

WELCOME!!




ENJOY THE SHOW!

This abbreviated version was first shown to participating HOA attendees on November 2, 2023.

Hope this is helpful.

The maintenance of stormwater
management facilities by HOA's

OPERATION AND MAINTENANCE (O&M)

The background features decorative curved lines in shades of green and blue, positioned in the top-left and bottom-right corners. The text is centered in a dark blue, sans-serif font.

PREPARE
AND
IMPLEMENT
A SITE SPECIFIC
MANAGEMENT PLAN

Identify and locate the various stormwater facilities

Swales

Rain Gardens

WQ Inlet inserts

Rock Aprons

Riparian Forest Buffer (RFB)

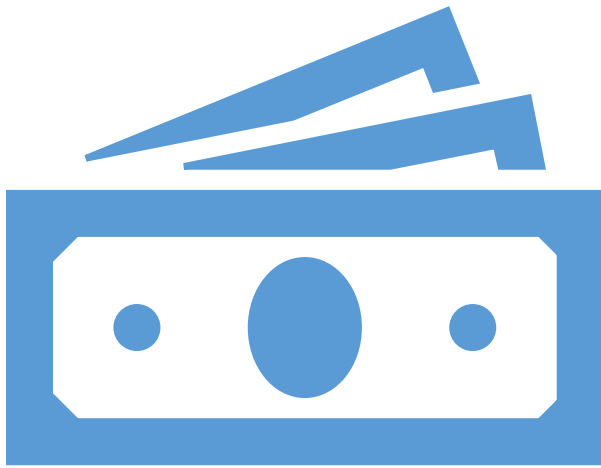
Detention Basins

Open Space Areas

Street Sweeping

Vegetated Filter Strips

Underground Systems

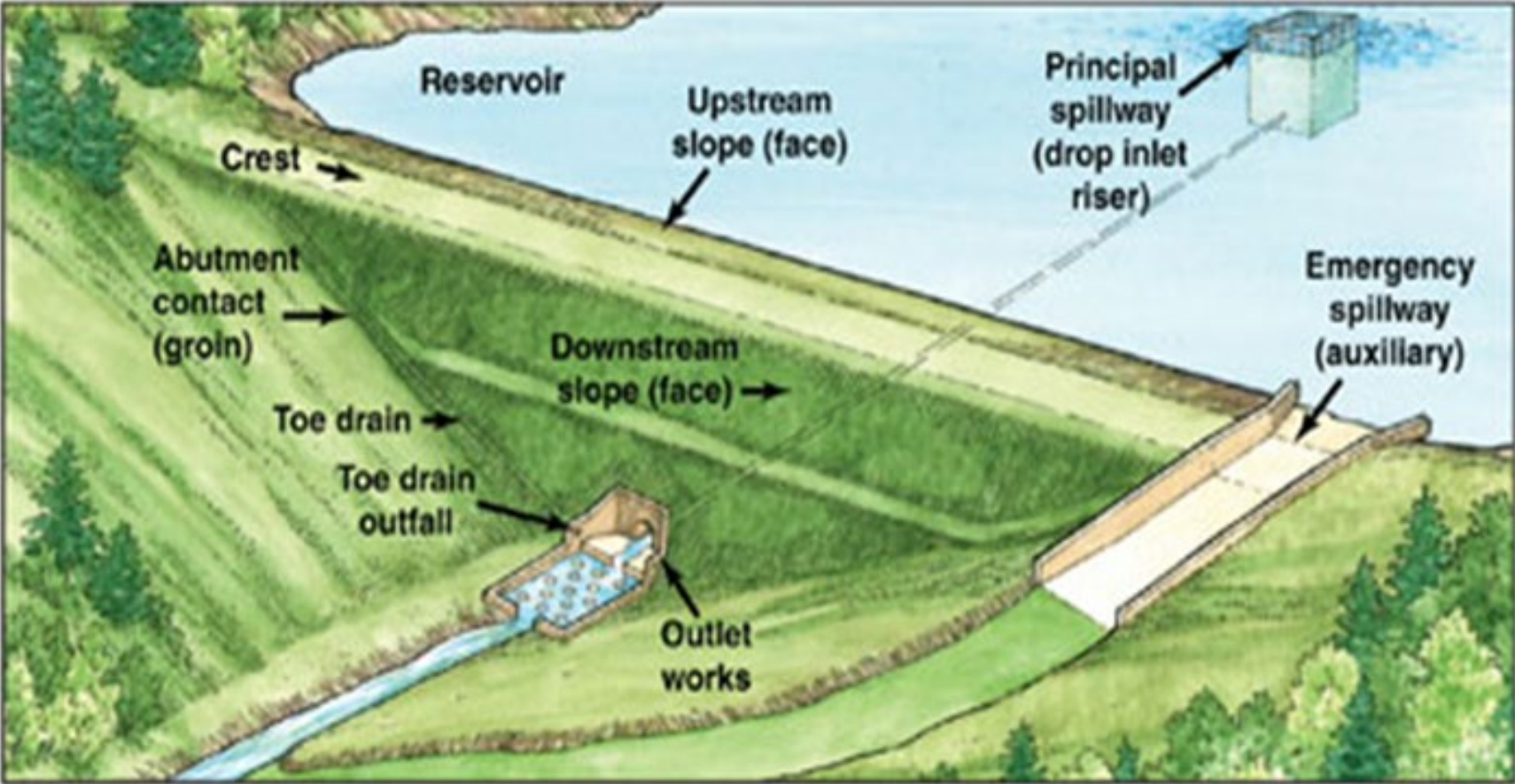


Prepare a BUDGET !!

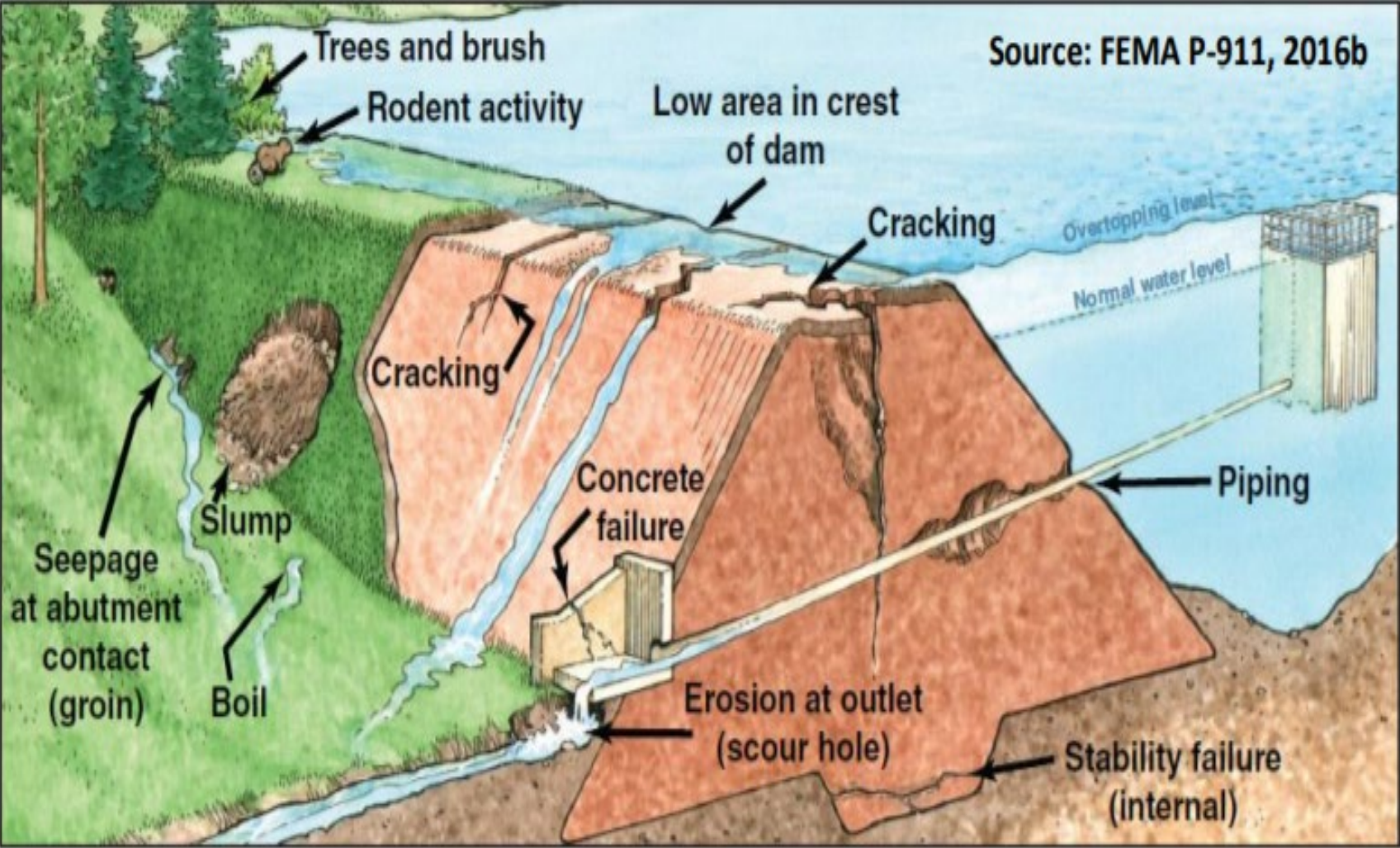
Retain a licensed professional for advice/inspections?

