Rain Garden: Maintenance

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Steps

1. Planning & Design
   - Location
   - Soil Test
   - Calculate

2. Construction

3. Plant Selection & Installation

4. Maintenance
   Photo: kirklandwa.gov
**Types**

**Simple**
- Shallow basin
- Infiltration
- Mainly turf

**Complex**
- Structural
- Connected to storm drain
- Plant diversity
Types

Commercial

Harmon Ave.

Residential

Solvita Townhomes

Parks

Bull Creek Park
Northwest Recreation Center

Types

Roadways

Municipal

Spirit of Austin Blvd

Northwest Recreation Center
Inspection

Inspections should occur after large rain events OR at least 2-3 times per year

Inspections should look at the following:

- Vegetation blocking the inflow OR outflow
- Scoured areas OR areas where the mulch washed away
- Sediment more than 3” deep in basin bottom
- Woody plants growing too close to inflow or walls
- Dead vegetation or bare areas >10 sq. ft.
- Function - is the rain garden draining 48 hours after storm?
- Presence of weeds OR invasives
- Sediment OR debris in the inlet
- Plants obstructing sidewalks OR access points
Inspection

BARE AREAS GREATER THAN 10 SQ FT

SEDIMENT BLOCKING INFLOW

WEEDS OR INVASIVES

PLANTS OBSTRUCTING SIDEWALKS /ACCESS
Rainscapes – rain gardens **NOT** low/no maintenance

Require frequent small scale maintenance to keep in good working order, particularly in rainy years

**MAINTENANCE ITEMS:**
- Irrigation
- Mulch
- Sediment
- Vegetation Management
  - Weeding
  - Pruning
  - Plant replacement
- Trash/Waste
- Leaves
- Ponding or Standing Water
- Structural Issues
- Safety
- The unexpected
Irrigation

• Water for plant establishment – at least 1 year
• Water after installation through hot months
• Water during drought
• Follow Austin Water Conservation mandates

http://www.austintexas.gov/department/watering-restrictions

Source: San Antonio Express-News

Botanist in Big Bend with sotol killed by drought, 2012
Irrigation

Many Ways to Water

Drip irrigation can be easily damaged during maintenance.
Irrigation

RECLAIMED WATER

In commercial rain gardens, reclaimed water use is **NOT** permitted. Elevated nutrient concentrations impair nutrient removal function of facility. (ECM 1.6.3.D)

OTHER WATER SOURCES: LCRA raw water

- LCRA offers long-term landscape irrigation contracts to property owner associations, parks, and commercial properties for up to 10 years, up to 20 AF/yr.
- Temporary raw water use contracts for up to 10 AF/yr for up to 3 yrs.

For application and more information: [http://www.lcra.org/water/water-supply/water-supply-contracts/Pages/default.aspx](http://www.lcra.org/water/water-supply/water-supply-contracts/Pages/default.aspx)
Mulch

Coarse-ground hardwood mulch
Avoid using finely ground mulch – it floats and washes to the sides.

Avoid rubber mulch.

Avoid dark colored mulch – increases soil heat.

Pecan shell mulch

3" OF MULCH

Pea gravel

River rock
**Sediment**

Remove when accumulates to depth of 2–3 inches

**REMOVAL METHODS**

- Shovel, rake
- Larger equipment (mini excavator)

Source: Oregon State University, Field Guide: Maintaining Rain Gardens...
Vegetation Management

PLANTS NEED TO BE REMOVED, PRUNED, REPLACED

TOOLS USED

- Mower, string trimmer (turf)
- Lopper, shears, clipper
- Blower, rake
- Personal Protective Equipment

Source: safetypostershop.com
Weeding

No pesticide use in rain gardens

- Hand removal
- Corn gluten for weed control
- Boiling water for fire ant control

No fertilizer use in rain gardens

Photo: news.psu.edu
Pruning

• Cannot block access, especially in high traffic areas

• Suckers and seedlings should be thinned
  • If several relatively equal saplings are growing in an area, you may need to ‘choose a winner’ and remove the rest
  • all suckers or saplings growing within 3 to 4 feet of inlet should be removed

• Saplings growing near fences should be removed before they can damage fence
PLANT MORTALITY DUE TO VARIOUS CAUSES:

- Wrong plant, wrong place
- Drought
- Pests
- Disease
- Other

Source: theleif.org
PLANT FUNCTION: scrub stormwater (pollutant uptake), slows the water, improves soil microbial environment (rhizosphere is important).

