



## Enhanced Rain Garden Design Review Checklist

**Applicant:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**Submitted By:** \_\_\_\_\_ **Project Location:** \_\_\_\_\_

- 1) Complete Appendix **F**, **G**, and **H** - Sizing Worksheet, Cross Section, and Materials List.
- 2) Attach a map of the drainage area, plan view, planting plan, and plant list.
- 3) Discuss soils investigation findings (i.e. texture, degree of compaction, percolation potentials, depth to water table, contamination, etc.). \_\_\_\_\_  
\_\_\_\_\_
- 4) Describe any pretreatment techniques provided (what practice(s) was used, how were things sized, etc.). \_\_\_\_\_  
\_\_\_\_\_
- 5) Describe where water exits the solid outlet pipe: \_\_\_\_\_  
\_\_\_\_\_
- 6) Describe how the water leaves the rain garden when it exceeds ponding depth (i.e. stand pipe, notch in berm, etc.): \_\_\_\_\_  
\_\_\_\_\_
- 7) Separation distance from nearest foundation \_\_\_\_\_. If less than 10 ft, describe water proofing methods. \_\_\_\_\_
- 8) Spacing and size of plants \_\_\_\_\_
- 9) If seeding was done, describe type and quantity of seed used and the rate that was applied (i.e. lbs/ac or per 1,000 SF). \_\_\_\_\_  
\_\_\_\_\_
- 10) Please describe the Erosion and Sediment Control measures employed if the drainage area is not stabilized or the rain garden is not planted and stabilized immediately: \_\_\_\_\_  
\_\_\_\_\_

FOR REVIEWERS USE ONLY

*Design appears to comply with the standards in the Iowa Rain Garden Design and Installation Guide and the Iowa Stormwater Management Manual.*                      Yes                      No

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Reviewer Name: \_\_\_\_\_ Date: \_\_\_\_\_ Signature: \_\_\_\_\_

## Rain Garden Sizing Worksheet

Project Name:

Installation Date:

### Step 1: Estimate Impervious Drainage Area

1a. What is the total surface area of the contributing roof section(s)?	ft <sup>2</sup>
1b. What is the total surface area of the contributing driveway, sidewalk, or other impervious areas?	ft <sup>2</sup>
1c. Total Impervious Surface Area = Step 1a + Step 1b	ft <sup>2</sup>

### Step 2: Estimate Pervious Drainage Area

2a. What is the contributing area of lawn upslope of the rain garden?	ft <sup>2</sup>
2b. Has Soil Quality Restoration (SQR) been completed at the rain garden location?	Yes      No
If "Yes" to step 2b, ignore Step 2 altogether. If SQR has been performed at the project site, then the lawn area will not contribute runoff to the rain garden. If "No" to Step 2b, multiply Step 2a by 0.5.	
2c. Total Pervious Surface Area = Step 2a x 0.5	ft <sup>2</sup>

