



**RUTGERS UNIVERSITY**  
**Water Resources Program**  
New Jersey Agricultural Experiment Station



# Homeowner Rain Garden Workshop

***March 16, 2026 at 6:30 pm***

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[water.rutgers.edu](http://water.rutgers.edu)

# Rutgers Cooperative Extension

Rutgers Cooperative Extension (RCE) helps the diverse population of New Jersey adapt to a rapidly changing society and improves their lives through an educational process that uses science-based knowledge.





# Water Resources Program



*Our mission is to identify and address water resources issues by engaging and empowering communities to employ practical science-based solutions to help create a more equitable and sustainable New Jersey.*

[www.water.rutgers.edu](http://www.water.rutgers.edu)

# What happens to the rain in our watersheds?



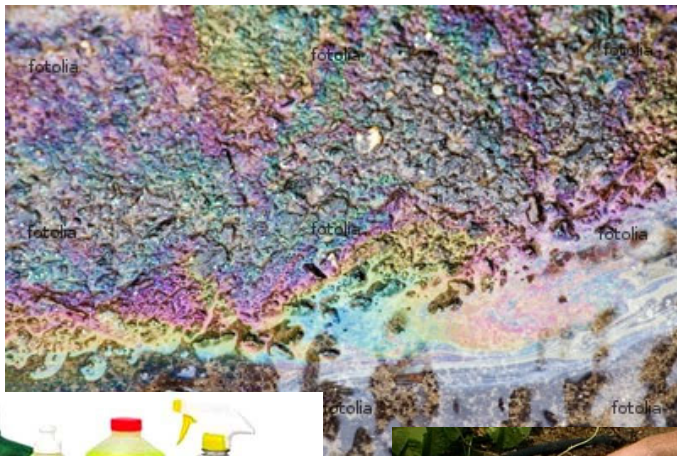
# What is stormwater?

Stormwater is the water from rain or melting snows that can become “runoff,” flowing over the ground surface and returning to lakes and streams.

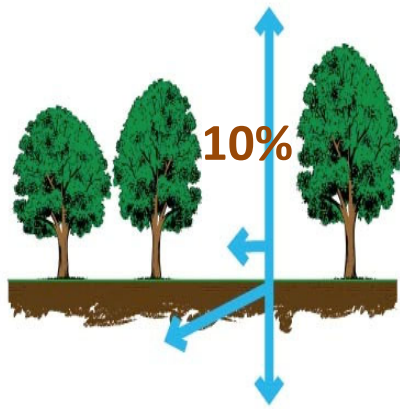


# Examples of Nonpoint Source Pollution

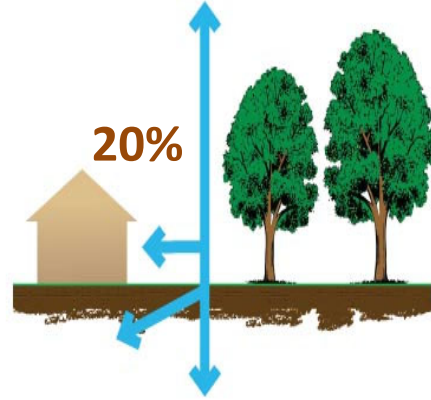
- Oil and grease from cars
- Fertilizers
- Animal waste
- Grass clippings
- Septic systems
- Sewage leaks
- Household cleaning products
- Litter
- Agriculture
- Sediment



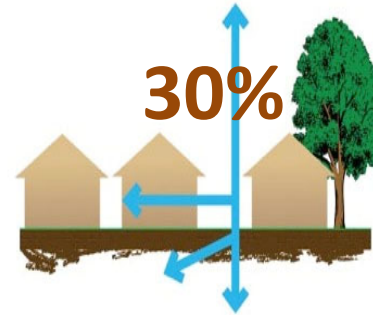
# The Impact of Development on Stormwater Runoff



