Green Infrastructure Champions Program

This program is partially funded by the Rutgers New Jersey Agricultural Experiment Station, The Geraldine R. Dodge Foundation, and NJ Sea Grant Consortium and is a collaboration of the Rutgers Cooperative Extension Water Resources Program, the Green Infrastructure Subcommittee of Jersey Water Works, and Duke Farms.
Green Infrastructure Champion Training: Part 2
“Moving from planning to implementation of green infrastructure”

January 31, 2020
Duke Farms
Hillsborough, NJ
Remember

It is all about controlling runoff from impervious surfaces
What does the science say about impervious surfaces?

Impervious Cover Assessments (ICAs)
Impervious Cover Assessment

• Scare the hell out of the municipality
• Analysis completed by watershed and by municipality
• Use 2012 Land Use data to determine impervious cover
• Calculate runoff volumes for water quality, 2, 10 and 100 year design storm and annual rainfall
• Contain three concept designs
Agriculture
0.9%

Forest
2.3%

Wetlands
5.0%

Water
1.2%

Urban
90.6%
<table>
<thead>
<tr>
<th>Watershed</th>
<th>Total Area (ac)</th>
<th>Impervious Cover (ac)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branchport Creek</td>
<td>1,258</td>
<td>436</td>
<td>35.3%</td>
</tr>
<tr>
<td>Whale Pond Brook</td>
<td>596</td>
<td>156</td>
<td>26.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,854</strong></td>
<td><strong>592</strong></td>
<td><strong>32.3%</strong></td>
</tr>
<tr>
<td>Subwatershed</td>
<td>NJ Water Quality Storm (MGal)</td>
<td>Annual Rainfall of 44” (MGal)</td>
<td>2-Year Design Storm (3.3”) (MGal)</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------------</td>
<td>-------------------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Branchport Creek</td>
<td>15</td>
<td>521</td>
<td>40</td>
</tr>
<tr>
<td>Whale Pond Brook</td>
<td>5</td>
<td>186</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>707</td>
<td>55</td>
</tr>
</tbody>
</table>
WE LOOK HERE FIRST:

- Schools
- Houses of Worship
- Libraries
- Municipal Building
- Public Works
- Firehouses
- Post Offices
- Elks or Moose Lodge
- Parks/Recreational Fields

- 20 to 40 sites are entered into a PowerPoint
- Site visits are conducted
West Long Branch Borough
Impervious Cover Assessment
West Long Branch Community Center, 116 Locust Avenue

PROJECT LOCATION:

SITE PLAN:

1. BIORETENTION SYSTEMS: Rain gardens will be used to reduce sediment and nutrient loading to the local waterway and increase groundwater recharge. This site has multiple areas where downsputs can be disconnected, and rain gardens implemented.

2. RAINWATER HARVESTING SYSTEM: Rainwater can be harvested from the roof of the building and stored in a cistern. The water can be used for gardening and landscaping around the community center.

3. EDUCATIONAL PROGRAM: The RCE Water Resources Program, Stormwater Management in Your Schoolyard, can be delivered at West Long Branch Community Center to educate township residents about stormwater management and engage them in designing and building the bioretention systems.

1. PREVIOUS PAVEMENT
2. RAINWATER HARVESTING SYSTEM
3. EDUCATIONAL PROGRAM
West Long Branch Borough
Impervious Cover Assessment
West Long Branch Home Security Alarm Systems, 185 NJ-36

PROJECT LOCATION:

1. BIORETENTION SYSTEM: A rain garden can be used to reduce sediment and nutrient loading to the local waterway and increase groundwater recharge. This site has a turf grass area where a rain garden can be built to catch runoff from the parking lot.

2. BIOSWALE: A bioswale is a vegetated system that conveys stormwater while removing sediment and nutrients. It can be installed in the eroded canal.
West Long Branch Borough
Impervious Cover Assessment
Betty McElmon Elementary School, 20 Parker Road

PROJECT LOCATION:

BIORETENTION SYSTEM: A rain garden can be used to reduce sediment and nutrient loading to the local waterway and increase groundwater recharge. This site has an area where downspouts can be disconnected, and a rain garden implemented.

RAINWATER HARVESTING SYSTEM: Rainwater can be harvested from the roof of the building and stored in a cistern. The water can be used for gardening and landscaping around the school.

PERVIOUS PAVEMENT: Portions of the northwest parking lot can be converted to pervious pavement. This can allow for infiltration of runoff from the parking lot.

