenance Program

Public-Owned
Operations and Maintenance

Day-to-day Analysis, Inspection, and Maintenance (AIM)

- Stormwater Conveyance System
- Combined Sewer Outfalls and Stormwater Outfalls
- Post-Construction Public BMPs
- Compliant-Driven Inspections
Stormwater Conveyance System

- Combination Vac/Flush truck FY14
- Approx. 13,500 drainage structures
- 185 miles of storm drainage pipe
- Using Cityworks™ asset mgmt. software
- Preventive maintenance - clean the storm, sanitary and combined sewer systems
Preventative Maintenance

- Frequent inspection & maintenance
- Regular flushing program
- Catch basin and culvert cleaning
- CCTV inspections
- Regular street sweeping
Combined Sewer Outfalls and Stormwater Outfalls

- 4 Combined Sewer/Stormwater Outfalls
- About 400 Total Outfalls
  - About 10% equipped with Tide Gates
- Event-Triggered Inspections
  - Debris and blockages
  - Structural integrity
  - Mechanical malfunctions
  - Dry weather flows and cross-connections
Post-Construction Public-BMPs

- Approximately 100 municipally-owned and operated BMPs
- 19 different types
- 43 different locations
- Annual Inspections
  - Ensure system is performing properly
  - Protecting downstream water quality
Public BMPs

Beatley Library

Duncan Library
Compliant-Driven Inspections

- **Call.Click.Connect.**
- Respond more efficiently to requests from residents and the public
- Launched January 28, 2013
- Customer service initiative
- Generates Service Requests
  - Web-based – City Homepage
  - Call Center at 703-746-HELP
- Integrated with Cityworks™
- Geolocate stormwater request and allocate the appropriate resources
EPA Inspection

- Requested database information
- Focus on public facilities
- Maintenance records
- Inspection dates and results
- Documentation, documentation, documentation
- Run-through inspection of a few facilities
Standard Operating Procedures (SOPs) for Daily Operations
Daily Operations SOPs

- Due June 30, 2015
- Road, street, and parking lot maintenance
- Equipment maintenance
- Application, storage, transport, and disposal of pesticides, herbicides, and fertilizers.
- Utilized in employee training
Prevent and Minimize Pollution

- Vehicle and equipment leaks
- Waste materials
- Vehicle wash water and wastewater
- Pumped utility construction and maintenance activities
- Bulk storage areas (e.g., salt storage, topsoil stockpiles)
- Apply materials, including fertilizers and pesticides, per manufacturer's specs
Stormwater Pollution Prevention Plans (SWPPPs) for Municipal Operations
MS4 SWPPP Requirements

- MS4 requirement
- Develop and implement SWPPPs for high-priority facilities
- Provide training for all municipal operations
- Implement BMPs
- Quarterly visual and annual compliance inspections
- Recordkeeping
Type of Municipal Facilities

- Equipment storage and maintenance
- Materials storage
- Pesticide storage
- Public works yards
- Recycling
- Salt storage
- Composting
- Solid waste handling and transfer
- Vehicle storage and maintenance
SWPPP Contents

- Site description and map
- Potential pollutants sources and BMPs
- Staff training
- Annual site compliance evaluation
- Inspection and maintenance schedule
- Inspection results and follow-up
- Evaluate and modify SWPPP as needed
Stormwater Pollution

- 5 quarts of oil can contaminate 1 million gallons of water
- Nutrients from yard waste and mulch lowers dissolved oxygen in water
- Sediment smothers oysters and fish eggs
- Concrete, grout and salt changes pH
EPA Inspection

- EPA/consultant requested SWPPPs for facilities
- Focused heavily on municipal operations (1 of top 4 focus areas)
- Facility walk-throughs and talked to staff
- Requested vehicle/equipment maintenance logs
- Requested oil recycling records; contracts
High-Priority Municipal Facilities Requiring SWPPPs
T&ES and RPCA
Potential Pollution Sources and BMPs
Potential Pollution Sources and BMPs
Potential Pollution Sources and BMPs

• Motor oil from leaks $\rightarrow$ Drip pans, dry absorb and recover; pre-trip inspection
• Hydraulic fluid $\rightarrow$ Same
• Organics from leaf trucks $\rightarrow$ Cover, ensure tight seals, clean
• Wash water $\rightarrow$ Wash in authorized location
• Form release oils $\rightarrow$ Cover, apply using plastic or tarp
• Dumpster juice $\rightarrow$ Keep closed; replace or repair if leaking
Materials and Vehicle Storage
Potential Pollution Sources and BMPs
Potential Pollution Sources and BMPs
Potential Pollution Sources and BMPs

• Salt and brine storage, loading → Cover and contain, sweep spillage
• Asphalt, sand and aggregate → Cover and contain, sweep spillage
• Motor oil and hydraulic leaks → Drip pans, dry absorb
• Dumpster juice → Keep closed; replace or repair if leaking
• Vehicle/equip wash → Use wash rack
• Impact to BMPs → All the above
Potential Pollution Sources and BMPs

• Paint from test striping → Perform away from storm inlets, not before rain
• Paint storage → Lids, label, cover
• Vehicle and equipment wash water → Discharge to sanitary sewer
• Gas can storage → Covered location, outside preferable
• Metals from light posts → Store on pallets, covered; salvage as applicable
• Dumpster juice → Keep closed; replace or repair if leaking
Fueling Activities
Potential Pollution Sources and BMPs

- No “topping off”
- Remain with vehicle
- Use dry absorb and clean it up
- Provide spill kits
- Minimize refueling during rain events
Thanks!

Derek Claytor
Superintendent of
Sewer, Hydrant, and
Stormwater BMP Maintenance.
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