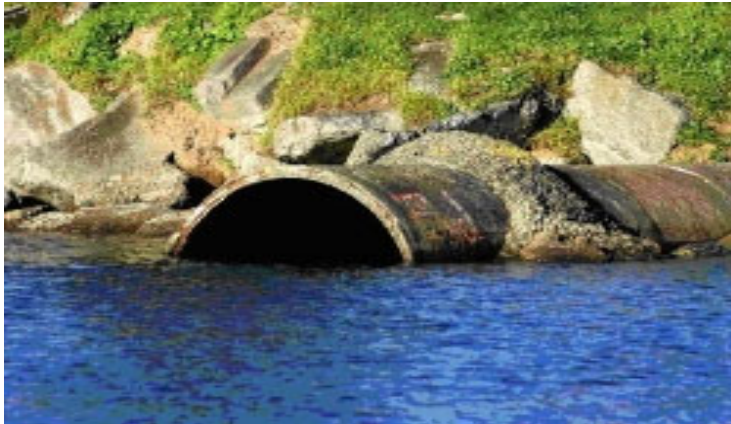
*more development*



→ *More impervious surfaces*



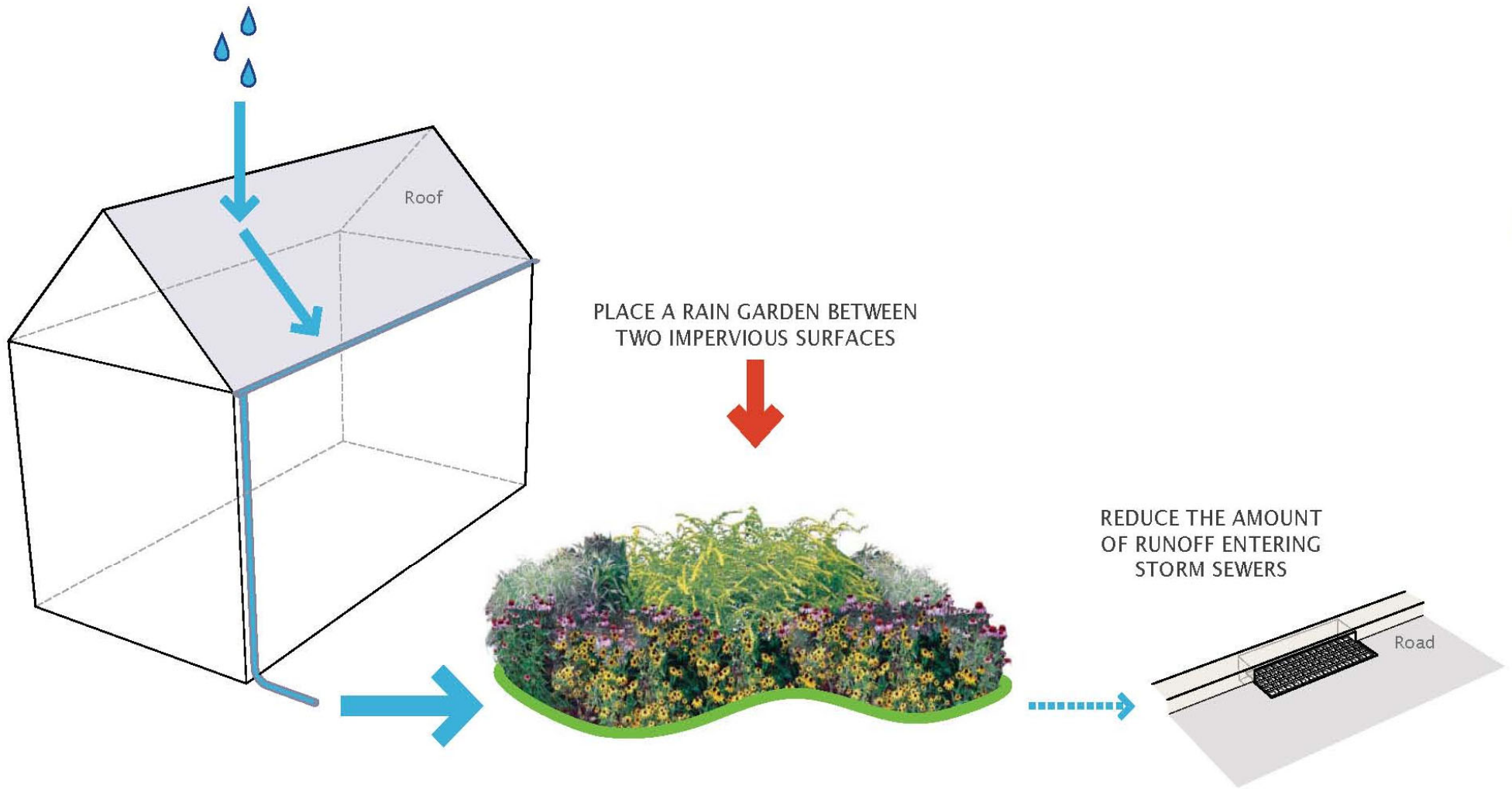
→ *more stormwater runoff*



# Connected or Disconnected?



# One Solution...

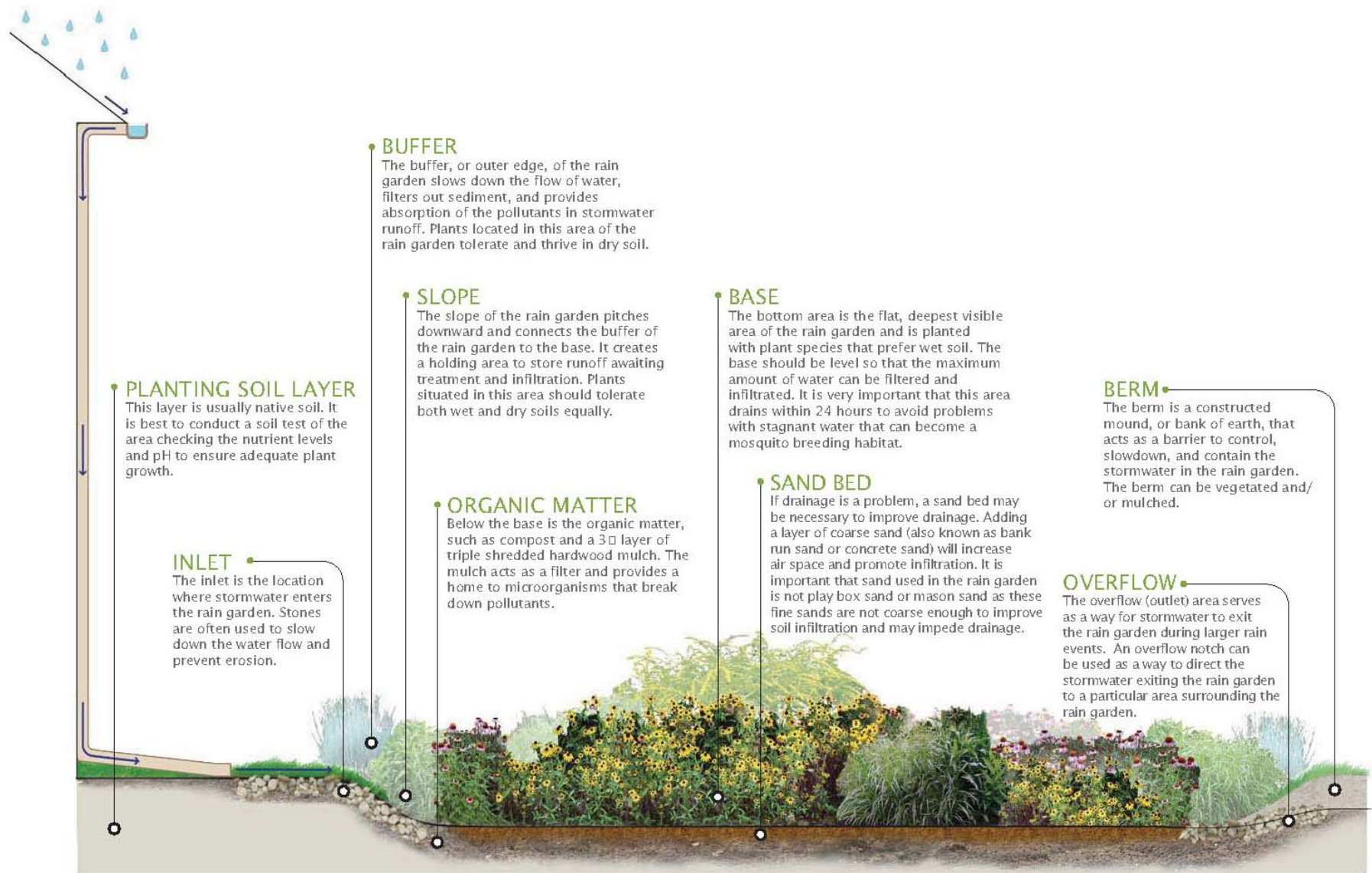


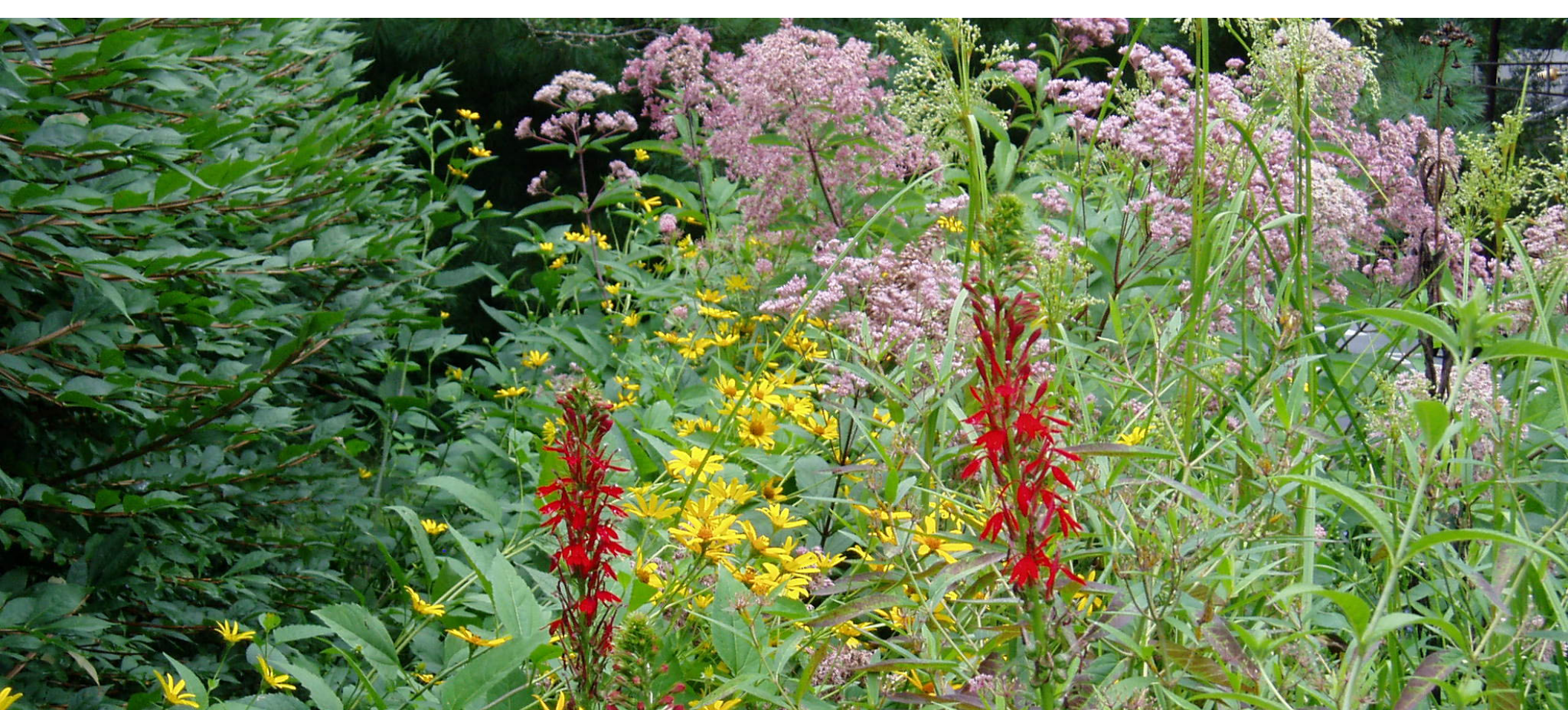
# Rain Gardens

A rain garden is a landscaped, shallow depression that is designed to intercept, treat, and infiltrate stormwater at the source before it becomes runoff. The plants used in the rain garden are native to the region and help retain pollutants that could otherwise harm nearby waterways.



