



Green Infrastructure and how to “Save the Rain”

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Khris Dodson, Environmental Finance Center

Overview

- What is GI, why is it important and some examples
- Community Engagement in Onondaga County



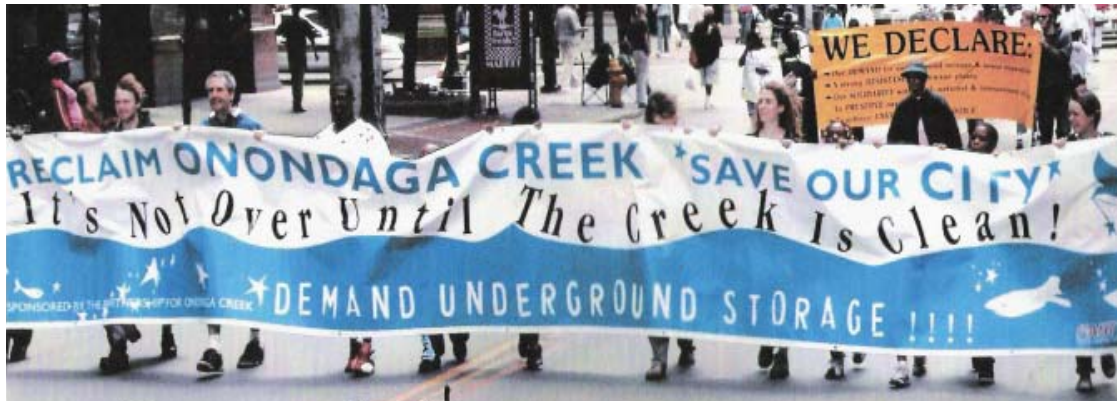
A voice for the Midland Community and the environment
advocating for better, nonpolluting solutions
for Onondaga Creek – Since 2000



Environmental Justice

Green Infrastructure means...

- *Injustice of Midland plant will not be repeated*
- *Onondaga Creek & Harbor Brook will be cleaner*
- *Community investment and beautification instead of further disruption*



Midland Sewage Plant



Syracuse would be pioneer in green approach to stormwater management

SYRACUSE, FROM PAGE A-1
back its construction of concrete-and-steel facilities and place more emphasis on natural systems that use plants and soils.

Going green would cost less, county officials said, but it's unknown how much less.

"Syracuse will be one of the leaders in the country, easily, if this approach is taken and effectively implemented. It's a big deal."

— James M. Tierney,

DEC's assistant commissioner for water resources

The tanks would be underground or "mostly underground," said engineer Matthew J. Marko, vice president of CH2M Hill, a consultant. The county also would undertake several sewer separation projects and other traditional

latest cleanup plan, called an amended consent judgment (ACJ).

Green Infrastructure

- Solution to capacity problems with underground storage – reduce the rain!
- Proposed by Onondaga Nation
- POC: "If you can stop the Armory Sewage Plant, you can stop the Phase III Pipeline too!"
- County Executive Mahoney has promised that the pipeline will not be built.



Victory!! Onondaga County Scraps Sewage Plants in Favor of Green Infrastructure

Lindsay Speer

Change is in the air, and it smells sweet. Onondaga County Executive Joanne Mahoney announced on May 2, 2008 that the County will not award construction bids for the proposed Clinton Regional Treatment Facility (RTF) in Armory Square. Instead, it will explore more environmentally and economically sound options with the State of New York, Atlantic States Legal Foundation, City of Syracuse, and, for the first time, the Onondaga Nation and other community stakeholders.

Persistence Pays Off

Syracuse has an antiquated combined sewer system, in which stormwater runoff is directed into the sanitary sewers. A heavy rainfall results in Combined Sewer Overflows (CSOs), dumping sewage directly into Onondaga Creek. Onondaga County's previous solution was to treat the sewage with chlorine before dumping it into the creek, solving the bacteria problem but creating a host of other environmental and environmental justice concerns.

The County's first large RTF (Midland) was built in a predominantly African-

existed year-round, not just after storms, calling into serious question the effectiveness of the RTFs' end-of-pipe solution.

Going Green

In January 2008, the federal Environmental Protection Agency released a report urging municipalities to use green infrastructure, such as rain barrels, green roofs, and other methods to keep stormwater out of the sewer system. These developments combined with new County and State leadership this year to create a perfect storm for revisiting the mandates of the Amended Consent Judgment (ACJ), which dictates the cleanup of sewer pollution in Onondaga Creek and Harbor Brook.

On June 18th, the Partnership for Onondaga Creek gave a presentation to Onondaga County and the NYS Department of Environmental Conservation to outline alternatives to the remaining phase of the Midland plant: a \$57 Million, 12 foot diameter, 1.5 mile long pipeline currently slated to be installed beside Onondaga Creek to pick up the few remaining untreated CSOs and direct the sewage to the Midland RTF.

