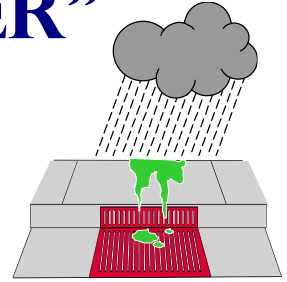


# ORANGE "STORMWATER"



## Protecting Orange County's Water Quality Through Effective Stormwater Management

ORANGE COUNTY SOIL & WATER CONSERVATION DISTRICT  
225 Dolson Avenue, Suite 103 Middletown, NY 10940  
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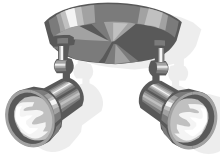


EDITOR:  
Kevin Sumner

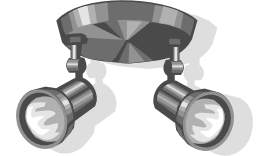
Issue 9

Summer 2010

LAYOUT/DTP:  
Kris Breitenfeld



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## PROJECT SPOTLIGHT

### LOCAL "GREEN" PROJECTS

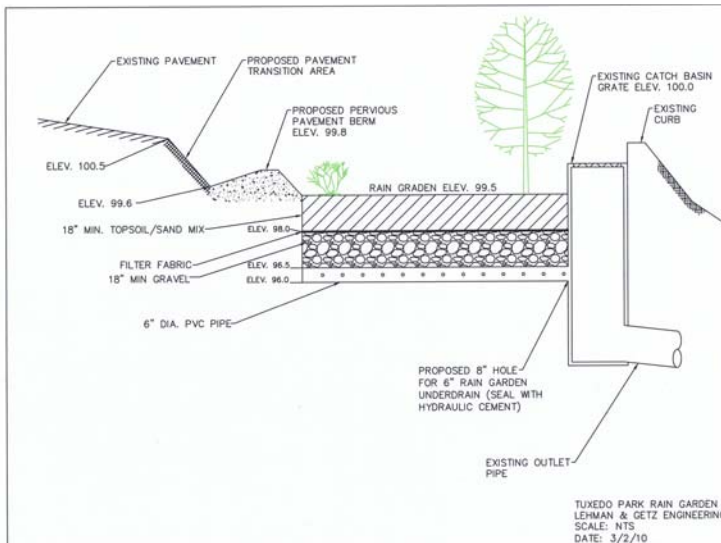
#### TUXEDO PARK RAIN GARDEN

by Karen Emmerich, AICP, PP  
Lehman & Getz Engineering, P.C.

In February 2010, Dena Steele of the Tuxedo Park Garden Club contacted Lehman & Getz Engineering about preparing a rain garden design for Tuxedo Park's Village Hall parking lot. The Garden Club had discussed the concept of a rain garden with Kevin Sumner of Orange County Soil & Water Conservation District, and he suggested that a rain garden be constructed in the northwest corner of the Village's parking lot.

The parking lot is a large expanse of asphalt that slopes toward Little Wee Wah Lake. At the corner of the lot there is a catch basin that empties into a pipe, which discharges directly to the lake. The Garden Club recognized that runoff from the parking lot and the roof drains from Village Hall were contributing pollutants to the lake. They decided to undertake a rain garden as a demonstration project to show residents that a stormwater practice can be an effective filter for stormwater as well as an attractive addition to the landscape.

Lehman & Getz expanded on Kevin Sumner's design, and prepared a plan for a 190-square foot rain garden. The Village DPW cut the pavement in the corner of the lot, creating a pie-shaped area for the garden. Once the pavement was removed, the area was excavated so that the proper soil and underdrain pipe could be installed.



At the bottom of the rain garden is a 6" diameter perforated pipe, which transmits filtered stormwater that doesn't infiltrate into the ground to the outfall. On top of the pipe is 18" of gravel, covered by filter fabric. Above that is 18" of topsoil. Runoff from the parking area enters the rain garden at the edge of the parking lot, runs through a gravel filter\* to pick up large particulates, and then into the rain garden. It filters through the topsoil into the gravel beneath, and finally, into the ground and/or the perforated pipe before it flows out to the lake. The catch basin is now available only for overflow purposes, when the garden cannot handle the volume of water coming from the parking lot and roof leaders.

\* The original design called for pervious pavement to act as a filter on the edge of the rain garden, the idea being that a harder surface would be easy to clean of debris that runs off from the parking lot (tree litter, sticks, etc.), but would still allow water to pass through the media. The Village chose to substitute river jacks due to cost considerations and availability.