EDUCATIONAL PROGRAM: The RCE Water Resources Program, Stormwater Management in Your Schoolyard, can be delivered at Betty McElmon Elementary School to educate the students about stormwater management and engage them in designing and building the bioretention systems.
Calculation Runoff Volumes from Impervious Surfaces

Storms to consider:

• NJ Water Quality Storm (WQS) = 1.25” of rain over two hours
• 2-year design storm = 3.3” of rain over 24-hours
• 10-year design storm = 5.1” of rain over 24-hours
• 100-year design storm = 8.6” of rain over 24-hours
• Total annual rainfall = 44” to 46” of rain per year
The Formula

Drainage area in square feet x rainfall total in feet = volume of water in cubic feet

How much water runs off a 1,000 square foot driveway during the NJ Water Quality Storm?

Water Quality Storm is 1.25” = 0.1 ft of rain

1,000 ft² x 0.1 ft = 100 ft³

7.48 gallons of water in one cubic foot (ft³)

100 ft³ = 748 gallons of water
How much runoff on an annual basis from the driveway?

Annual rainfall total is 45” = 3.75 ft of rain

\[ 1,000 \text{ ft}^2 \times 3.75 \text{ ft} = 3,750 \text{ ft}^3 \]

\[ 3,750 \text{ ft}^3 \times 7.48 \text{ gallons/ft}^3 = 28,050 \text{ gallons} \]
How big does a rain garden need to be to treat runoff from my driveway?

1,000 square foot driveway for the NJ Water Quality Storm

1,000 ft² x 0.1 ft = 100 ft³ of runoff

Let’s make the rain garden 6 inches deep

100 ft³ / 0.5 ft = 200 ft² or 20 ft x 10 ft x 6 inches deep

Let’s make the rain garden 3 inches deep

100 ft³ / 0.25 ft = 400 ft² or 20 ft x 20 ft x 3 inches
What about climate change?

- Let’s overdesign to account for more intense storms
- Instead of 1.25” we will use 1.50” = 0.125 ft

**Back to our example:**

1,000 ft² x 0.125 ft = 125 ft³ of runoff

Let’s make the rain garden 6 inches deep

125 ft³ / 0.5 ft = 250 ft² or 25 ft x 10 ft x 6 inches deep

Let’s make the rain garden 3 inches deep

125 ft³ / 0.25 ft = 500 ft² or 25 ft x 20 ft x 3 inches
Impervious Cover Reduction Action Plan (ICRAP)
Impervious Cover Reduction Action Plan

• A comprehensive document with many opportunities for green infrastructure
• A living document
• Shovel ready projects
• Projects for all ages (youth to seniors)
• Provides mitigation opportunities for developers
• Site level analysis
SITES WITHIN THE BRNACHPORT CREEK SUBWATERSHED:

1. Frank Antonides Elementary School
2. Lutheran Church Reformation
3. Old First United Methodist Church
4. Saint Jerome's Catholic Church and School
5. Shore Regional High School
6. Sovereign Bank
7. West Long Branch Community Center
8. West Long Branch Public School
FRANK ANTONIDES ELEMENTARY SCHOOL

Subwatershed: Branchport Creek
Site Area: 107,870 sq. ft.
Address: 198-208 Wall Street
West Long Branch, NJ 07764
Block and Lot: Block 20, Lot 13, 15

Parking spots can be replaced with pervious pavement to capture and infiltrate parking lot and roof runoff. A cistern can be installed adjacent to the building to harvest rainwater that can be used to conduct car wash fundraisers. A preliminary soil assessment suggests that the soils have suitable drainage characteristics 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>%</td>
<td>sq. ft.</td>
</tr>
<tr>
<td></td>
<td>56</td>
<td>60,568</td>
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</table>

<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>Pervious pavements</td>
<td>0.238</td>
<td>40</td>
<td>18,057</td>
<td>0.49</td>
<td>2,340</td>
<td>$58,500</td>
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<tr>
<td>Rainwater harvesting systems</td>
<td>0.036</td>
<td>6</td>
<td>1,000</td>
<td>0.08</td>
<td>1,000 (gal)</td>
<td>$2,000</td>
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</tbody>
</table>
GREEN INFRASTRUCTURE RECOMMENDATIONS

Frank Antonides Elementary School

- disconnected downspouts
- pervious pavements
- rainwater harvesting
- drainage areas
- property line