The rainwater runoff that overwhelms



Rain barrels are a simple solution activists recommend for protecting Onondaga Creek and other waterways. Photo: goforg33n on flickr.com

to capture water using residential rain barrels and green roof installation on commercial properties. The installation of vegetated curb extensions and tree box filters along roadsides, which serve to infiltrate water into the ground at the same time as beautifying neighborhoods, complete the plan. The cost of these alternatives is about half that of the



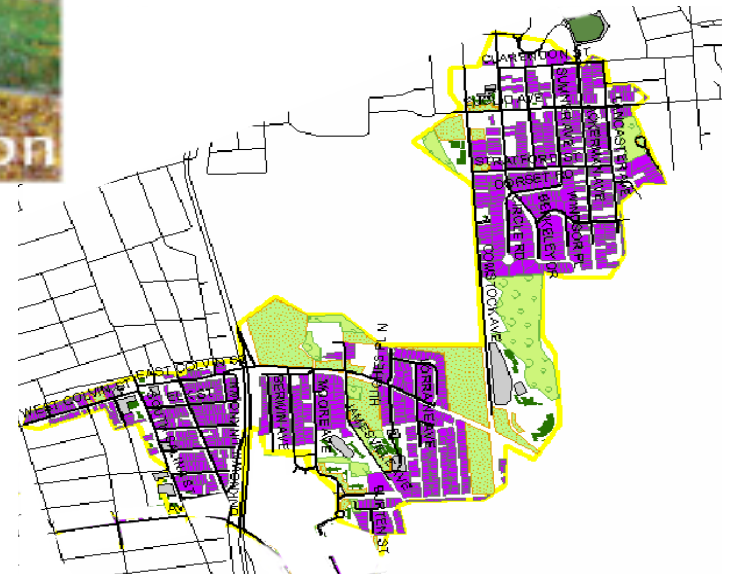
*Which would you prefer
in your neighborhood?*



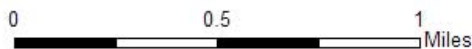
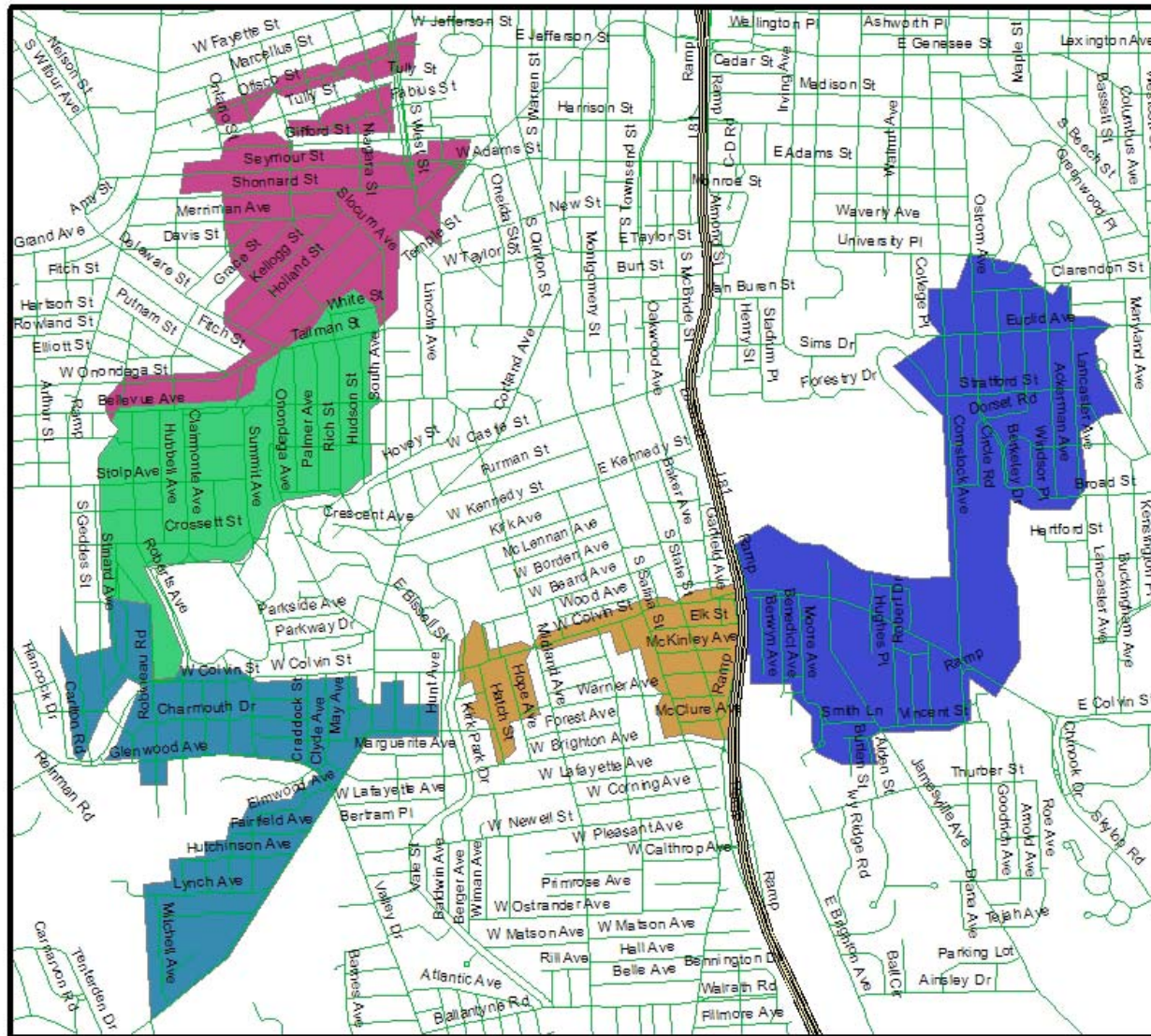
Engaging Community



Map of land use / GI possibilities in the 077
sewershed, including University Neighborhood.
Part of presentation by POC to DEC & Onondaga
County, 2008. →



During 2008 and 2009 the POC, Syracuse University and SUNY-ESF cooperated to obtain over 200 surveys among five neighborhoods of the Midland and Clinton Sewershed to assess public attitudes toward Green Infrastructure (GI) Implementation.