The Garden Club members chose native plants for the site, including Red Twig Dogwood, Joe Pye Weed, and Cardinal Flower, to name a few. They planted the garden in mid-April, and this photo was taken a week after planting.



## VILLAGE OF GREENWOOD LAKE'S VILLAGE HALL PROJECT



*Here is the Village Hall parking area before construction began to convert the area to pervious pavers and a vegetated swale.*



*At work on installing the pervious pavers.*



*The vegetated swale is in place.*



*The "Before" photo shows a generator and dumpster—they have since been moved. The generator is by the Police Department and the dumpster is now to the side of Village Hall.*



*The trellis is in place along one side of Village Hall and a green screen will soon be installed.*



*The rain garden is located right in front of Village Hall and the pervious paver sidewalk.*

The Village received ARRA (American Recovery and Reinvestment Act) funds for this project which began in March 2010 and is expected to be completed by mid-September. The green infrastructure elements of the project are:

- \* Replacement of 15,700 sf +/- of impervious surface with pervious surface and landscaping (sidewalks and parking areas)
- \* Rain garden to treat roof runoff
- \* Vegetated swale to treat runoff from driveway area and encourage infiltration of stormwater
- \* Native plants used throughout the landscaping plan, prepared by Karen Arent, Landscape Architect
- \* Trellis and Green Screen alongside of Village Hall to reduce heat island effects from Village Hall and to provide an aesthetic background
- \* Used Unilock Eco Piora pervious pavers for walkways and parking area

Design by Lehman & Getz Engineering and Karen Arent, Landscape Architect.  
Contractor is DTM Development from Monroe.

## DEC CONSTRUCTION PERMIT (GP-0-10-001) UPDATE

The current permit was issued on 1/29/10 and the pending green infrastructure and runoff reduction requirement revisions do not have to be addressed by modifying this permit. The revisions will be to the **NYS Stormwater Management Design Manual**. The current permit addresses this by stating, "If the Design Manual is revised during the term of this permit, an owner or operator must begin using the revised version of the Design Manual to prepare their SWPPP six months from the final revision date of the Design Manual."

The NYS DEC announced the final revisions in the June 30, 2010 edition of the Environmental Notice Bulletin and they can be found on the DEC website:

<http://www.dec.ny.gov/chemical/41392.html>

The current SPDES General Permit for Stormwater Discharges from Construction Activity (GP-0-10-001) requires that the revised Design Manual be used six months from the final revision date.

The NYS Stormwater Management Design Manual revision now requires that the Water Quality Volume (WQ(v)) generated by new development, and redevelopment, be reduced, to the maximum extent practical, to pre-development conditions. To achieve this requirement, Stormwater Pollution Prevention Plans must incorporate Green Infrastructure and Runoff Reduction measures as described in the Design Manual. If properly implemented, the new requirements will result in better management of the WQ(v) and smaller, more manageable stormwater management measures.

## STORMWATER MANAGEMENT AND GREEN INFRASTRUCTURE PRACTICES

by Simon Gruber, Hudson Valley Regional Council

Stormwater management, which for many years focused on managing runoff from developed areas using hard (or gray) infrastructure like pavement, catch basins, and culverts to provide drainage, has more recently taken a different direction. Green infrastructure is an emerging term for a whole set of practices and design strategies to minimize runoff, maximize infiltration of water into the soil onsite, use water efficiently, and utilize vegetation and soils to filter runoff and protect water resources. There is growing interest in the benefits of using these principles and practices, and the NY State Dept. of Environmental Conservation, US Environmental Protection Agency, and other agencies are increasingly adopting them as preferred approaches.



**Soil & Water District staff designed and assisted Treatment Plant staff with planting shrubs in this completed rain garden at the Water Treatment Plant in Newburgh, NY. The Water Department staff built the rain garden.**

Green infrastructure (GI) practices include rain gardens and larger landscaped bioretention areas designed to filter and infiltrate water to the soil, permeable paving systems, rainwater harvesting and reuse systems like rain barrels, vegetated swales, green roofs, and many other variations. Most GI systems include soils and vegetation as part of the design, and the same set of ideas and practices have also been described as low-impact development and better site design. Ponds and wetlands to capture and treat stormwater runoff can be included as part of a GI design, if the site plan includes other GI practices to reduce runoff and infiltrate it onsite (the plan shouldn't rely solely on a conventional stormwater pond to meet regulatory requirements.)