# PARTS OF A RAIN GARDEN





SITE SELECTION & DESIGN

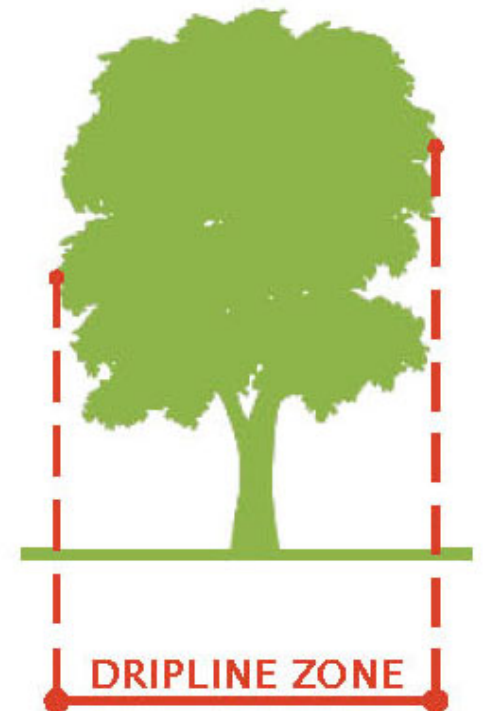
# PLANNING YOUR RAIN GARDEN





# SITE SELECTION

1. Next to a building with a basement, rain garden should be located min. 10' from building; no basement: 2' from building
2. Do not place rain garden within 25' of a septic system
3. Do not situate rain garden in soggy places where water already ponds
4. Avoid seasonably-high water tables within 2' of rain garden depth
5. Consider flat areas first – easier digging
6. Avoid placing rain garden within dripline of trees
7. Provide adequate space for rain garden









# CALL BEFORE YOU DIG

## LOCATE YOUR UTILITY LINES!

*Call BEFORE You Dig!*

*NJ One Call  
1-800-272-1000*

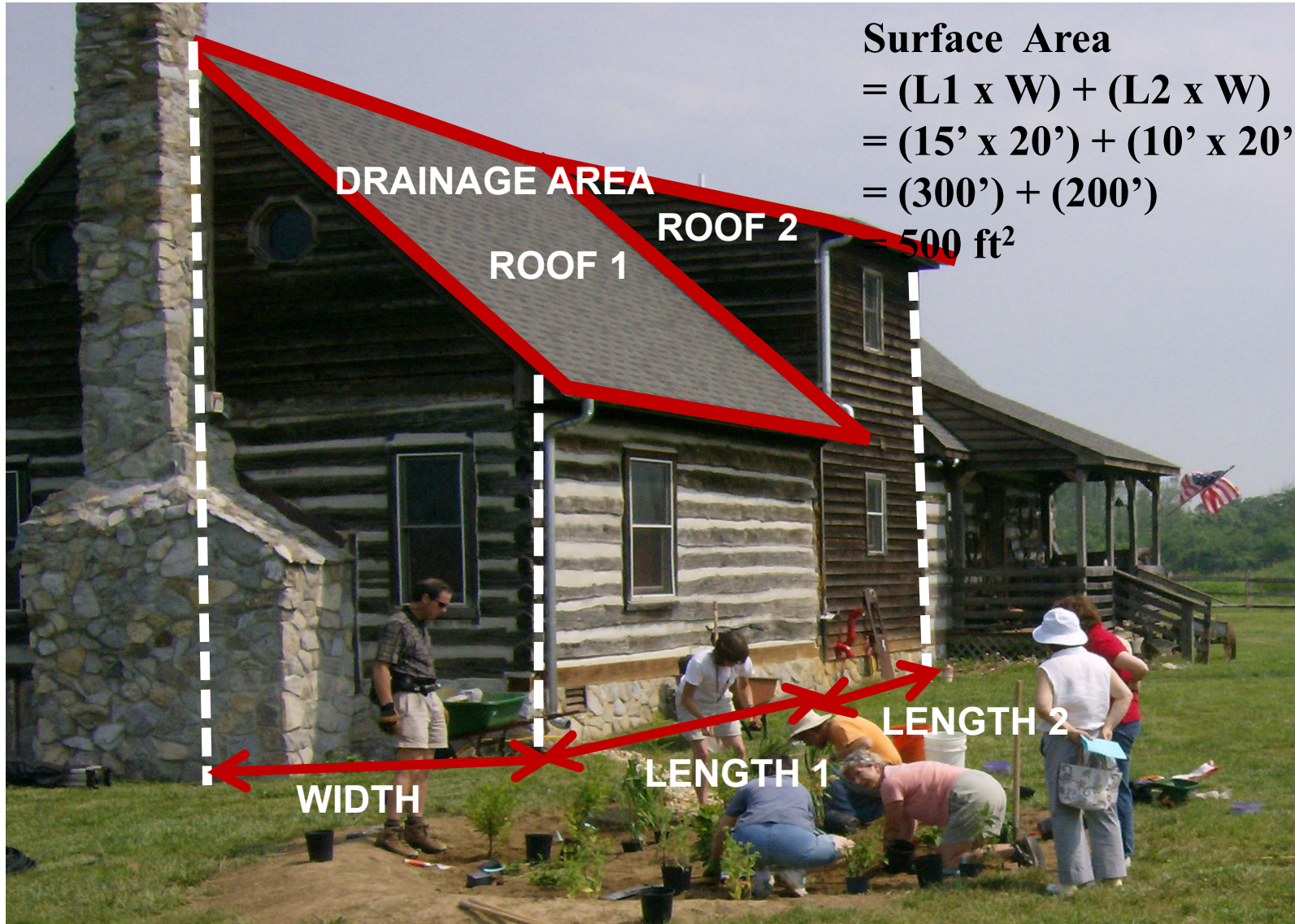
*The different colors of the markout flags represent specific utilities.*

-  ELECTRIC
-  GAS, OIL, STEAM
-  COMMUNICATIONS, CATV
-  WATER
-  SEWER

- **NJ One Call: 1-800-272-1000**
- Free markout of underground gas, water, sewer, cable, telephone, and electric utility lines
- Call at least 3 full working days, but not more than 10 days, prior to planned installation date
- Do not place rain garden within 5' horizontally and 1' vertically from any utilities



# DRAINAGE AREA CALCULATION



Surface Area

$$= (L1 \times W) + (L2 \times W)$$

$$= (15' \times 20') + (10' \times 20')$$

$$= (300') + (200')$$

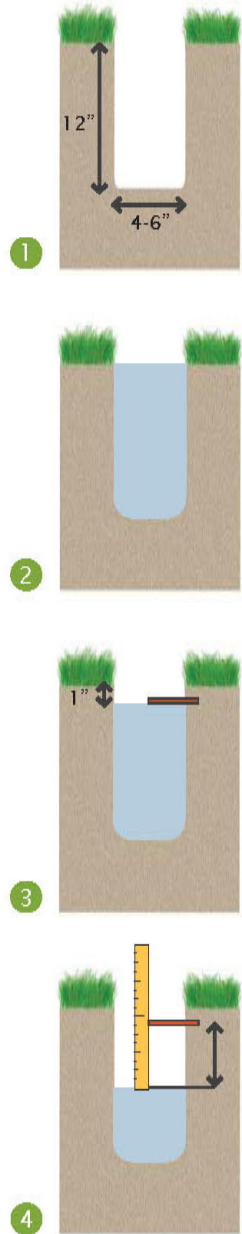
$$= 500 \text{ ft}^2$$

WIDTH

LENGTH 1

LENGTH 2

# CHECK YOUR SOIL



- Infiltration/Percolation Test

1. Dig a hole in the proposed rain garden site (12" deep, 4-6" wide)
2. Fill with water to saturate soil and then let stand until all the water has drained into the soil
3. Once water has drained, refill the empty hole again with water so that the water level is about 1" from the top of the hole
4. Check depth of water with a ruler every hour for at least 4 hours
5. Calculate how many inches of water drained per hour