- Legend**
- Highway I81
 - Onondaga Street
 - Near Westside
 - Strathmore
 - CSO 052
 - CSO 060 & 077B
 - CSO 077A

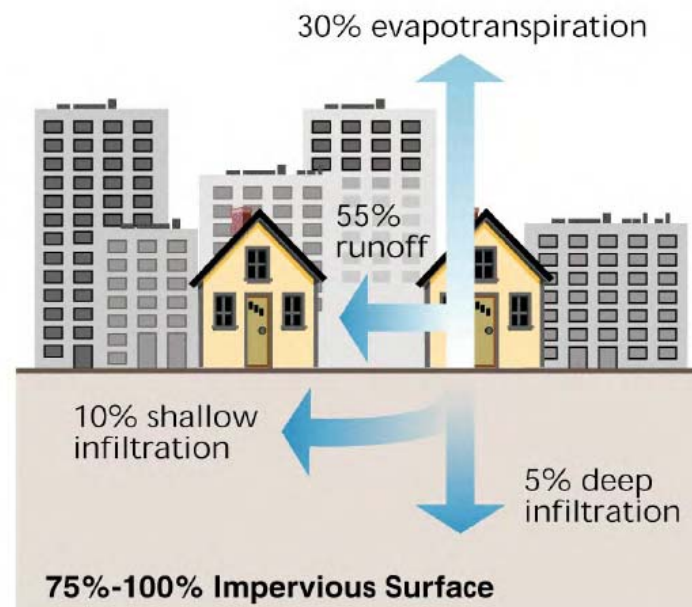
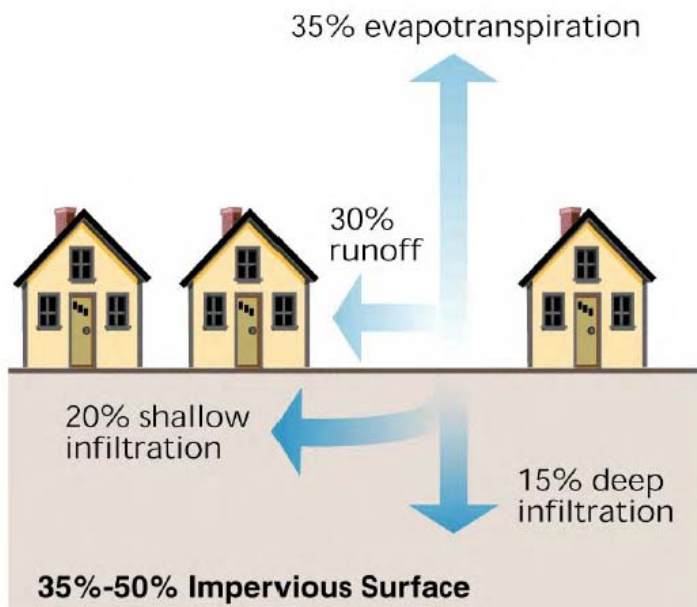
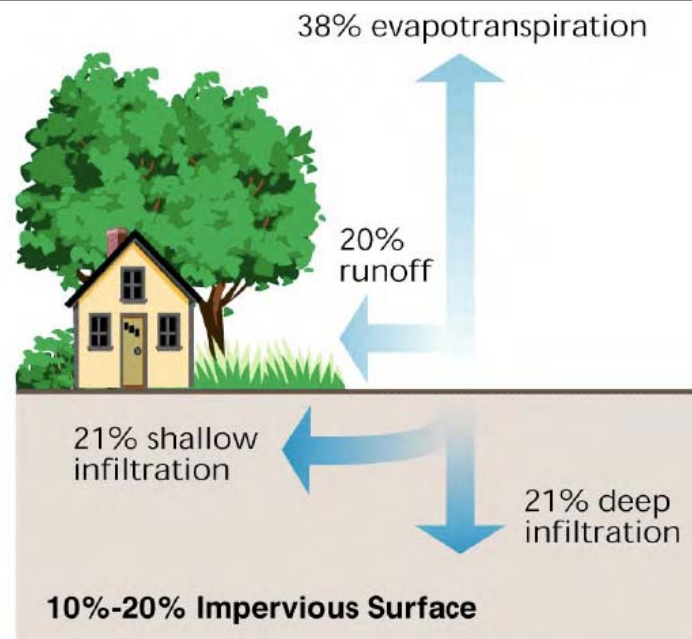
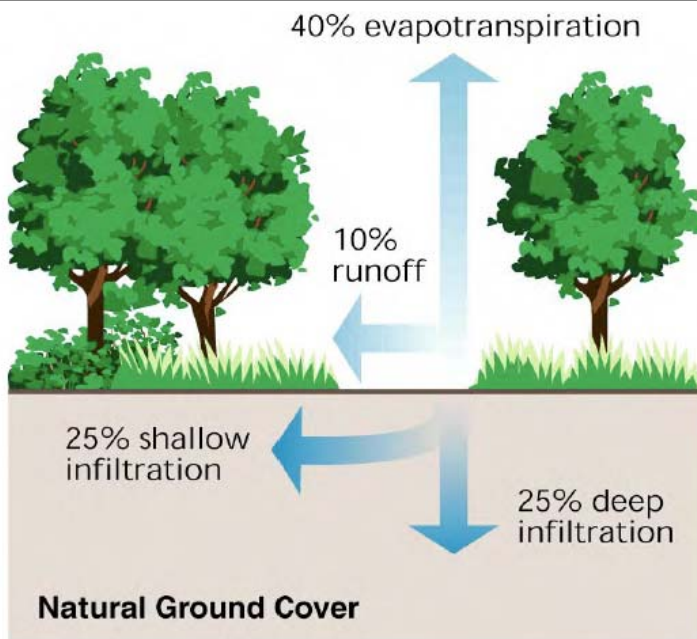
And, the survey says...