2012 Aerial: NJOIT, OGIS
West Long Branch Borough
Green Infrastructure Feasibility Studies
Green Infrastructure Feasibility Study

• A high-end visual presentation of opportunities
• Provides green infrastructure overview
• Incorporates ICA and RAP information
• User-friendly format
Stormwater is currently directed to an existing catch basin. Installing rain gardens in the parking lot islands can capture, treat, and infiltrate stormwater runoff from the parking lot. Replacing parking spaces with porous pavement can capture and infiltrate runoff from the other side of the parking lot. 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></td>
<td>From the 1.25” Water Quality Storm</td>
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<tr>
<td></td>
<td></td>
<td>For an Annual Rainfall of 44”</td>
</tr>
<tr>
<td>%</td>
<td>sq. ft.</td>
<td>0.040</td>
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<tr>
<td>30</td>
<td>51,770</td>
<td>1.42</td>
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<table>
<thead>
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<th>Recommended 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>
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<tbody>
<tr>
<td>Bioretention systems</td>
<td>0.288</td>
<td>48</td>
<td>21,834</td>
<td>0.82</td>
<td>2,765</td>
<td>$13,825</td>
</tr>
<tr>
<td>Pervious pavement</td>
<td>0.352</td>
<td>59</td>
<td>26,651</td>
<td>1.00</td>
<td>2,410</td>
<td>$60,250</td>
</tr>
</tbody>
</table>
CURRENT CONDITION
CONCEPT DESIGN
• Impervious Cover Assessment (ICA) = ICA (5 points)

• Impervious Cover Reduction Action Plan (RAP) = Green Infrastructure Action Plan (10 points)

• Green Infrastructure Feasibility Study = Green Infrastructure Strategic Plan (20 points)

GET YOUR SUSTAINABLE JERSEY POINTS!
Implement a Green Infrastructure Project
Funding Implementation

• Leverage existing projects
• Build partnerships
• Write grants
What to things cost?

**Design Costs**

- What level of design is needed?
  1. Simple sketch
  2. Single sheet engineering drawing
  3. Full Engineering drawing set (3 to 5 sheets)
  4. Construction specifications and bid documents

- Do you need a rendering?
Simple Design

NORTH
1" = 3'

2 - RED-TWIG DOGWOOD
5 - BEEBalm
7 - COREOPSIS
5 - BLACK-EYED SUSAN
5 - CARDINAL FLOWER
7 - JOE-PYE WEED
7 - PURPLE CONEFLOWER

EXISTING SIDEWALK

BLACK-EYED SUSAN

PURPLE CONEFLOWER
Simple Design

1 - Switch Grass
4 - Bluestem
5 - Sedum
5 - Swamp Milkweed
6 - Butterfly Milkweed
5 - Black-Eyed Susan
7 - Purple Coneflower
5 - Bee Balm
5. Woodland Phlox
7. American Columbine
5. Ferns
3. Ornamental Grasses - Creak Sedge
5. Spice Bush
HENRY INMAN LIBRARY
RAIN GARDEN DEMONSTRATION PROJECT
AS-BUILT PLANS
607 INMAN AVENUE, WOODBRIDGE
MIDDLESEX COUNTY, NEW JERSEY

PROJECT DESCRIPTION:
A RAIN GARDEN HAS BEEN DESIGNED AND CONSTRUCTED TO MANAGE STORM WATER RUNOFF FROM THE LIBRARY'S ROOFTOP. EXISTING DOWNSOUTS ARE DISCONNECTED AND PIPED INTO RAIN GARDEN.

LOCATION MAP:

LEGEND:

- EXISTING DRAINAGE AREA
- EDGE OF PAVEMENT
- EXISTING CENTERLINE
- EXISTING FENCE
- EXISTING TREELINE
- EXISTING TREE
- EXISTING BUILDING
- EXISTING UTILITY POLE
- EXISTING CATCH BASIN
- EXISTING CONTOURS
- EXISTING SPOT ELEVATIONS
- TOP OF STREAM BANK
- LIMIT OF WORK
- PROPOSED GREEN INFRASTRUCTURE

LIST OF DRAWINGS:

<table>
<thead>
<tr>
<th>SHEET NAME</th>
<th>TITLE</th>
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<tbody>
<tr>
<td>COVER</td>
<td>COVER SHEET</td>
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<tr>
<td>P-1</td>
<td>EXISTING CONDITIONS AND DEMOLITION PLAN</td>
</tr>
<tr>
<td>P-2</td>
<td>AS BUILT SITE PLAN</td>
</tr>
<tr>
<td>P-3</td>
<td>AS BUILT PLANTING PLAN</td>
</tr>
<tr>
<td>D-1</td>
<td>RAIN GARDEN DETAILS</td>
</tr>
<tr>
<td>D-2</td>
<td>PLANTING DETAILS</td>
</tr>
</tbody>
</table>
PLANTING SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>KEY</th>
<th>BOTANICAL NAME</th>
<th>COMMON NAME</th>
<th>QUANTITY</th>
<th>SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAIN GARDEN</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PERENNIALS</td>
<td>JE</td>
<td>Juncus effusus</td>
<td>SOFT RUSH</td>
<td>100</td>
<td>1 QUART</td>
</tr>
<tr>
<td></td>
<td>LS</td>
<td>Lobelia spiculata</td>
<td>BLUE LOBELIA</td>
<td>50</td>
<td>1 QUART</td>
</tr>
<tr>
<td></td>
<td>MR</td>
<td>Mimulus ringens</td>
<td>MONKEY FLOWER</td>
<td>50</td>
<td>1 QUART</td>
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<tr>
<td></td>
<td>MD</td>
<td>Monarda didyma</td>
<td>SCARLET BEEBAM</td>
<td>50</td>
<td>1 QUART</td>
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<tr>
<td></td>
<td>MP</td>
<td>Monarda punctata</td>
<td>SPOTTED BEEBAM</td>
<td>100</td>
<td>1 QUART</td>
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<tr>
<td></td>
<td>PD</td>
<td>Penstemon digitalis</td>
<td>FOXGLOVE BEARDOTONGUE</td>
<td>50</td>
<td>1 QUART</td>
</tr>
<tr>
<td></td>
<td>SN</td>
<td>Solidago nemoralis</td>
<td>GRAY GOLDENROD</td>
<td>50</td>
<td>1 QUART</td>
</tr>
<tr>
<td>SHRUBS</td>
<td>EC</td>
<td>Eupatorium coelestinum</td>
<td>BLUE MISTFLOWER</td>
<td>15</td>
<td>1 QUART</td>
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<tr>
<td></td>
<td>LSp</td>
<td>Listro spicata</td>
<td>BLAZING STAR</td>
<td>5</td>
<td>1 QUART</td>
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<tr>
<td></td>
<td>TP</td>
<td>Thelypteris palustris</td>
<td>MARSH FERN</td>
<td>15</td>
<td>1 QUART</td>
</tr>
<tr>
<td>TREE</td>
<td>BN</td>
<td>Betula nigra</td>
<td>RIVER BIRCH</td>
<td>2</td>
<td>1 QUART</td>
</tr>
<tr>
<td></td>
<td>SP</td>
<td>Betula populifolia</td>
<td>GRAY BIRCH</td>
<td>1</td>
<td>1 QUART</td>
</tr>
</tbody>
</table>
Back to Costs – Simple Sketch

• Rain Garden Rebate Program ($5,000 per session)
  ➢ One 45 minute educational session
  ➢ One technical session (5 to 20 simple design sketches created)

• Rain Garden Sketch for individual project
  ➢ Rain Garden Manual (Self-design) ($0)
  ➢ Rain Garden App (Self-design) ($0)
  ➢ RCE Water Resources Program ($500)

• Cistern Design
  ➢ Contractor typically will size the cistern and provide a simple sketch for free
  ➢ RCE Water Resources Program ($500)
Back to Costs – Single sheet engineering drawing

• RCE Water Resources Program ($750 to $1,000)
• Private contractor ($1,500 to $2,000)
Back to Costs – Full Engineering drawing set

• RCE Water Resources Program ($2,500 to $5,000)
  ➢ Includes site survey
  ➢ Includes grading plan and landscape design
  ➢ Includes detail sheet
  ➢ Includes soil erosion and sediment control plan (if needed)
  ➢ Signed and sealed by a professional engineer

• Private contractor ($5,000 to $10,000)
Back to Costs – Construction Specifications and Bid Documents

- RCE Water Resources Program ($5,000 to $10,000)
- Private contractor ($10,000 to $20,000)
What does it cost to build green infrastructure?