# DETERMINING THE DEPTH OF THE RAIN GARDEN



6" DEEP RAIN GARDEN - NO SOIL AMENDMENTS



3" DEEP RAIN GARDEN - SOIL AMENDMENTS



- Depth of rain garden is dependent upon the soil texture found at the site of the rain garden
- Depth is usually 3-8 inches

# DETERMINING THE SIZE OF THE RAIN GARDEN



- The size of the rain garden is dependent upon the amount of runoff entering the rain garden

## Rain Garden Sizing Table

Based on New Jersey's Water Quality Design Storm (1.25" of rain over 2 hours)

Drainage Area	Size of 3" Deep Rain Garden CLAY SOIL*	Size of 6" Deep Rain Garden SILTY SOIL	Size of 8" Deep Rain Garden SANDY SOIL
500 ft <sup>2</sup>	200 ft <sup>2</sup>	100 ft <sup>2</sup>	75 ft <sup>2</sup>
750 ft <sup>2</sup>	350 ft <sup>2</sup>	150 ft <sup>2</sup>	112 ft <sup>2</sup>
1,000 ft <sup>2</sup>	400 ft <sup>2</sup>	200 ft <sup>2</sup>	149 ft <sup>2</sup>
1,500 ft <sup>2</sup>	600 ft <sup>2</sup>	300 ft <sup>2</sup>	224 ft <sup>2</sup>
2,000 ft <sup>2</sup>	800 ft <sup>2</sup>	400 ft <sup>2</sup>	299 ft <sup>2</sup>

\*SOIL TEXTURE AMENDMENTS NEEDED

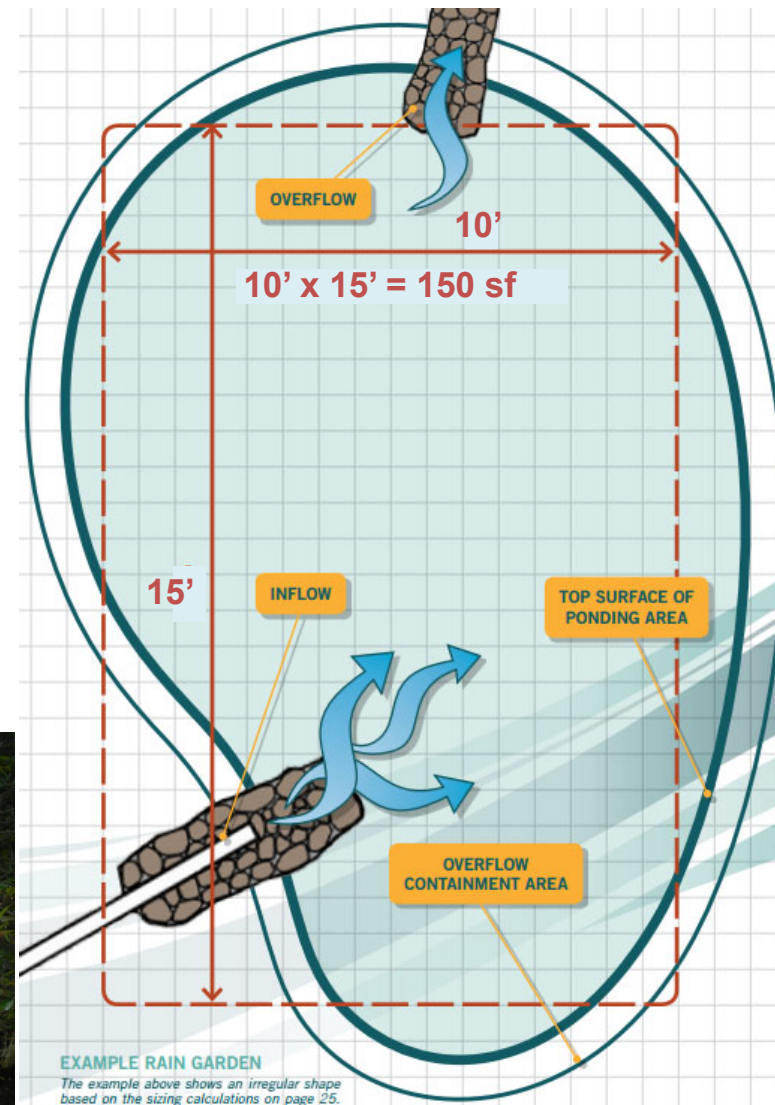
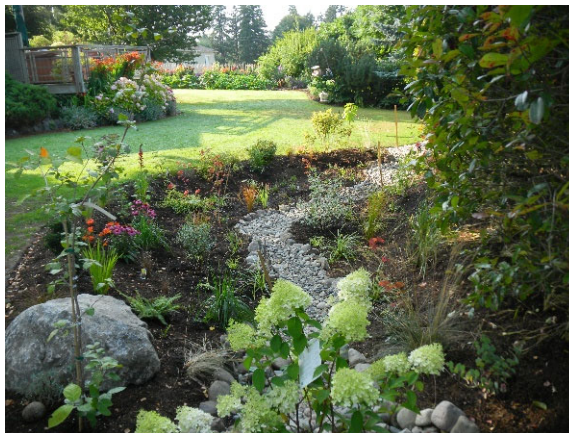
# RAIN GARDENS

## Typical Size

Modified from Rain Garden Handbook for Western WA

What is a typical rain garden size?

- Typically 100-200 square feet.
- A 100 square foot rain garden will often receive water from an area 5 to 10 times larger than the rain garden..



# SOIL AMENDMENTS

- Soil amendments improve the rain garden's infiltration rate and help the plants grow



# DETERMINING THE INLET AND OVERFLOW

- Stormwater runoff enters the rain garden from an **inlet**
- Stormwater exits through the **overflow**





# PREVENTING EROSION

- Slope no greater than 3:1
- Slow down velocity of water flowing through rain garden
  - Add rocks to inlet area (River Stone)



# DETERMINING MULCH QUANTITY



- Allow for a 3” depth mulch (triple-shredded hardwood with no dye) to be spread throughout the entire rain garden
- Every 100 square feet of rain garden needs 1 cubic yards (3” depth)





# RAIN GARDEN PLANTING DESIGN



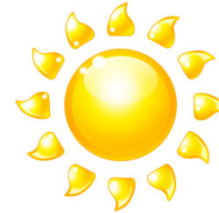
# DESIGN AESTHETICS

- Formal or traditional design
  - Shrub bed
  - Perennial garden
  - Hedges
- Naturalized planting & design
  - Butterfly garden
  - Meadow (warm season grasses & wildflowers)
  - Buffer plantings



# SITE CONSTRAINTS

- Sun vs. shade
- Exposure/wind
- Soil characteristics
- Hydrologic conditions
- Road salts
- Vehicle/pedestrian traffic



