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THE STATE UNIVERSITY
OF NEW JERSEY

New Jersey Rain Garden Rebate Program:

Fostering the Adoption of Stormwater Management Practices

presented at

Fixing Flooding One Community at a Time Conference

Sayreville, NJ

February 26, 2016

STATEMENT OF PROBLEM

Stormwater is degrading water quality of the Raritan River

GOAL

Reduce the water quality impacts of stormwater runoff to the Raritan River

Photo courtesy of Andrew Mills

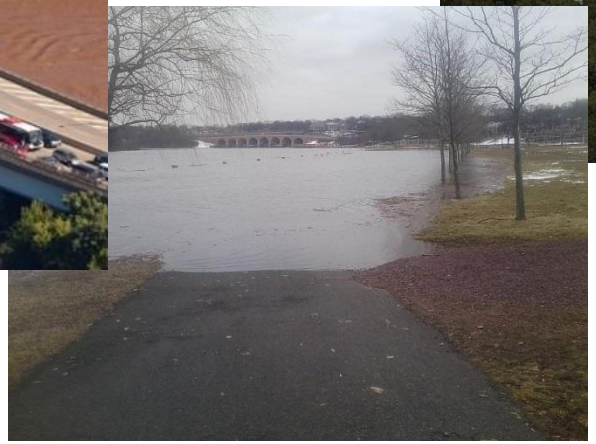

Photo courtesy of commons.wikkimedia.com

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OBJECTIVE

Encourage homeowner adoption of stormwater management practices through education and incentives

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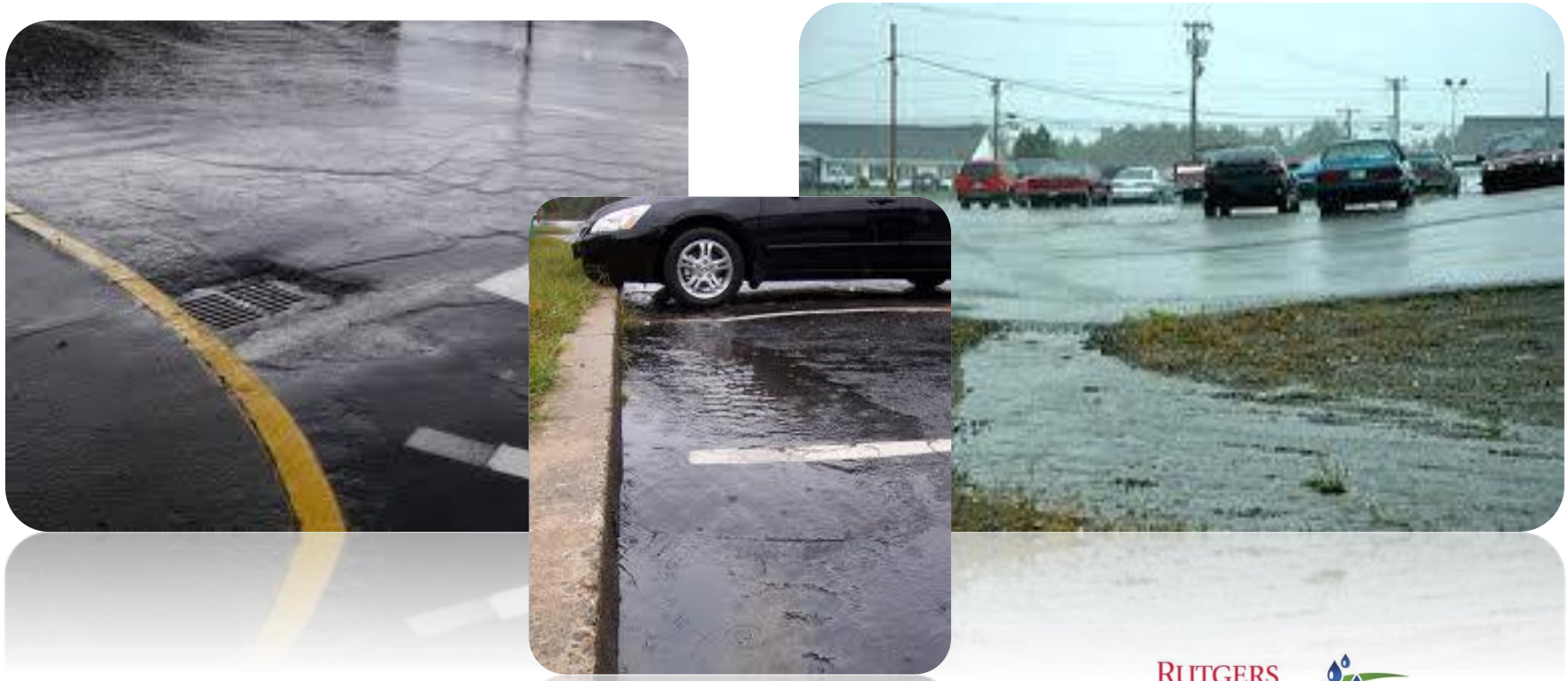
To minimize impact of stormwater runoff, you must control runoff from impervious surfaces



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We must deal with impacts from impervious cover

Are there impervious surfaces that you can eliminate?

If we can't eliminate it, can we reduce it?

If we can't eliminate or reduce it, can we disconnect it?

Are there impervious surfaces that you can harvest rainwater for reuse?

Connected or Disconnected?

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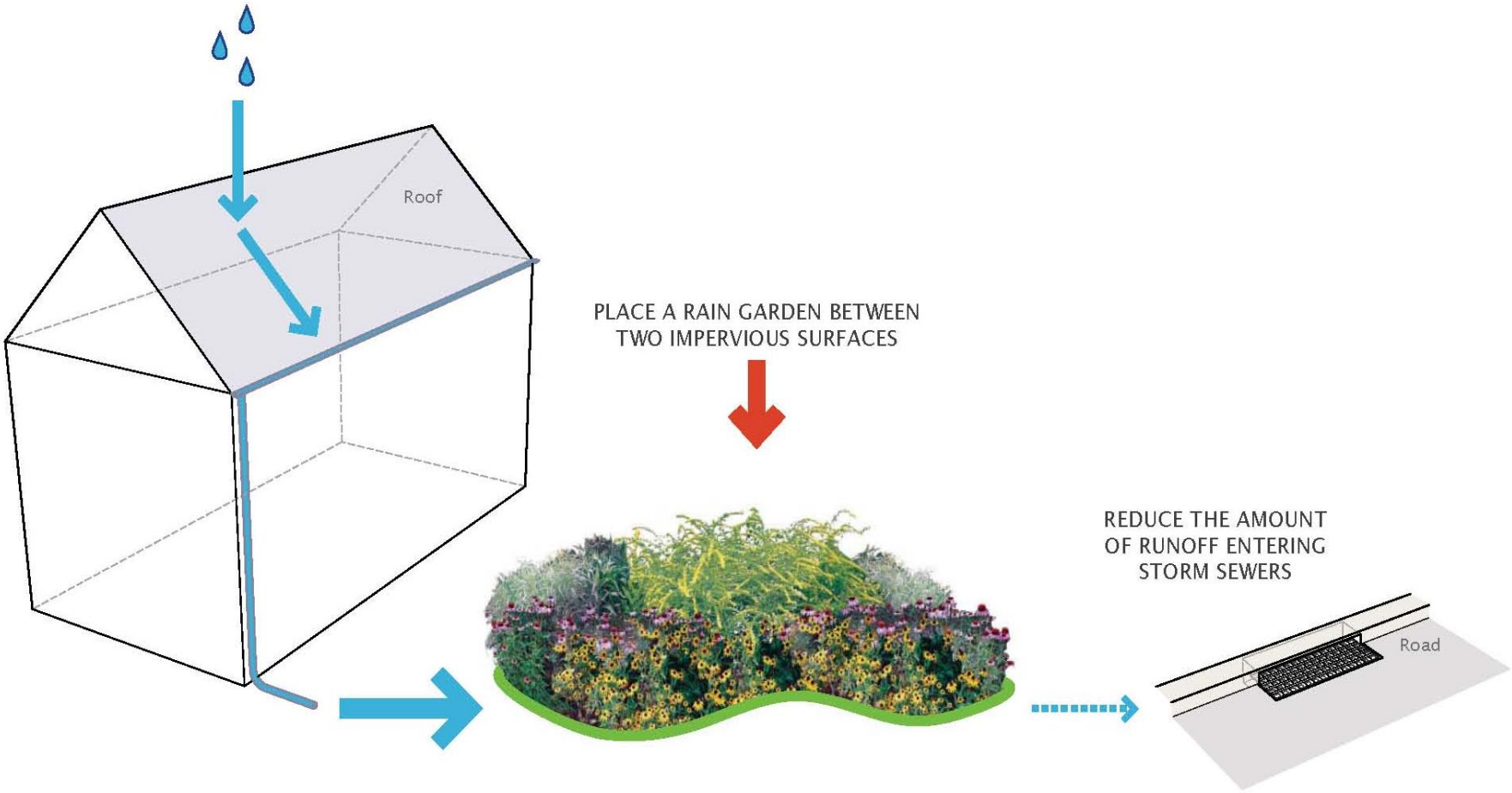
The Solution…



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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.