Rain Gardens ($0.50 to $25 per square foot)

- Excavation costs
- Soil removal
- Soil replacement
- Underdrain system (Piping and stone)
- Mulch (one yard per 100 square feet of garden)
- Plants (big or small)
SITE PLAN

ROCK-LINED EXISTING DRAIN
BASE ELEV = 100.07'
TOP OF DRAIN SHOULD BE 4 IN.
ABOVE THE BASE OF RAIN GARDEN

PROPOSED RAIN GARDEN
450 SF, BASE 335 SF
BASE ELEV = 98.25'
MIN. BERM ELEV = 100.25'

GRADE TO 1:3 SLOPE FROM BASE OF SLOPE

EXISTING SIDEWALK

BRIDGEWATER-RARITAN MIDDLE SCHOOL

SCALE 1" = 5'-0"
(335 ft² + 450 ft²) x 0.75 ft = 
\[
\frac{294.4 \text{ ft}^3}{2}
\]

335 ft² x 1 ft = 335 ft³
Converting volume to be excavated and volume of soil needed

\[
335 \text{ ft}^3 \times \frac{1 \text{ cubic yard}}{27 \text{ ft}^3} = 12.4 \text{ cubic yards}
\]

\[
294 \text{ ft}^3 \times \frac{1 \text{ cubic yard}}{27 \text{ ft}^3} = 10.9 \text{ cubic yards}
\]

Notes:

1 cubic yard (yd\(^3\)) = 27 cubic feet (ft\(^3\))

cubic yard = CY = yd\(^3\)
cubic foot = CF = ft\(^3\)
One Rain Garden – 450 square feet

- Soil Excavation – 23.3 cubic yards at $30 to $50/cubic yard = $699 to $1,165
- Soil Replacement – 335 square feet at 1 foot deep = 335 cubic feet = 12.4 cubic yards = $35 per yard = $434
- Inlet = Home Depot = $35
- 20 feet of underdrain piping - $1 per foot = $20
- Stone for underdrain piping – 1 cubic foot per 1 foot of pipe = 20 cubic feet = 0.75 cubic yards = $35
- Mulch = 1 cubic yard per 100 square feet = 4.5 cubic yards = $30 per cubic yard = $135

Total = $1,358 to $1,824 plus plants
LOCATION MAP (N.T.S)  

PLANTING PLAN (N.T.S)  

PLANTING SCHEDULE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>KEY</th>
<th>BOTANICAL NAME</th>
<th>COMMON NAME</th>
<th>QUANTITY</th>
<th>SIZE</th>
</tr>
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<tbody>
<tr>
<td>RAIN GARDEN</td>
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</tr>
<tr>
<td>PERENNIALS</td>
<td>AI</td>
<td>Asclepias incarnata</td>
<td>SWAMP MILKWEED</td>
<td>25</td>
<td>1 QUART</td>
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<tr>
<td></td>
<td>EP</td>
<td>Echinacea purpurea</td>
<td>PURPLE CONEFLOWER</td>
<td>15</td>
<td>1 QUART</td>
</tr>
<tr>
<td></td>
<td>JE</td>
<td>Juncus effusus</td>
<td>SOFT RUSH</td>
<td>20</td>
<td>1 QUART</td>
</tr>
<tr>
<td></td>
<td>RH</td>
<td>Rudbeckia hirta</td>
<td>BLACKEYED SUSANS</td>
<td>15</td>
<td>1 QUART</td>
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</table>
Plants for One Rain Garden – 450 square feet

<table>
<thead>
<tr>
<th>Plant Type</th>
<th>Quantity</th>
<th>Price per Unit</th>
<th>Total Cost</th>
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<tbody>
<tr>
<td>Swamp milkweed</td>
<td>25</td>
<td>$3</td>
<td>$ 75</td>
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<tr>
<td>Purple coneflower</td>
<td>15</td>
<td>$3</td>
<td>$ 45</td>
</tr>
<tr>
<td>Soft rush</td>
<td>20</td>
<td>$3</td>
<td>$ 60</td>
</tr>
<tr>
<td>Blackeyed susans</td>
<td>15</td>
<td>$3</td>
<td>$ 45</td>
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<tr>
<td><strong>Total</strong></td>
<td>75</td>
<td></td>
<td><strong>$225</strong></td>
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</table>

Grand Total = $1,583 to $2,049

**Notes:**

- 3-gallon container = $12 to $30/each
- 1-gallon container = $8 to $15/each
- 1-quart container = $3 to $6/each
- 2-inch plugs = $1 to $2/each
Cutting costs . . .

