Rain Garden Design & Construction Worksheet

City of Maplewood, April 2007

Project Goals

1. Drainage Goals:

2. Aesthetic Goals:

3. Budget Maximum:

Engineering Design Steps

Step 1: Determine Drainage Area

What areas do you want to capture water from?

Drainage Area	Area in sq ft
□ Gutter/Roof – area 1 □ Gutter/Roof – area 2	
□ Driveway (slopes to garden)	
□ Walkway, patio	
□ Low spot	
□ Lawn	
□ Base of hill	
□ Street (consult engineer)	
□ Other:	
TOTAL sq ft DRAINAGE	

Step 2: Determine Location

Does location meets following criteria?

- □ Garden at least 10’ from house
- □ Garden is not over utilities
- □ Garden is not over septic system
- □ Slope < 12% (12’ rise over 100’ distance)
- □ Called Gopher 1 for locates (651-454-0002)

Step 3: Analyze Soil and Determine Amendments

A. Soil texture

Test more than one area of garden. Take soil sample 6”-12” below bottom of garden. Use soil texture worksheet to determine texture, or have soil test done.

Your soil	Class	texture	Recommended amendments
	A	Sandy	Compost helpful, but not required
	B	Silt loam Loam	Add 1-2” compost
	C	Sandy clay loam	Add 2-4” compost
	D	Clayey	Add 2-4” compost

B. Infiltration test results – optional for sandy soils

Use infiltration rate worksheet to determine infiltration rate. Record rates:

Hours to infiltrate 6” water	**Recommended amendments**
□ 4 hours	Compost helpful but not required
□ 8 hours	Till in 1-2” compost
□ 12	Till in 2-4” compost
□ 24	Till in 2-4” compost
□ 48	Till in 3-6” compost

C. *Soil compaction – optional*

Conduct wire flag test (poke wire flag in ground)

□ Easily penetrates 6”-8” or more
□ Compacted, difficult to insert

Step 4: Determine Garden Depth and Size

Depth: Gardens with clay soils will be shallower since they infiltrate slowly and rain gardens should infiltrate within 24-48 hours.

Soil Type	Typical Depth
Type A – sandy soils	□ 9”-12” depth
Type B – silty loam Type C – loamy soils	□ 6”-9” depth
Type D – clay soils	□ 4” maximum depth

Size: Size is based on drainage area and soil type. Gardens with clay soils are shallower, so usually will have larger area. These are guidelines, not absolutes.

Total drainage area (from Step 1): _____ sq ft
Multiply by factor in table below _____
Minimum Size _____ sq ft

Soil Type	Min Garden Size	Multiply by
A – sandy	5% of drainage area	.05
B- silty loam	8%	.08
C – loamy	10%	.10
D – clay	15%	.15

Step 5: Determine Inlet

How will water enter garden?

Method	Materials; Size (length, width, diameter, quantity)
☐ Extended downspout	
☐ Buried downspout or drain tile	
☐ Across lawn	
☐ Vegetated swale	
☐ Dry creek (rock, no plastic liner)	
☐ Stone or concrete spillway	
☐ Other	

Erosion Potential	Materials and Quantity
☐ Velocity and erosion should not be a problem	
☐ Erosion possible, address this with: ☐ Grading ☐ Rocks or obstructions to slow flow ☐ Rocks to stabilize ☐ Erosion control blanket	

Step 6: Determine Overflow

Check all that apply

- ☐ Yes, overflow is away from buildings
- ☐ Berm higher near building
- ☐ Over flow sheets over lawn or garden
- ☐ Overflow sheets over driveway, walkway
- ☐ Flows onto street
- ☐ Other

Step 8: Summarize Design

Size:

Depth:

Amendments:

Materials:

Construction Methods & Materials

Step 1: Call Gopher One

Before digging call Gopher One – 651-454-002, 800-252-1166

Step 2: Mark and Dig Garden

How remove soil?

- ☐ Shovel
- ☐ Mini-backhoe
- ☐ Other

Where put excess soil?

- ☐ Use for berm around garden
- ☐ Use or store elsewhere on site
- ☐ Haul off site

Be sure garden bottom is flat and slopes are gentle.

Step 3: Scarify and Add Amendments

Scarify bottom 6-12" with:

- ☐ Shovel
- ☐ Fork
- ☐ Tiller
- ☐ Other:

How incorporate amendments

- ☐ No amendments
- ☐ Turn into soil with shovel
- ☐ Till into soil
- ☐ Other:

** Must incorporate, do not create layer

AVOID COMPACTING SOIL!! Plan your work for least amount of walking in the garden.

Step 4: Edge garden

Type of edging

- ☐ plastic
- ☐ metal
- ☐ rock
- ☐ brick
- ☐ Other:

CALCULATION for Mulch or Amendments

Area of garden / 1000 x 3.12 x depth of amendment = _____ cubic yards mulch
Sq ft inches

Ex: 200 sq ft x 3.12 x 3" mulch = 1.9 cu yards

Planting Methods & Materials

Step 1: Determine Design Elements

Style

- ☐ Wild
- ☐ Naturalistic but not too wild
- ☐ Relatively formal
- ☐ Formal
- ☐ Other:

Natives or non-natives?

- ☐ Natives only
- ☐ Mix of natives and non-natives
- ☐ Non-natives and cultivars only

What zones will you include?

- ☐ Wet zone
  For type B, C, D soils must use plants that tolerate saturated soils. For type A (sandy) soils may try wider selection of plants.
- ☐ Upland zone
  Optional if garden is shallow.

What types of plants?

- ☐ Annuals
- ☐ Bulbs (upland only)
- ☐ Perennials
- ☐ Shrubs
- ☐ Trees

Maximum height of plants

- ☐ All , 2’
- ☐ Up to 3’
- ☐ Up to 5’
- ☐ Over 5’

Step 2: Create design

1. List plants to use in wet zone.
2. List plants to use in upland zone.
3. Will plants be mixed or massed?
4. Draw design on paper.

Step 3: Determine # plants

Spacing

- ☐ Plugs – 12”-15” spacing
- ☐ 2”-4” pots -- 15”-18” spacing
- ☐ 6”+ pots -- depends on species
- ☐ Trees & shrubs – depends on species

 # plants needed for 100 sq ft

12” spacing – 100 plants
16” spacing – 56 plants
18” spacing – 45 plants
24” spacing – 25 plants
48” spacing – 6.25 plants

Calculation for total number plants: Area of garden / 100 * # plants in chart

EX: 150 sq ft garden, plugs at 16” spacing 150 sq ft / 100 * 56 = 84 plants