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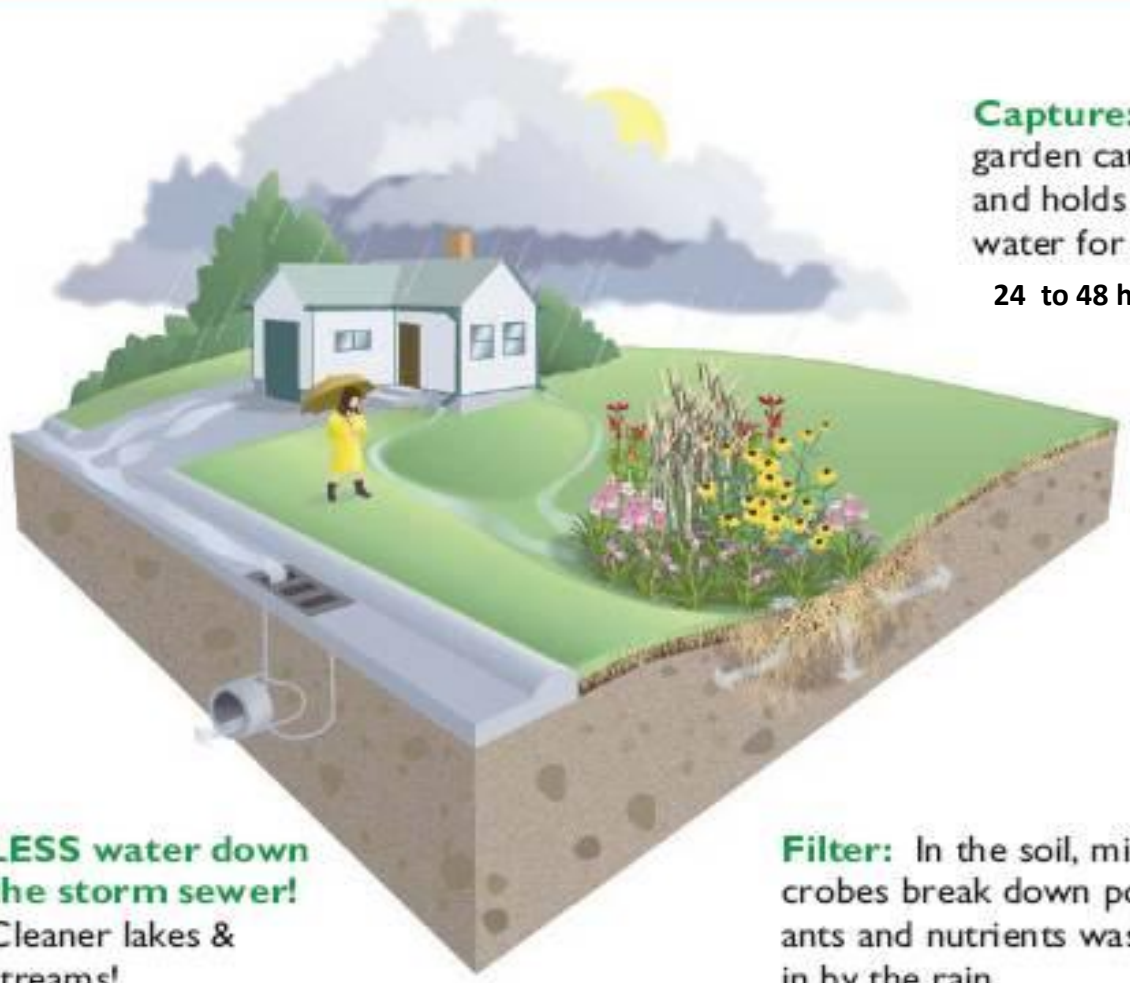
Rain Gardens



Capture: A rain garden catches runoff and holds standing water for no more than **24 to 48 hours.**

Soak: Deep-rooted plants loosen the soil, creating a sponge zone. Water soaks in and groundwater aquifers are recharged.

LESS water down the storm sewer!
Cleaner lakes & streams!

Filter: In the soil, microbes break down pollutants and nutrients washed in by the rain.

Courtesy of City of Maplewood, MN

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Rebate Programs for the Raritan River Watershed

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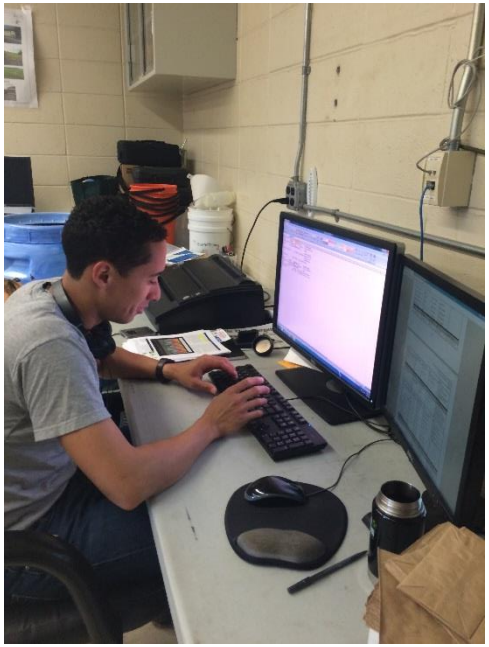
Develop and deliver educational and outreach programs to provide solutions to stakeholders



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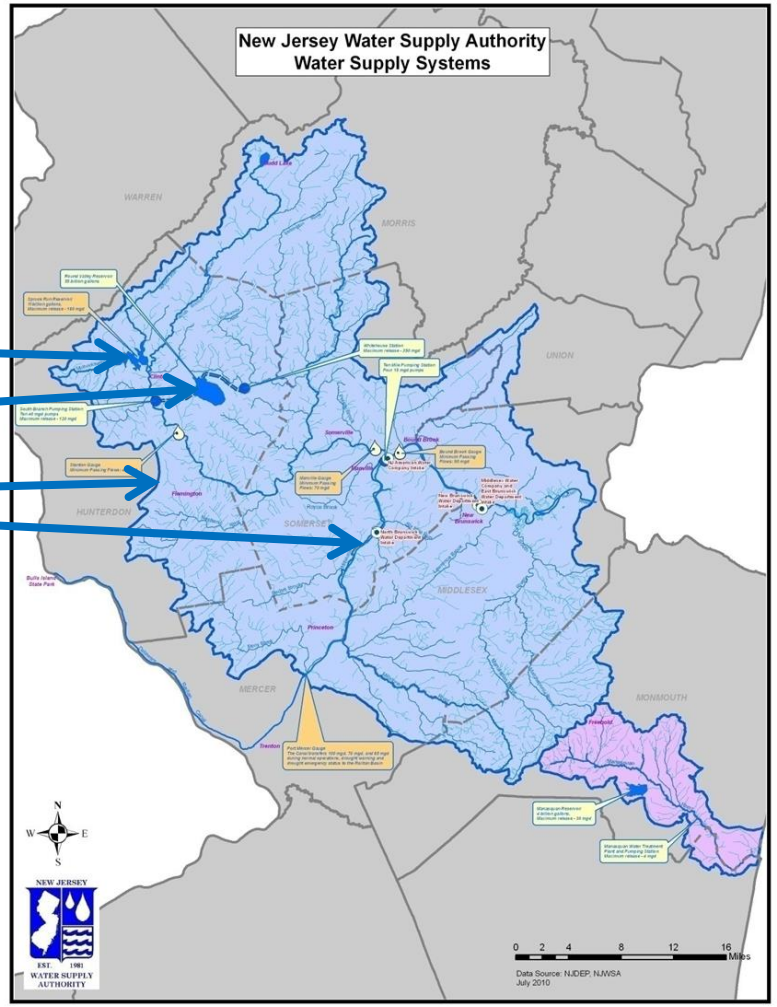
New Jersey Water Supply Authority

Raritan System

- Spruce Run Reservoir
- Round Valley Reservoir
- D&R Canal



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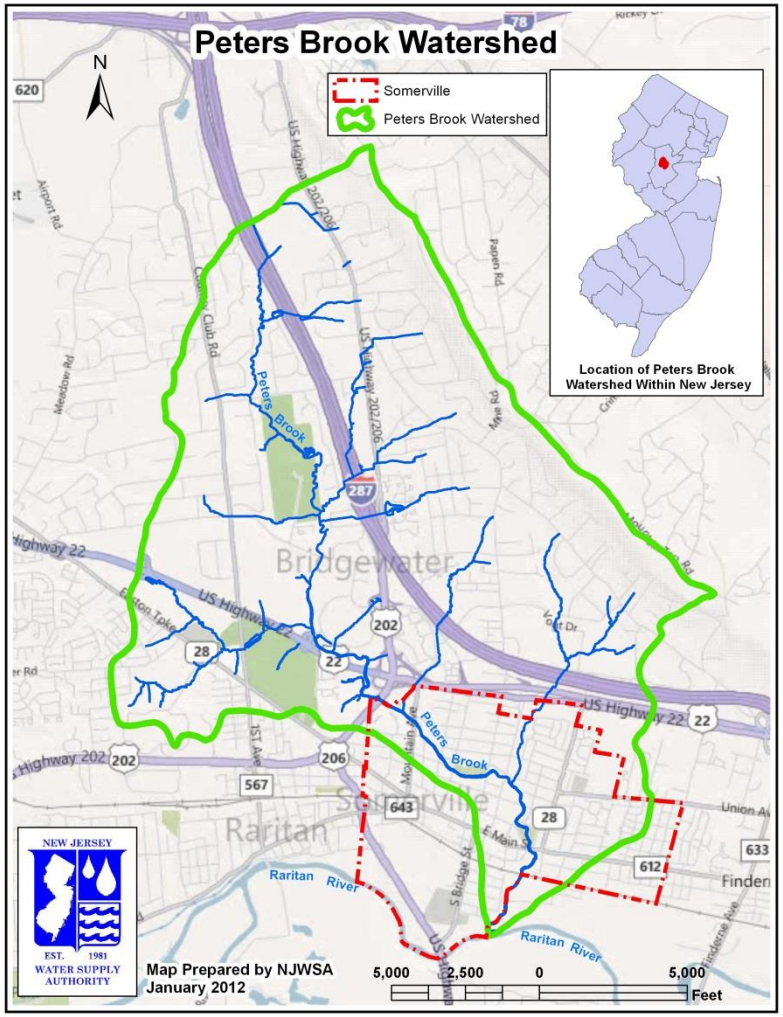
Priority Watershed
The Peters Brook

