

# Rain Garden Design & Construction Worksheet

## Engineering Design Steps

### Step 1: Determine Drainage Area

What areas do you want to capture water from?

Drainage Area	Area in sq ft
<input type="checkbox"/> Gutter/Roof – area 1	
<input type="checkbox"/> Gutter/Roof – area 2	
<input type="checkbox"/> Driveway (slopes to Garden)	
<input type="checkbox"/> Walkway, patio	
<input type="checkbox"/> Low spot	
<input type="checkbox"/> Lawn	
<input type="checkbox"/> Base of hill	
<input type="checkbox"/> Other:	
<b>TOTAL sq ft DRAINAGE</b>	

### Step 2: Determine Location

Does location meet following criteria?

- Garden at least 10' from house
- Garden is not over utilities
- Garden is not over septic system
- Slope is less than 12% (12' rise over 100' distance)
- Call MB Hydro/MTS for locates

### Step 3: Analyze Soil and Determine Amendments – Soil Texture

Test more than one area of the garden. Take soil sample 6"-12" below bottom of garden. Use soil texture worksheet (appendix a) 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

**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
A – Sandy	<input type="checkbox"/> 9”-12”
B – Silty loam	<input type="checkbox"/> 6’-9”
C – Loamy	
D - Clay	<input type="checkbox"/> 4” maximum depth

*Size:* Size is based on drainage area and soil type. Gardens with clay soils are shallower, so usually will have a larger area. These are guidelines!!

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)
<input type="checkbox"/> Extended downspout	
<input type="checkbox"/> Buried downspout or tile drain	
<input type="checkbox"/> Across lawn	
<input type="checkbox"/> Vegetated swale	
<input type="checkbox"/> Other:	

Erosion Potential	Materials and Quantity
<input type="checkbox"/> Erosion should not be a problem	
<input type="checkbox"/> Erosion possible, address with:	
<input type="checkbox"/> Grading	
<input type="checkbox"/> Rocks to stabilize	
<input type="checkbox"/> Erosion control blanket	

**Step 6: Determine Overflow**

Check all that apply:

- Yes, overflow is away from buildings
- Berm higher near building
- Overflow sheets over lawn or garden
- Overflow sheets over driveway, walkway
- Other

**Step 7: Summarize Design**

Size:

Depth:

Soil Amendments:

Materials:

**Planting Methods and Materials**

**Step 1: Determine Design Elements**

Style

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

What types of plants? Check all that apply

- Perennials
- Shrubs
- Natives only
- Mix of natives and non-natives
- Non-natives only

**Step 2: Create Design (for list of plants see appendix b)**

1. List plants to use in wet zone

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

### Step 3: Determine number of plants

#### Spacing

- 2"-4" pots – 12"-15" spacing
- 6"+ pots – depends on species
- Shrubs – depends on species

#### Number of plants needed for 100 sq ft

- 12" spacing – 100 plants
- 16" spacing – 56 plants
- 18" spacing – 45 plants
- 24" spacing – 25 plants

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

Example: 150 sq ft garden, 4" pots at 16" spacing

$150 \text{ sq ft} / 100 \times 56 = 84 \text{ plants}$

## Construction Methods & Materials

### Step 1: Call MB Hydro and MTS

Before digging call 1-888-624-9376 and 1-888-365-1172

### Step 2: Mark and Dig Garden

How to remove soil?

- Shovel
- Mini-backhoe
- Other:

Where to 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 to 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 the least amount of walking in the garden.

### Step 4: Edge of Garden

Type of Edging

- Plastic
- Brick
- Other:

### CALCULATION for Mulch or other amendment

Area of garden / 1000 x 3.12 x depth of amendment (inches) = \_\_\_\_\_cu yards of mulch

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

## APPENDIX A

### Determining Soil Texture

When a quick determination is required, the “feel method” may be used to determine soil texture. A soil sample is mixed with water and manipulated in the hand. In general, grittiness (detected both by feel and sound) denotes a sandy soil. Clay or loam is indicated if the soil can be rolled into a moist soil ball and it stains your fingers. Clay is sticky; silt is smooth and velvety. Clay soil will “ribbon” that is, by pressing and working a moist sample, it can be rolled and pushed into a ribbon.

Specific soil texture categories as determined by the “feel method” are described below:

#### **Sandy**

Dry Loose, single grained, gritty; no clods (or they are very weak).

Moist Gritty; forms easily crumbled ball; does not ribbon.

Wet Lacks stickiness, but may show faint clay staining (especially loamy sand). Individual grains can be both seen and felt under all moisture conditions.

#### **Loam**

NOTE: This is the most difficult texture to identify since characteristics of sand, silt and clay are all present but none predominates.

Dry Clods are slightly difficult to break; somewhat gritty.

Moist Forms firm ball; ribbons poorly; may show poor fingerprint.

Wet Gritty, smooth, and sticky – all at the same time; stains fingers.

#### **Silt Loam**

Dry Clods are moderately difficult to break and they can rupture suddenly, turning them into a floury powder that clings to fingers; shows fingerprints.

Moist Has smooth, slick, velvety, or buttery feel; forms firm ball; may ribbon slightly before breaking, shows good fingerprint.

Wet Smooth with some stickiness from clay; stains fingers; the grittiness of sand is present, but other separates are more dominant.

#### **Sandy Clay Loam**

Dry Clods break with difficulty.

Moist Forms firm ball, becoming moderately hard on drying; ribbons fairly well, but ribbons barely support their own weight; shows fair to good fingerprint.

Wet Moderately sticky, with stickiness dominating over grittiness and smoothness; stains fingers.

## Clay

NOTE: Think of molding clay here (smooth and sticky).

Dry Clods predominate.

Moist Forms very firm ball, very hard on drying; ribbons very easily; shows fingerprint.

Wet Stains fingers, sticky, no grittiness.

## APPENDIX B

Rain Garden Plant List	
COMMON NAME	SCIENTIFIC NAME
Bergamot	<i>Monarda fistulosa</i>
Purple Coneflower	<i>Echinacea purpurea</i>
Black Eyed Susan	<i>Rudbeckia hirta</i>
Daisy	
Butterfly Weed	<i>Asclepias tuberosa</i>
Blazing Star	<i>Liatris</i>
Aster	<i>Aster</i>
Obedient Plant	<i>Physostegia virginiana</i>
Little Bluestem	<i>Schizachyrium scoparium</i>
Pasque flower	<i>Anemone patens</i>
Blanket Flower	<i>Gaillardia pulchella</i>
Russian Sage	<i>Perovskia atriplicifolia</i>
Spirea	<i>spiraea</i>
Peony	<i>Paeonia sp.</i>
Daylily	<i>Hemerocallis</i>
Iris	<i>Iris</i>
Hydrangea	<i>Hydrangea</i>
Sedge	<i>Carex</i>
Rush	<i>Juncus</i>
Columbine	<i>Aquilegia canadensis</i>
Potentilla	<i>Dasiphora floribunda</i>
Prairie Coneflower	<i>Ratibida columnifera</i>