Insurance Policy?

Principal spillway versus Emergency spillway



Source: FEMA P-911, 2016b



RECORD KEEPING

Use of checklist

VISUAL INSPECTIONS

FREQUENCY ?

Preventative Maintenance for Basins

- Keep vegetation cut back in the easement to allow inspections to be conducted
- Repair erosion early
- Keep trees from growing on the dam
- Keep trash picked up
- Keep the spillways operational
- Inspect all pipes
- Keep an eye on the facilities, don't neglect maintenance
- **Encourage HOA to organize workdays**

INSPECTION REPORT FOR STORMWATER MANAGEMENT FACILITIES

DEVELOPMENT NAME: _____

DATE: _____

INSPECTOR: _____

SITE CONDITIONS: _____

TYPE OF INSPECTION: _____

(MONTHLY, QUARTERLY, YEARLY, AFTER LARGE RAIN EVENT)

| STORMWATER FACILITY | INSPECTED? Yes/No/n/a | REMARKS |
|--|--------------------------|---------|
| DRY EXTENDED BASIN | | |
| STRUCTURES CLEAR OF DEBRIS | | |
| STRUCTURES CLEAR OF SEDIMENT | | |
| STRUCTURES STRUCTURALLY SOUND | | |
| SURFACE VEGETATION HEALTHY | | |
| EROSION PRESENT | | |
| SOIL CONTAMINATION | | |
| SLOPE STABILITY | | |
| DISCHARGE WATER CLEAR | | |
| BIO-RETENTION POND | | |
| STRUCTURES CLEAR OF DEBRIS | | |
| STRUCTURES CLEAR OF SEDIMENT | | |
| STRUCTURES STRUCTURALLY SOUND | | |
| SURFACE VEGETATION HEALTHY | | |
| EROSION PRESENT | | |
| SOIL CONTAMINATION | | |
| SLOPE STABILITY | | |
| STANDING WATER LONGER THAN 72 HOURS | | |
| VEGETATED SWALE | | |
| VEGETATION MAINTAINED | | |
| SLOPE STABILITY | | |
| SURFACE VEGETATION HEALTHY | | |
| EROSION PRESENT | | |
| WATER STANDING LONGER THAN 48 HOURS | | |
| DEBRIS/SEDIMENT PRESENT | | |
| RIPRAP APRON | | |
| NOXIOUS VEGETATION PRESENT | | |
| STRUCTURALLY STABLE | | |
| SETTLEMENT EVIDENT | | |

| INFILTRATION BASIN | |
|--|-----------------------|
| OPERATION & MAINTENANCE PROCEDURES | |
| ACTIVITY | SCHEDULE |
| IF APPLICABLE, REMULCH VOID AREAS, AND REVEGETATE. | AS NEEDED |
| WATER VEGETATION DAILY FOR TWO WEEKS. | AT PROJECT COMPLETION |
| INSPECT SOIL & REPAIR ERODED AREAS, REMOVE LITTER AND DEBRIS. | MONTHLY |
| INSPECT FOR SEDIMENT BUILD-UP, EROSION, DAMAGE TO OUTLET STRUCTURES AND SLOPE STABILITY | TWICE PER YEAR |
| MOW VEGETATION IN FACILITY USING EQUIPMENT THAT WILL NOT COMPACT BOTTOM OF FACILITY OR UNDERDRAIN. THIS SHOULD BE DONE IN DRY WEATHER. | TWICE PER YEAR |
| GENERAL MAINTENANCE NOTES: <ol style="list-style-type: none"> 1. WHILE VEGETATION IS BEING ESTABLISHED, PRUNING AND WEEDING MAY BE REQUIRED. 2. DURING PERIODS OF EXTENDED DROUGHT, FACILITY MAY REQUIRE WATERING. 3. VEHICLES OR MACHINERY SHOULD NOT BE PARKED OR DRIVEN ON THE BASIN OR FILTER AREA TO AVOID COMPACTION. 4. THE PROPERTY OWNER IS RESPONSIBLE FOR MAINTAINING THE VEGETATION WITHIN THE BASIN. 5. IF THE BMP DOES NOT DEWATER WITHIN 72 HOURS AFTER A RAINFALL EVENT, THE OWNER SHALL CONTACT THE LICENSED PROFESSIONAL TO DETERMINE THE CORRECTIVE MEASURES NECESSARY TO MITIGATE THE BMP'S DYSFUNCTION. | |
| POTENTIAL REPAIRS: <ol style="list-style-type: none"> 1. IF FACILITY OR UNDERDRAIN DOES NOT DEWATER APPROPRIATELY, INSPECT THE FACILITY FOR COMPACTED SOILS, ETC. THE ORIGINAL SOILS NOT DEWATERING MAY NEED TO BE REMOVED AND REPLACED WITH NON-COMPACTED SOILS. | |