Located in Somerset County within Bridgewater, Raritan and Somerville

Confluence with the Raritan River about 2 miles upstream from the NJ American Water treatment plant

Encourage stormwater management on private residential properties



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Rain Barrels

- 2010 NJWSA and Rutgers cosponsored “build a rain barrel” workshops in targeted neighborhoods in each of the three communities (NJWSA continued to hold workshops through 2015)
- 2011-Present NJWSA and the Regional Center Partnership of Somerset offers the rain barrel rebate program
- The programs have resulted in the installation of over 250 barrels in the three communities

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Rain Barrel Rebate Program

- First 3 years only properties in the Peters Brook
  - 29 barrel rebates
- Years 4 and 5 any property within the 3 communities
  - 37 barrel rebates
- Offers rebates of up to $200 ($50/55 gal)

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The success of the Rain Barrel Rebate Program led to the development of the Rain Garden Rebate Program

A cooperative effort between NJWSA and Rutgers Water Resources Program

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Rain Garden Rebate Program

- Partnership between New Jersey Water Supply Authority and RCE Water Resources Program
- Focused on Bridgewater, Raritan Borough, Somerville, and as of December 2015 Hillsborough
- One educational session (1-1/2 hours)
- One-on-one technical sessions (30 minutes per homeowner
- Rebates of $3 per square foot of garden
- Inspections of completed gardens
- Evaluation of impact

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Lots of impervious surfaces in the study area

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Educational Sessions

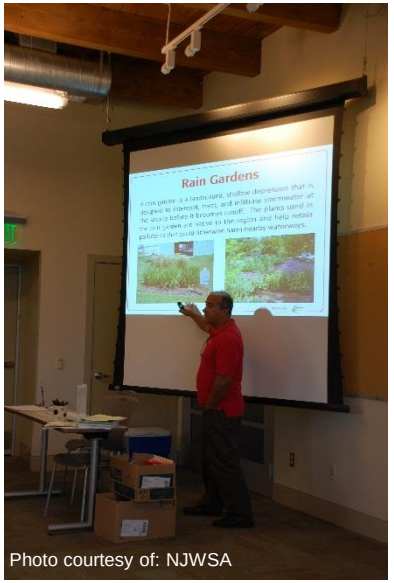

Photo courtesy of: NJWSA

Photo courtesy of: NJWSA

Photo courtesy of: NJWSA

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Pre/Post Survey

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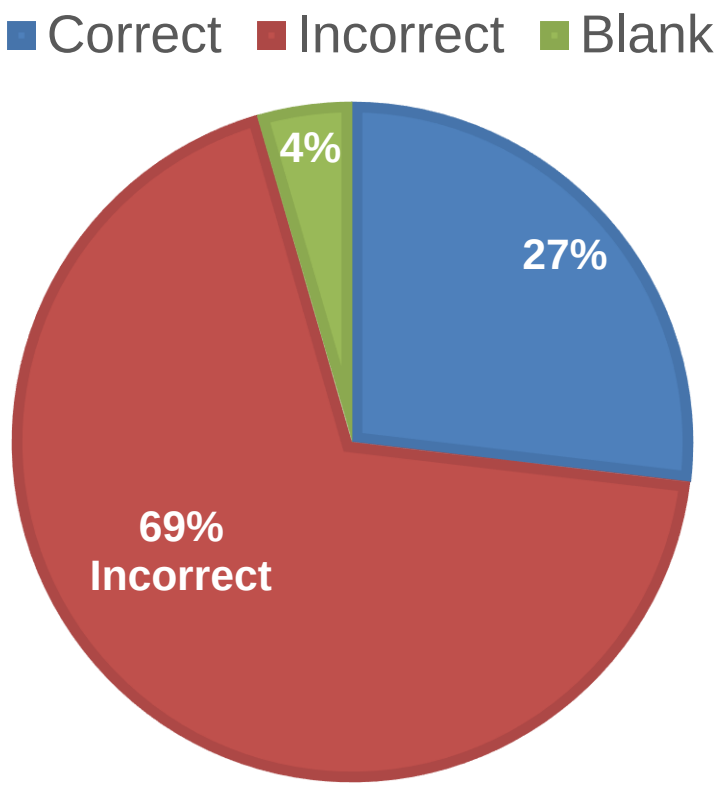
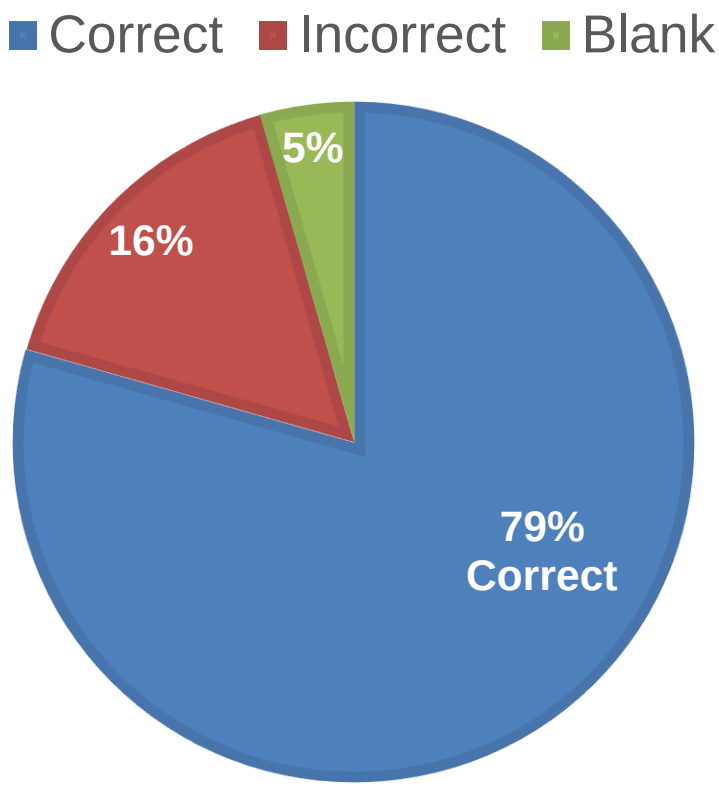
Q: A typical ponding depth for a rain garden?

Pre Survey



Post Survey



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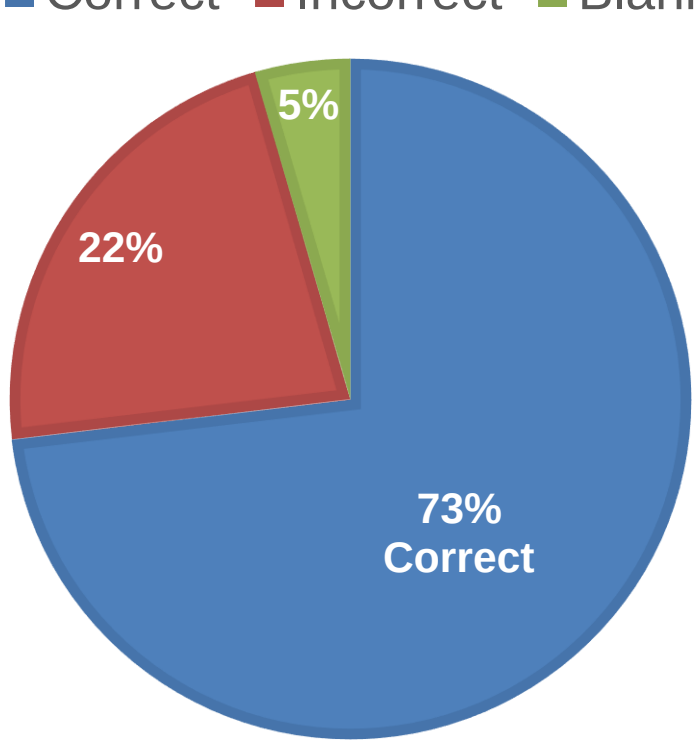
Q: A rain garden should be sized based upon?

