## Project Partners

DWSD funded the Cody Rouge ecosystem services design project, in conjunction with the University of Michigan Water Center, part of the Graham Sustainability Institute, with funds from the Fred A. and Barbara M. Erb Family Foundation and the University of Michigan. Other project partners are involved throughout the process.

| Project Partner | Project Role |
|---|---|
| DETROIT Water & Sewerage Department | • Project implementation<br>• Fund design/construction |
| dlba THE DETROIT LAND BANK AUTHORITY | • Land owner<br>• Demolition of homes and land management<br>• Public outreach |
| WATER CENTER UNIVERSITY OF MICHIGAN | • Project concept<br>• Project design and water quality, social impacts |
| WAYNE STATE | • Monitor water quality impacts |
| Fred A. and Barbara M. Erb Family Foundation | • Funder for U of M Water Center Research green infrastructure in Detroit |
| THE CITY OF DETROIT MICHIGAN | • Permitting and approvals |
| TETRA TECH | • DWSD Green Infrastructure Program consultant<br>• Project detailed design and oversight construction<br>• Flow monitoring and assessment |
| TOOLES CONTRACTING GROUP LLC | • Bioretention garden construction |

## For More Information

DWSD will provide updates about the bioretention gardens, as well as other Green Infrastructure projects, on their website (www.detroitmi.gov/dwsd).

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# Making Vacant Lots Work for Detroit

DETROIT'S green space blue water

## Why Design for Ecosystem Services?

Ecological design of demolition sites helps Detroit meet combined sewer overflow (CSO) permit requirements. DWSD's National Pollutant Discharge Elimination System (NPDES) CSO permit requires an investment in green infrastructure to help reduce CSO discharges. One type of green infrastructure investment is demolition and removal of vacant structures. Total volumetric reduction is measured relative to the 2-year, 24-hour (2.34 inch) event.

## Designing Ecosystem Services into Demolition Sites in the Cody Rouge Neighborhood

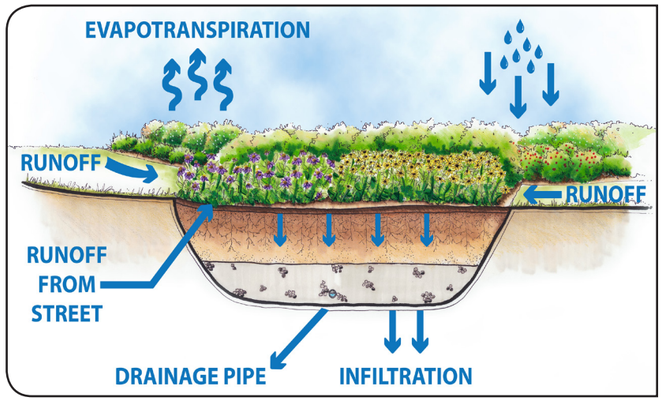
Removing Detroit's blighted structures can revitalize neighborhoods and provides a unique opportunity for local partners to design the cleared parcel using approaches that will generate environmental, social, and economic benefits.

Designs to build ecosystem services on demolished sites through green infrastructure practices can beautify a neighborhood while reducing the amount of storm water entering Detroit's combined sewer system. Replacing demolished structures with cover to promote storm water infiltration is an approach identified in the Detroit Water and Sewerage Department's (DWSD) approved Green Infrastructure Plan.

A transdisciplinary project funded by The University of Michigan Water Center with the support of the Erb Family Foundation developed design concepts to turn vacant property demolitions into bioretention gardens and assessed the gardens' socio-environmental performance. The research team coordinated with leaders in the Cody Rouge area and City of Detroit decision-makers. Discussions with the Detroit Land Bank Authority (DLBA), owners of the vacant lots, helped to ensure that the garden locations fit the DLBA's goals. Based on project concepts, DWSD developed detailed project designs in close coordination with the University of Michigan Water Center. DWSD is also funding and providing oversight of project construction.

## How Does a Bioretention Garden Work?

Each bioretention garden is a shallow depressed area designed to capture storm water allowing it to infiltrate into the ground slowly over a 24 to 48 hour period. The top layer is the garden of small shrubs and flowers planted in engineered soil surrounded by mown turf grass. The next layer is stone that provides large empty spaces to allow the storm water to infiltrate. A perforated pipe sits below the stone to capture storm water that doesn't infiltrate. During heavy rainfall, the bioretention garden may fill up and then overflow back into the street and into the sewer. The existing drainage system (pipes and catch basins) are not removed.




*Inside look at the structure and function of a bioretention garden*

## Bioretention Garden Locations

Four locations in the Cody Rouge neighborhood provide examples of ecosystem services design at work in Detroit. Each site occupies two adjacent lots owned by the DLBA, with bioretention gardens centered on the lots to allow for gentle side slopes to adjacent houses.


## From Vacant Structure to Bioretention Garden


*Rendering credit: U of M Water Center*

## Related Project Research

Project partners will assess the environmental performance and social benefits of the bioretention gardens in the Cody Rouge neighborhood.

### *Environmental Research*

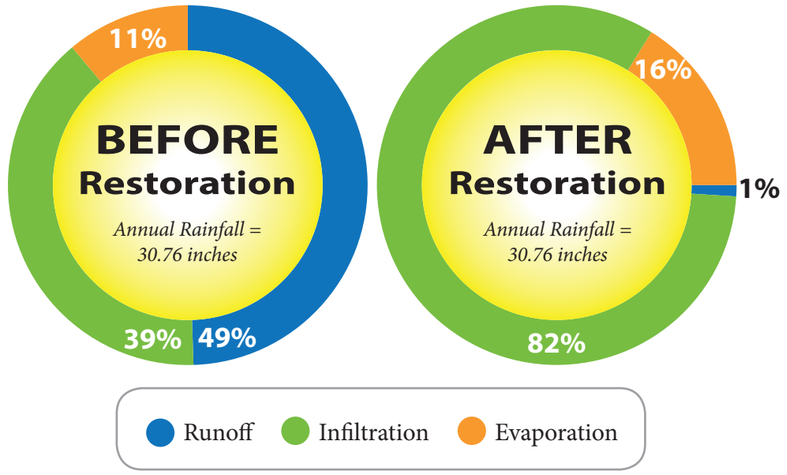
DWSD will assess the water quantity performance of the Cody Rouge bioretention gardens. Flow monitoring data will determine modifications to the parcel's hydrograph, reductions in the total volume of wastewater going to the wastewater treatment plant, reductions in the peak flow that contributes to CSOs, and the horizontal extent of the groundwater mounding to understand how close together future bioretention gardens can be built. In addition, the University of Michigan Water Center research team will monitor to determine the water quality effects of the bioretention gardens.

### *Social Research*

The University of Michigan Water Center, with support of the Erb Family Foundation, surveyed over 160 Cody Rouge residents to measure their acceptance of the bioretention garden designs and to anticipate how the gardens might support their well-being. The project team has also conducted interviews with relevant stakeholders, professionals, and decision makers in Detroit and Cleveland to understand what aspects of governance might support or impede the long-term success of the bioretention gardens.


*Informational signage located at each garden*

*University of Michigan Water Center research team members distributing information on the bioretention garden project to Cody Rouge community residents.*




*Expected environmental performance of bioretention gardens*

### The bioretention gardens are expected to...

- Completely retain the 90% and 2-year storm events.
- Manage approximately 90% of the 10-year event and approximately 50% of the 100-year event.
- Achieve an average annual storm water volume reduction of 0.3 million gallons per site, for a total of 1.2 million gallons.