- People really aren't that into trees!
- Maintenance of rain gardens is a significant barrier
- Education needed on effective rainbarrel use
- If it's free (or less than \$25) than count me in!
Otherwise, I'm not so sure why I'd want to do this

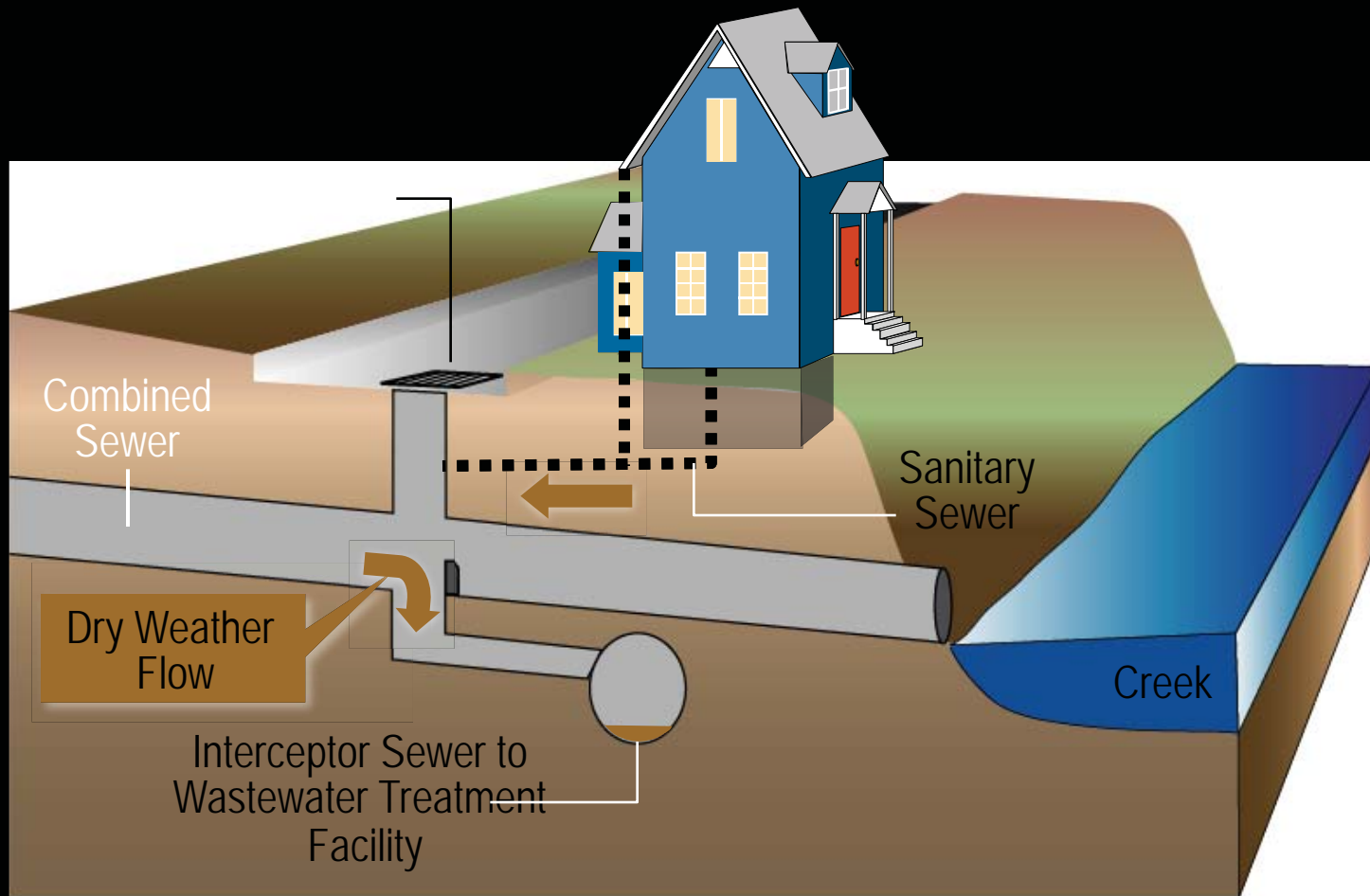