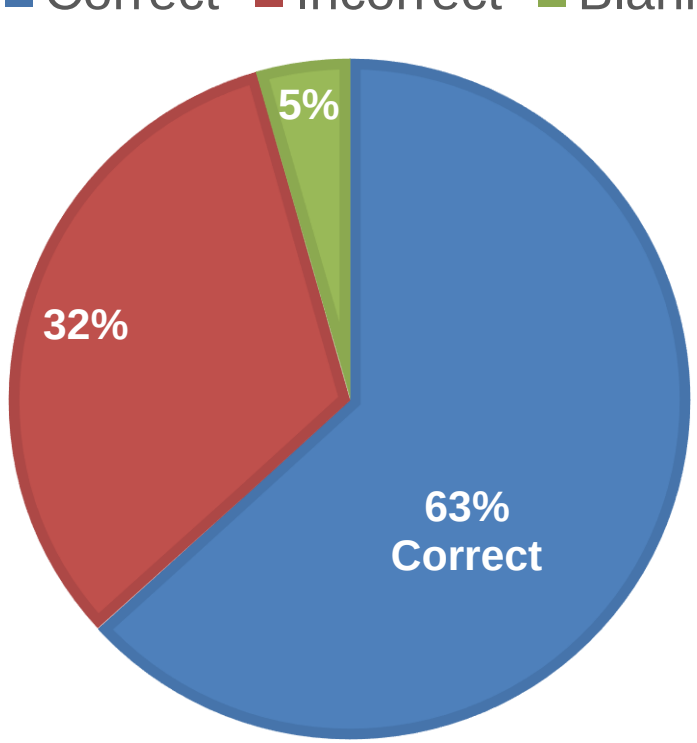
A:

A. Amount of impervious area draining to it
B. Target water quality volume
C. Depth of surface storage
D. Soil percolation
E. All of the above
F. Not sure

Pre Survey



Post Survey



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Take Home Handouts

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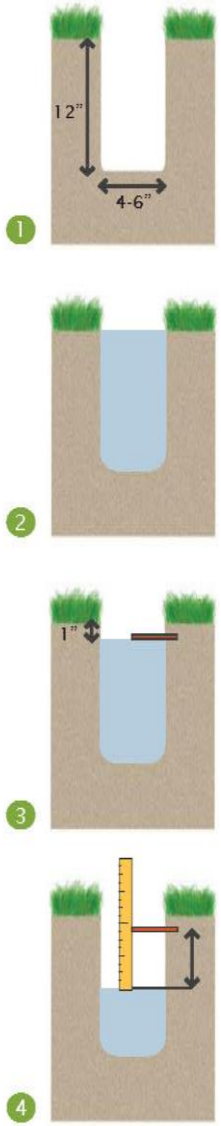
Water Resources Program

water.rutgers.edu

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

Prior to technical support session, please email this form along with your photos to Sara at saramellor@envsci.rutgers.edu

RAIN GARDEN
DESIGN FORM

HOW BIG DO YOU WANT YOUR RAIN GARDEN TO BE?

_____ FEET LONG X _____ FEET WIDE

WHAT ARE THE GARDEN SITE'S CONDITIONS?

SUN	☐ Full shade	☐ Partial shade	☐ Sunny
SOIL	☐ Sandy soil	☐ Loam soil	☐ Clay soil
DRAINAGE	☐ Well drained	☐ Poorly drained	☐ Compacted
SLOPE	☐ Flat	☐ Slight	☐ Steep

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HOW MUCH OF YOUR PROPERTY IS MADE UP OF IMPERVIOUS SURFACES?

_____ SQ. FT

WHAT IS THE DRAINAGE AREA OF YOUR PROPOSED RAIN GARDEN SITE?

_____ SQ. FT

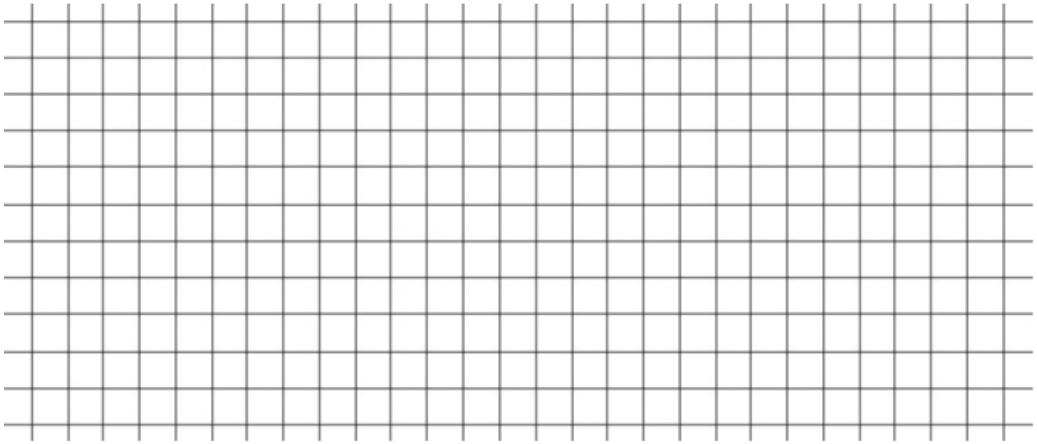
DO YOU HAVE A BASEMENT?

☐ YES ☐ NO

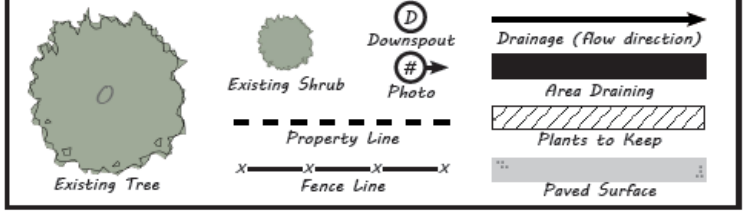
LANDSCAPE DESIGN PLAN

Draw a plan of your Rain Garden location, including the maximum area you are willing to dedicate to the garden. Please also attach a photo or two of the proposed area and mark on the plan where each photo was taken and the view it shows. Consider and include these details in your sketch on the graph paper below.

- Activites in your yard (i.e. kids playing, grilling, washing your car):
- Irrigation zones if applicable (i.e. sprinkler systems, drip irrigation):
- Sun/shade, wet/dry, steep slope, drainage patterns:
- Color preference for plants:
- Plant height restrictions:
- Block and hatch existing plants you want to keep



COMMON LANDSCAPE SYMBOLS



NEW JERSEY EST. 1981 WATER SUPPLY AUTHORITY

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Water Resources Program

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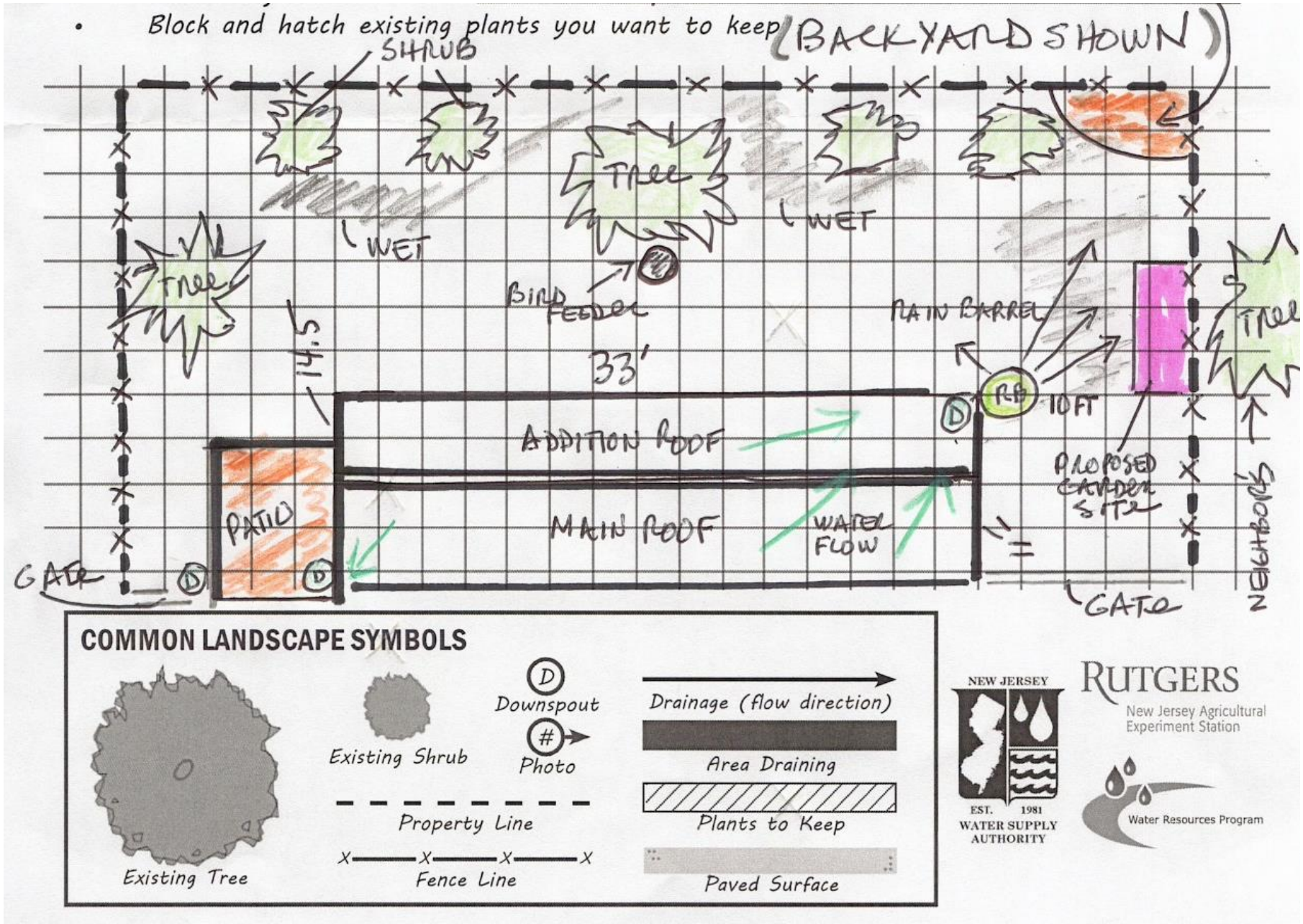
Block and hatch existing plants you want to keep
(BACKYARD SHOWN)
SHRUB
TREE
WET
WET
TREE
BIRD FEEDER
33'
MAIN BARREL
RB
10 FT
ADDITION ROOF
MAIN ROOF
WATER FLOW
PROPOSED GARDEN SITE
PATIO
GATE
GATE
NEIGHBORS
COMMON LANDSCAPE SYMBOLS
Existing Tree
Existing Shrub
D
Downspout
#
Photo
Property Line
Fence Line
Drainage (flow direction)
Area Draining
Plants to Keep
Paved Surface
NEW JERSEY
EST. 1981
WATER SUPPLY AUTHORITY
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Technical Support Sessions









