

# New Housing Development Uses Conservation Design

## PROJECT DESCRIPTION

The Wenger Woods housing development uses rain gardens and paver driveways to reduce stormwater runoff while improving water quality in the 10-home development adjacent to Brookville High School. Runoff from these homes in western Montgomery County flows into a shared, constructed wetland and the city's storm sewer system, eventually draining to the Great Miami River.

## Project Details

McCoy Homes, Inc. is installing two types of Low Impact Development (LID) practices—rain gardens and pavers. These practices will allow rainwater to soak into the ground, slowing stormwater flows and filtering potential pollutants.

A rain garden, an attractive landscaping feature planted with flowering native shrubs and perennial native plants, is constructed at each new home site. The rain gardens are designed to maximize the characteristics of slopes and conditions of each individual lot so they can best absorb stormwater runoff.

The rain gardens consist of several layers, beginning with a 12- to 24-inch deep planting layer made up of organic topsoil and coarse sand. This layer is under laid with an open, graded gravel layer with a perforated pipe to handle larger volumes of water from bigger storm events.

These layers allow for small rainfalls up to one-half inch to be fully absorbed into the system. The water is cleaned of contaminants and then either infiltrated

into the surrounding soil or put back into the air through evapotranspiration processes.

Instead of traditional driveways, made of impervious materials such as concrete, McCoy Homes installed attractive pavers at each home. Rainwater flowing over concrete driveways and lawns brings with it pollutants, chemicals, fertilizers, sediment and oils, degrading the quality of water flowing into storm sewers.

Pavers permit rain water to be cleaned and absorbed by the ground underneath. Pavers also provide a very stable and long-lasting surface for vehicles. Paver driveways allow water to flow through the cracks between each paver very quickly so that no water ponds during a rainstorm, and ice doesn't form in the winter. The pavers are set with a space in between that is filled with an open graded fine gravel.

The pavers are laid on a structural gravel layer of clean #57s or one-half to three-quarter inch gravel that locks together to assist in supporting the pavers. This layer never becomes saturated with water.



The development is adjacent to Brookville High School's stormwater wetland.

Under this layer is a varying depth of #2 clean gravel. This gravel accepts the surface water, slows it, allows infiltration into the underlying soil, and channels the rest of the water into the neighboring rain garden.

## Benefits

Rain gardens and pavers reduce the amount of potential pollutants and impervious surface. They also reduce the volume of water from rooftops, lawns, driveways, and sidewalks that eventually flow into the Great Miami River. In addition, property values are potentially increased by using the attractive paver surfaces and the colorful and seasonally interesting planting beds that make up the rain gardens.

## Water Quality Results

As of the completion of this brochure, actual water quality monitoring at the site had not been completed. Early results, however, show reductions in runoff quantity and improvements in water quality. The monitoring is designed to collect nutrient and flow data as it drains from the stormwater into the wetland. Contact The Miami Conservancy District for final results for this project.

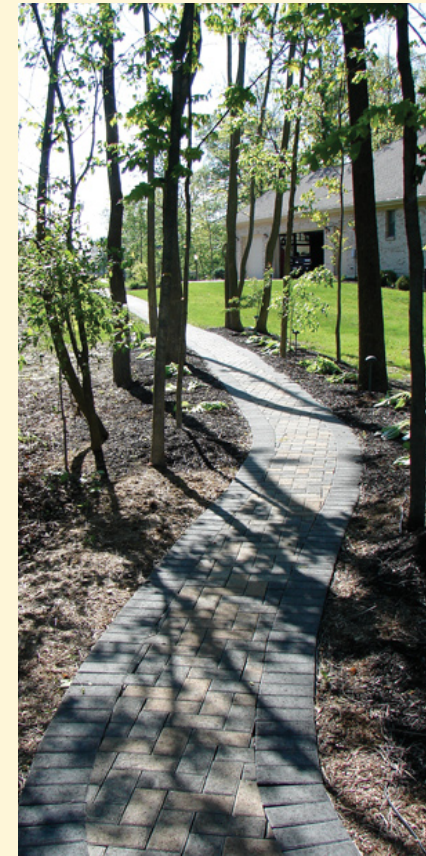
## Lessons Learned

The design and installation of this project went smoothly. By working with an experienced landscape architect, many problems with design and construction were avoided. However, a very dry year prevented the housing developer from planting the rain gardens the same season that the base was constructed.

## Costs

Traditional driveways at each home were estimated to cost \$5/square foot. The paver driveway system cost an additional \$3.50/square foot more than the traditional design. The homebuilder had originally planned to provide each new home with a \$5,000/per home landscaping allowance. The rain garden design and construction cost an additional \$4,000.00/per home more than the original allowance.

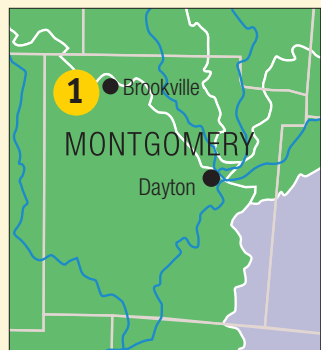
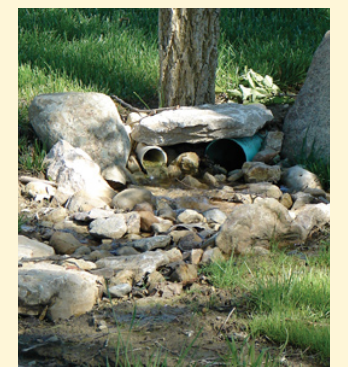
Installing these practices as a part of the original development, however, could have saved time and money. The developer wouldn't have had to install the traditional pipe and catch basin system and the size of the neighboring constructed wetland could have been reduced. To be fully cost-effective, these practices should be incorporated early into the development design. If they are added to traditional stormwater controls, there is less cost savings, but they still offer a high environmental benefit.



Above: In addition to sidewalks near the street, the development includes a paver walkway to allow residents easy access to the nearby middle/high school complex. Installing a paver brick pathway instead of a standard cement sidewalk allows rain water to seep into the soil.

Left: All sidewalk, driveway and apron surfaces are constructed of paver bricks which allow runoff water to be absorbed into the soil. As a result, there is less burden to the city's storm sewer system.

Below: All downspouts are routed underground to a rock-filled swale that leads to the rain garden located on each homeowner's property.



Above: Pervious paver bricks are used for the driveway as well as the driveway apron and pedestrian sidewalks.

Right: Each home has its own rain garden, like the one shown here. It is planted with native perennials, grasses and shrubs.