| DRY EXTENDED DETENTION BASIN | |
|---|------------------------|
| OPERATION & MAINTENANCE PROCEDURES | |
| ACTIVITY | SCHEDULE |
| REPAIR UNDERCUT OR ERODED AREAS, MOW SIDE SLOPES, SEED OR SOD TO REPAIR DEAD OR DAMAGED GROUND COVER. | AS NEEDED |
| ALL BASIN STRUCTURES EXPECTED TO RECEIVE &/OR TRAP DEBRIS & SEDIMENT SHOULD BE INSPECTED FOR CLOGGING & EXCESSIVE DEBRIS & SEDIMENT ACCUMULATION, AS WELL AS AFTER EVERY STORM GREATER THAN 1 INCH. | FOUR TIMES PER YEAR |
| NOTE EROSION OF POND BANKS OR BOTTOM. | SEMI-ANNUAL |
| INSPECT FOR DAMAGE TO THE EMBANKMENT. MONITOR FOR SEDIMENT ACCUMULATION IN THE FACILITY & FOREBAY, EXAMINE TO ENSURE THAT INLET & OUTLET DEVICES ARE FREE OF DEBRIS & OPERATIONAL. INSPECT VEGETATED AREAS FOR EROSION & INVASIVE SPECIES. | ANNUAL |
| REMOVE SEDIMENT FROM THE FOREBAY (IF APPLICABLE). | 5-7 YEAR MAINTENANCE |
| MONITOR SEDIMENT ACCUMULATIONS, & REMOVE SEDIMENT WHEN THE POND VOLUME HAS BEEN REDUCED BY 25%. | 25-50 YEAR MAINTENANCE |
| GENERAL MAINTENANCE NOTES: <ol style="list-style-type: none"> 1. SEDIMENT REMOVAL SHOULD BE CONDUCTED WHEN THE BASIN IS COMPLETELY DRY. 2. VEGETATIVE COVER SHOULD BE MAINTAINED AT A MINIMUM OF 95%. 3. IF VEGETATIVE COVER HAS BEEN REDUCED BY 10%, VEGETATION SHOULD BE REESTABLISHED. | |



Neil Bowman/FLPA/Minden

BURROWING ANIMALS

(groundhogs and muskrats)

Animals or something else going on?



Impoundment Concerns



Cracking

Sloughing



**A common failure of a facility
is:**

Failure to drain after 72 hours

failed rain garden?



05/29/2009

WNV concern?





trees and subsurface piping don't mix well



VEGETATIVE O&M

HOW OFTEN

CLEARING AND GRUBBING

MOWING

NOXIOUS WEEDS AND INVASIVE PLANTS

HERBICIDES

Landscaping with Native Plants



in Pennsylvania

Commonwealth of Pennsylvania
Edward G. Rendell, Governor
Department of Conservation & Natural Resources
Michael DiBernardinis, Secretary



Invasive Plants

in Pennsylvania



Commonwealth of Pennsylvania
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RAIN GARDEN PLANT IDENTIFICATION



1 *Amelanchier leavis* 'Sercise Berry'



4 *Pennstemon digitalis* 'Husker Red'
Beardstongue



7 *Vernonia noveboracensis*
'NY Iron Weed'



11 *Panicum Virgatum* 'Shenandoah'
Red Switchgrass



14 Dwarf Inkberry Bush



15 *Crocus sp.* Crocus



16 *Waldsteinia ternata*
'Barren Strawberry'