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Program Summary

- Attend an educational workshop or 1:1 educational meeting to learn about rain gardens
- Rain garden design and size must be developed by RCE WRP at technical support session or approved by RCE WRP.
- Native plants are preferred. Installed plants must not be an invasive species
- Renters need a signed written agreement from the homeowner/property manager prior to participation
- Participants must pledge to maintain their rain garden for at least five (5) years

Rebate Summary

- All rain gardens installed must pass inspection by RCE WRP or NJWSA
- Visa™ gift card for $3 per square foot of rain garden
- up to $450 per property
- Minimum size: 25 square feet

Work with local stakeholders to implement the necessary solutions

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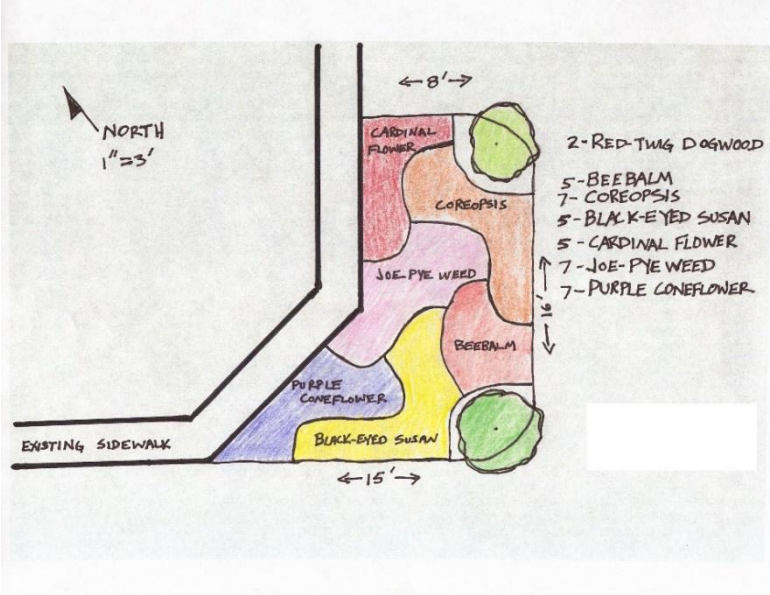
Roof Runoff

Design



Installed Rain Garden

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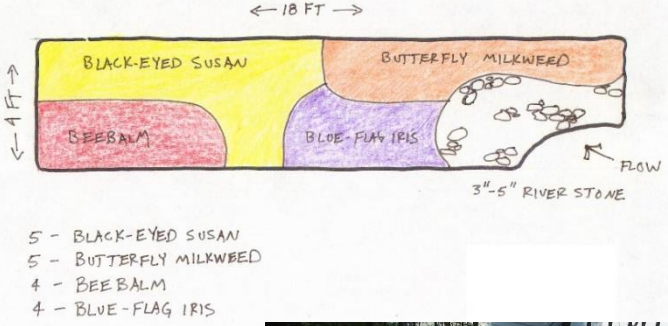
Roof, Sump Pump and Driveway Runoff

Design



Installed Rain Garden

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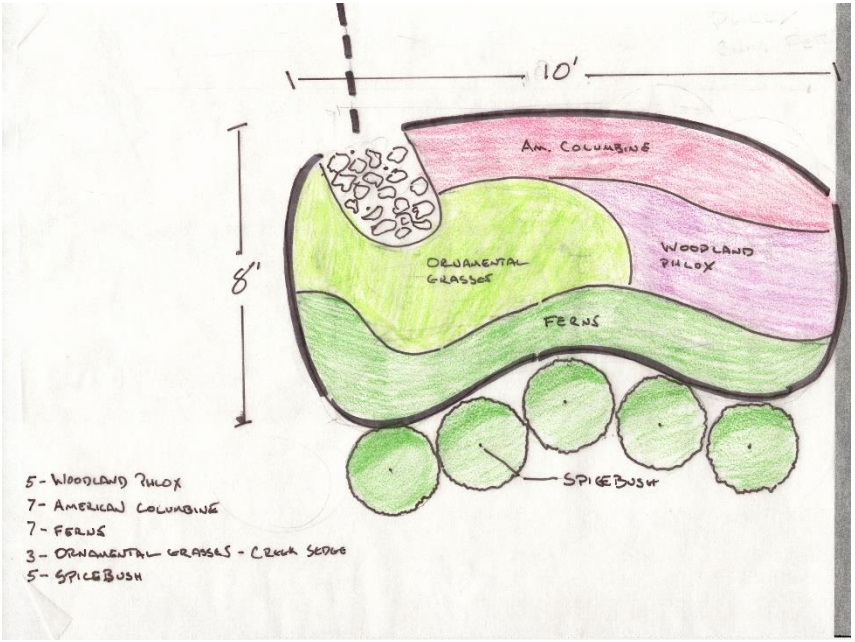
Roof Runoff

Design



Installed Rain Garden

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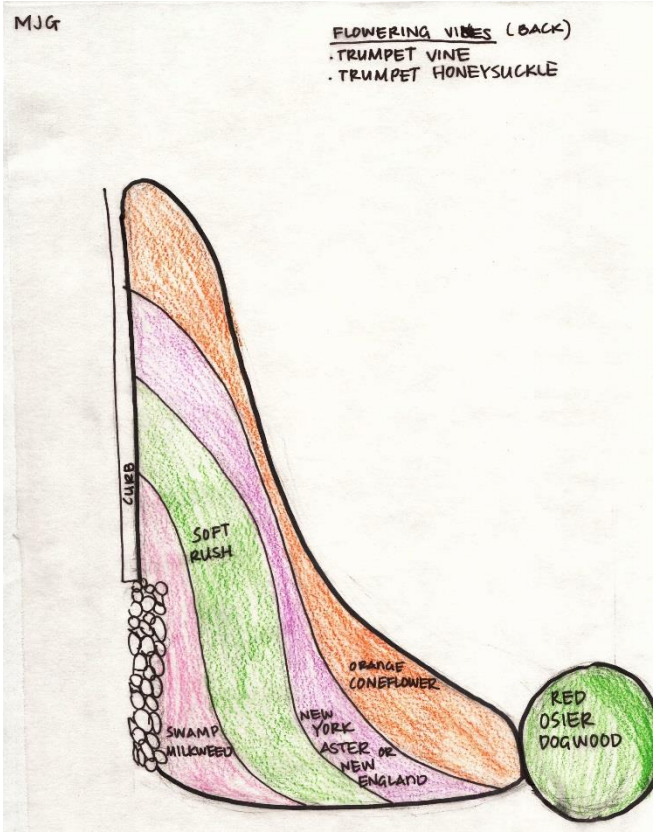
Driveway Runoff

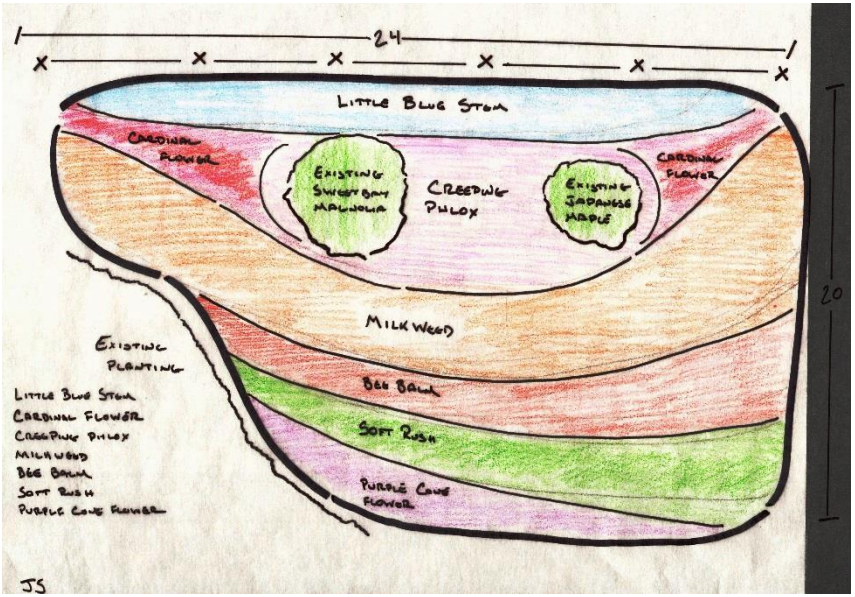
Design



Rain Garden Installed

Roof Runoff

Design



Installed Rain Garden

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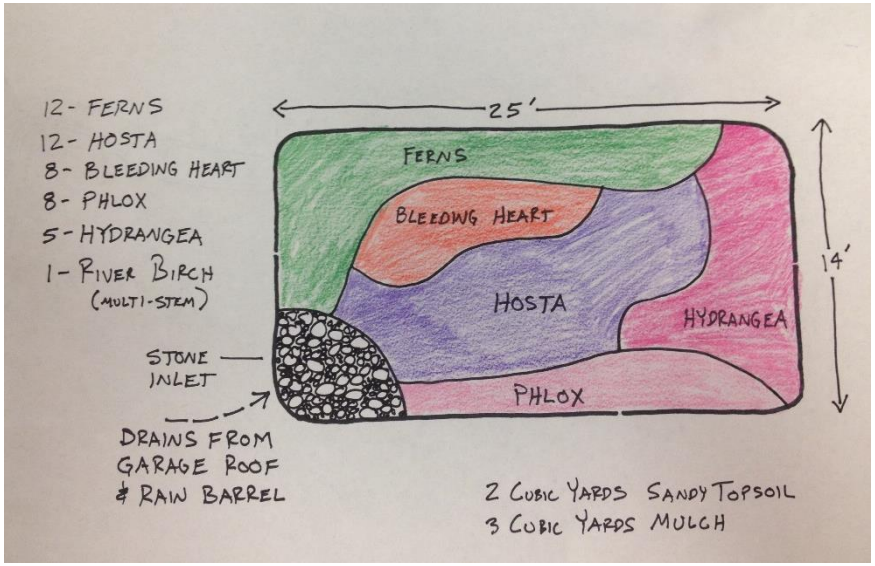
Garage Roof Runoff and Rain Barrel Overflow