Grand Total = $1,583 to $2,049

If you get somebody to volunteer to excavate, the cost becomes $884.

If you used 2” plugs instead of quarts, $75 instead of $225. Cost becomes $734.

If the soil was okay and you didn’t have to replace it, cost would be further reduced by $434. Total cost = $300.
Cost of a Cistern

• Two to three dollars per gallon installed.
• 2,500-gallon cistern costs $5,000 to $7,500
• Plus optional maintenance contract
Cost of a Porous Asphalt

• Depend on depth of stone
• Each foot of stone can hold 4.8 inches of water
• $10 to $25 per square foot
• Big expense is removal of existing asphalt and underlying soil and properly disposing of this material

Notes:

6” stone reservoir = $ 8/square foot
12” stone reservoir = $ 11/square foot
24” stone reservoir = $ 15/square foot
36” stone reservoir = $ 20/square foot
Grant/Funding Opportunities

• Sustainable Jersey ($2k, $10k and $20k)
• ANJEC (Association of NJ Environmental Commissions)
• NJDEP
• NJ American Waters
• Home and School Associations
Who should I partner with at the local level?

- RCE Environmental County Agents
- Municipal Department of Public Works
- Municipal Department of Parks and Recreation
- Municipal Green Teams (Sustainable Jersey)
- Green Teams for Schools (Sustainable Jersey)
- Environmental Commissions
- Boy Scouts and Girl Scouts
- Kiwanis Club
- Rotary Club
- Schools
- House of Worship
- Americorps Watershed Ambassadors
- RCE Environmental Stewards
- RCE Master Gardeners
Who should I partner with at the state level?

- The Nature Conservancy
- Association of Environmental Commissions
- Trust for Public Lands
- New Jersey Tree Foundation
- New Jersey Department of Environmental Protection
Be a Connector, Maven, or Saleman!
Grant Writing – The Most Important Thing:

CAREFULLY READ THE REQUEST FOR PROPOSALS (RFP)
Sample Requirement of RFPs “Format”

- Most RFPs provide a format for the proposal including maximum number of pages (font size and margins)
- Most require forms to be completed such as application sheet and budget table
- Most require resumes of the people who will be working on the project
- Mapping of area being studied
Short Clear Titles

• Green Infrastructure Planning and Implementation for Caldwell New Jersey

• Rain Garden Rebate Program for Somerset County

• Detention Basin Retrofits for Hamilton Township
Grant Abstract

• Stay within the work limit (250 words max)
• Inform readers about the problem to be addressed
• Inform readers about the general approach to be taken to address problem
• Discuss anticipated results
• Abstracts are often used as a screening tool by the reviewers.
Priority Issues

• Most RFPs identify “priority issues”
• Focus on addressing one of the issues
• Briefly describe how your proposal helps contribute to the understanding and/or solution of the issue
• Include a brief literature review that places the proposed research in its scientific context.
Eligibility Requirements

- Eligible Entities – most proposal list entities that can apply for the funding (e.g., universities, consultants, etc.,)
- Eligible Entity Capabilities – must provide a description of how you are qualified to do the work
- Project Eligibility Requirements – most proposals list the projects that are eligible for funding
- Ineligible Activities – most proposals list the projects that are not eligible for funding
The goal statement(s) must identify the desired outcome(s) related to the identified problem or need and be stated in terms of results to be accomplished.
Example of Proposal Goals

The goals of this project are:

• to reduce pollutant loads to the Raritan River and its tributaries

• to reduce flooding in the Raritan River Watershed

• to enhance the resilience of the municipalities within the Raritan River Basin study area by implementing green infrastructure practices that have been identified in Impervious Cover Assessments and Reduction Action Plans
Describe the outcomes in a measurable way, specify the results to be achieved or criteria by which results will be measured (e.g., 25% reduction in phosphorous loading to the Muddy River), and the time frame for achieving the objective.
Objective 1: Prepare engineering designs for green infrastructure practices

- Impervious cover reduction action plans have been developed for the 54 municipalities. Each of these plans contain recommendations for green infrastructure practices at 20 to 40 sites. Ten green infrastructure designs will be completed within the first year of the project.
Tasks . . .

are concise statements of activities that need to take place to achieve the stated objectives. Tasks should:

• Describe the specific action that will be taken to achieve the project goals and objectives
• Have a designated responsible party
• Have a specified timeframe to accomplish the action.
Example of Proposal Tasks

Task 1: Create preliminary engineering designs.

