

Operations & Maintenance for Residential Stormwater Practices

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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

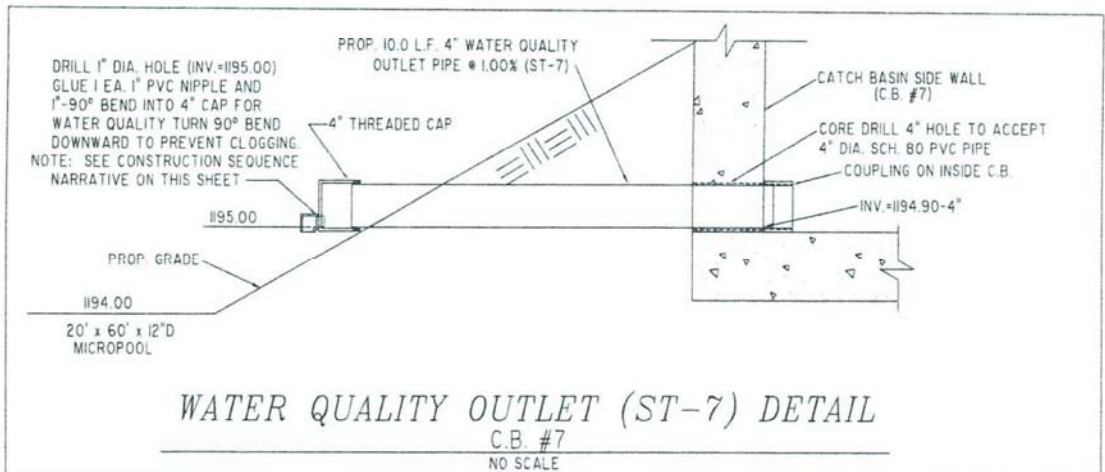


Monthly Routine Maintenance:

- 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.



* NOTE:





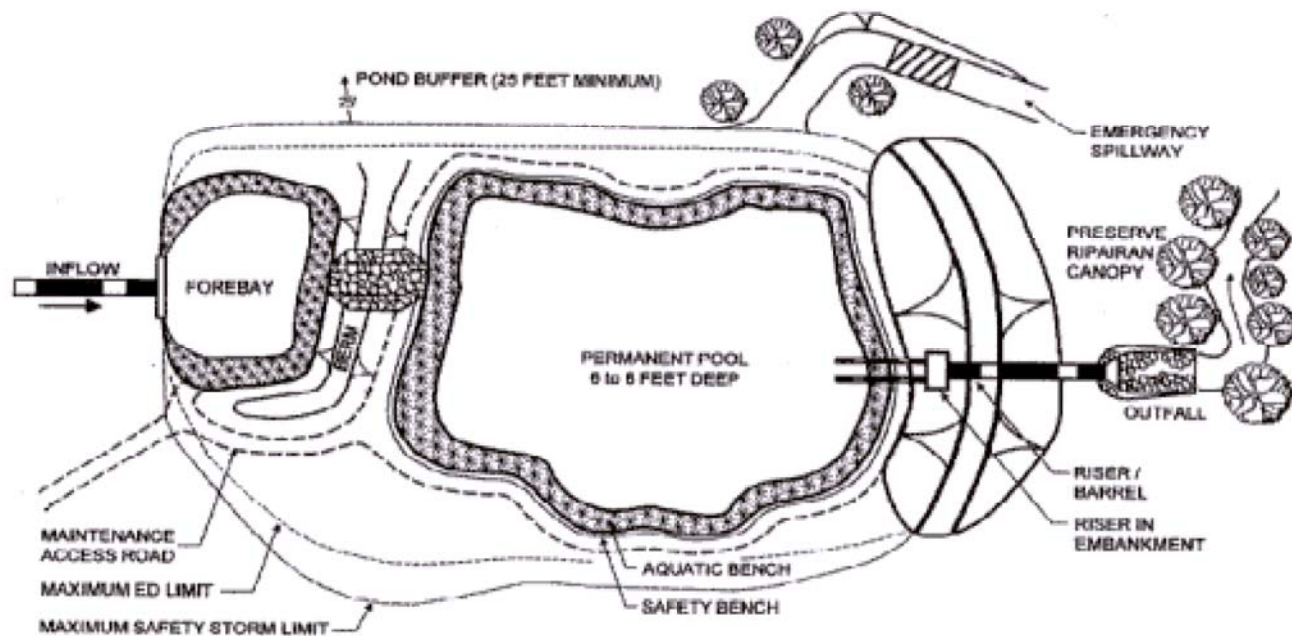




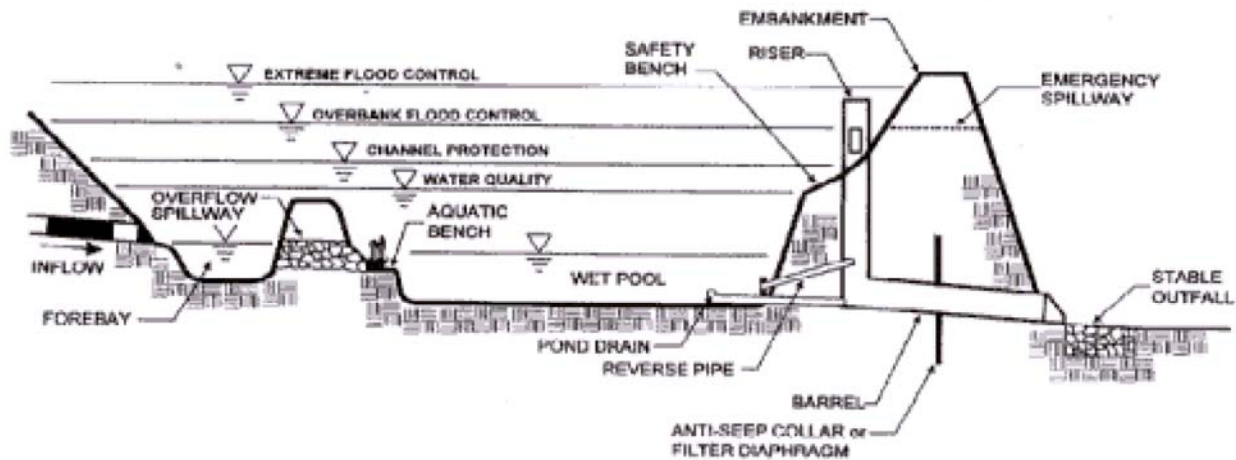


Wet Basins





PLAN VIEW



PROFILE

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.