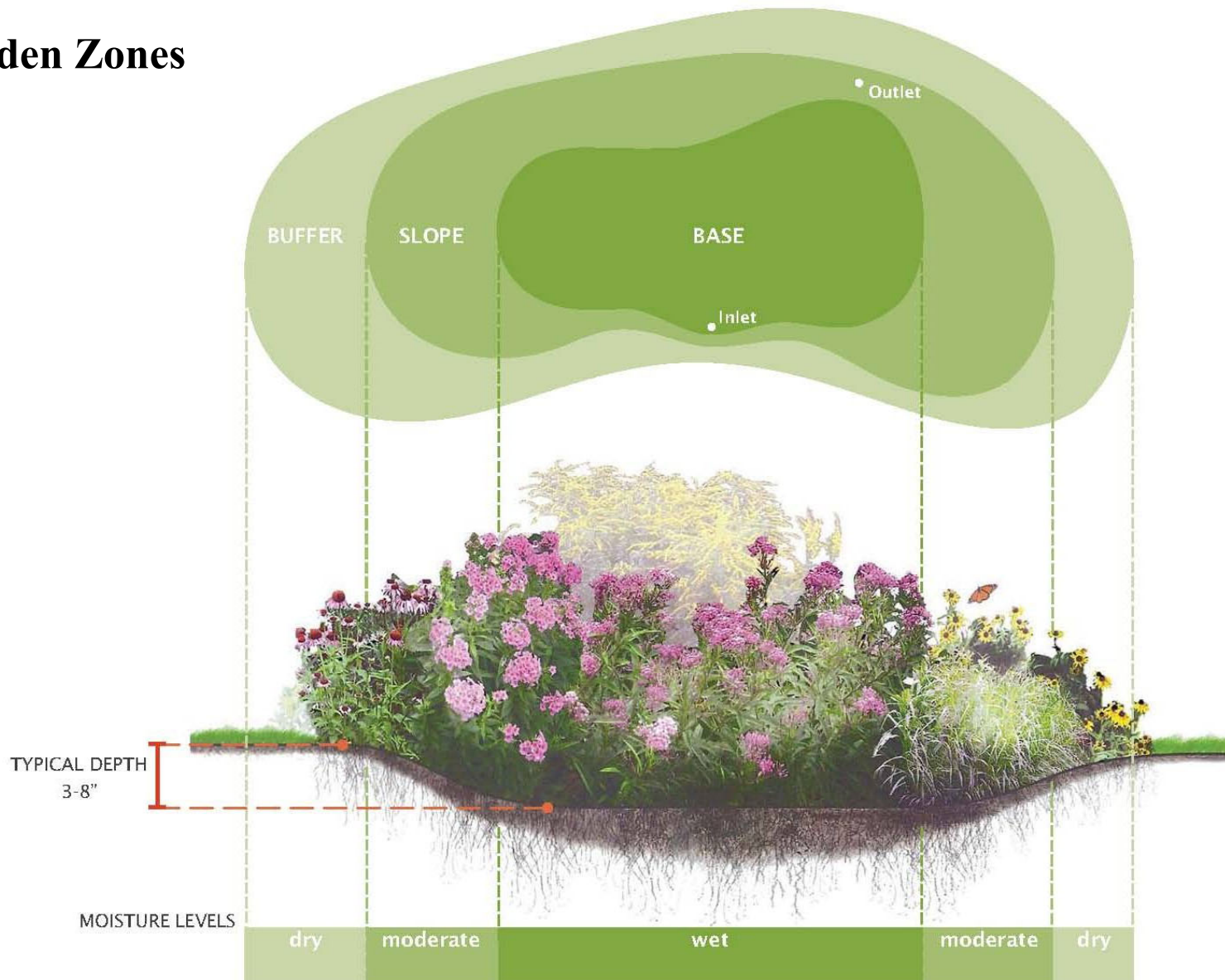
# PLANTS IN THE RIGHT PLACE...



*Courtesy of Pinelands Nursery & Supply*

# PLANTING DESIGN: Wet + Dry Conditions

## Rain Garden Zones



# SELECTING PLANT SPECIES

- Mature plant size
  - Proximity to buildings and utility lines
  - Pruning and shaping
- Seasonal interest
  - Flowers
  - Fall color
  - Winter character
- Beneficial wildlife
  - Flowers for butterflies
  - Fruits for song birds



# GRASSES & GROUND COVERS



## BUFFER

- Broomsedge
- Bearberry
- Panic grass
- Switchgrass
- Little bluestem
- Indiangrass

## BASE

- Big bluestem
- Virginia wild-rye
- Switchgrass
- Wool grass

## SLOPE

- Bluejoint grass
- Sedges
- Fowl mannagrass
- Softrush



# WILDFLOWERS & FERNS



## BUFFER

- Butterfly milkweed
- Wild indigo
- Purple coneflower
- Beebalm
- Black-eyed susan

## BASE

- New England aster
- New York aster
- Columbine
- Coreopsis
- Joe-pye weed
- Blazing star
- Sensitive fern
- Cinnamon fern
- Ironweed

## SLOPE

- Swamp milkweed
- Marsh marigold
- Turtlehead
- Boneset
- Rose-mallow/hibiscus
- Blueflag iris
- Cardinal flower
- Blue lobelia
- Monkey flower



# TREES & SHRUBS



## BUFFER

- Hackberry
- Red Bud
- Pepperbush
- American Holly
- Bayberry
- Witchhazel
- White Oak
- Red Oak
- Arrowwood
- Viburnum

## BASE

- Red Maple
- Service Berry
- River Birch
- Silky Dogwood
- Red-twig Dogwood
- Inkberry Holly
- Winterberry
- Sweetbay
- Magnolia

## SLOPE

- River Birch
- Buttonbush
- Silky Dogwood
- Green Ash
- Swamp White Oak
- Pin Oak
- Cranberrybush
- Viburnum





THE FUN PART!

# INSTALLING YOUR RAIN GARDEN



# STEP ONE

- Select and design a rain garden location during your 45 minute session with Rutgers Team
- Outline the rain garden area with marking paint or flags



# STEP TWO

- Complete the Call Before You Dig- NJ One Call: 1-800-272-1000
- They will come out and mark the area for your utilities



# STEP THREE

- Remove existing grass with a shovel or machinery (sod cutter/ small backhoe)



# STEP FOUR

- Excavate to design depth based on necessary storage and soil amendment requirements



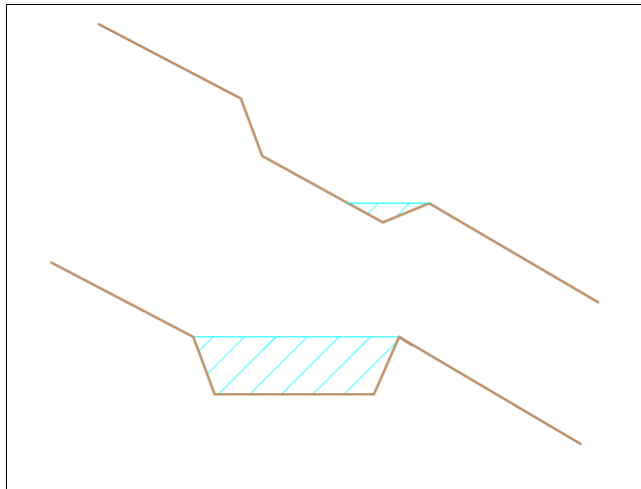
# STEP FIVE

- Add soil amendments, if necessary
- Combine amendments with existing soil using shovels or rototiller
- Loosen and prepare soil for grading and planting