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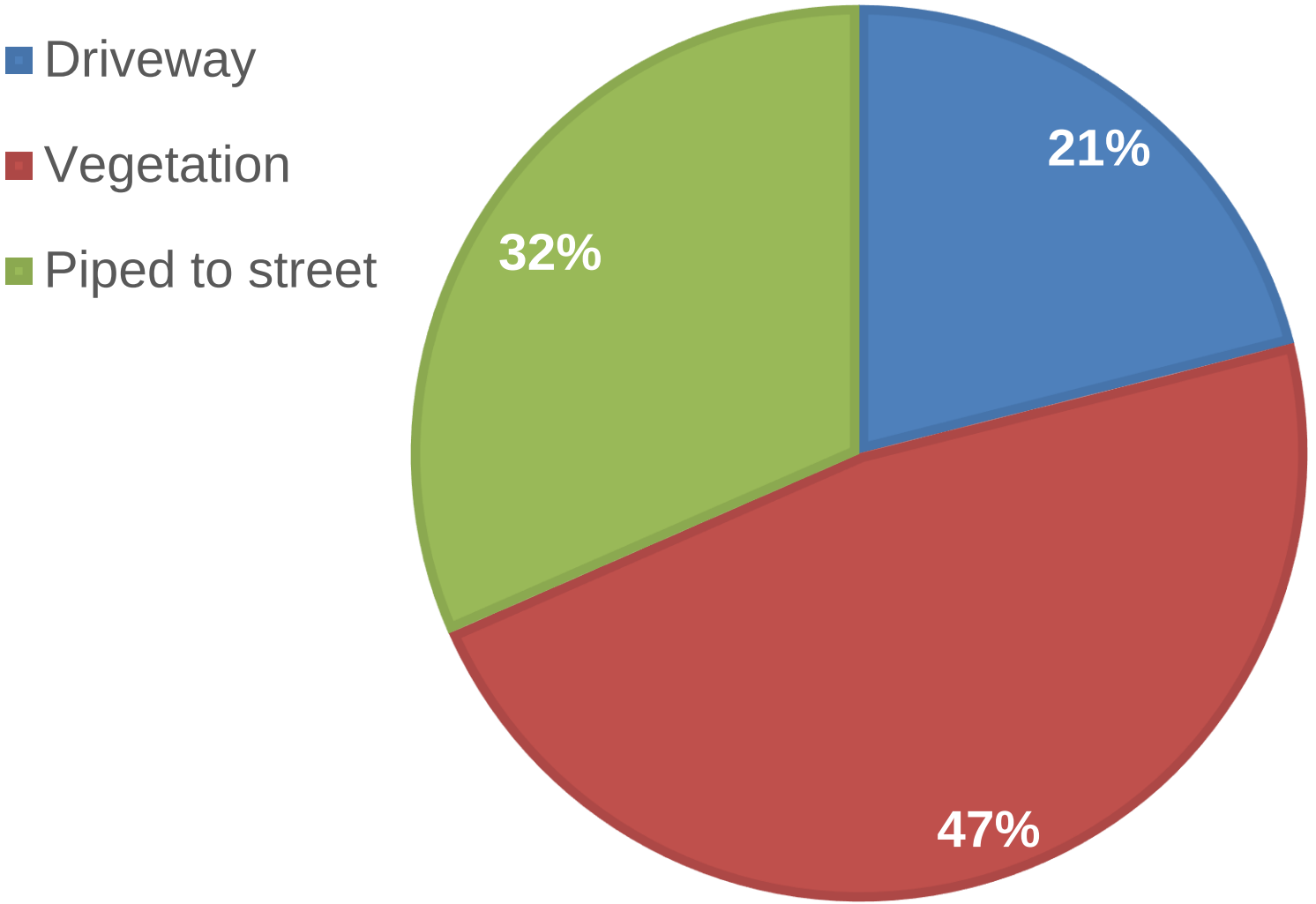
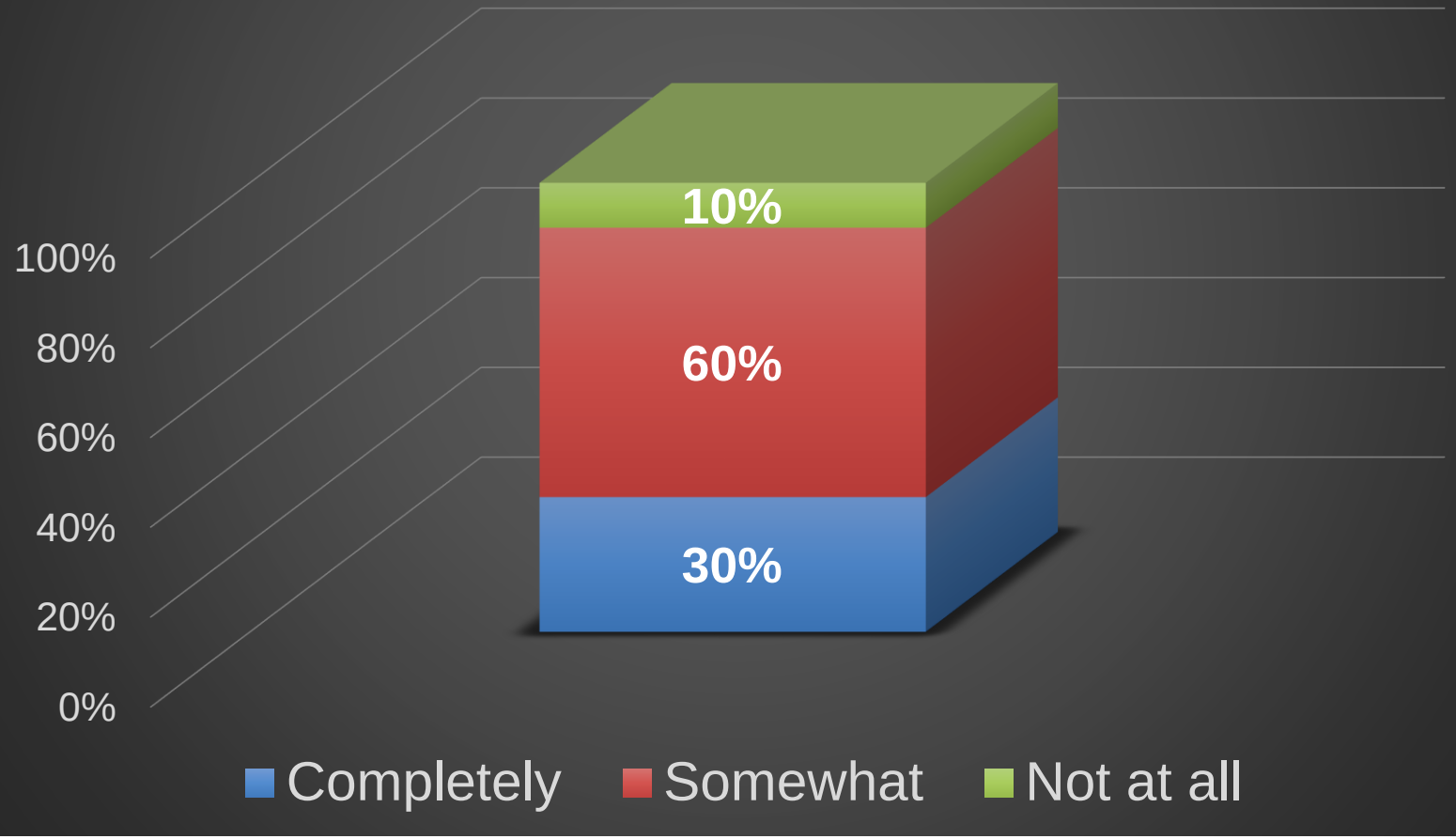
Measuring impacts and adapting programs to enhance impacts

PRIOR TO INSTALLATION WHERE DID THE ROOF LEADER(S) DRAIN?



How much did the rebate influence your decision to install a rain garden?