The Hudson Valley Regional Council (HVRC) is leading a project to support development of community-based GI plans in municipalities and watersheds in the mid-Hudson region, working with other partners including the Orange County Soil and Water Conservation District. This project includes development of a training and outreach process, working with community leaders and volunteers in each place to identify promising sites for GI projects, and development of conceptual GI plans for selected sites. Other partner organizations include the Hudson River Watershed Alliance and Hudson River Sloop Clearwater Inc., and the project is funded through the NY State Dept. of Environmental Conservation with Federal funding from the American Recovery and Reinvestment Act.

GI plans in each participating community will focus on local water resources priorities, including reducing wastewater overflows in cities along the Hudson River, management of phosphorus in certain sensitive watersheds, flooding in some areas, and other water resources goals. While this project will result in conceptual plans, the project team is hoping to see certain projects move quickly into final design and construction if other funding can be obtained. The program is designed to support job creation, and will be linked with other existing and pending programs of HVRC and partner organizations related to job training and development in the stormwater management sector and related water-industry sectors. The public library in Kingston is one of the first sites being assessed in this project, and the illustration on the next page provides a preliminary idea of some ideas being considered for this site.

The Orange County Soil and Water Conservation District is providing important technical support for this pro-

ject, building on Kevin Sumner's experience with planning, designing and installing several green infrastructure demonstration projects, including two shown here that were funded with grants from the NYS DEC Hudson River Estuary Program. The District is also incorporating GI information in educational outreach, and will be helping to refine some of the site-specific concept plans we develop. The regional planning project is scheduled to be implemented over the next 18 months and conclude in early 2012, and we are optimistic that some of these plans may move into the construction phase in 2011. If you are interested in participating as a volunteer to assess sites in one of the participating communities (which include Newburgh and Warwick in Orange County and others in other counties) or want more information, please contact us through the District office or see other contact information below.



Fall 2009



July 2010

*This rain garden project by a gravel parking lot was completed at the Black Rock Forest Consortium in the fall of 2009 through the efforts of staff from Black Rock, the Soil & Water Conservation District and Cornell Cooperative Extension.*

**Educational Resources**

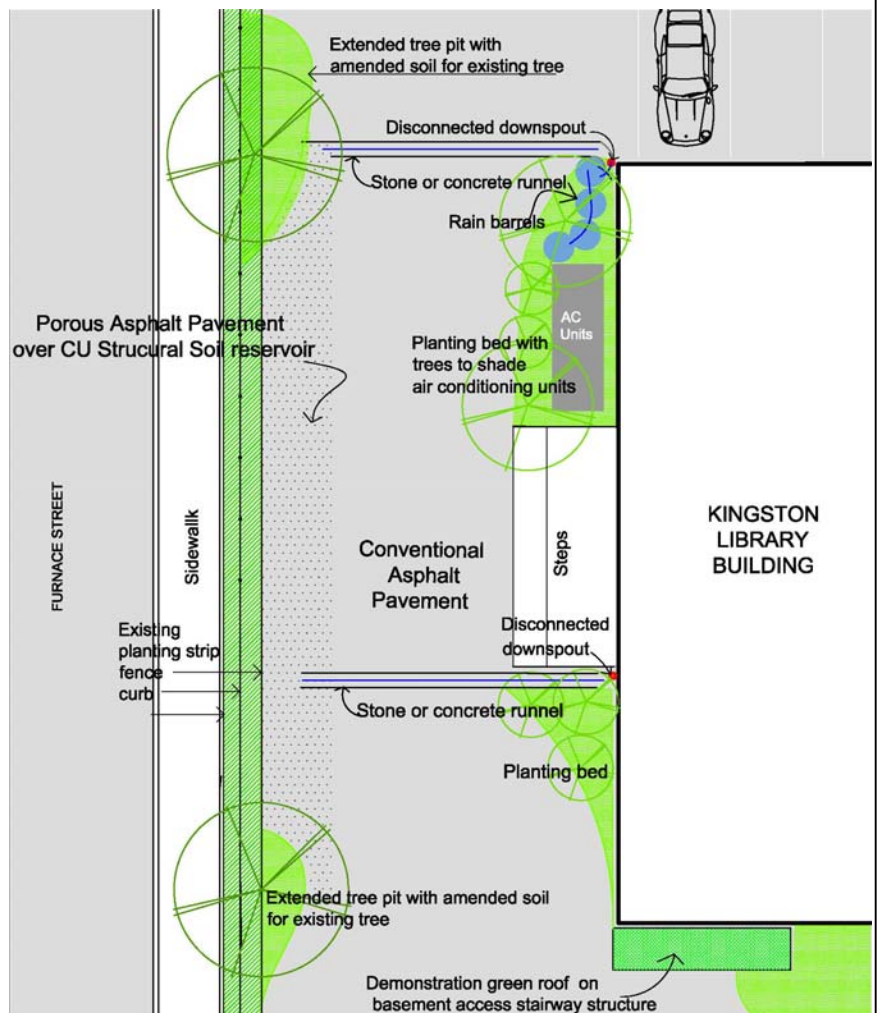
Some good online resources about green infrastructure practices, benefits and local examples are available at the following links:

NYS DEC – GI project examples in the Hudson Valley  
<http://www.dec.ny.gov/lands/58930.html>

US EPA – Green infrastructure web page with many educational resources  
[http://cfpub.epa.gov/npdes/home.cfm?program\\_id=298](http://cfpub.epa.gov/npdes/home.cfm?program_id=298)

Hudson Valley Regional Council – various green infrastructure and other green resources  
<http://hudsonvalleyregionalcouncil.com/>  
 (check back soon -- this site will have more information later this year)

Cornell University Urban Horticulture Institute  
<http://www.hort.cornell.edu/uhi/>



*This is a preliminary concept plan prepared for the Kingston Library, one of the sites participating in the regional project, where they are planning to re-pave the parking lot and incorporate green infrastructure practices in the site.*

Illustration by Marcy Denker, Landscape Designer

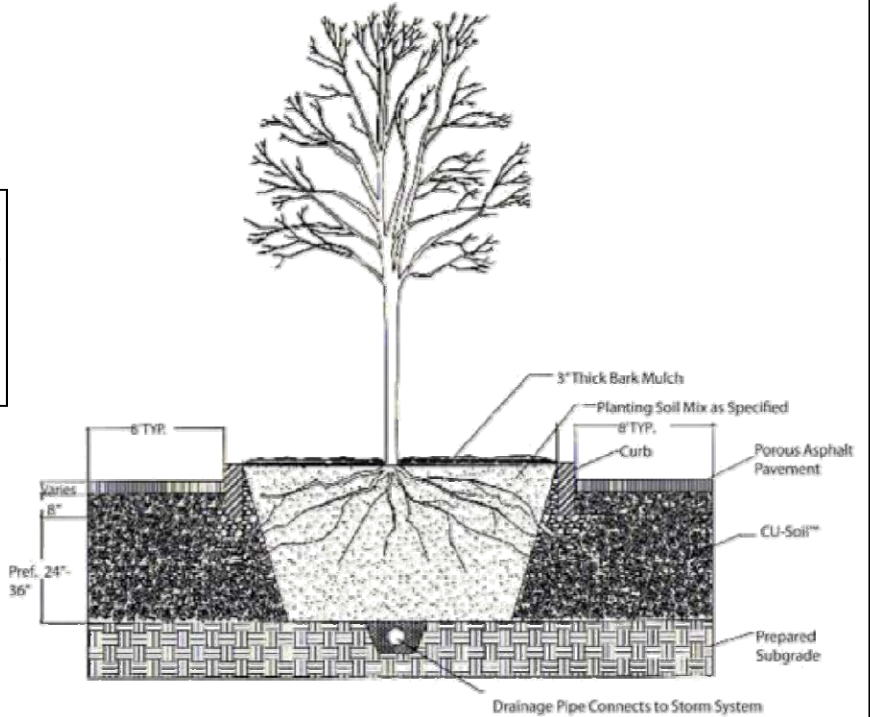
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**NEW WEB PAGE—IT'LL BE "GREEN"**

The Soil and Water District is developing a Green Infrastructure page on our website [www.ocsoil.org](http://www.ocsoil.org) Check it out for information on many of the practices that are being used in Orange County and future projects in this area.