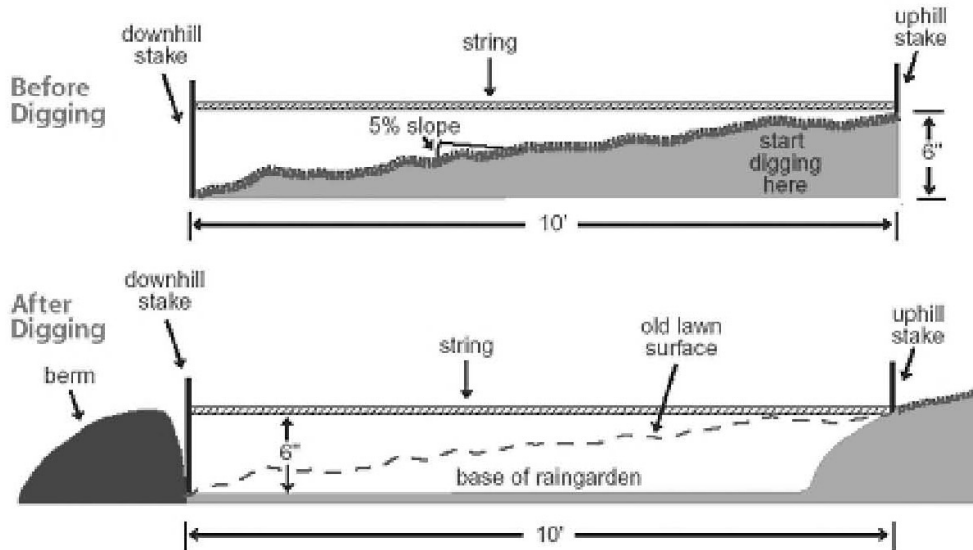
# STEP SIX

- Level the rain garden base



# STEP SEVEN

- Prepare the berm, if necessary



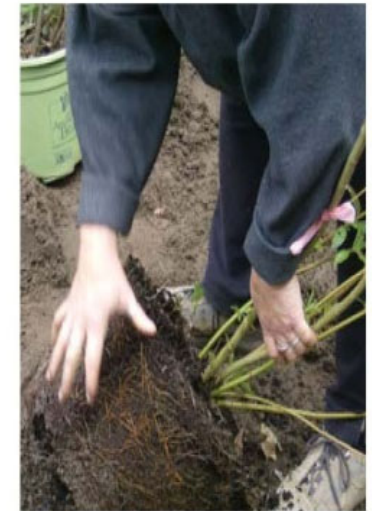
# STEP EIGHT

- Prepare the inlet and overflow



# STEP NINE

- Plant native species



# STEP EIGHT

- Apply mulch



- Allow for a 3” depth mulch (triple-shredded hardwood with no dye) to be spread throughout the entire rain garden
- For every 100 square feet of rain garden, you will need about 1 cubic yard of mulch (3” depth)

# STEP NINE

- Water Plants



# STEP TEN

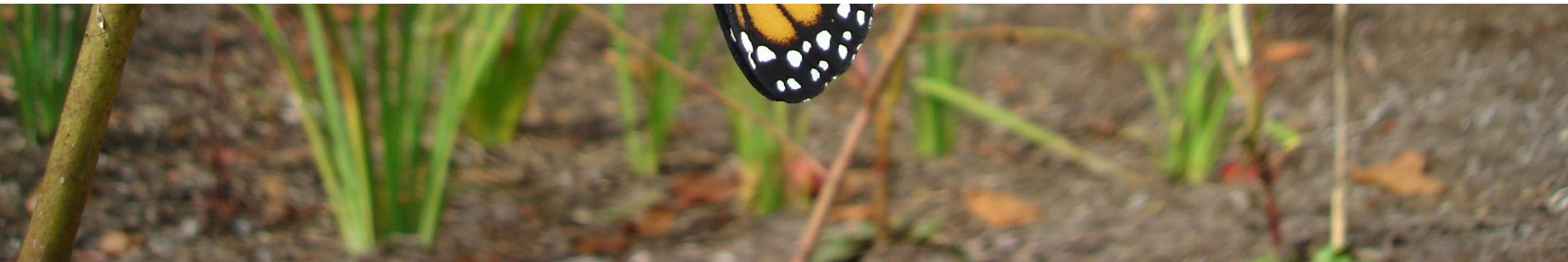
- Appreciate a job well done





INSPECTION AND MAINTENANCE

# MAINTAINING YOUR RAIN GARDEN



# MAINTENANCE MEASURES

## *WEEKLY TASKS:*

1. Watering
2. Weeding
3. Inspecting

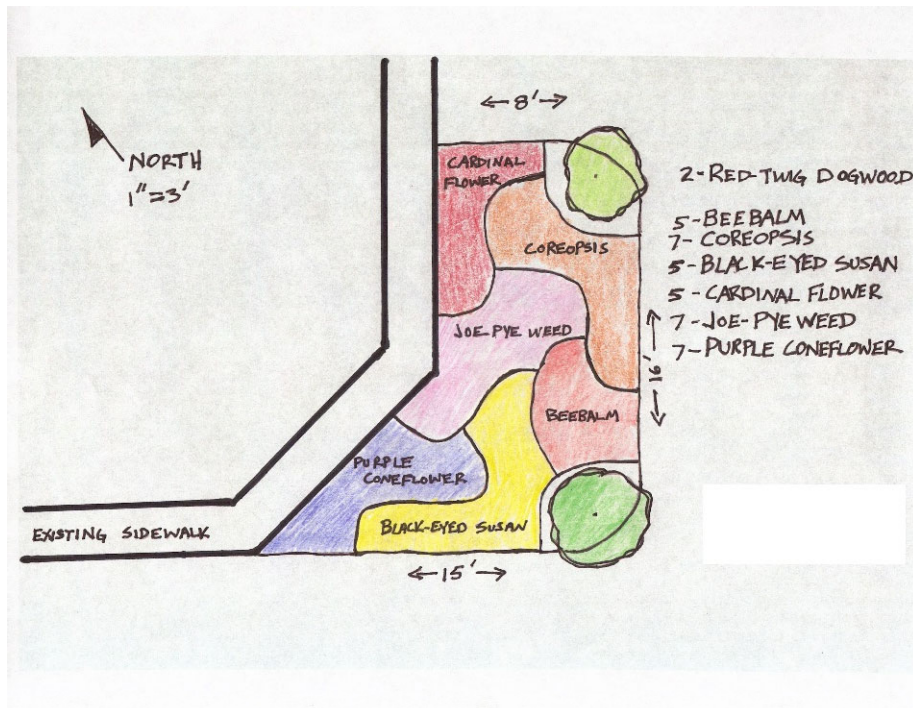
## *ANNUAL TASKS:*

1. Mulching
2. Pruning
3. Re-planting
4. Removing sediment
5. Soil Testing
6. Harvesting Plants
7. Cleaning of Gutters
8. Replacing materials (stone, landscape fabric)

