

# GREEN INFRASTRUCTURE

**E**PA is helping several communities explore opportunities for implementing green infrastructure on vacant land, infill sites, and contaminated properties.

Green infrastructure involves the use of landscape features to store, infiltrate, and evaporate stormwater. This reduces the amount of water draining into sewers and helps reduce the discharge of pollutants into area water bodies. Examples of green infrastructure include rain gardens, swales, constructed wetlands, and permeable pavements.

Building green infrastructure on underused and vacant properties, including brownfields, can be an innovative environmental solution that goes beyond conventional regulatory fixes for controlling stormwater runoff. Green infrastructure also can provide important environmental and socio-economic benefits to communities, regardless of whether the communities have separate sewers or combined sewer systems (see box below).

In Region 7, EPA and the Iowa Department of Agriculture and Land Survey sponsored a green infrastructure workshop for local governments in September 2010 that focused on how to apply green infrastructure techniques to the former stockyard properties in Sioux City, Iowa.

## NEW ENVIRONMENTAL SOLUTIONS

EPA's land revitalization initiatives are producing significant environmental benefits and helping to transform communities into more sustainable and livable places. The strategy of encouraging market-driven redevelopment of brownfields and other contaminated sites for economic reuse is proving to be a successful approach at many sites. However, challenging real estate markets and economic realities can leave some formerly contaminated properties unused, possibly for a long time. New approaches are needed to revitalize these sites and protect human health and the environment.

EPA's Land Revitalization Team is working with communities, states, other federal agencies, academic institutions, nonprofit organizations, and the private sector to develop and test new approaches that recognize valuable reuse alternatives for formerly contaminated properties. Building green infrastructure to help manage stormwater runoff and floods, promoting safe soil management to support urban agriculture, and siting renewable energy on contaminated sites can bring environmental, ecological, and social benefits to communities. Unlocking the potential value of these underused properties often requires creativity and close collaboration with many public and private partners. These projects can help stabilize communities and spur economic development.

In Region 5, EPA is working with cities such as Cincinnati and Cleveland that are investing in green infrastructure as an element of their CSO long-term control programs. Both cities are working on huge new public works projects to reduce CSO discharges and protect area waters. These communities and the regulatory agencies recognize the important role that land revitalization can play in controlling water pollution from stormwater runoff.

Building green infrastructure on underutilized parcels in urban areas can simultaneously help cities reduce CSO discharges, stormwater runoff, and reduce the amount of vacant property, while creating greenspace and public amenities that contribute to neighborhood revitalization. The goal is to find solutions that can become true community investments—in the environment and in social and economic development—that yield benefits in the “triple bottom line.”

Many communities in the U.S. have separate sewer systems. One set of sewer pipes conveys wastewater to treatment plants before discharging it into nearby lakes and rivers. A second set of pipes conveys stormwater from rain events, which is discharged into receiving waters, generally without treatment. Stormwater typically contains pollutants such as bacteria, nutrients, and oil and grease, that wash off streets and parking lots and other surfaces during rain events. The large volumes of stormwater and pollutants being discharged can have substantial adverse effects on lakes, rivers, streams, and wetlands.

Some communities have only one set of sewer pipes that handle both wastewater and stormwater. These combined sewer systems can convey wastewater and stormwater to area treatment plants in dry weather, but during rain events there is too much volume for the sewers to handle. The sewers overflow, releasing a mixture of stormwater and untreated wastewater into receiving waters. These discharges, called combined sewer overflows (CSOs), are a major water pollution concern for the approximately 772 cities in the U.S. that have combined sewer systems.



## CLEVELAND'S PROJECT CLEAN LAKE

In late 2010, EPA, the U.S. Department of Justice, and the Northeast Ohio Regional Sewer District (NEORSD) agreed on a plan to address the flow of untreated sewage into Cleveland area waterways and Lake Erie by capturing and treating more than 98 percent of wet weather flows entering the combined sewer system servicing Cleveland and 59 adjoining communities.

Project Clean Lake is a \$3 billion, 25-year plan. As part of this plan, the sewer district will invest at least

\$42 million in green infrastructure projects.

Under Project Clean Lake, NEORSD will reuse brownfields and vacant properties for green infrastructure, which is expected to assist in the revitalization of targeted urban neighborhoods. The sewer district will work with the Cleveland and Cuyahoga County land banks to transform the area's numerous vacant or abandoned properties to runoff control landscape uses. The sewer district will collaborate with governments and local community groups to select the



*Mill Creek Falls, Cleveland*

locations and types of green infrastructure projects.

## CINCINNATI'S LICK RUN CORRIDOR

In Cincinnati, the Metropolitan Sewer District (MSD) reached an agreement on a substantial list of projects to reduce CSO discharges. The agreement allows the sewer district to substitute green infrastructure solutions for conventional "grey infrastructure" control measures, provided the same level of CSO control can be ensured. MSD is working on plans for several projects that involve using green infrastructure to meet CSO control commitments. EPA's Brownfields and Land Revitalization programs are providing significant assistance to MSD during its planning work.

One project MSD is evaluating is in the South Fairmont area of Cincinnati, in a corridor known as Lick Run. MSD is exploring strategies to keep stormwater out of the combined

sewer system. Instead, stormwater will be conveyed to Mill Creek via a new above-ground channel. This will free up capacity in the sewer system and reduce CSO discharges. The new green corridor would be a significant amenity for the neighborhood and could spark commercial and economic revitalization in the area. EPA Brownfields and Land Revitalization funds are being used to support MSD's planning work, including site assessments of properties in the corridor and planning of action steps to bring the concept to fruition.

EPA invited the U.S. Department of Housing and Urban

Development and the Department of Transportation to help focus transportation and community development resources on the affected neighborhood. This interagency partnership is an outgrowth of a national Sustainable Communities Partnership among the three agencies. The agencies hope to develop a strategy to increase habitat, clean up brownfields, and reduce the supply of vacant land in the area.



*Lick Run Corridor Proposed Plan*

### MORE INFORMATION:

Visit EPA's green infrastructure web site at [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=298](http://cfpub.epa.gov/npdes/home.cfm?program_id=298)

Visit EPA's Land Revitalization program web site at <http://www.epa.gov/landrevitalization/>