### Step 3: Calculate Total Drainage Area

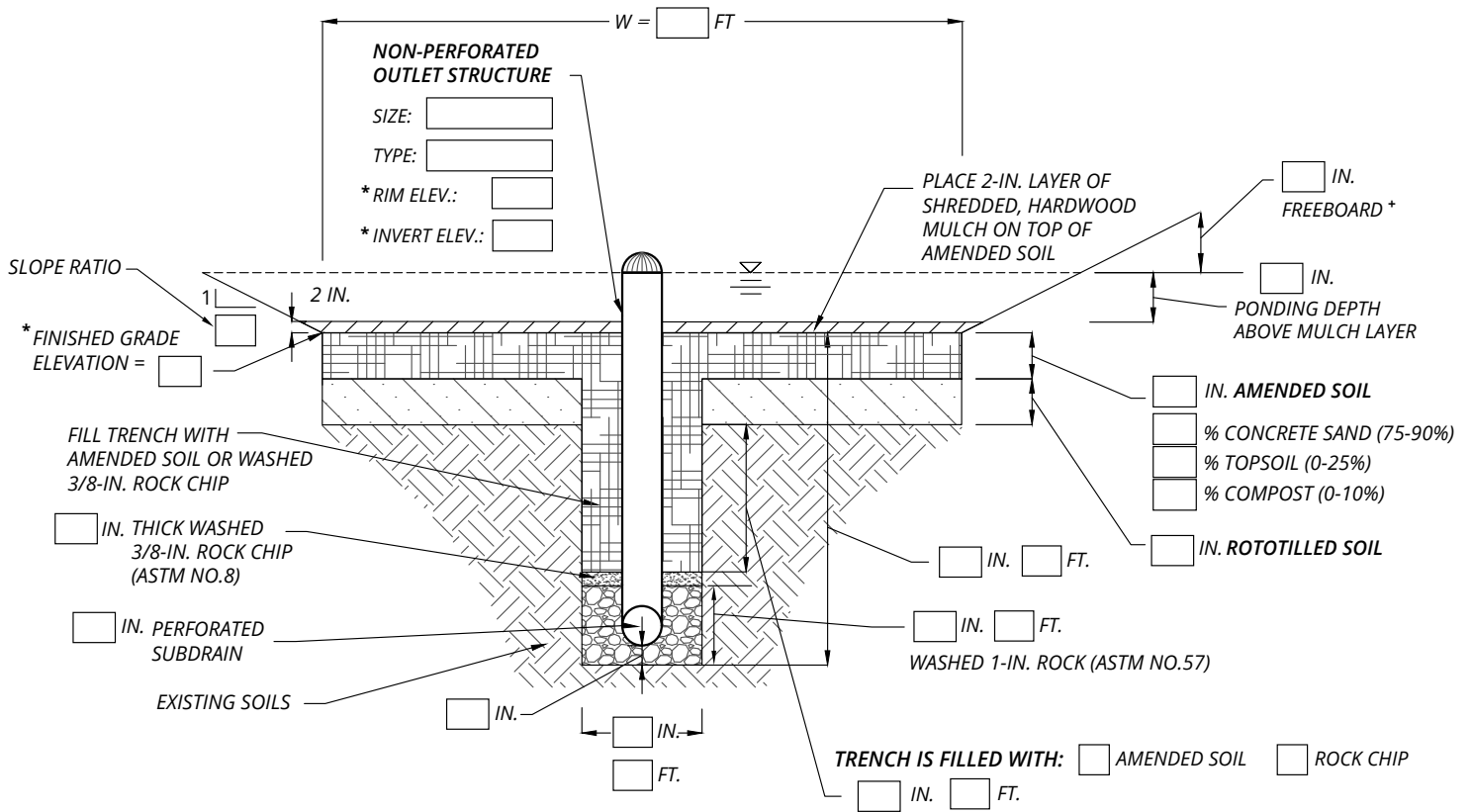
3a. Total Impervious Surface Area from Step 1	ft <sup>2</sup>
3b. Total Pervious Surface Area from Step 2	ft <sup>2</sup>
3c. Total Drainage Area = Step 3a + Step 3b	ft <sup>2</sup>

Step 4: Selecting Footprint Area Percentage			
4a. Are you constructing a Basic Rain Garden (BRG) or an Enhanced Rain Garden (ERG)?	BRG	ERG	
4b. What was the calculated percolation rate at the rain garden site?	inches/hour		
4c. What is the desired ponding depth?	6"	9"	12"
4d. Footprint of Rain Garden Area per Sizing Table Recommendation (shown below)	%		

Percolation Rate	Ponding Depths	Footprint Area %	Footprint Area Decimal
> 0.5 inches per hour	Enhanced Rain Garden	5%	.05
> 1.0 inches per hour	Basic Rain Garden with 6" Ponding Depth	10%	.10
	Basic Rain Garden with 9" Ponding Depth	7%	.07
	Basic Rain Garden with 12" Ponding Depth	5%	.05
0.5 - 1.0 inches per hour	Basic Rain Garden with 6" Ponding Depth	21%	.21
	Basic Rain Garden with 9" Ponding Depth	14%	.14
	Basic Rain Garden with 12" Ponding Depth	10%	.10
< 0.5 inches per hour	Bioretention Cell (Follow ISWMM Guidance)	~3% - 4%	.03 - .04

Step 5: Calculate Footprint of Rain Garden Area	
<p><b>5a. Footprint of Rain Garden = (Step 3c Total) x (Step 4d Decimal)</b>  <i>Required surface area of proposed rain garden in order to manage WQv</i></p>	ft <sup>2</sup>
<p><b>5b. Temporarily Impounded Water by 1.25" Rainfall Event</b>                      Total drainage area SF (3c) x 1.25 x 0.623 = gallons                      _____ gallons x 0.1337 = cubic feet</p>	gallons ft <sup>3</sup>

## Enhanced Rain Garden Cross Section



## ENHANCED RAIN GARDEN

NOT TO SCALE

\* IF KNOWN, OTHERWISE LEAVE BLANK

+ FREEBOARD IS THE ELEVATION DIFFERENCE BETWEEN THE OUTLET AND THE TOP OF THE BERM (OR HIGHEST ELEVATION OF THE RAIN GARDEN EDGE).