Understanding CSOs



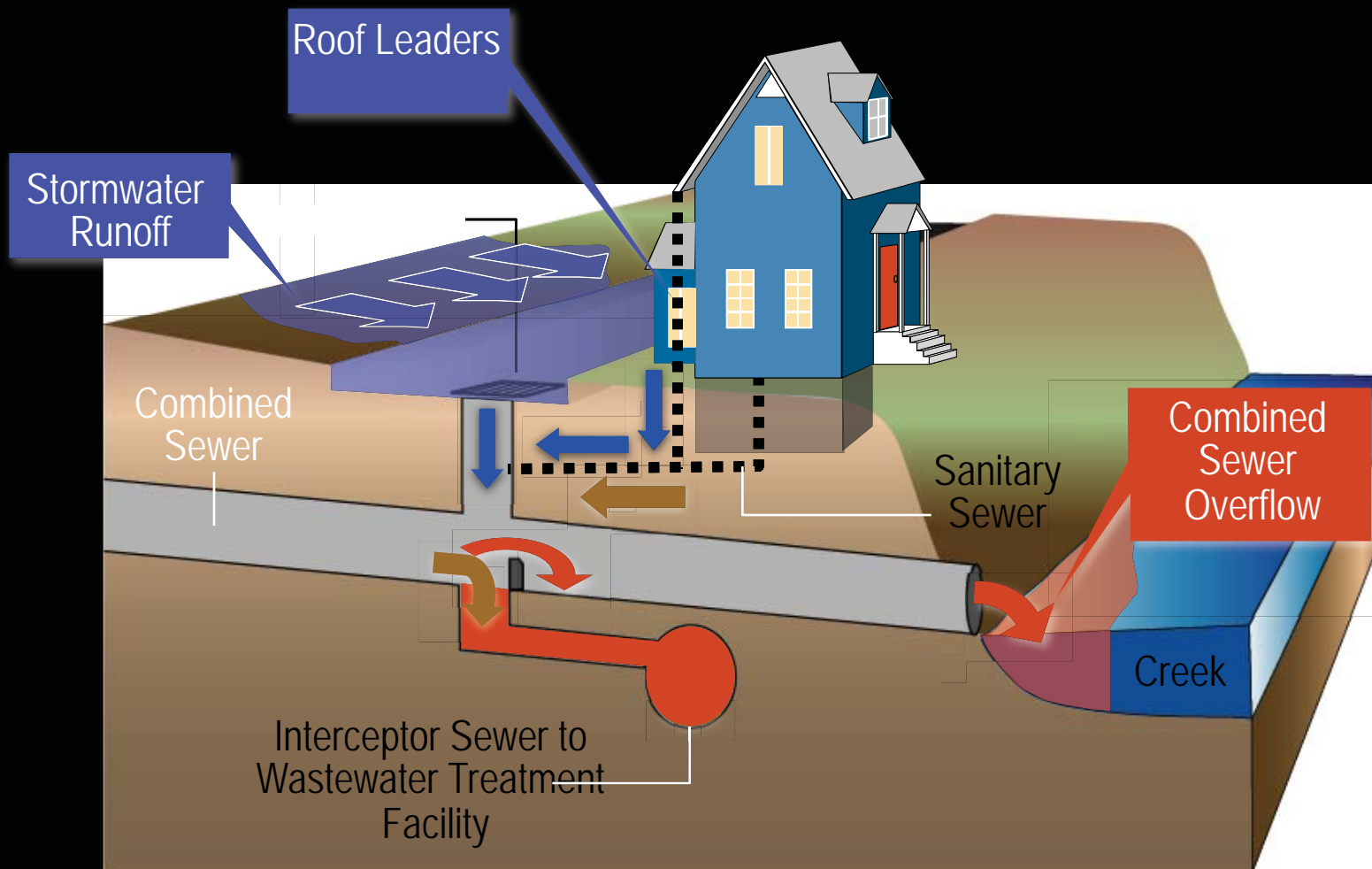
There's Sh@# in the water!



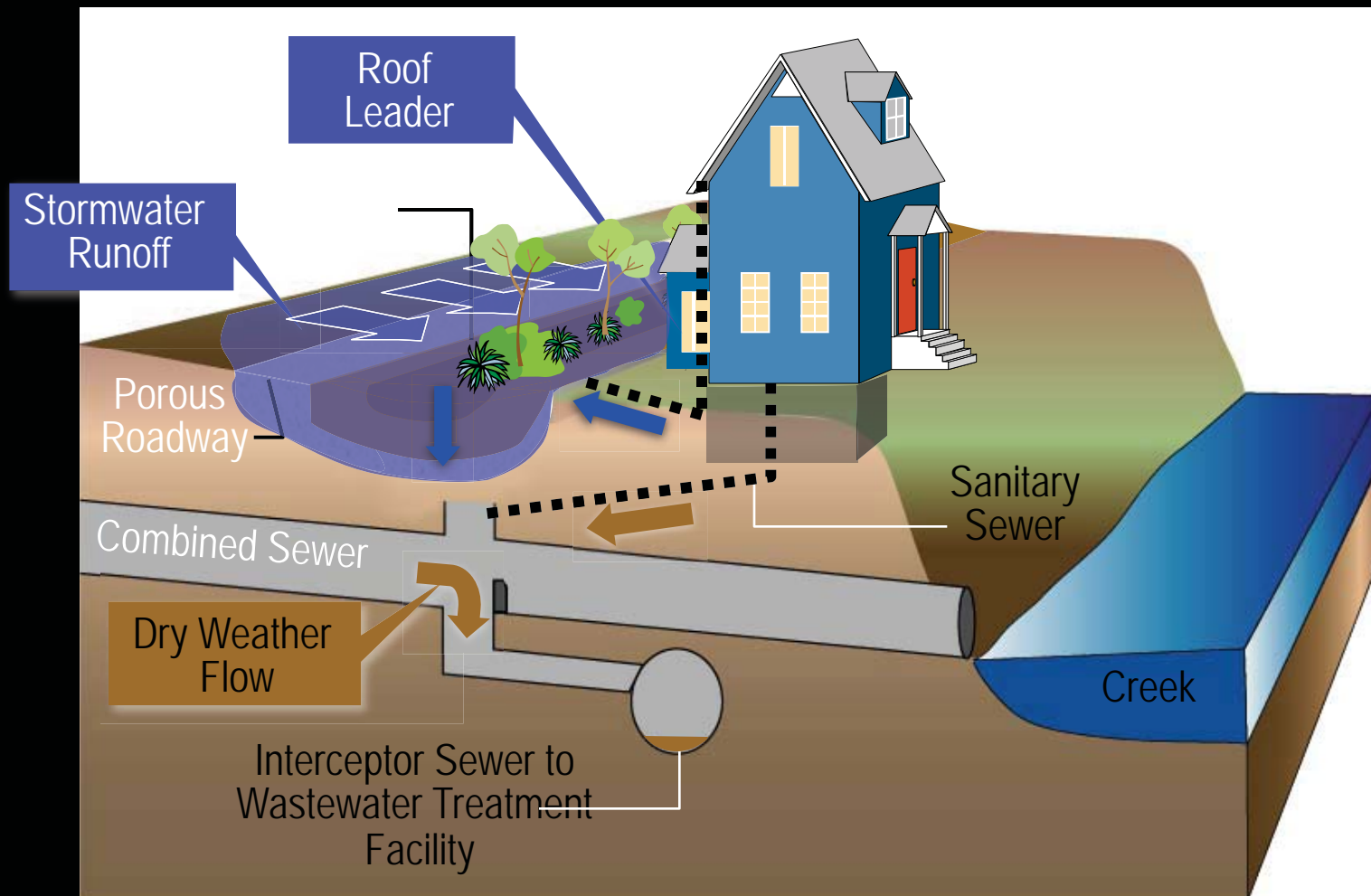
During dry weather, sanitary flows are collected in combined sewers for treatment at Wastewater treatment facilities



