Rain Gardens:
A Simple Solution

presented to the Borough of Caldwell, Essex County by Christopher C. Obropta, Ph.D., P.E. and Matthew Leconey from the Rutgers Cooperative Extension Water Resources Program

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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.
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.
What happens to the rain in our watersheds?

It runs off of rooftops and pavement...
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
Green Infrastructure

...an approach to stormwater management that is cost-effective, sustainable, and environmentally friendly.

Green Infrastructure projects:

- capture,
- filter,
- absorb, and
- reuse

stormwater to maintain or mimic natural systems and treat runoff as a resource.
Green Infrastructure Practices

- Rain Gardens/Bioretention Systems
- Bioswales
- Downspout Planters
- Stormwater Planters
- Rainwater Harvesting
- Permeable Pavements
- Tree Filter Boxes
- Dry Wells
- Green Roofs
- Naturalizing Detention Basins
- Wetlands
- Infiltration Basins
- Sand Filters
Keep the Rain from the Drain
Disconnect with a Rain Garden

PLACE A RAIN GARDEN BETWEEN TWO IMPERVIOUS SURFACES

REDUCE THE AMOUNT OF RUNOFF ENTERING STORM SEWERS
Rain Gardens

A rain garden is a landscaped, shallow depression that is designed to capture, treat, and infiltrate stormwater at the source before it becomes runoff.
Parts of a Rain Garden

- Buffer
- Slope
- Base
- Soil
Rain Gardens

• Landscaped areas that treat stormwater runoff.
• Designed to merge two important goals: aesthetics and water quality.
• Can be blended into the landscape and made to look natural.
• Water is directed into them by pipes, swales, or curb openings.
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
Native Vegetation
Here is the website for the rain garden manual:
http://www.water.rutgers.edu/Rain_Gardens/RGWebsite/RainGardenManualofNJ.html
Rain Garden App
A Mobile App for designing, installing, and maintaining a Rain Garden

Download the Rain Garden App first. "Rain Garden" is a FREE app designed to help you properly install a rain garden at your home, office, or job site. Through video tutorials, diagrams, text, and tools, the App guides you through determining the size and placement of your garden, selecting plants, digging and planting your garden, and maintaining your garden. It also includes tools for determining your soil type, measuring the size of the area that will drain to your garden, and managing multiple rain garden projects.

Help Promote the App! Click here to request App promo cards to display in your town hall or business.

To learn more about Rain Gardens visit the NEMO Rain Garden Website.

For more information about the App, if you are interested in expanding the App’s tools to your area, to make suggestions or to simply heap praise upon the heads of your humble App designers, please contact us.

Funding for national expansion of this app was provided by the United States Department of Agriculture/National Institute of Food and Agriculture, project #CONS2013-05768.
Example from Rain Garden Rebate Program

Design

Installed Rain Garden
Roof Runoff Example

Design

Installed Rain Garden
Roof Runoff from Rain Barrel Overflow

Design

Installed Rain Garden
1189 Jefferson Garden
Caldwell Borough: Green Infrastructure Sites

Sites within the Deepavaal Brook Subwatershed
1. Grover Cleveland Center for Senior Citizens
2. United States Postal Service

Sites within the Upper Passaic River Subwatershed
3. Caldwell Municipal Complex
4. Caldwell United Methodist Church
5. Caldwell University
6. Center For Spiritual Living North Jersey
7. Congregation Agudath Israel
8. Essex Lodge No. 7
9. First Baptist Church
10. First Presbyterian Church
11. Gould Place & Bloomfield Avenue Right of Way
12. Green Acres: 27 Personette Street
13. Grover Cleveland Birthplace
14. Grover Cleveland Middle School
15. Grover Cleveland Park
16. Lincoln Elementary School
17. Municipal Parking Lot
18. Park Avenue & Bloomfield Avenue Right of Way
19. Saint Aloysius Roman Catholic Church
CALDWELL MUNICIPAL COMPLEX

Subwatershed: Upper Passaic River

Site Area: 343,616 sq. ft.

Address: 1 Provost Square
Caldwell, NJ 07006

Block and Lot: Block 56, Lot 1, 2, 3, 10.01,
10.02, 0.03, 10.06, 17

Several rain gardens can be installed in the turfgrass area around the municipal complex to capture, treat, and infiltrate stormwater runoff from the field and help reported flooding in the area. A preliminary soil assessment suggests that more soil testing would be required before determining the soil's suitability for green infrastructure.

<table>
<thead>
<tr>
<th>Impervious Cover</th>
<th>Existing Loads from Impervious Cover (lbs/yr)</th>
<th>Runoff Volume from Impervious Cover (Mgal)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TP</td>
<td>TN</td>
</tr>
<tr>
<td>%</td>
<td>sq. ft.</td>
<td></td>
</tr>
<tr>
<td>90</td>
<td>307,669</td>
<td>14.8</td>
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Recommended Green Infrastructure Practices

<table>
<thead>
<tr>
<th>Recommended Green Infrastructure Practices</th>
<th>Recharge Potential (Mgal/yr)</th>
<th>TSS Removal Potential (lbs/yr)</th>
<th>Maximum Volume Reduction Potential (gal/storm)</th>
<th>Peak Discharge Reduction Potential (cu. ft./second)</th>
<th>Estimated Size (sq. ft.)</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioretention systems</td>
<td>0.179</td>
<td>30</td>
<td>13,540</td>
<td>0.51</td>
<td>1,715</td>
<td>$8,575</td>
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</table>
Caldwell Community Center
Rain Garden
Excavated Rain Garden
Soil Amendments Added
Finished Rain Garden
Quick Numbers

• Rain Garden Size: 100 ft²
• Managed Impervious Area: 765 ft²
• Peak Discharge Reduction: 0.04 cfs
• Runoff Volume Managed per storm (1.25” rain): 500 gallons
• Annual Runoff Managed: 16,760 gal/yr
A rain garden can be installed in the turfgrass along the side of the church to capture, treat, and infiltrate stormwater runoff from the roof. An existing asphalt strip adjacent to the sidewalk can be replaced with a series of stormwater planters that could capture stormwater from the roadway. A preliminary soil assessment suggests that more soil testing would be required before determining the soil’s suitability for green infrastructure.

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<tr>
<td>%</td>
<td>sq. ft.</td>
<td>TP</td>
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<td>33</td>
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<th>Estimated Cost</th>
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<tr>
<td>Bioretention systems</td>
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<td>3</td>
<td>1,320</td>
<td>0.05</td>
<td>170</td>
<td>$850</td>
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<tr>
<td>Stormwater planters</td>
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<td>12</td>
<td>5,290</td>
<td>0.20</td>
<td>680</td>
<td>$255,000</td>
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