USE DIVERSITY OF PLANTS:

- Type: small trees, shrubs, perennials, bunch grasses, groundcover.
- Leaf Retention: evergreen, semi-evergreen, deciduous.
- Mixed-species encourage diverse microbial environment in soil.
- Deep-rooted species facilitate water infiltration.

Remember pollinators, birds

NO BULLET-PROOF PLANTS

NO “ONE-SIZE FITS ALL”
Plant Selection

PLANTS TO AVOID:

• Fast growing, weak wooded trees.
• Suckering trees.
• Plants with fruit, nuts (unless you plan to harvest them).
• Large trees in tiny rain gardens.
• Vigorous self seeders which will become a nuisance within a season or two.
• Plants with sharp edges, spines.
**Plant Selection**

**HERBIVORY**

**PERENNIAL**
- American germander (*Teucrium canadense*)
- Blackfoot daisy (*Melampodium leucanthum*)
- Blue-eyed grass (*Sisyrinchium sp.*)
- Coneflower (*Echinacea angustifolia*)
- Damianita (*Chrysactinia mexicana*)
- Engelmann daisy (*Engelmannia peristenia*)
- Frogfruit (*Phyla nodiflora*)
- Maximilian sunflower (*Helianthus maximiliani*)
- Mealy sage (*Salvia farinacea*)
- Mexican hat (*Ratibida columnifera*)
- Slender greenthread (*Thelesperma filifolium*)
- Tall goldenrod (*Solidago altissima*)
- Texas aster (*Symphyotrichum drummondii*)
- Texas lantana (*Lantana urticoides*)
- Zexmenia (*Wedelia hispida*)

**GRASS**
- Blue grama grass (*Bouteloua gracilis*)
- Eastern gamagrass (*Tripsacum dactyloides*)
- Gulf muhly (*Muhlenbergia capillaris*)
- Little bluestem (*Schizachyrium scoparium*)

**SHRUB**
- Agarito (*Mahonia trifoliolata*)
- American beautyberry (*Callicarpa americana*)
- Black dalea (*Dalea frutescens*)
- Flame acanthus (*Anisacanthus quadridifidus var. wrightii*)
- Shrubby boneset (*Ageratina havanensis*)
- Texas kidneywood (*Eysenhardtia texana*)
- Turk’s cap (*Molvviscus arboreus*)
- Wright pavonia (*Pavonia lasiopetala*)

**TREE**
- Cenizo (*Leucaena leucocephala*)
- Eve’s necklace (*Syphnolobium affine*)
- Fragrant mimosa (*Mimosa borealis*)
- Texas mountain laurel (*Sophora secundiflora*)
- Texas persimmon (*Diospyros texana*)
- Wafer ash (*Ptelea trifoliata*)

*Information courtesy of Environmental Survey Consulting*

*Source: mother-natures-backyard.blogspot.com*
Plant Selection

WHICH PLANTS WORK WELL?

• native bunchgrasses (Muhlies, Indian grass)
• sedges (Carex spp.)
• Salvia spp.
• Maximillan sunflower (Helianthus maximiliani)
• flame acanthus (Anisacanthus quadrifidus)
• Texas mountain laurel (Sophora secundiflora)
• obedient plant (Physostegia virginiana)

WHICH PLANTS ARE LESS SUITABLE?