### RAIN GARDEN AREA

L [ ] FT x W [ ] FT = [ ] FT<sup>2</sup>

## Enhanced Rain Garden Materials List

"Mix" refers to the amended soil mixture used in enhanced rain gardens.

**TOPSOIL** (Suggested **0.5 ft [6 in.] Amended Soil Layer = 0.17 [17%] of Mixture = 1 in. Layer of Topsoil**)

**Mix:** \_\_\_\_\_ ft<sup>2</sup> (rain garden SF) x \_\_\_\_\_ ft = \_\_\_\_\_ ft<sup>3</sup> x \_\_\_\_\_ % Mix (decimal) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cu yd

**\*Trench:** L \_\_\_\_\_ ft x W \_\_\_\_\_ ft x D \_\_\_\_\_ ft = \_\_\_\_\_ ft<sup>3</sup> x \_\_\_\_\_ % Mix (decimal) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cu yd

*\* Complete if subdrain trench is filled with amended soils.*

**TOTAL TOPSOIL:** \_\_\_\_\_ cu yd (mix) + \_\_\_\_\_ cu yd (trench) = \_\_\_\_\_ **total cubic yards (cu yd)**

\_\_\_\_\_ total cu yd x 2,400 lbs. = \_\_\_\_\_ **total lbs.** / 2,000 = \_\_\_\_\_ **total tons**

**COMPOST** (Suggested **0.5 ft [6 in.] Amended Soil Layer = 0.08 [8%] of Mixture = ½ in. Layer of Compost**)

**Mix:** \_\_\_\_\_ ft<sup>2</sup> (rain garden SF) x \_\_\_\_\_ ft = \_\_\_\_\_ ft<sup>3</sup> x \_\_\_\_\_ % Mix (decimal) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cu yd

**\*Trench:** L \_\_\_\_\_ ft x W \_\_\_\_\_ ft x D \_\_\_\_\_ ft = \_\_\_\_\_ ft<sup>3</sup> x \_\_\_\_\_ % Mix (decimal) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cu yd

*\* Complete if subdrain trench is filled with amended soils.*

**TOTAL COMPOST:** \_\_\_\_\_ cu yd (mix) + \_\_\_\_\_ cu yd (trench) = \_\_\_\_\_ **total cubic yards (cu yd)**

\_\_\_\_\_ total cu yd x 1,200 lbs. = \_\_\_\_\_ **total lbs.** / 2,000 = \_\_\_\_\_ **total tons**

**CONCRETE SAND** (Suggested: **0.5 ft [6 in.] Amended Soils = 0.75 [75%] of Mixture = 4 ½ in. Sand Layer**)

**Mix:** \_\_\_\_\_ ft<sup>2</sup> (rain garden SF) x \_\_\_\_\_ ft = \_\_\_\_\_ ft<sup>3</sup> x \_\_\_\_\_ % Mix (decimal) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cu yd

**\*Trench:** L \_\_\_\_\_ ft x W \_\_\_\_\_ ft x D \_\_\_\_\_ ft = \_\_\_\_\_ ft<sup>3</sup> x \_\_\_\_\_ % Mix (decimal) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cu yd

*\* Complete if subdrain trench is filled with amended soils.*

**TOTAL CONCRETE SAND:** \_\_\_\_\_ cu yd (mix) + \_\_\_\_\_ cu yd (trench) = \_\_\_\_\_ **total cubic yards (cu yd)**

\_\_\_\_\_ total cu yd x 3,000 lbs. = \_\_\_\_\_ **total lbs.** / 2,000 = \_\_\_\_\_ **total tons**

**CHOKER ROCK** (Suggested Choker Layer: **0.17 ft [2 in.] Depth, Trench Depth from Cross Section in feet**)

**Choker Layer:** L \_\_\_\_\_ ft x W \_\_\_\_\_ ft x D \_\_\_\_\_ ft (depth) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cubic yards

**\*Trench:** L \_\_\_\_\_ ft x W \_\_\_\_\_ ft x D \_\_\_\_\_ ft (depth) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cubic yards

*\* Complete if subdrain trench is filled with rock.*

**TOTAL CHOKER ROCK:** \_\_\_\_\_ cu yd (choker layer) + \_\_\_\_\_ cu yd (trench) = \_\_\_\_\_ **total cubic yards (cu yd)**

\_\_\_\_\_ total cu yd x 3,000 lbs. = \_\_\_\_\_ **total lbs.** / 2,000 = \_\_\_\_\_ **total tons**

**WASHED ROCK** (Suggested **0.83 ft [10 in.]** Depth)

**Trench:** L \_\_\_\_\_ ft x W \_\_\_\_\_ ft x D \_\_\_\_\_ ft (depth) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cubic yards