During wet weather, inflows exceed the collection system's capacity and trigger a CSO



Green solutions intercept and reduce stormwater flows to sewers, providing storage, infiltration, and treatment



Combined Sewer Overflows



- In 1994, the U.S. Environmental Protection Agency (EPA) adopted a Combined Sewer Overflow Control Policy designed to reduce and eliminate combined sewer overflows nationwide. The purpose of the CSO Control Policy was to elaborate on the 1989 EPA CSO Control Strategy and to facilitate compliance with Clean Water Act (CWA) requirements.

- **The three objectives of the 1989 CSO Control Strategy are:**
 - Ensure that if CSOs occur, they are only as a result of wet weather.
 - Bring all wet weather CSO discharge points into compliance with the technology-based and water-quality-based requirements of the CWA.
 - Minimize the impacts of CSOs on water quality, aquatic biota and human health.

Rethinking the Rain

- Rain is a Resource!
- Shift from the curb, gutter and big basin approach to the way mother nature would manage stormwater
- Region or watershed → Neighborhood → Site

From Traditional to Integrated

Traditional

Drainage Systems

Reactive (solve problems)

Engineer-driven

Protect property

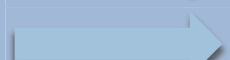
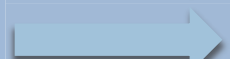
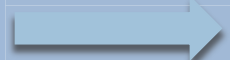
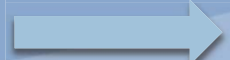
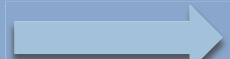
Pipe and Convey

Limited Community consultation

Local Government Ownership

Extreme Storm Focus

Peak Flow Thinking!



Integrated

Ecosystems

Proactive (prevent problems)

Interdisciplinary Team-driven

Protect Property and Habitat

Mimic Natural Processes

Extensive Consultation

Partnerships with Others

Rainwater Integrated with Land Use

Volume-based Thinking!

Green Infrastructure Improves:

- ❑ Water quality
- ❑ Air quality
- ❑ Neighborhood aesthetics
- ❑ Habitat and biodiversity
- ❑ Recreational and transportation opportunities
- ❑ Property values
- ❑ Community health and vitality

Green Infrastructure Reduces....

- Flooding
- Erosion
- Stormwater runoff volume
- Stormwater pollutant loadings
- CSOs
- Gray infrastructure operation, maintenance, energy and treatment costs

Types of Green Infrastructure

Water Pillow

Green Wall



Bioswales



Rain Barrels



Rain Gardens

Save the Rain 

Green Roofs



Walters Hall, SUNY ESF

Vegetation

Growing Medium

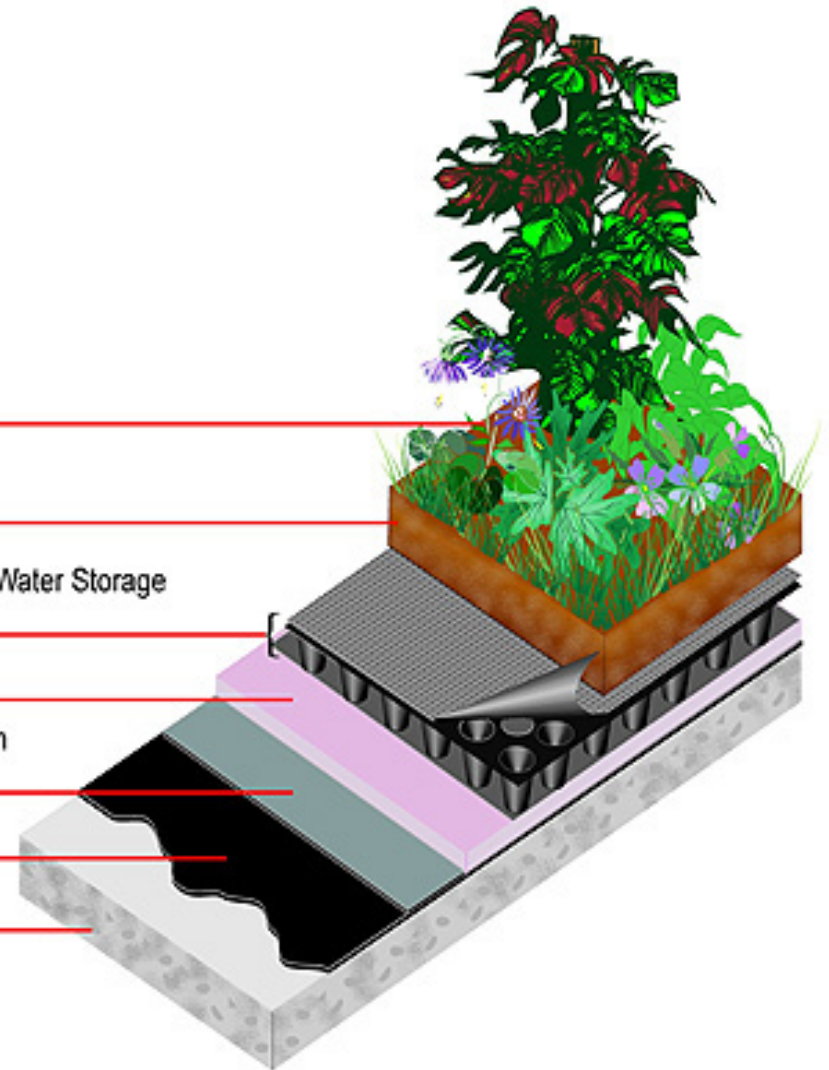
Drainage, Aeration, Water Storage
and Root Barrier