# Installed Homeowner Rain Gardens

# Design Example for Roof Runoff

## Design



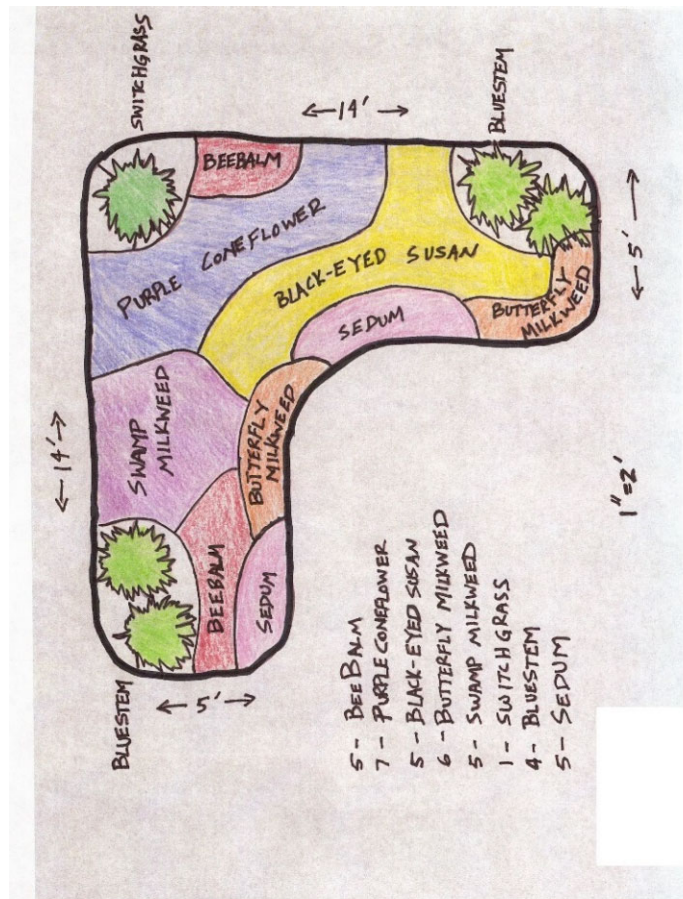
## Installed Rain Garden





# Design Example for Parking Lot Runoff

## Design



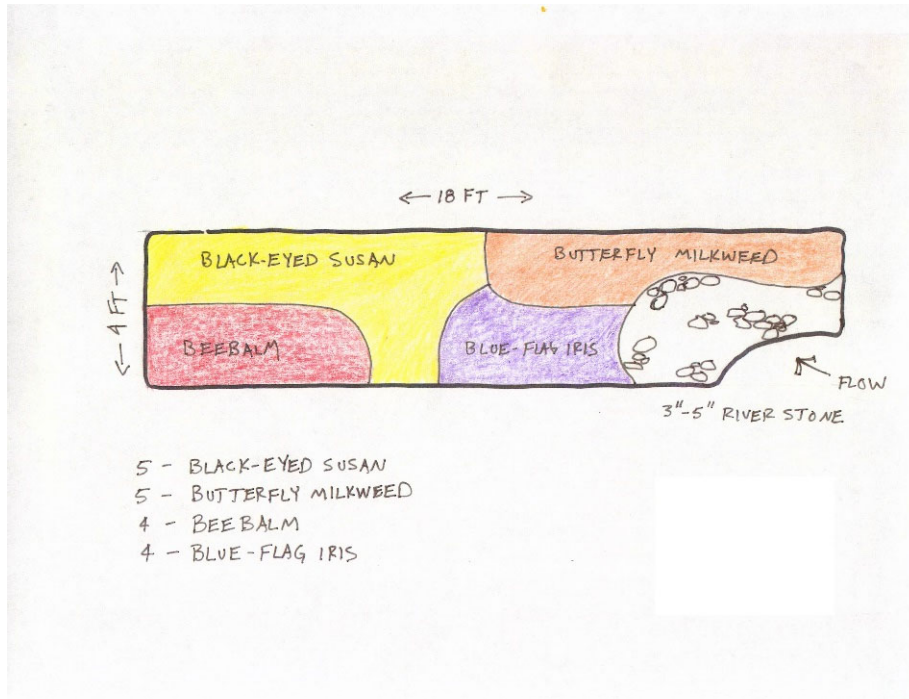
## Installed Rain Garden



# Roof, Sump Pump and Driveway Runoff – WOW!

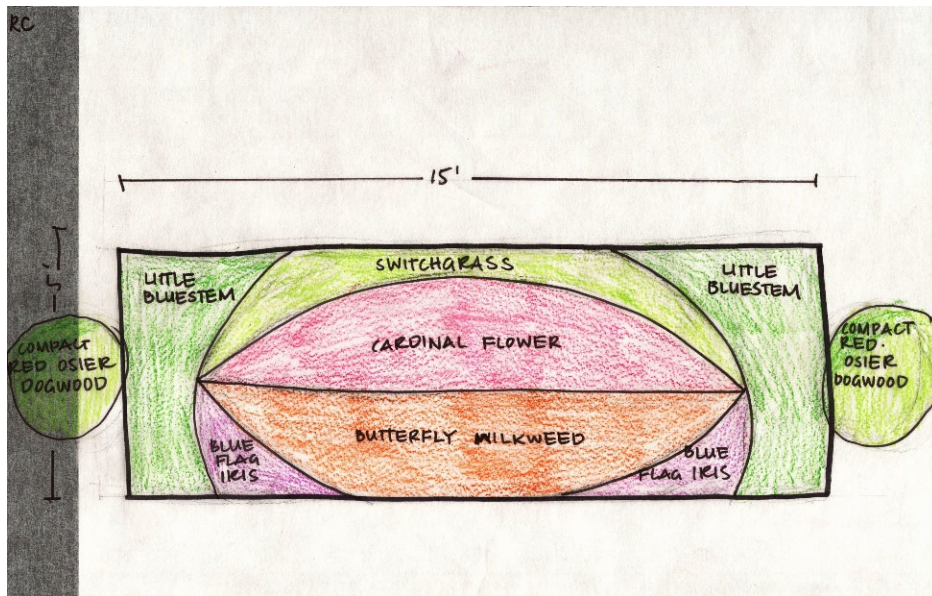
## Design

## Installed Rain Garden



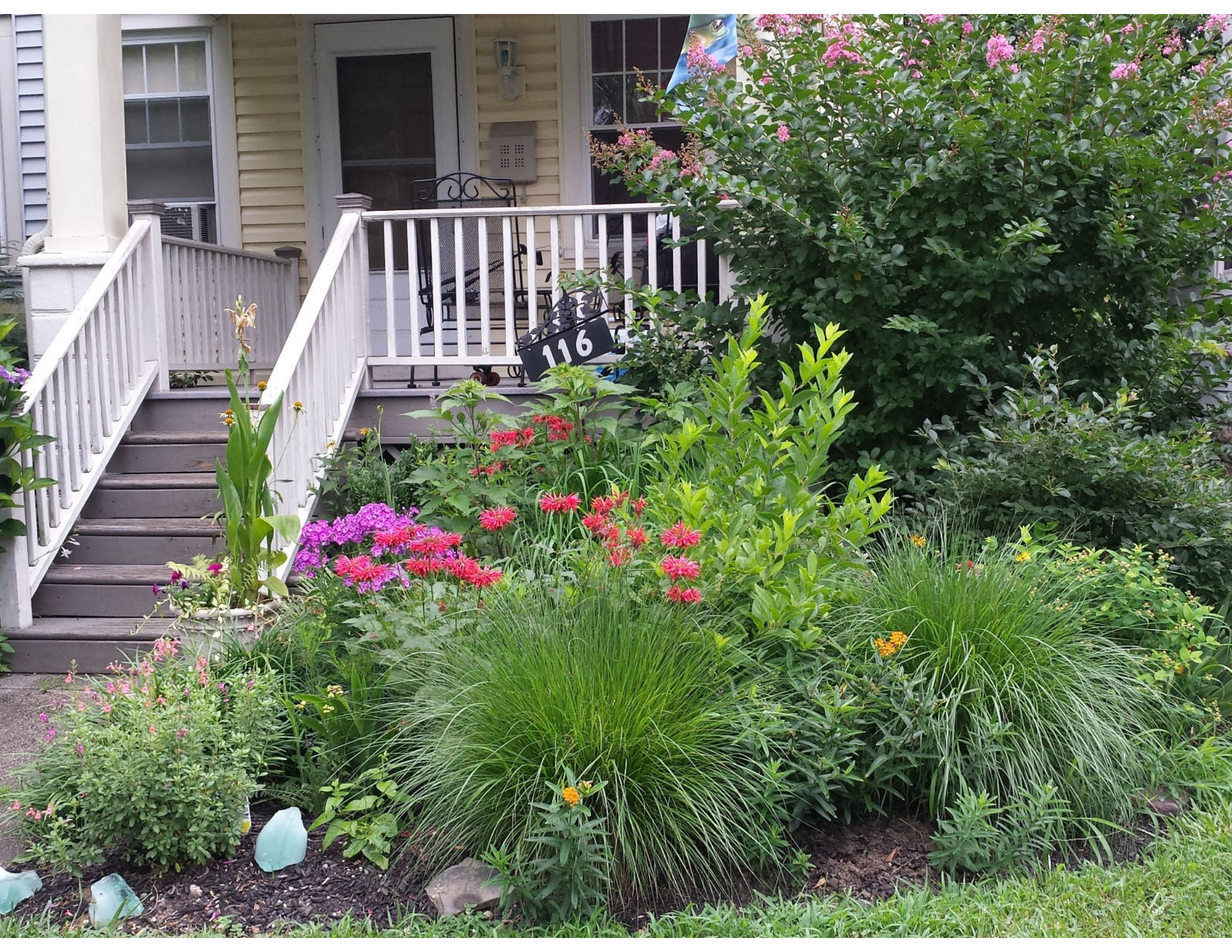
# Roof Runoff from Rain Barrel Overflow

## Design



## Installed Rain Garden





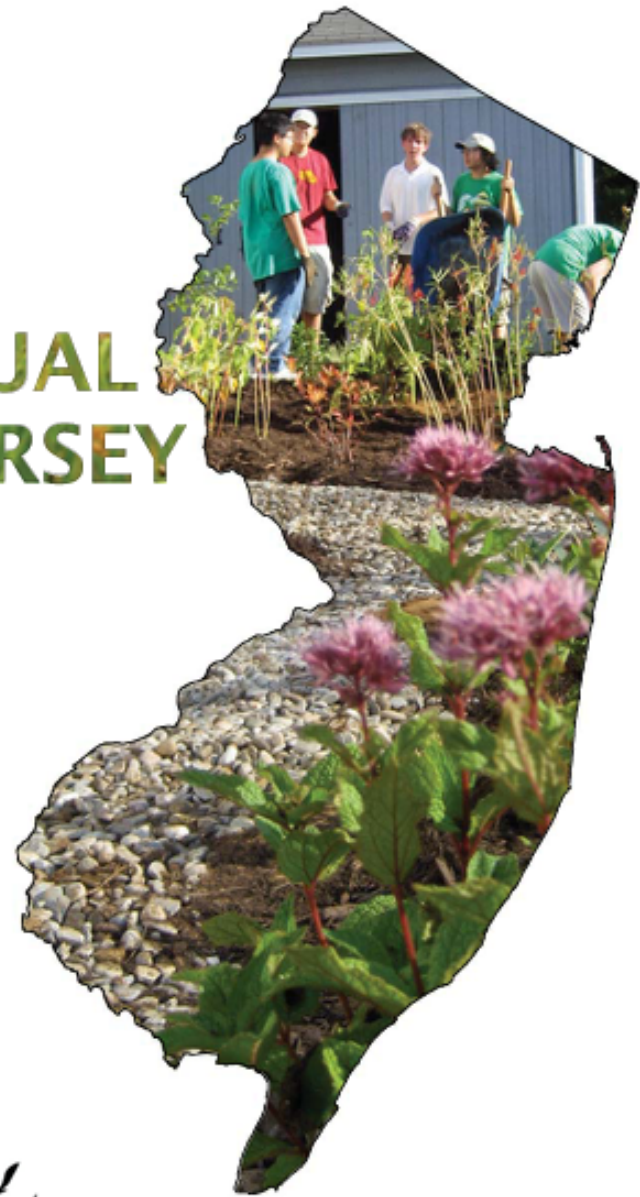
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[http://water.rutgers.edu/Rain\\_Gardens/RGWebsite/rginfo.html](http://water.rutgers.edu/Rain_Gardens/RGWebsite/rginfo.html)