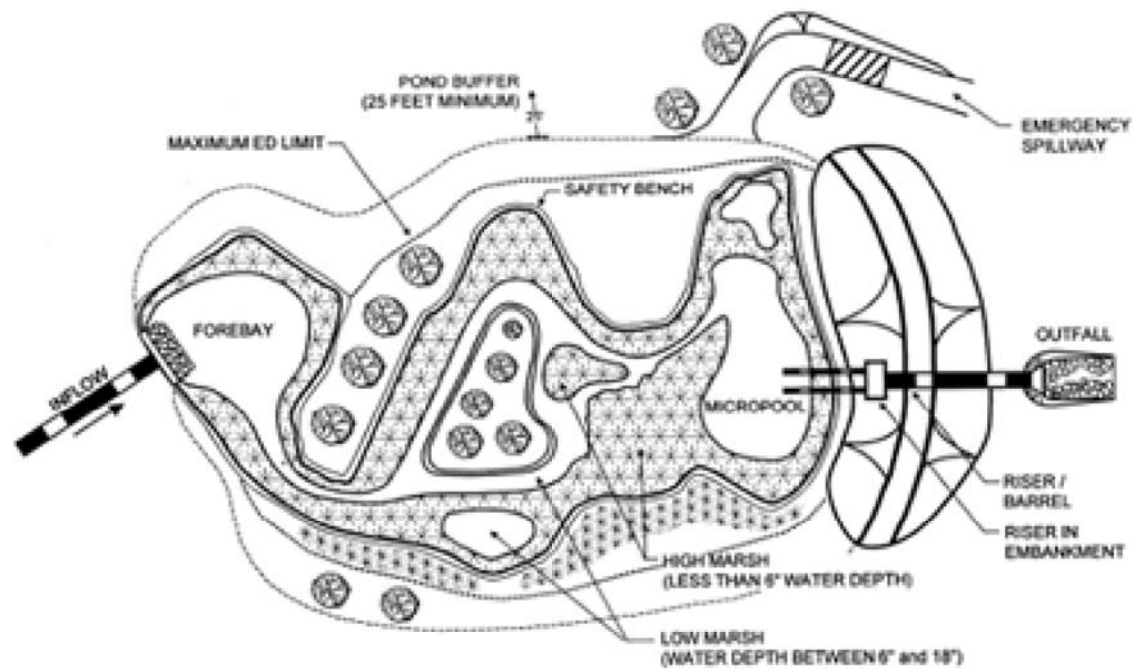




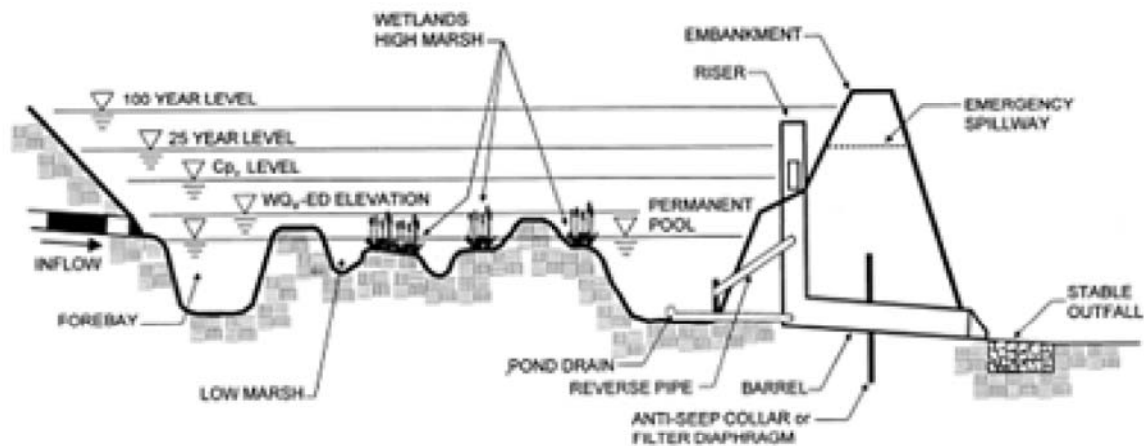


Wetland Basins

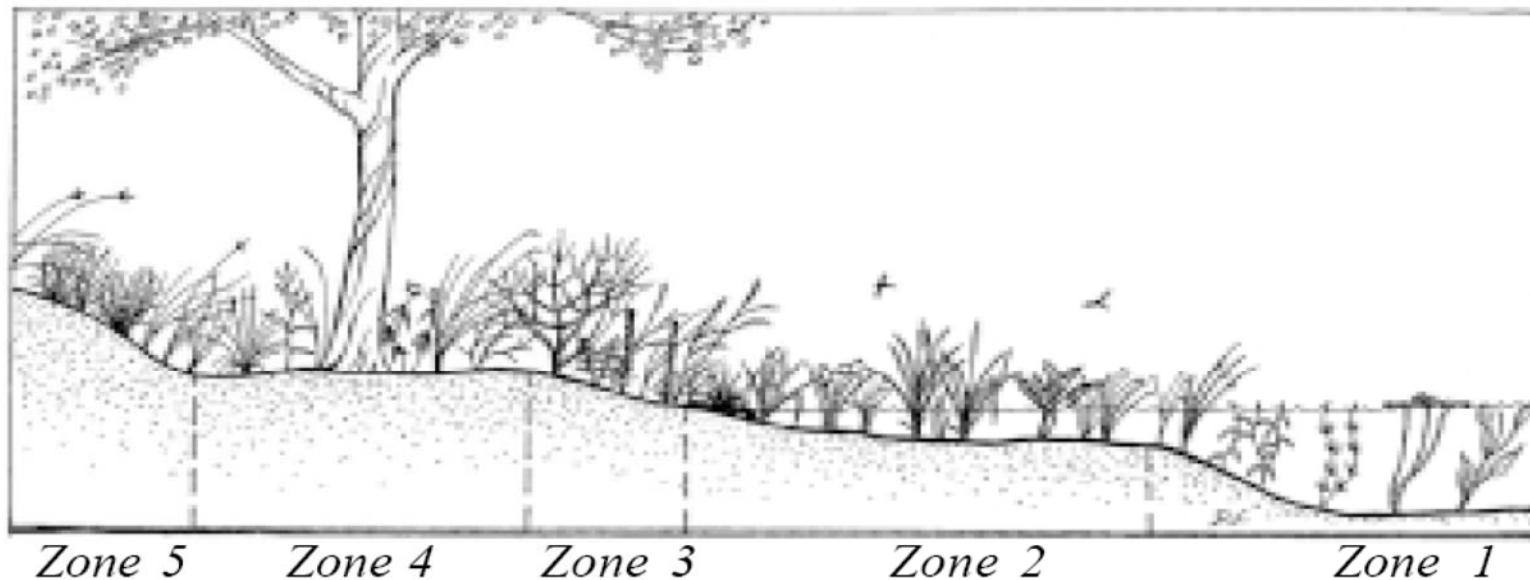
- **Constructed Wetlands**
- Extended Dry Detention Wetland
- Pocket wetland
- Wet swale (linear wetland)
- Submerged Gravel Wetland



