Sizing

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Rain Garden Sizing

Two options:

• Simple Method
  – Sized to store 1 inch of runoff from 100% impervious watersheds

• Soil-Based Method
  – Multiply drainage area by soil sizing coefficient based on DIY texture analysis
Simple Method

- Calculate area of roof feeding to garden
- **Impervious surface:**
  50’ x 30’ = 1500 ft²
- **Drainage area:**
  1500 ft² / 2 = 750 ft²
  - This is because only half the roof contributes to the garden
- **Rain Garden area:**
  750 ft² / 6 = 125 ft²
  - This just sizes the garden to hold 1 inch of water from the roof in a 6 inch deep rain garden
How do I lay out 125 ft$^2$?

- Garden can be shaped in a variety of ways
- Should be twice as long as it is wide
- Should be oriented to intercept as much runoff as possible
• In the East and Midwest, around 90% of storms are 1” or less
Soil-Based Method

- Based on infiltration rates of soil texture groups and rain garden depth

| Rain Garden Surface Area in Sandy Soils (Sand, Loamy Sand and Sandy Loam) (square feet) |
|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|-----------------------------------------------|
| Drainage Area (Square feet)                  | for 4 inch deep garden                        | for 6 inch deep garden                        | for 8 inch deep garden                        |
| 200                                           | 38                                            | 30                                            | 16                                            |
| 400                                           | 76                                            | 60                                            | 32                                            |
| 600                                           | 114                                           | 90                                            | 48                                            |
| 800                                           | 152                                           | 120                                           | 64                                            |
| 1000                                          | 190                                           | 150                                           | 80                                            |
Drainage area is 100% impervious = 1,917 ft²
Simple Method

- If watershed is 100% impervious, size to capture 1” of runoff
- \(1,917 \text{ ft}^2 / 6 = 320 \text{ square feet} \) (6 inches deep)
Soil-Based Method

- Drainage Area: 1,917 ft²
- Rain Garden Depth: 6”
- Soil Type: Sandy

Generally:
- 4” deep → multiply drainage area by 0.19
- 6” deep → by 0.15
- 8” deep → by 0.08

### Rain Garden Sizing: Example

<table>
<thead>
<tr>
<th>Drainage Area (Square feet)</th>
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Soil-Based Method

- $1917 \, \text{ft}^2 \times 0.15 = 288 \text{ square feet}$ *

- Why less surface area than Simple Sizing Method?
  - Sandy soils = faster infiltration and less surface area
One plot side was not large enough for our required rain garden area, so we oversized it!
Is it really that big of a deal? 1 inch of rain isn’t much, right?

Let’s see how Google sees the world...
• Impervious Cover = 24,879 ft²
• 1” of rain = 15,509 gallons stormwater
• Average year = 48” or 744,432 gallons!