Insulation

Membrane Protection
and Root Barrier

Roofing Membrane

Structural Support

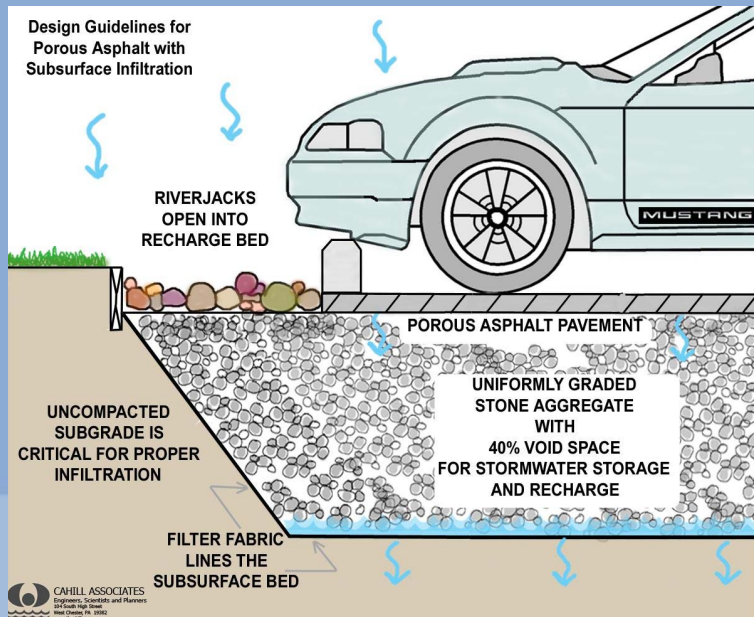


Jamesville Correctional Facility



Save the Rain 

Porous Pavements



New porous parking lot at Dunbar Center in Syracuse



Sidewalk at MOST in Syracuse







Bringing people together...



Save the Rain Programs

- Workshops
 - Intro to GI for Homeowners and Businesses
 - Topics include basic principles of stormwater hydrology, examples of simple GI for homes (rain barrels and rain gardens), and other GI opportunities for the community and businesses.
 - GI for New Homeowners
 - Provides an introduction to green yard care and residential GI to participants in Home Headquarters' (HHQ) home ownership program.
 - Community Workshop
 - Includes hands-on training for design and implementation of residential GI. Residential GI projects will be installed or maintained during each workshop through assistance by workshop participants.

Save the Rain Programs

□ Workshops

□ GI for Youth

- Participants will use and develop games, skits, role-plays, and hands-on opportunities to increase awareness about GI and instill an appreciation for the role young people play in reducing pollution.

□ GI and Art for Children

- combine crafts and hands-on activities to teach elementary and middle school age children about different kinds of GI: green roof birdhouse, painting a rain barrel, etc..

Save the Rain Programs

- Workshops
 - Rain Barrel
 - Participants at the workshops will learn proper installation techniques, maintenance and the role of rain barrels in reducing combined sewage overflows.
 - Landscape Professionals
 - includes a refresher on stormwater management principles, GI options, examples of local projects, and strategies for marketing GI to landscapers' customers.
 - Pervious Products
 - series of formal and hands-on workshops on the various pervious products available on the market will first provide an overview of the products, their uses and specifications, and installation guidelines.

Save the Rain Programs

- Design Charettes
 - This process will include community members in the visioning and decision-making process as plans are created to implement a neighborhood-planned and approved green street.
- Demonstration Projects
 - Rain gardens, green roofs, etc.

Save the Rain Programs

- Nature in the City
 - 3rd Grade classes learning about GI throughout SCS. The lessons will be: Traveling Water Drop, Stream Exploration, and Clean Water Matters.
- ESF in the High School
 - High school classrooms learning about GI throughout SCSD
- Exhibiting at Events
 - Come to local events like Blue Rain ECOFest and more to learn about Saving the Rain!

Billboards, ads, exhibit materials, and giveaways

Save
The Rain
Clean
The Lake

Every drop counts.
We can all make a difference.

Joanne M. Mahoney
County Executive

Save the Rain

Save the Rain
www.savetherain.us

Save
The Rain
Clean
The Lake

40%
Save water
by using
water-saving
fixtures.

100%
Good for our
neighborhoods,
communities
and
the lake.

BIOSWALE

Permeable Paving can...

Save the Rain
Clean The Lake

Joanne M. Mahoney
County Executive

Onondaga County

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Water Word Find

How to play: The word can be found in the puzzle by looking up, down, backwards, and diagonally.