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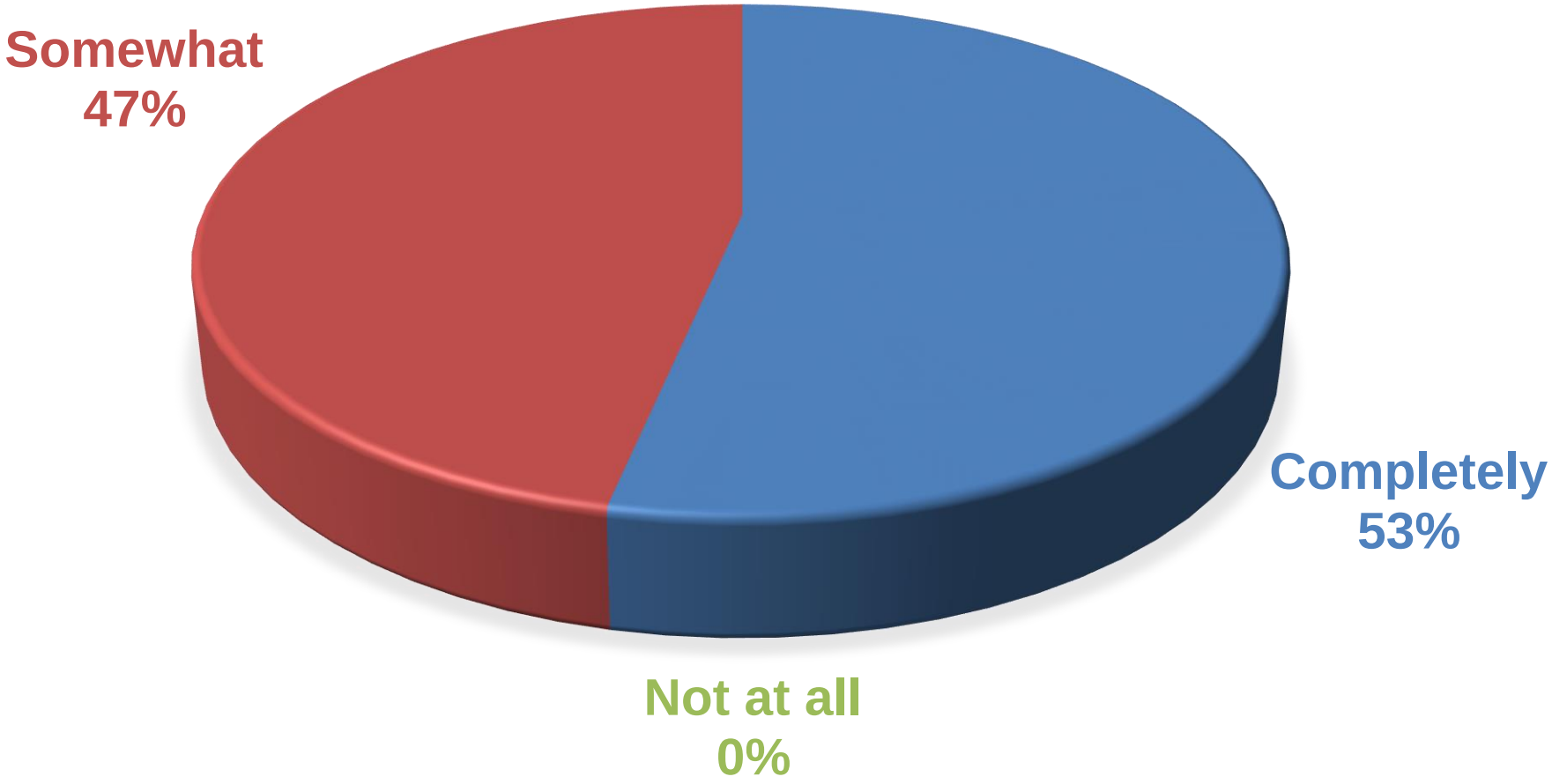
How much did the design support influence your decision to install a rain garden?



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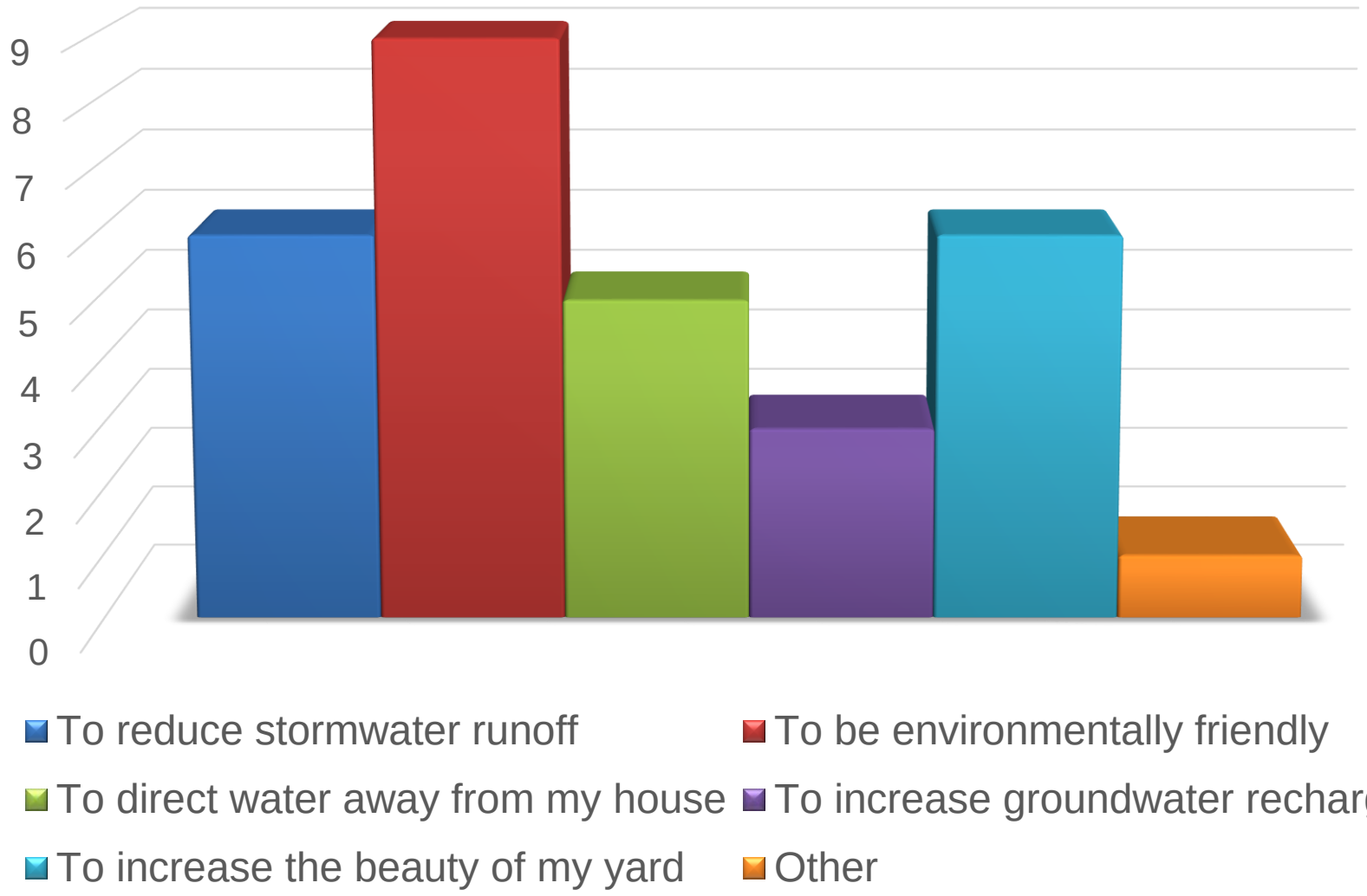
What was your primary reason for installing a rain garden?



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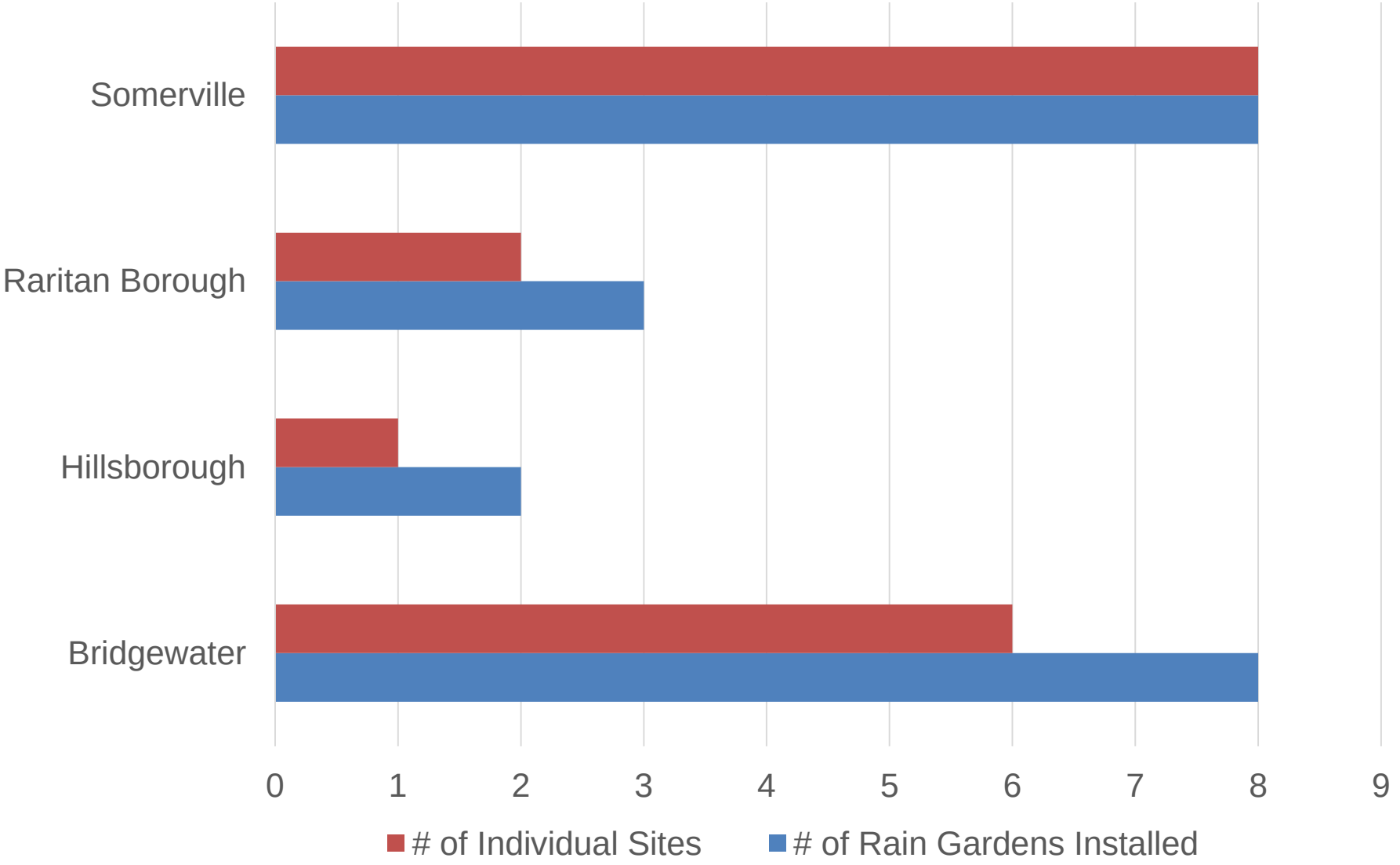
Rain Garden Distribution in Study Areas



