Operations & Maintenance for Residential Stormwater Practices

Brian Prunty
Stormwater Specialist
Summit Soil & Water Conservation District
Why Are We Here?

- EPA requires that we remove pollutants from the first flush or 85% of the rain events and protect stream stability through the WQv.
- EPA requires that these practices are maintained and functioning for perpetuity.
- Urbanized communities are required to track, inventory and ensure their maintenance and functionality.
Urbanized Communities...

- Are understaffed and short change to meet these unfunded mandates.
- Typically rely of landowners & HOAs to provide the required maintenance for these practices.
- Required to pass an ordinance to ensure the proper maintenance and functionality of these practices.
Why You?

- Landscapers and lawn care professionals are onsite usually once per week and may be doing part of the work already.
- The maintenance requirements match the services of the landscape professionals.
- Landscape professionals services several associations or sites.
What You Can Expect?

- A Long Term Maintenance Agreement.
- Being the middle man between the community and owner.
- Education materials, inspection and maintenance schedule.
- Working with professional engineers, stormwater professionals and other community employees.
- Each Community will be different or have different requirements and/or opinions.
Why Maintenance?

• Maintenance is inevitable.
• To ensure that the Stormwater Treatment Practice will function or perform as it was designed or constructed.
• Observe deteriorating infrastructure to prevent issues before they happen.
• Transfer trapped stormwater pollutants.
• The better it performs the more maintenance is required.
Types of Maintenance:
1. Routine Maintenance
2. Major Maintenance
Typical Residential Practices

- Basins (Dry, Wet and Wetland)
- Filtering (Bioretention and Rain Gardens)
- Porous Pavement
- Rain Water Harvesting
Dry Basins
Anatomy of a Dry Basin
Outlet Types
Water Quality Orifice
Monthly Routine Maintenance:

• Mow embankment to prevent woody vegetation.
• Inspect WQ orifice, principle and emergency spillway and outlet structure.
• Repair any scouring, erosion in low flow channel, sides or embankment.
• Reseed or stabilize bare areas.
• Remove vegetation at least 10 feet away from outlet structure
• Remove any debris or litter.
Annual Routine Maintenance:

- Inspect forebays & micropools for sediment accumulation and dredge, if needed.
- Monitor for invasive plants
- Thoroughly inspect the outlet structure and pipes for deterioration, spalling, corrosion etc.
- Check outfall and rock pad for vegetation and/or sediment accumulation.
WATER QUALITY OUTLET (ST-7) DETAIL

C.B. #7

NO SCALE

* NOTE:

PROF. 10.0 L.F. 4" WATER QUALITY OUTLET PIPE #100% (ST-7)

CATCH BASIN SIDE WALL (C.B. #7)

CORE DRILL 4" HOLE TO ACCEPT 4" DIA. SCH. 40 PVC PIPE COUPLING ON INSIDE C.B.

INV.+194.90-4"

PROF. 34.00

20" x 60" x 12" D. MICROPOL

4" THREADED CAP

PROF. GRADE

INV.+195.00

DRILL 1" DIA. HOLE (INV.+195.00) GLUE 1 EA. 1" PVC NIPPLE AND 1"-90° BEND INTO 4" CAP FOR WATER QUALITY TURN 90° BEND DOWNWARD TO PREVENT Clogging. NOTE: SEE CONSTRUCTION SEQUENCE NARRATIVE ON THIS SHEET.
Wet Basins
Monthly Routine Maintenance:

- Mow embankment to prevent woody vegetation.
- Inspect WQ orifice, principle and emergency spillway and outlet structure.
- Repair any scouring or erosion on sides or embankment.
- Reseed or stabilize bare areas.
- Remove vegetation at least 10 feet away from outlet structure.
- Remove any debris or litter.
Annual Routine Maintenance:

- Inspect forebays (if applicable) for sediment accumulation and dredge, if needed.
- Monitor for invasive plants
- Check pond aeration system
- Thoroughly inspect the outlet structure and pipes for deterioration, spalling, corrosion etc.
- Check outfall and rock pad for vegetation and/or sediment accumulation.
Wetland Basins

- Constructed Wetlands
- Extended Dry Detention Wetland
- Pocket wetland
- Wet swale (linear wetland)
- Submerged Gravel Wetland
<table>
<thead>
<tr>
<th>ZONE</th>
<th>PLANT COMMUNITY</th>
<th>HYDROLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Submergent zone</td>
<td>1.5-6 feet of water</td>
</tr>
<tr>
<td>2</td>
<td>Emergent zone</td>
<td>0-18 inches of water</td>
</tr>
<tr>
<td>3</td>
<td>Wet meadow zone</td>
<td>Permanent moisture</td>
</tr>
<tr>
<td>4</td>
<td>Floodplain zone</td>
<td>Flooded during snowmelt and large storms</td>
</tr>
<tr>
<td>5</td>
<td>Upland zone</td>
<td>Seldom or never inundated (the upland zone includes prairie and forest plant communities)</td>
</tr>
</tbody>
</table>
Monthly Routine Maintenance:

- Mow embankment to prevent woody vegetation.
- Inspect WQ orifice, principle and emergency spillway and outlet structure.
- Repair any scouring, erosion in low flow channel, sides or embankment.
- Reseed or stabilize bare areas.
- Remove vegetation at least 10 feet away from outlet structure
- Remove any debris or litter.
Annual Routine Maintenance:

- Inspect forebays & micropools for sediment accumulation and dredge, if needed.
- Monitor for invasive plants
- Thoroughly inspect the outlet structure and pipes for deterioration, spalling, corrosion etc.
- Check outfall and rock pad for vegetation and/or sediment accumulation.
Bioretention

- Maintain level section
- Pea gravel/grass interface
- Slotted curb
- Inflow points
- Asphalt paving
- Runoff
- Sheet flow
- 2' 
- 12'' sand bed
- Pea gravel diaphragm
- Grassed filter strip
- Mulch layer
- 4'' min. planting soil bed
- Overflow storm drain
- Inlet (above max. ponding depth)
- Shallow ponding area - 6'' depth, max.
- Pea gravel curtain drain - for overflow
- 8'' pea gravel/pipe underdrain system to storm drainage network, or receiving waters
- 4'' of pea gravel over pipe in lieu of filter fabric
- Plant material
- Underdrain system clean-outs
- Ponding limits
- 6'' drop at curb opening (typical)
- 10' - 15' min. (recommended)
- 40' min. (recommended)
Monthly Routine Maintenance:

- Clean litter, debris or sediment
- Erosion or scouring of mulch or pretreatment
- Look at outlet and keep clear
- If there is a cleanout, look down the pipe to see if there is water.
- Watering plants if needed (first year)
Annual Routine Maintenance:

- Inspect mulch for debris and sediment accumulation and remove if needed.
- Replace or add mulch, if needed
- Monitor for plants, replace dead and diseased, prune or trim if needed.
- Thoroughly inspect the outlet structure and pipes for deterioration, spalling, corrosion etc.
Use two opposing, flexible ties—when staking is necessary. Ties should be placed on the lower half of the tree and allow trunk movement.

Keep mulch 1 to 2 inches back from trunk.

Trunk flare

Gently pack backfill, using water to settle soil around the root ball.

Remove containers, wrappings, wires, and ties.

Set ball on firmly packed soil to prevent settling.
Rain Gardens
Impervious surfaces include roof tops, driveways, sidewalks and even turf grass.
Typical Maintenance:

- Natural versus Formal
- Weeding, mulching, pruning or cutting back plants.
- Replacing plants, if needed
- Clean gutter for debris and leaves
- Repair scouring or erosion
- Do not fertilize!
Rainwater Harvesting

- Cistern
- Rain Barrels
- Rain Bladder
- Rain Tanks
Typical Maintenance:

- Clean gutter from debris.
- Maintain screens and traps.
- Prevent mosquitoes, algae and mildew.
- Clean of sediment and debris from barrel.
- Inspect foundation, spigots, connection and overflow.
- Disconnect in winter and store indoors, if applicable.
- Follow manufacture’s instructions, never climb inside cisterns (OSHA) and do not drink water or give to pets.
- Check pumps (if applicable).
Mosquitoes & Your Barrel

• Use mosquito proof screening.
• Drain barrel every few days and store no longer than a week. It takes mosquitoes 10-12 day to complete cycle.
• Mosquito Dunks: 1/8 of a dunk will last 1 month.
Porous Pavement

Figure 2. Types of permeable pavement
Concrete & Asphalt

• Sweep 2-4x per year with a vacuum street sweeper.
• Stabilize surrounding areas
• Inspect pavement integrity and at transitions. Is raveling excessive?
• Is water ponding in any places?
• Winter salt application and snow piling?
Pavers and Grids

• Vacuum 2-4x per year with Vacuum or follow manufacture’s instructions.
• Stabilize surrounding areas
• Inspect paver integrity and at transitions. Repair any settling.
• Are weeds growing between spaces or is overseeding required. Do not pull weeds, flame or spray.
• Is water ponding in any places?
• If snow plowing, is rubber blade required or have any pavers been lifted?
<table>
<thead>
<tr>
<th>ZONE</th>
<th>PLANT COMMUNITY</th>
<th>HYDROLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Submergent zone</td>
<td>1.5-6 feet of water</td>
</tr>
<tr>
<td>2</td>
<td>Emergent zone</td>
<td>0-18 inches of water</td>
</tr>
<tr>
<td>3</td>
<td>Wet meadow zone</td>
<td>Permanent moisture</td>
</tr>
<tr>
<td>4</td>
<td>Floodplain zone</td>
<td>Flooded during snowmelt and large storms</td>
</tr>
<tr>
<td>5</td>
<td>Upland zone</td>
<td>Seldom or never inundated</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(the upland zone includes prairie and forest plant communities)</td>
</tr>
</tbody>
</table>
QUESTIONS?

Brian Prunty  
Stormwater Specialist  
Summit SWCD  
330-929-2871  
bprunty@summitswcd.org