MAINTAINING THE BMP
SESSION OVERVIEW

• TRANSITIONING TO THE “MANY BMP” MODEL
• MAINTENANCE ISSUES THAT ARE REALLY DESIGN ISSUES
• BMP MAINTENANCE FORENSICS
• MAINTENANCE PROGRAM TOOLS
• BMP PERFORMANCE VERIFICATION FOR BAY MODEL
Maintenance Access Award!
WATERWAY BUFFER ZONE

VEGETATION PROTECTED
BY COUNTY CODE
THE OLD POND MAINTENANCE MODEL

ONE BIG POND
The New “Many-BMP” Maintenance Model

- 24 disconnections
- 18 swale sections
- 14 rain gardens
- 5 bioretention areas
- 4 tree planting areas
- 6 sheet flow credits
## The Changing Maintenance Paradigm

<table>
<thead>
<tr>
<th></th>
<th>Conventional Practices</th>
<th>LID Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Example of Practice</strong></td>
<td>Pond</td>
<td>Disconnects/rain garden</td>
</tr>
<tr>
<td><strong>Number of practices?</strong></td>
<td>A few at each site</td>
<td>Dozens</td>
</tr>
<tr>
<td><strong>Size of practices?</strong></td>
<td>Large drainage area</td>
<td>Micro-drainage area</td>
</tr>
<tr>
<td><strong>When to construct?</strong></td>
<td>During site construction</td>
<td>After site is stabilized</td>
</tr>
<tr>
<td><strong>Who is responsible?</strong></td>
<td>Homeowner association</td>
<td>Homeowner</td>
</tr>
<tr>
<td><strong>Who does inspection?</strong></td>
<td>Public sector engineer</td>
<td>Trained contractor</td>
</tr>
<tr>
<td><strong>Who does maintenance</strong></td>
<td>Specialized contractor</td>
<td>Landscape contractor</td>
</tr>
<tr>
<td><strong>How long does it take?</strong></td>
<td>Hour or more</td>
<td>10 minutes</td>
</tr>
<tr>
<td><strong>What is the goal?</strong></td>
<td>Prevent dam failure and public nuisances</td>
<td>Maintain hydrologic function and landscaping</td>
</tr>
<tr>
<td><strong>Sediment cleanouts?</strong></td>
<td>On a 30 to 50 year cycle (if ever)</td>
<td>Annual cleanouts at pretreatment devices</td>
</tr>
<tr>
<td><strong>Maintenance Triggers</strong></td>
<td>After catastrophic failure</td>
<td>When it looks like crap</td>
</tr>
</tbody>
</table>
Technical Report
Stormwater BMPs in Virginia’s James River Basin:
An Assessment of Field Conditions & Programs
(part of the Extreme BMP Makeover project)

June 2009
Final Draft

- Design
- Installation
- Maintenance
Maintenance Issues
Percent of BMPs Surveyed with Maintenance Issues

- Level Spreaders: 100%
- Permeable Pavement: 60%
- Bioretention: 40%
- Other BMPs: 20% or less
Sediment Deposition

- Forebay filled in
- Flow cutting through, bypassing pretreatment
- Sediment deposition in pervious pavers
Maintenance Access

Are YOUR inspectors this adventurous?
Don’t worry homeowners, here we come!

Difficult to Maintain
Erosion
Vegetation: Too much, too little – what's the intended palette?

Bioretention lacking vegetation
Owner Awareness

4”
What are some solutions?
CONSIDER MAINTENANCE DURING DESIGN

• PUT RISER NEAR EDGE OF POND
• MAINTENANCE ACCESS TO FOREBAY & RISER
• GENTLE SLOPE ON EMBANKMENTS
• RODS TO SHOW SEDIMENT ACCUMULATION
• PROTECT LOW-FLOW ORIFICE FROM CLOGGING
• VEGETATION MAINTENANCE PLAN & TARGET COMMUNITIES THROUGH TIME: 1-YEAR, 2-YEAR, 5-YEAR, 10-YEAR, ETC.
• INTEGRATE BMPS AESTHETICALLY WITH SITE AND “COMMON” USES
PLAN FOR SEDIMENTATION

• “OVERBUILD” FOR LOSS OF DEPTH OVER TIME
• PLAN FOR ACCUMULATION AT INLETS
• SEDIMENTATION RODS IN PRETREATMENT AREAS
• MAKE SEDIMENT REMOVAL SIMPLE

Good access to forebays for sediment removal
MAINTAINING ON-LOT PRACTICES

- Local program policies/alternative inspection schedule
- Role of lot owner vs. homeowners’ assoc.
- Consider BMPs on-lot vs. in expanded right-of-way or drainage easement
YOUR TURN:
BMP MAINTENANCE FORENSICS

HOW DOES MAINTENANCE RELATE TO DESIGN CHOICES?
PRE-TREATMENT DETAILS
(EXAMPLE: VA, CURB INLETS, CONCENTRATED FLOW)
VEGETATION OPTIONS

PERENNIAL GARDEN

TREE – TURF

PERENNIAL - SHRUB

TREE – SHRUB – MULCH
DYNAMIC VEGETATION MANAGEMENT

Year 1

Year 3

Year 10
Soil Media

Pea Gravel Over Underdrain Stone
RUN-ON RATIO, PRE-TREATMENT
WHO IS RESPONSIBLE FOR MAINTENANCE?