8 *Fothergilla gardenii*
'Dwarf Witch Alder'



2 *Osmunda claytoniana*
'Interrupted Fern'



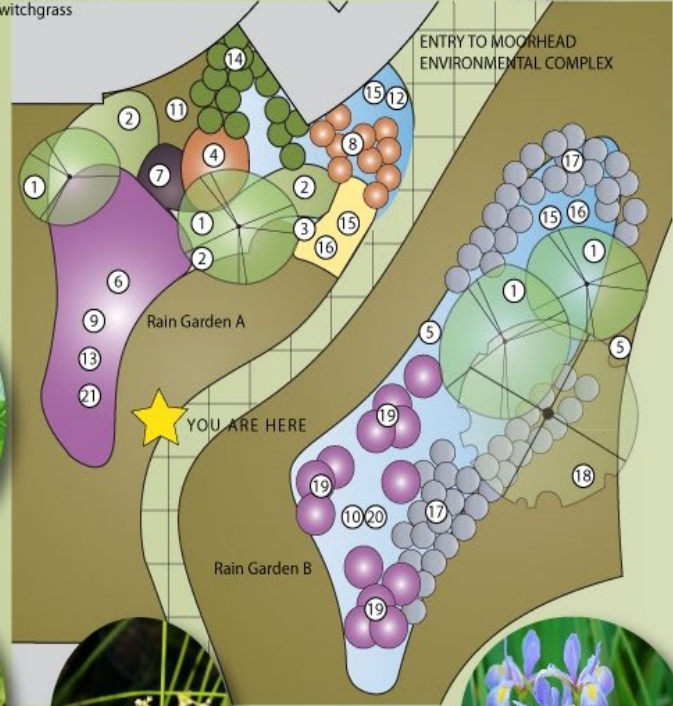
5 *Aster oblongifolius*
'Raydon's Favorite'
aromatic aster



9 *Chalone Glabra*
'White Turtlehead'



12 *Amsonia* 'Blue Ice'
Blue Star



17 *Hydrangea quercifolia* 'pee wee'
Oakleaf Hydrangea



3 *Phlox x.* 'Minnie Pearl'
Minnie Pearl Phlox



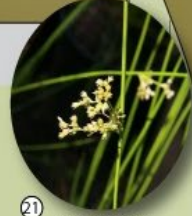
6 *Liatris spicata* 'Blazing Star'



10 *Coreopsis rosea*
Pink Tickseed



13 *Lobelia siphilitica*
Great Blue Lobelia



21 *Juncus effusus*
'Common Rush'



18 *Acer rubrum* 'Red Maple'



20 *Iris versicolor*
Blue Flag Iris



19 *Magnolia virginiana*
'Sweetbay Magnolia'

Control of invasive and PA Noxious plants



Mile-a-minute, Japanese Knotweed, Purple Loosestrife

Purple Loosestrife at Cedarfield



Use of Herbicides ?



MOWING 101



clearing of cattails ok but avoid rutting -
mosquitos



MOW or not to Mow?



“Old School” SWM Basin – water in water out





Infiltration Basin that actually drains



Canada Thistle “gone to seed”.
Early detection is key!



Was subsurface piping installed? If yes than the woody vegetation in bottom of basin is a problem.



Swale Maintenance – to mow or not to mow?



dreamstime.com ID 224003663 © Inna Tarasenko

This basin is being maintained properly.



Hide and Seek



THOUGHTS ??



Vegetation Management at Outlet Structures



Woody vegetation should be removed from embankments and around outlet structures. Leaving the trees could result in HOA spending \$\$ for repairs of embankment.



Emergency Spillway needing tree removal



+
o •

Clogging and Obstructions

+
• o











To mow or not mow?



Emergency Spillway - unobstructed and maintained



maintenance/replacement



roadside swales



Rock Aprons



Required for Insurance Policy ?



Discussion – good or bad?



Rain Garden – before and after



Extensive landscaped rain garden - before



Forest Buffer Plantings



MEADOW plantings are fine.
Just assure the noxious and
invasive plants are controlled.
Mowing is seasonal.



RETENTIVE BERM – fits nice into wooded lot



WQ inlet inserts



Street Sweeping/Vaccuum



Porous Concrete or Asphalt - requires specific maintenance requirements



AMENDED SOILS



10/02/2003

disconnection
of roof water



Level Spreaders – used
to promote sheet flow



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