- The RCE Water Resources Program will prepare preliminary engineering designs for the projects that are prioritized by municipalities. These designs will be provided to NJDEP for their review prior to completing final designs. **Deliverable: Preliminary engineering designs for NJDEP's approval.**

Task 2: Create final engineering designs.

- The RCE Water Resources Program will prepare final engineering designs for the projects that are approved by NJDEP. These designs will include construction specifications and schedules so the project can be build. **Deliverable: Final engineering designs that are ready for construction.**
Example of Task Table

<table>
<thead>
<tr>
<th>TASK</th>
<th>Responsible Party</th>
<th>Timeframe</th>
<th>Anticipated Start Month</th>
<th>Project Deliverable</th>
<th>Anticipated Completion Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rutgers</td>
<td>12 Months</td>
<td>1</td>
<td>Preliminary designs for green infrastructure projects for NJDEP’s approval</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>Rutgers</td>
<td>18 Months</td>
<td>6</td>
<td>Final designs for green infrastructure projects</td>
<td>24</td>
</tr>
</tbody>
</table>
Budget

- Salary and Fringe,
- Project supplies,
- Equipment supplies,
- Subcontractors/consultants
- Travel,
- Publication costs,
- Tuition and stipend for graduate students, and
- DON’T FORGET THE OVERHEAD
Bottom Line: Are Your Goals and Objectives Achievable and Measurable?
More Tips

• A good idea is nothing without a good leader and visa-a-versa
• Get the right project partners and make sure they are all engaged
• If possible, have proof of concept
• If you have never received a grant before, you might want to team up with someone who has
• Make sure you read the Request for Proposals (RFP) or Request for Application (RFA) and address all the requirements
• Look at who and what was funded last year
Final Tips

• Get to know the grant funders – go to meetings, conferences, and other events – be strategic
• If you have questions on the RFP or RFA, call granting agency officer and ask them
• If a match is desired but not required, provide one
• Don’t be afraid to piggyback grants together to fund a project
• Don’t waste too much of your time on the long-shots but also don’t be afraid to shoot for the stars – you might get lucky and hit it big
Resources for You!
Our green infrastructure initiative in urban centers focuses on capturing stormwater with cost-effective practices before it enters the combined sewer systems.

ABOUT US

Rutgers Cooperative Extension
Water Resources Program

G.H. Cook Campus
14 College Farm Road
New Brunswick, NJ 08901

www.water.rutgers.edu

~Creating Solutions for Water Resources Issues in New Jersey~

Our mission is to identify and address community water resources issues using sustainable and practical science-based solutions.

NEWS

- In the News - October 3, 2017
- SEBS/NJAES Newsroom
# Projects & Programs

<table>
<thead>
<tr>
<th>Agricultural Watershed Planning &amp; Implementation</th>
<th>Municipal/Community Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Infrastructure Program</td>
<td>Rain Gardens &amp; Rain Barrels</td>
</tr>
<tr>
<td>Keep the Rain from the Drain ~ Impervious Cover Reduction Program</td>
<td>Watershed Planning &amp; Implementation</td>
</tr>
<tr>
<td>Municipal Stormwater Management</td>
<td></td>
</tr>
</tbody>
</table>

## Agricultural Watershed Planning & Implementation

- Watershed Restoration & Protection Plan for Assiscunk Creek, Burlington County, NJ
- Assiscunk Creek Watershed Agricultural Mini-Grant Program
- Biofilter Wetland at Harrow Run, Water Quality Evaluation of Pollutant Removal Efficiency from a Tailwater Recovery System
- Watershed Restoration Plan for the Upper Cohanse River Watershed
- Upper Cohanse River Watershed Agricultural Mini-Grant Program
- Watershed Restoration Plan for the Upper Salem River Watershed
- Upper Salem River Watershed Agricultural Mini-Grant Program

## Green Infrastructure Program

- Camden Green Infrastructure Initiative
- Fixing Flooding: One Community at a Time Innovative Solutions using Green Infrastructure Conference
- Green Infrastructure Education and Implementation Program
- Green Infrastructure Guidance Manual for New Jersey
- Green Infrastructure Solutions for New Jersey Conference
Keep the Rain from the Drain ~ Impervious Cover Reduction Program