# RAIN GARDEN MANUAL OF NEW JERSEY





# Rain Garden 4+

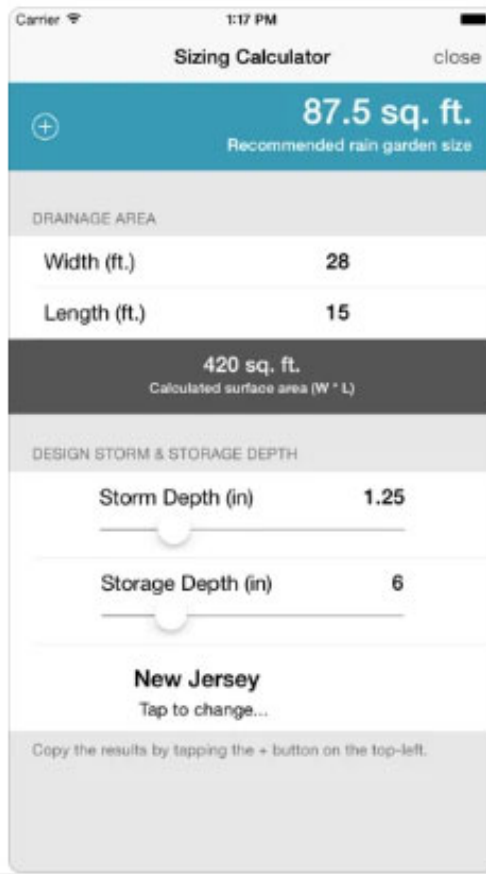
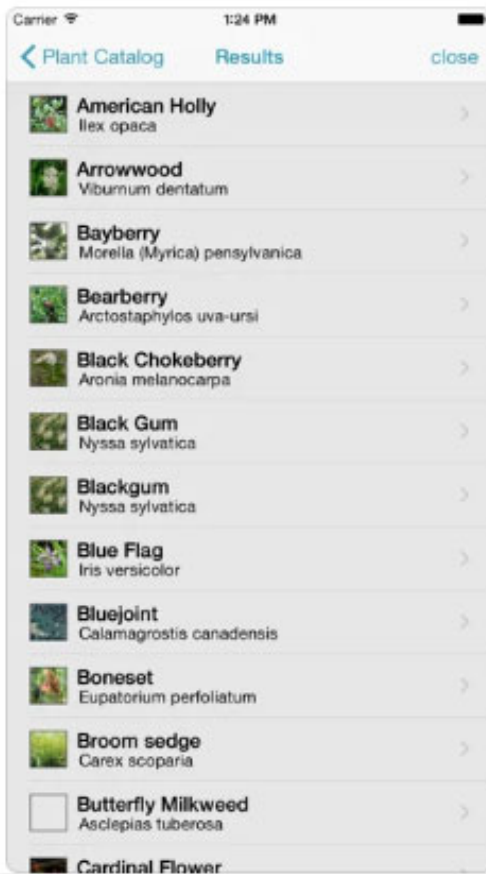
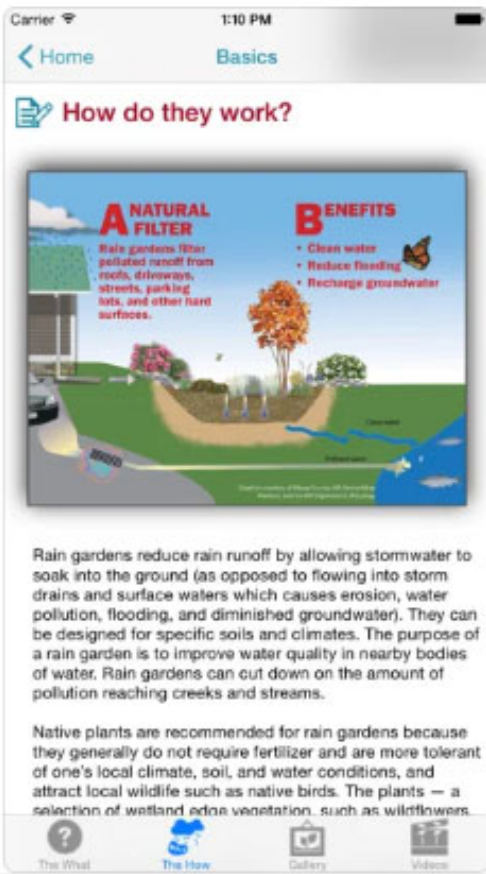
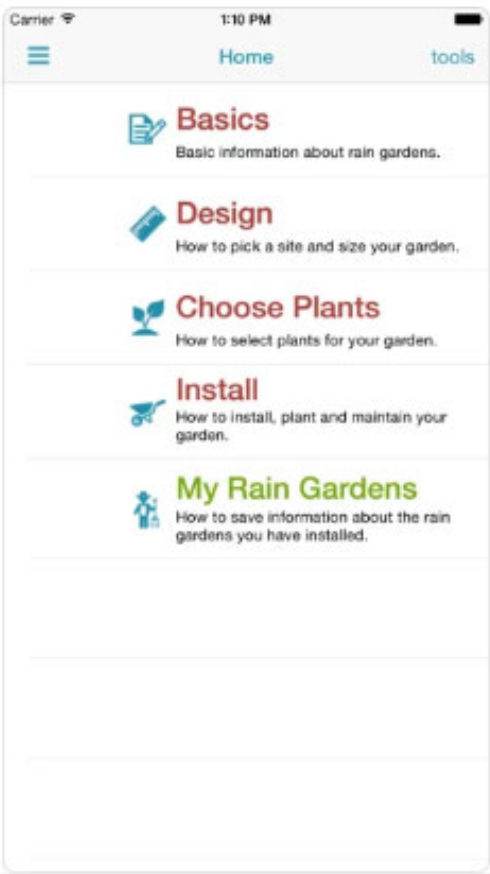
University of Connecticut

Designed for iPhone

★★★★☆ 2.6 • 11 Ratings

Free

## iPhone Screenshots



# NEXT STEPS

The technical session will be on Tuesday, March 24th, from 8 am to 6 pm, with a session every half hour. Send Hollie an email after this presentation to sign up.

*Hollie DiMuro, Senior Program Administrator Supervisor*  
[hdimuro@envsci.rutgers.edu](mailto:hdimuro@envsci.rutgers.edu)