**TOTAL WASHED ROCK:** \_\_\_\_\_ cu yd (trench) = \_\_\_\_\_ **total cubic yards (cu yd)**

\_\_\_\_\_ total cubic yards x 3,000 lbs. = \_\_\_\_\_ **total lbs.** / 2,000 = \_\_\_\_\_ **total tons**

**SHREDDED HARDWOOD MULCH** (Suggested **0.17 ft [2 in.]** Depth)

**Surface Layer:** \_\_\_\_\_ ft<sup>2</sup> (rain garden SF) x \_\_\_\_\_ ft (depth) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cubic yards

**Berm/Slopes:** \_\_\_\_\_ ft<sup>2</sup> (SF of berm & slopes, if applicable) x \_\_\_\_\_ ft (depth) = \_\_\_\_\_ ft<sup>3</sup> / 27 = \_\_\_\_\_ cu yd

**TOTAL MULCH:** \_\_\_\_\_ cu yd (surface layer) + \_\_\_\_\_ cu yd (berm/slopes) = \_\_\_\_\_ **total cubic yds**

**Subdrain and Overflow Structure**

Subdrain Material \_\_\_\_\_ Approximate Linear Feet \_\_\_\_\_

Overflow Stand Pipe Material \_\_\_\_\_

Solid Outlet Pipe Material \_\_\_\_\_ Approximate Linear Feet \_\_\_\_\_

Animal Guard?      Yes                  No

**Edging**

Type of Edging \_\_\_\_\_ Approximate Linear Feet \_\_\_\_\_

**Vegetation**

The rain garden square footage only accounts for the flat bottom of the rain garden. If plants are desired for the side slopes and berms, measure the total square footage of the area to calculate needed plants. Spacing options include 1 plant per square foot, 1 plant per 1.5 square foot, and 1 plant per 2 square feet.

1 plant per square foot

1 plant per 1.5 square foot

1 plant per 2 square feet

\_\_\_\_\_ ft<sup>2</sup> (enhanced rain garden SF) / \_\_\_\_\_ ft<sup>2</sup> (average plant spacing) = \_\_\_\_\_ total plants

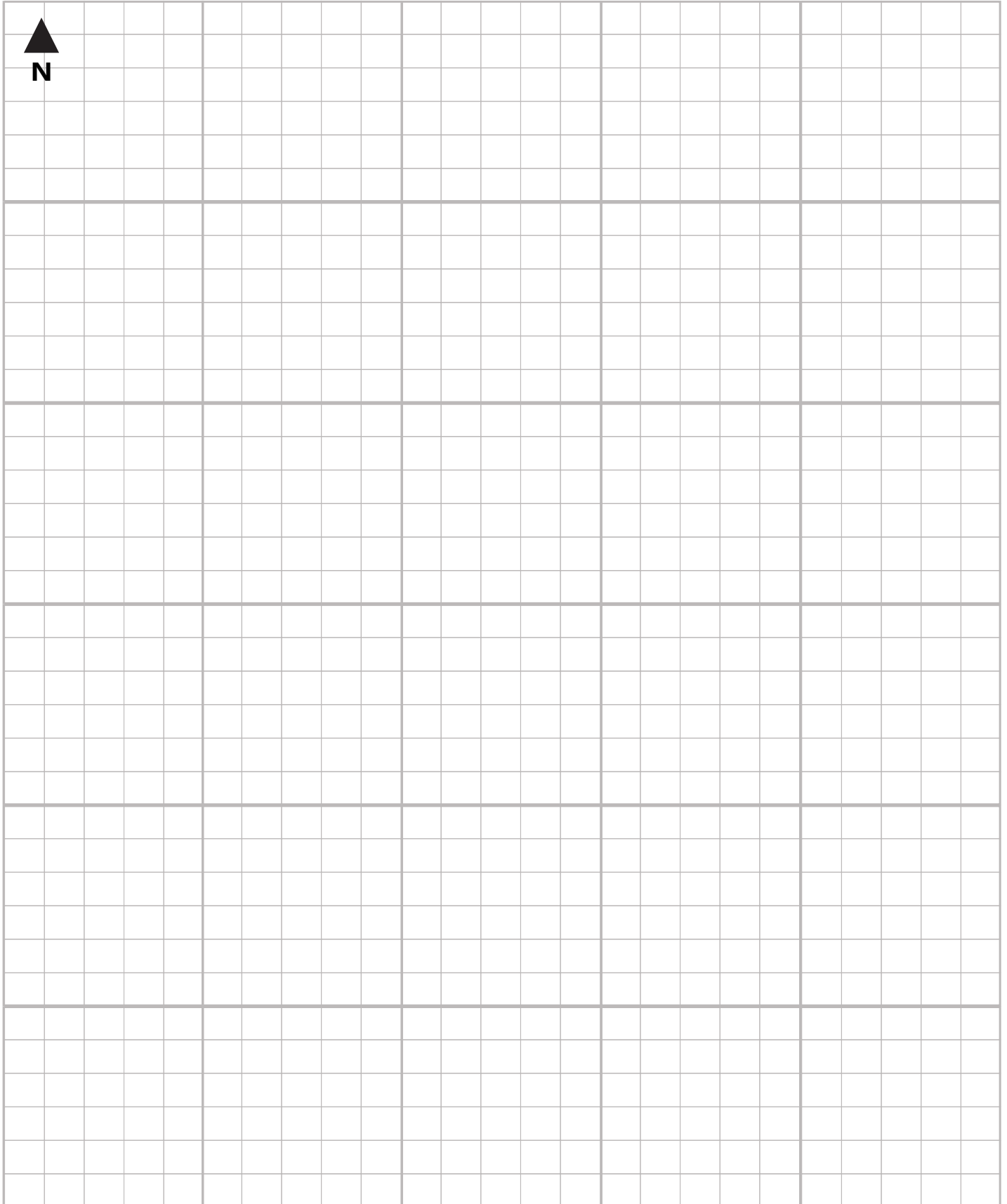
\_\_\_\_\_ ft<sup>2</sup> (SF of berms & slopes, if applicable) / \_\_\_\_\_ ft<sup>2</sup> (average plant spacing) = \_\_\_\_\_ total plants