PLAN VIEW



PROFILE



ZONE	PLANT COMMUNITY	HYDROLOGY
1	Submergent zone	1.5-6 feet of water
2	Emergent zone	0-18 inches of water
3	Wet meadow zone	Permanent moisture
4	Floodplain zone	Flooded during snowmelt and large storms
5	Upland zone	Seldom or never inundated (the upland zone includes prairie and forest plant communities)

Monthly Routine Maintenance:

- Mow embankment to prevent woody vegetation.
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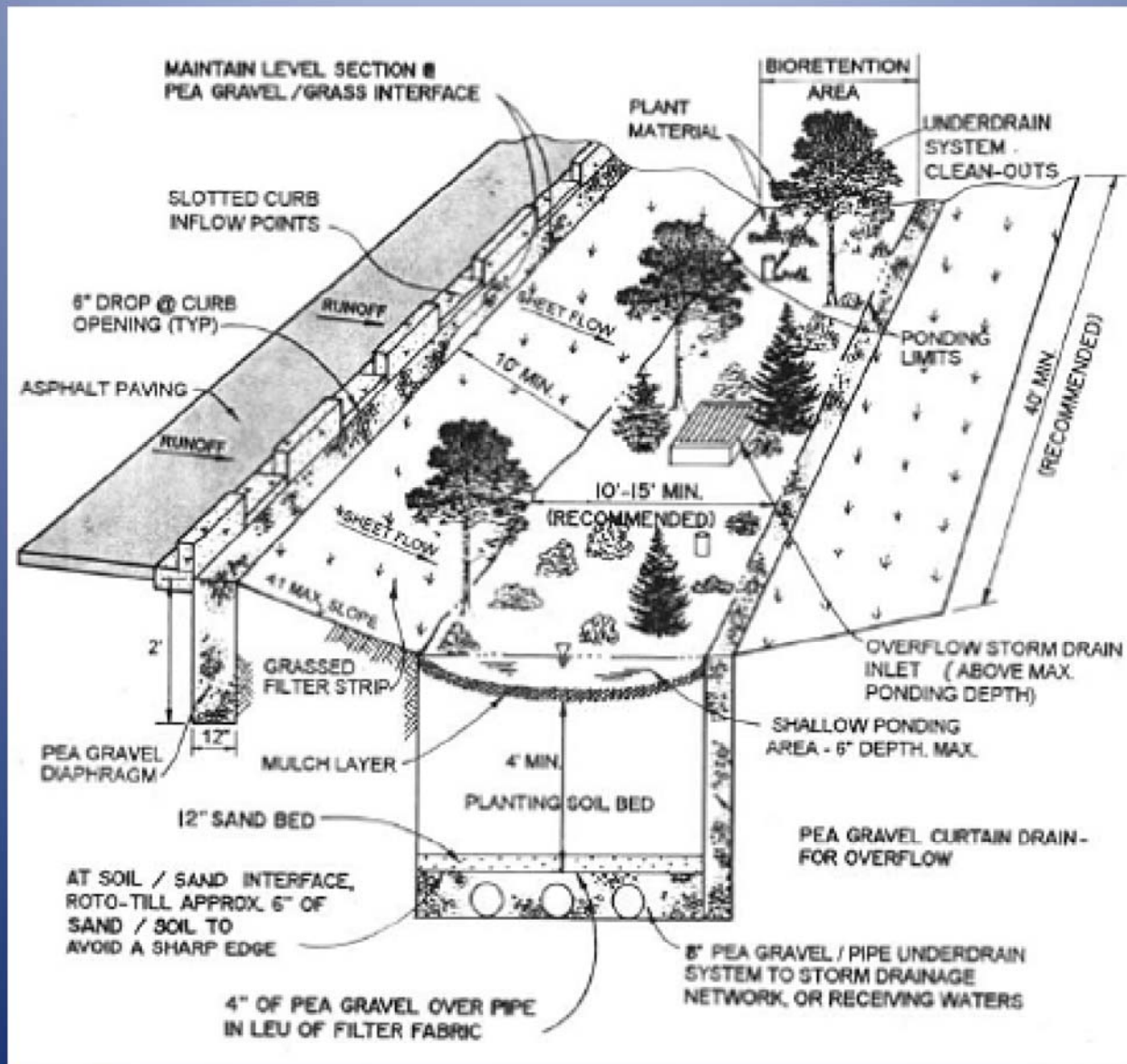
Annual Routine Maintenance:

- 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



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:

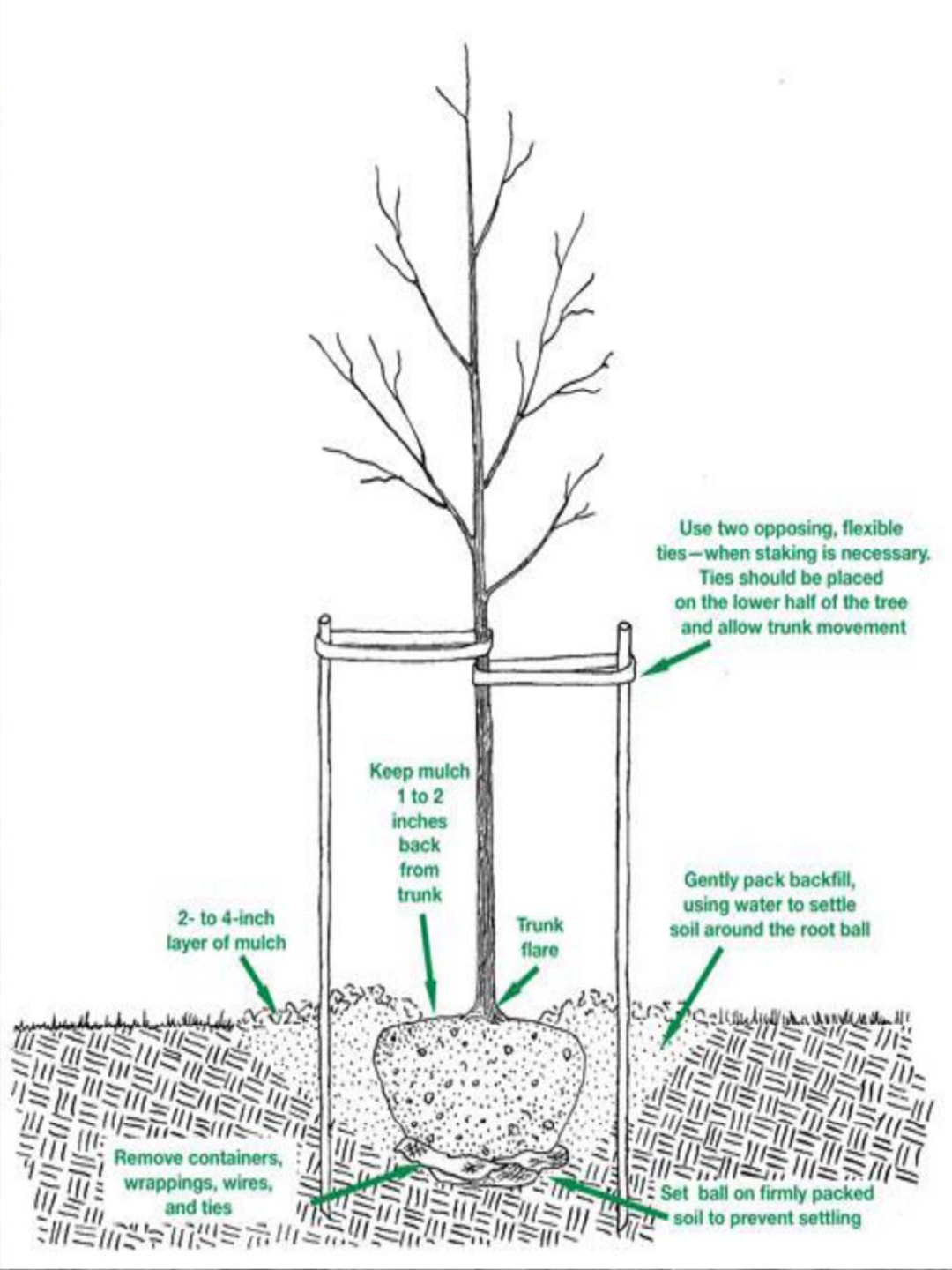
- Inspect mulch for debris and sediment accumulation and remove if needed.
- Replace or add mulch, if needed
- Monitor for plants, replace dead and diseased, prune or trim if needed.
- Thoroughly inspect the outlet structure and pipes for deterioration, spalling, corrosion etc.