REGULATORY CONTEXT

- **MS4 PERMIT:**
  - **PRIVATE:** INSPECT EVERY 5 YEARS, POLICIES TO ENSURE MAINTENANCE, SCHEDULE, MAINTENANCE AGREEMENTS, ALTERNATIVE
  - **PUBLIC:** INSPECT ANNUALLY, CONDUCT MAINTENANCE
  - TRACKING & REPORTING

- **VSMP:**
  - LOCAL ORDINANCE, POLICIES & PROCEDURES, RECORDED INSTRUMENT FOR MAINTENANCE

- **WIP/TMDL**
  - VERIFICATION OF PERFORMANCE EVERY 9-10 YEARS
INSPECTION/MAINTENANCE PROGRAM TOOLS

• TB# 10 BIORETENTION ILLUSTRATED!
  • COMPLETE VISUAL INDICATORS FOR LID PRACTICES

• CONSTRUCTION, INSPECTION AND MAINTENANCE VIDEOS FOR LID PRACTICES ON CSN WEBSITE
  • IN ENGLISH AND SPANISH

• TABLET/SMARTPHONE APP THAT USES VISUAL INDICATORS TO RAPIDLY INSPECT AND DEVELOP MAINTENANCE PUNCH-LIST FOR EACH SITE

www.chesapeakestormwater.net
Chesapeake Bay Stormwater Training Partnership

Visit: www.chesapeakestormwater.net

To learn how you can have access to:

Discounted Webcasts
Free One-day design workshops
Intensive master stormwater design seminars
Direct On-site technical assistance
Self guided web-based learning modules
Bioretention Illustrated: Visual Indicator Approach for Inspection
Inlet Obstruction

Good condition

Remove sediment, debris

Removal of sediment, obstruction

Sediment staining = entry problem
Standing Water

Pass

None

<3” of standing water after 72 hrs

Minor

Saturated soils

Moderate

Severe

Proceed to pump down and test pit

#10

BED ZONE

Standing Water

FBI
Vegetative Cover

Good cover

Few bare spots

Tip: more mulch area exposed = more maintenance cost

Tip: Routinely split and replant Herbaceous material to reduce mulch area

< 75% coverage
Key Inspection Zones in a Stormwater Pond
EQUIPMENT ACCESS

ABILITY TO GET ACCESS TO POND WITH HEAVY EQUIPMENT

• EASEMENT WIDTH
• VEGETATION GROWTH IN EASEMENT
• SLOPE
• FENCES
• LOCKS
INSPECTION APP: GIVE ME YOUR EMAIL
VIDEOS: INSTALLATION, MAINTENANCE & INSPECTION (ENGLISH & SPANISH)

http://www.youtube.com/user/CenterforWatershed
THE BRAVE NEW WORLD OF BMP PERFORMANCE VERIFICATION

URBAN BMP VERIFICATION AND THE BAY POLLUTION DIET

• BMP VERIFICATION A PRIORITY FOR ALL SECTORS IN THE CHESAPEAKE BAY PROGRAM

• URBAN STORMWATER WORKGROUP ADOPTED ITS VERIFICATION PROTOCOL IN NOVEMBER 2012, REVISED IN JUNE 2013, MAY BE REVISED AGAIN

• STATES WILL IMPLEMENT THEM THRU THEIR EXISTING MS4 BMP REPORTING EFFORTS
Performance Verification

Ensure BMP still exists and is providing the pollutant removal it was designed to achieve or if it requires major restoration.

MS-4 Permit/Bay TMDL

Once every 9-10 years

Trained evaluator

State BMP Reporting for Bay TMDL

Local BMP Inventory
THREE PART TEST: PASS/FAIL

1. DOES IT STILL PHYSICALLY EXIST?

2. IS IT STILL OPERATING TO TREAT AND REDUCE RUNOFF AS IT WAS ORIGINALLY DESIGNED?

3. IS IT’S MAINTENANCE CONDITION SUFFICIENT TO STILL SUPPORT ITS POLLUTANT REDUCTION FUNCTIONS?
SUMMARY

• MANY BMPS? HAVE A MAINTENANCE PLAN

• BMP DESIGN – USE MAINTENANCE REDUCTION FEATURES

• NEW SPECS – LOTS OF DETAILS, E.G. PRETREATMENT

• STRATEGIC APPROACH FOR VEGETATION

• AVAILABLE MAINTENANCE PROGRAM TOOLS