Q U B Z H U B E V R E S N O C
M T E S T V E C R U O S X G S
F R E C H A R G E E U M O D N
E Z W Q C M E N I R O L H C O
T T O Q U A L I T Y X L M Y W
U C D R I N K T P M U P Z B T
L T P S W I M I C H S E R F B
L M R I X P T O S E W E R Q I
O E K E V A P O R A T E G P M
P K D J A G Z F M G C O X I T
C A R F Y T I T N A U Q R O R
K L I Z K L M I R L R U I P E
Q W V Q T F R E U Z W L X E T
B P E E M P M D N I E U J E A
O T R B S E E S A T R A I N W

- | | | | |
|-----------|----------|----------|-----------|
| Chlorine | Lake | Rain | Spring |
| Conserve | Pollute | Recharge | Swim |
| Drink | Protect | River | Test |
| Evaporate | Pump | Sewer | Toilet |
| Filter | Quality | Snow | Treatment |
| Fresh | Quantity | Source | Water |



Don't put trash down the drain!



Remember to remind Mom and Dad that the water from your house ends up in everyone's lake!

How to Prevent Water & Storm Sewer Pollution

Stormwater Pollution



What is Stormwater?

Stormwater is water from rain or melting snow that does not soak into ground. It flows from rooftops that paved areas, bare soil, and sloped lawns. As it flows, stormwater runoff collects and transports soil, animal waste, salt, pesticides, fertilizers, oil and grease, debris and other potential pollutants.

What is the Problem?

Rain and snowmelt wash pollutants from streets, construction sites, and land into storm sewers and rivers. Eventually, the storm sewers and rivers empty the polluted stormwater directly into streams and rivers with no treatment. This is known as stormwater pollution.

Polluted stormwater degrades our lakes, rivers, wetlands and other waterways. Nutrients such as phosphorus and nitrogen can cause the overgrowth of algae leading to oxygen depletion in waterways. Toxic substances from motor oil, antifreeze, lubrication or disinfectants from household water quality products can be harmful to aquatic life. Bacteria from animal wastes and improper connections to storm sewer systems can make lakes and waterways unsafe for fishing, swimming and fish consumption. Road salt is a pollutant as well. It clouds the waterweasel's confidence with the habitat of fish and plant life.

Best Management Practices

- Cover pits contain topsoil and mulch during installation.
- Plant rain gardens of native drought- and pest resistant plants to collect and filter rainwater.
- Install pervious pavement and gravel driveways to reduce stormwater runoff.
- Do not drain swimming pools into storm drains or road ditches.
- Install vegetative buffers along streams and drainage pathways.
- Compost or mulch leaves and weed debris rather than taking to dumps.
- Direct downspouts away from driveways or storm drains.
- Clean gutter downpipes to allow rain to drain.
- Maintain septic systems to prevent failure and inspect every 3 years.
- Sweep up litter and debris from driveways and parking lots rather than hosing debris in storm drains.
- Plant vegetated filter areas or swales to trap pollutants along streets and driveways.
- Install and maintain sediment and erosion control measures during soil disturbing activities.
- Reduce amount of paved surfaces.
- Tightly rinse and recycle empty pesticide and fertilizer containers.
- Use proper spray notification signage and comply with neighbor notification regulations.
- Comply with NY's Department of Environmental Conservation pesticide application regulations.
- Use Integrated Pest Management (IPM) to avoid runoff or leaching from excess chemical applications.
- Avoid using chemicals near waterways or storm drains.
- Dispose of unused or excess pesticides in a collection device with NY's DEC and US EPA regulations.
- Clean up spills immediately and properly dispose of cleanup materials.
- Fill tanks on a gravel surface, away from storm drains, sewers or ditches.
- Avoid spreading in windy conditions or when rain is in the forecast.
- Provide spill containment at storage facilities and store chemicals away from floor drains.

Onondaga County
www.savetherain.us

Brochures, activity books, bookmarks, and a board game: "Raindrop Run"

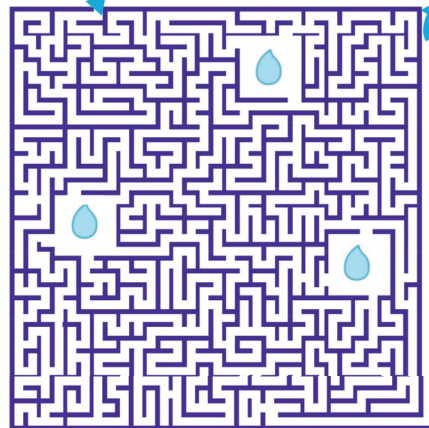
Save the Rain

Only Rain in the Drain

What can you do to keep pollution out of Onondaga Creek and Onondaga Lake? Try these puzzles and look for hints along the way!

What will you pledge to do to help clean up our creek and lake?

Start Water Maze Finish



Always pick up your pet's waste!



Never wash your car on pavement!



Check the weather and don't fertilize the lawn before it rains!

Residential Rain Gardens



Save the Rain

Make sure to pick up your dog's waste!



It's Your Doodie!

Dog waste can contaminate our lake, our creek, and our streams.

Save the Rain

Onondaga County
www.savetherain.us

Savetherain.us



HOME

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GREEN SOLUTIONS

RESOURCES

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Pearl Street
goes green

The Pearl Street Lot in the City of Syracuse is a prime example of what a "green" facelift can do. [Read more...](#)



Our many project partners include...



State University of New York
College of Environmental Science and Forestry



**Baltimore Woods
Nature Center**
Nature in your hands



**Onondaga
Environmental
Institute**



*The Partnership for
Onondaga Creek*

www.onondagacreek.org



**Environmental
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Save the Rain



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