- Impervious Cover Assessments and Impervious Cover Reduction Action Plans for Coastal Communities
- National Fish and Wildlife Foundation ~ Incorporating Green Infrastructure Resiliency in the Raritan River Basin
- Impervious Cover Assessments, Impervious Cover Reduction Action Plans, and Green Infrastructure Reduction Action Plans for New Jersey Future's Mainstreaming Green Infrastructure Program
- [Salem County and Cumberland County, NJ ~ Impervious Cover Assessments and Impervious Cover Reduction Action Plans](#)
- William Penn Foundation - Technical Support Program for Municipalities and Watershed Partners
### Hunterdon County

<table>
<thead>
<tr>
<th>Township</th>
<th>Resources Available</th>
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</thead>
<tbody>
<tr>
<td>Delaware Twp</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em></td>
</tr>
<tr>
<td>Franklin Twp</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em></td>
</tr>
<tr>
<td>East Amwell Twp</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em></td>
</tr>
<tr>
<td>Raritan Twp</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em></td>
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<tr>
<td>Flemington Boro</td>
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</tr>
<tr>
<td>Readington Twp</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em></td>
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<tr>
<td>Dunellen Boro</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em></td>
</tr>
<tr>
<td>North Brunswick Twp</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em></td>
</tr>
</tbody>
</table>

### New Jersey Highlands Watershed Cluster

<table>
<thead>
<tr>
<th>Location</th>
<th>Resources Available</th>
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<tbody>
<tr>
<td>Alpha</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em>, <em>Feasibility Study</em></td>
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<tr>
<td>Lopatcong</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em>, <em>Feasibility Study</em></td>
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<tr>
<td>Branchville</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em>, <em>Feasibility Study</em></td>
</tr>
<tr>
<td>Mount Arlington</td>
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</tr>
<tr>
<td>Greenwich</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em>, <em>Feasibility Study</em></td>
</tr>
<tr>
<td>Mount Olive</td>
<td><em>ICA</em>, <em>RAP</em>, <em>RAP web map</em>, <em>Feasibility Study</em></td>
</tr>
</tbody>
</table>
E-learning Tools

- Inventory and Assessment of Your Stormwater Infrastructure (January, 2017)
- Green Infrastructure Overview: Examples and Properties of a Variety of Stormwater Management Solutions (November, 2016)
- Ideas and Resources for Implementing Green Infrastructure in Your Community - Planning documents, programs, and ordinances (May, 2016)
- Impervious Cover Assessment (ICA) and Impervious Cover Reduction Action Plan: The Answer to All Your Problems (December, 2015)
- Asking the Right Questions in Stormwater Review (April, 2015)
- Understanding Your Impervious Cover Assessment (ICA) Report (March, 2015)
E-learning Tools

- *Inventory and Assessment of Your Stormwater Infrastructure* (January, 2017)


- *Ideas and Resources for Implementing Green Infrastructure in Your Community - Planning documents, programs, and ordinances* (May, 2016)

- *Impervious Cover Assessment (ICA) and Impervious Cover Reduction Action Plan: The Answer to All Your Problems* (December, 2015)


- *Understanding Your Impervious Cover Assessment (ICA) Report* (March, 2015)
New Development: Adequate Regulations Exist - Inadequate Enforcement
Staff to Contact

Sara Mellor, Program Associate, graduated in May 2010 from Rutgers, The State University of New Jersey, with a B.S. in Environmental Policy, Institutions, and Behaviors. Sara interned with the Water Resources Program from May 2009 to May 2010 and has worked part time as a Program Coordinator with the Water Resources Program from May 2010 to May 2011. During the internship and tenure as a Program Coordinator, Sara has participated in water quality sampling, flow monitoring, and stream visual assessments for watershed restoration and protection plans, assisted in the coordination, construction, and maintenance of rain gardens, helped develop and run rain barrel workshops, organized the "One Barrel at a Time Co-op," created flyers, press releases, and other forms of promotional materials for the program, supported Water Resources Program staff in community educational outreach projects, supervised project volunteers, researched ways to inform the public about the importance of conserving water, and contributed to the development of evaluation tools to measure programmatic impact. As a Program Associate with the Rutgers Cooperative Extension Water Resources Program, Sara will be coordinating and presenting rain barrel workshops throughout New Jersey, designing, constructing, and coordinating the installation of rain gardens and natural landscaped systems throughout New Jersey, and participating in community and youth outreach projects pertaining to water resources.

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