## Project Notes

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*Click in the box below to attach an image or drawing.*



= \_\_\_\_\_



## **Maintenance Checklist**

**Project Name:**

**Installation Date:**

Inspection Point	Maintenance Activity	Maintenance Schedule
Inlet, Outlet, Pre-Treatment Area	Remove litter, trash, and accumulated sediment	Annually, spring or fall and after major rainfall events
	Repair, re-armor with rocks, erosion control blankets, or mats, and revegetate area if erosion is present	As needed
	<b>Maintenance Completed:</b> Year 1      Year 2 <b>Notes:</b>	
Base of Rain Garden	Remove litter, trash, and debris	Annually, spring or fall and after major rainfall events
	Spread mulch evenly, 2-3" thick throughout	Annually, spring or fall
	If surface is plugged by sediment, find and eliminate source of sediment, then replace amended soils, re-plant and mulch. If the surface has been compacted, till the soils, re-plant and mulch.	As needed
	<b>Maintenance Completed:</b> Year 1      Year 2 <b>Notes:</b>	
Berm and/or Retaining Wall	Rebuild and compact berms in areas that have sunk over time or have blown out. Make sure there is a stabilized, notched out area for overflows from large rainfall events.	Inspect annually, repair as needed
	Remove bricks and rebuild retaining wall from lowest level, and level bricks at each course	Inspect annually, repair as needed
	<b>Maintenance Completed:</b> Year 1      Year 2 <b>Notes:</b>	

Inspection Point	Maintenance Activity	Maintenance Schedule
Newly Established / Young Plants	Supplement plantings if at less than 75% vegetative cover	Inspect at end of first growing season, replant as needed
	Remove dead vegetation, maintain some winter habitat for pollinators	Annually, spring or fall
	Water young plants regularly until root systems have established, plants should receive around 1" of water per week	As needed depending on weather patterns
	Pull weeds and invasive species, avoid use of herbicides if possible	Monthly during first 3 years after installation
	<b>Maintenance Completed:</b> Year 1      Year 2 <b>Notes:</b>	Year 3      Year 4+
Established / Mature Plants	"Deadhead" non-native flowering plants at the end of blooming period, cut back perennials several inches above base	Annually, depending on species
	General pruning of healthy plants	Annually, fall or early winter
	Replace diseased or dead plants. Dig out or prune back volunteer trees. Herbicide treatment will be needed if the tree roots are not removed.	As needed
	<b>Maintenance Completed:</b> Year 1      Year 2 <b>Notes:</b>	Year 3      Year 4+
Overflow Structure (Enhanced Rain Gardens Only)	Remove debris and trash from overflow grate, within pipe, and at the outlet where the enhanced rain garden daylight	Annually, spring or fall and after major rainfall events
	<b>Maintenance Completed:</b> Year 1      Year 2 <b>Notes:</b>	Year 3      Year 4+