The cross section at right shows porous pavement surrounding a tree planted in CU Structural Soil® developed at Cornell University (from one of their guidance manuals available for download at [http://www.hort.cornell.edu/uhi/outreach/pdfs/cu\\_porous\\_asphalt.pdf](http://www.hort.cornell.edu/uhi/outreach/pdfs/cu_porous_asphalt.pdf))

Contact for more information:  
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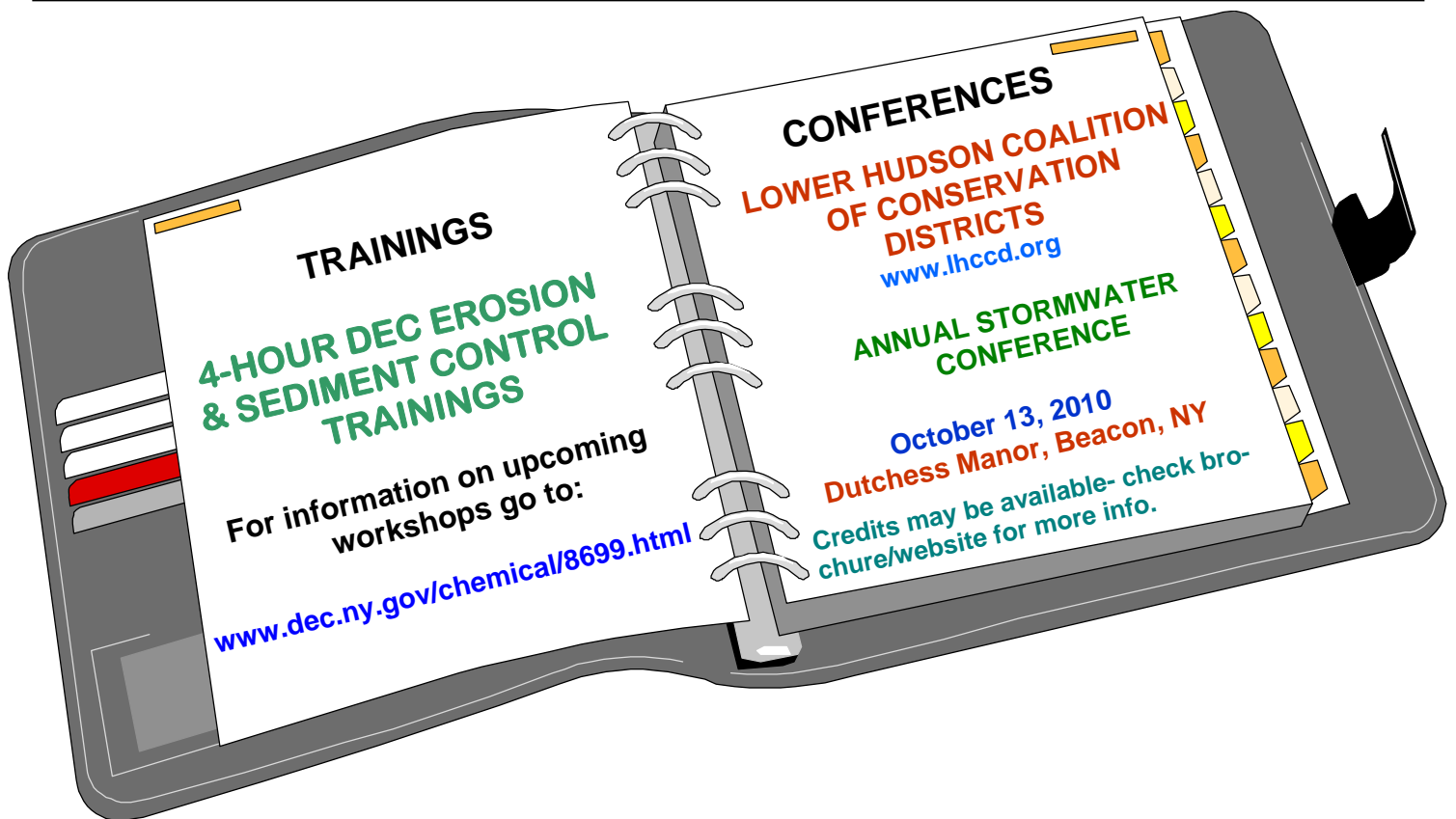


# RECOVERY.GOV



## NYWORKS

This project has been funded by the American Recovery and Reinvestment Act with support from the New York State Department of Environmental Conservation and New York State Economic Recovery and Reinvestment Cabinet. For more information, please visit: [www.recovery.gov](http://www.recovery.gov), [www.dec.ny.gov](http://www.dec.ny.gov) or [www.recovery.ny.gov](http://www.recovery.ny.gov)



### REMINDER

The District's Stormwater Education Display is available for use at public events, meetings, etc. Contact us for more information or if you'd like to reserve it for an upcoming event.