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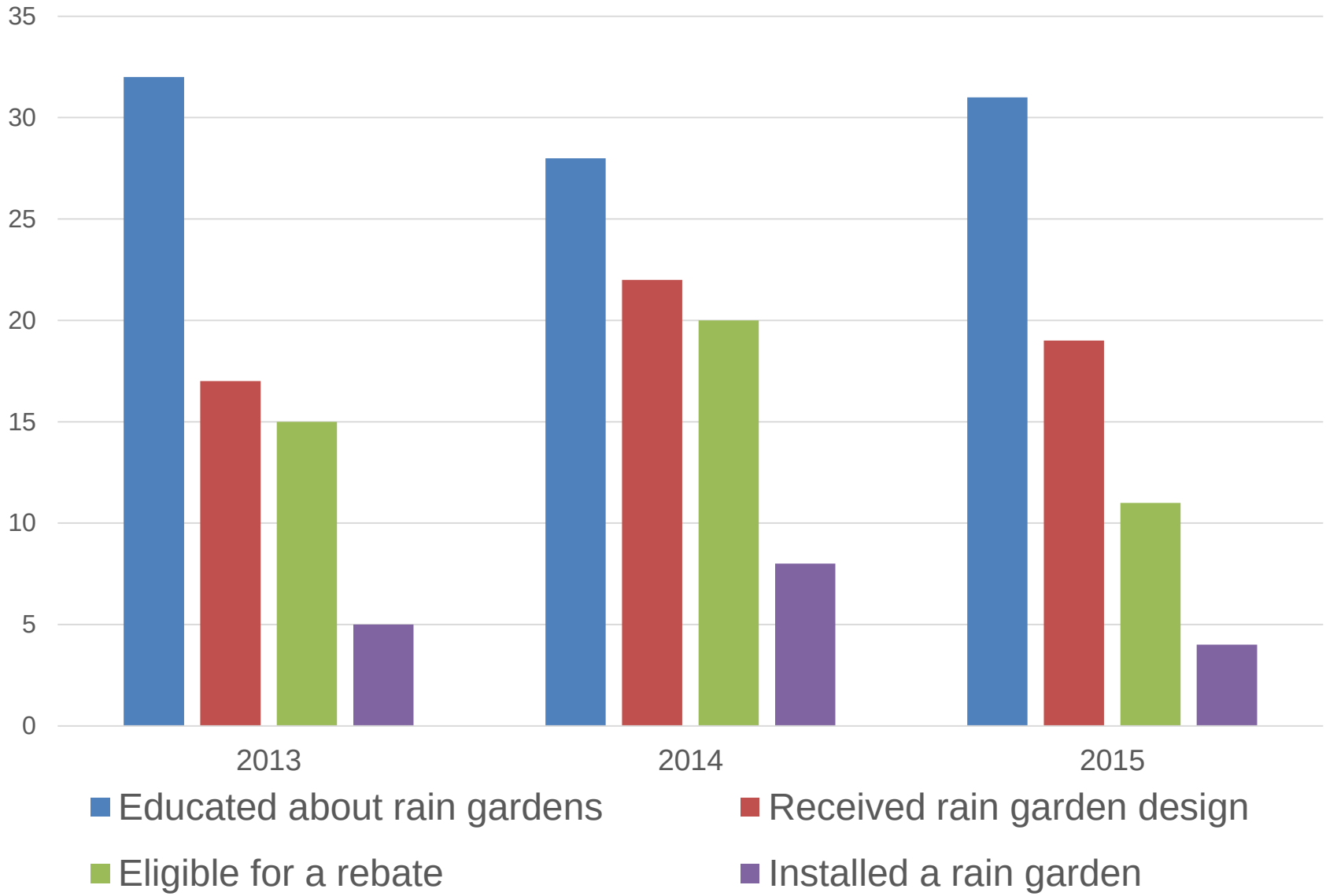
New Jersey Rain Garden Rebate Program



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Lessons Learned

- Design assistance was a primary influence for individuals to install a rain garden not the rebate!
- Local projects integrated into the educational program appears to increase participation (limit technical information and show examples!)
- Need to find assistance for those unable to physically do it themselves

46 projects eligible for a rebate
21 rain gardens installed

46% installation rate*

*Four participants installed two rain gardens each

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Construction cost breakdown

- Square Footage of Rain Gardens Installed

  4,625 ft^2

- Total Amount in Rebates Paid to Participants

  $6,480

- Final Cost $1.40 per square foot

Contractors charge $15 to $35 per square foot

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Square footage of drainage area treated = 23,125 ft^2

- **$0.28/square foot of drainage area**
- **or $12,206/acre of drainage area**

- **Green infrastructure in Philadelphia is estimated to be $250,000 per acre of drainage area**

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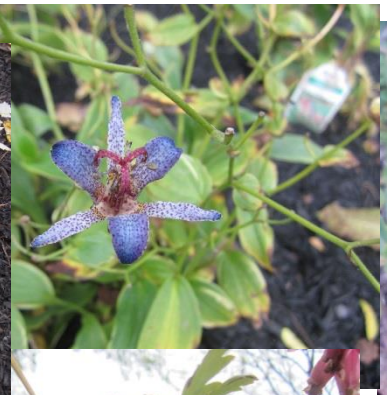
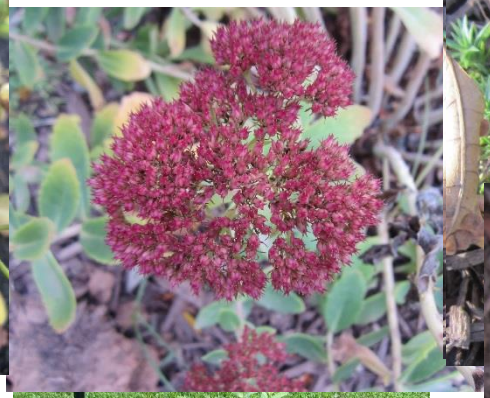





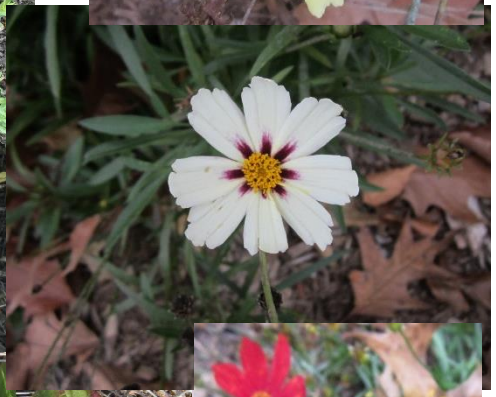




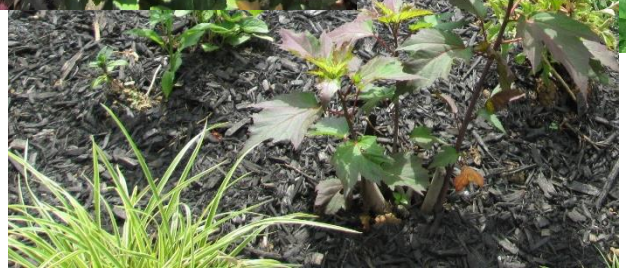


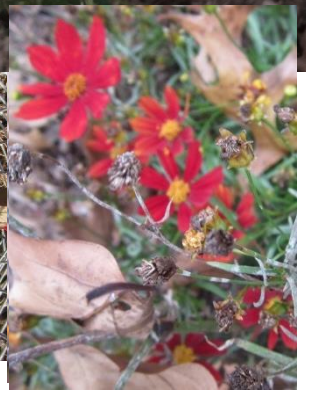
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NJ RAIN GARDEN REBATE PROGRAM WEBSITE

http://water.rutgers.edu/Projects/RGRebate/RGRebate.html

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Program Funding Provided by

New Jersey Water Supply Authority

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