• flameleaf sumac (Rhus lanceolata)
• desert willow (Chilopsis linearis)
• retama (Parkinsonia spp.)
• buckeye (Ungnadia speciosa)
• agaves
• bald cypress (Taxodium distichum)
It is an affirmative defense to a violation of Section 10-5-21(B)(1) that the weeds or grasses observed on the subject property did not reduce or impair visibility or line of sight at, of, or for right-of-way, vehicles, cyclists or pedestrians, and that the over-height weeds or grasses observed were located at or on one or more of the following:

1. an area within or adjacent to a stream, waterway, or water quality facility;
2. a landscaped area arranged and managed consistent with a plan accepted by the City which area includes native or adapted vegetation, where weed control and other periodic maintenance occurs.

Wildlife Austin promotes the creation and conservation of wildlife habitats through community-wide collaboration and public education, and helps bridge existing city initiatives that encourage a well-balanced and healthy urban environment for people and wildlife. Austin has a long track record of being dedicated to preserving and enhancing our environment. All of us have an important role to play. We all can make a profound contribution to keep Austin wild!

City code 10.25 section D

(D) It is an affirmative defense to a violation of Section 10-5-21(B)(1) that the weeds or grasses observed on the subject property did not reduce or impair visibility or line of sight at, of, or for right-of-way, vehicles, cyclists or pedestrians, and that the over-height weeds or grasses observed were located at or on one or more of the following:

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http://www.austintexas.gov/wildlifeatx
Plant Selection

CAN I PUT TREES IN MY RAIN GARDEN? Yes.

- In commercial rain gardens...as long as the underdrain system is protected from penetration by the tree root system and the structure does not meet the definition of a dam or levee/floodwall (Drainage Criteria Manual 8.3.3.).
- In residential rain gardens – up to homeowner.

HOWEVER ...

Right tree, right place

REMEMBER

A rain garden is a pond – it needs volume.
Trash/Waste

WHAT TYPES?

• Organic material vs Styrofoam and plastics
• Large dumped items
• Pet Waste, other biohazards
• Dead critters

VOLUME AND FREQUENCY OF TRASH REMOVAL WILL VARY BASED ON:

• Rainfall- intense storms and large amounts of rain will bring in more trash
• Location- residential areas and parks will get less trash than roadsides or high traffic areas.
• Season- more leaves and organic material in autumn
Leaves

WHY REMOVE?
• Possibility of causing a blockage.
• Deep drifts can shade out low growing plants.
• Aesthetics.
• Some leaves (e.g., live oak) decompose very slowly.
• Can fill rain garden & take up volume. Leaf mats can slow infiltration into the soil.

REMOVAL METHODS
• Rake - can get between plants without damaging them.
• Leaf Blower. DON’T BLOW LEAVES INTO STREET!!
• Vactor truck.
The goal of a rain garden is slow infiltration, not ponding.

**PONDING WATER CAUSES:**
- Soil compaction
- Mosquito problems
- >4 days standing water
- Plant death: drowning, anaerobic conditions
Structural Issues

- Erosion undercutting concrete curb
- Fence Damage
- Loose block
Safety

Barrier-type fences are required when pond has slope > 3:1 or > 1-ft drop

Poison ivy

Tree limb partially fallen in high traffic area
SNAKES
Most snakes you will encounter are not harmful to humans. Exceptions – rattlesnakes, copperheads, moccasins, coral snakes. Rain gardens are not their preferred habitat.

ID guides for Central Texas snakes-
http://www.austinreptileservice.net/austin_area_reptiles.html
http://www.whatsnakeisthat.com/south/texas.htm

RATS
Rats and mice are disease carriers, - But-
Snakes help control rat populations.

MOSQUITOES
• 5 day breeding cycle for *Aedes aegypti* – a working rain garden will drain in less time.
• Most mosquito problems originate close to the home in small pockets of water, as they have are no natural predators there.
• Avoid maintenance activities in peak feeding hours of dawn and dusk, or wear protective clothing.
Expect the *Unexpected*

Vehicle Damage

Animal Damage

Enthusiastic Mowing

Before

After
Design/Build for Maintenance

- Design failure: pedestrian desire line
- No fence/barrier
- High traffic area
- People cut through
- Plants killed, soil compacted

Inflow is partially clogged
Thank you for attending

Questions?

Discussion

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