Rain Gardens





**Impervious surfaces
include roof tops,
driveways, sidewalks
and even turf grass**

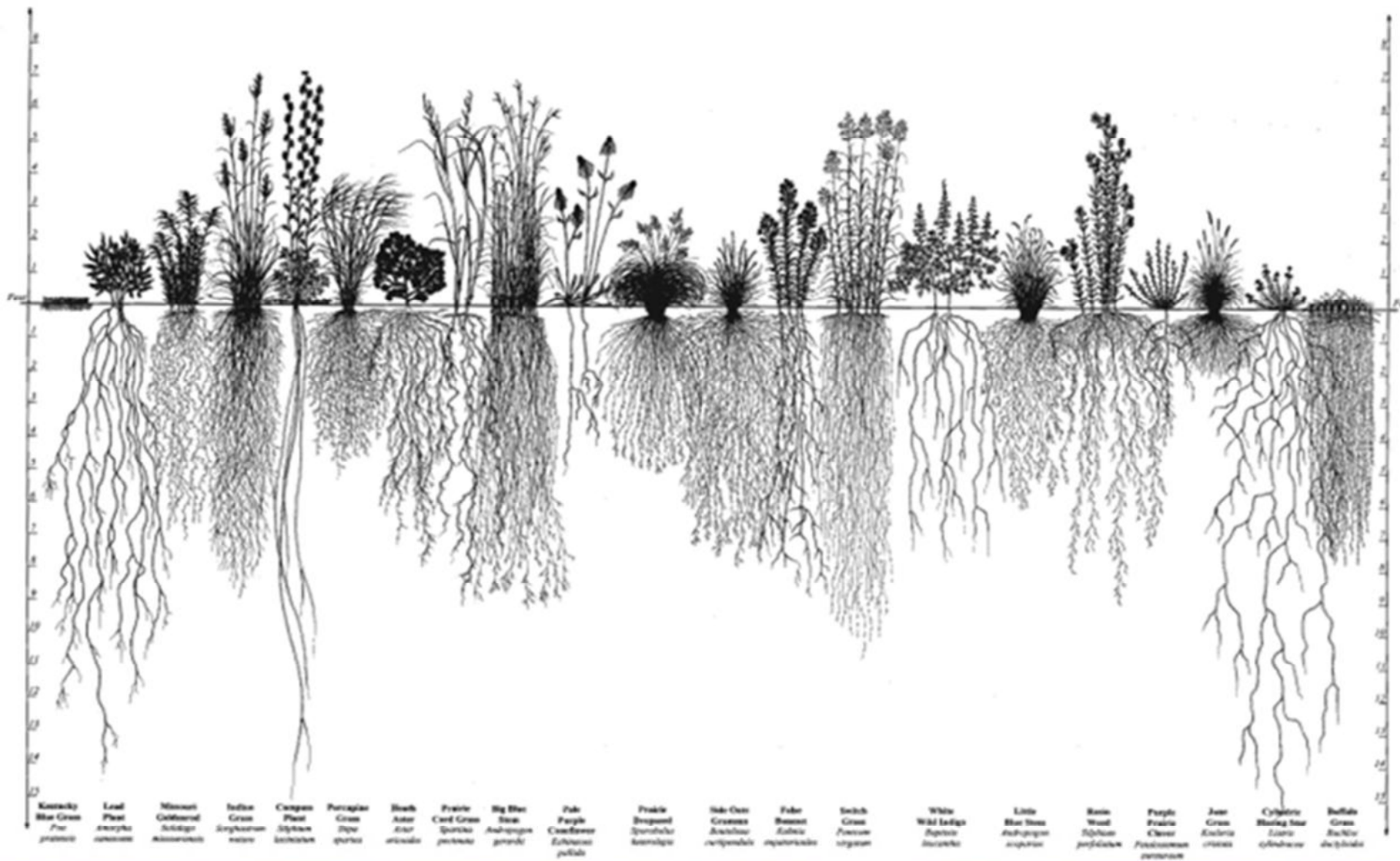
Typical Maintenance:

- 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:

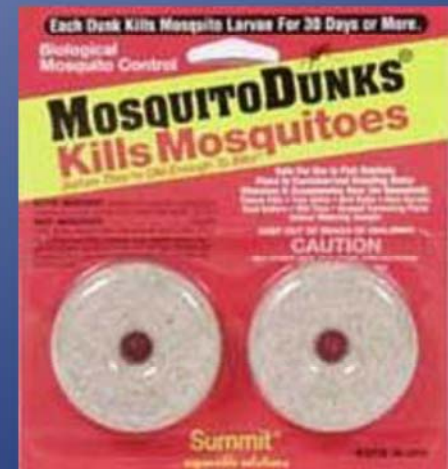
- Clean gutter from debris.
- Maintain screens and traps.
- Prevent mosquitos, algae and mildew.
- Clean of sediment and debris from barrel.
- Inspect foundation, spigots, connection and overflow.
- Disconnect in winter and store indoors, if applicable.
- Follow manufacture's instructions, never climb 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

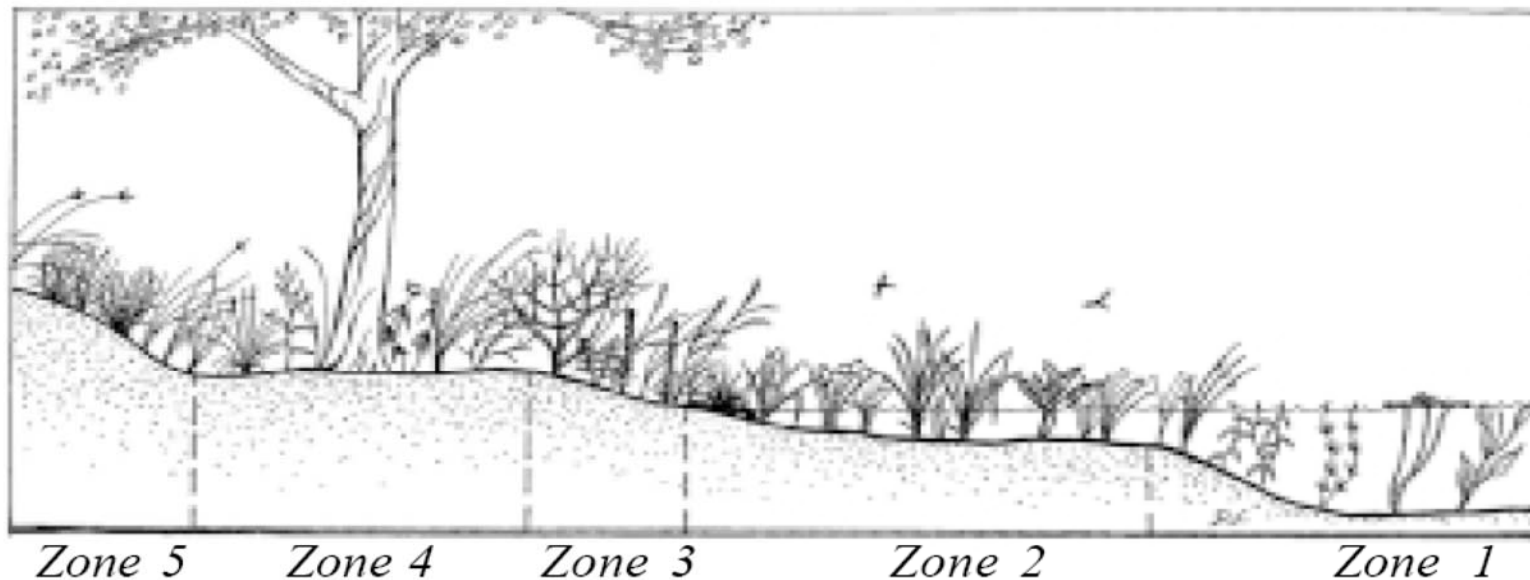
- Vacuum 2-4x per year with Vacuum or follow manufacture's instructions.
- Stabilize surrounding areas
- Inspect paver integrity and at transitions. Repair any settling.
- Are weeds growing between spaces or is overseeding required. Do not pull weeds, flame or spray.
- Is water ponding in any places?
- If snow plowing, is rubber blade required or have any pavers been lifted?











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QUESTIONS?

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