

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:	
TOTAL sq ft DRAINAGE	

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>