

BIORETENTION CELLS **Brooklyn Heights, Cuyahoga County**

Date Completed: August, 2011

Description: A bioretention cell was created at the entrance to a Brooklyn Heights office park in what used to be a concrete median. In total, three bioretention cells were installed and intended to filter stormwater street runoff before it enters West Creek.



Project Size: 7,400 square feet of total drainage area.

*Below: Entrance to Brooklyn Heights Office Park
(photo: Gregory SJ Soltis)*





Bioretention Cells

Chagrin Valley Engineering, Ltd. Stormwater Controls Design Engineer

Michael Henry, P.E. – Project Manager

Bret Keller, P.E. – Assistant Design Engineer and Plan Preparation

This project was completed as part of an overall pavement rehabilitation project for Lancaster Drive, which serves as the main entryway into the Village's largest business park. The project utilized a process referred to as "white-topping", whereby original concrete pavement was left in place to serve as the base for a new 6-inch fiber-reinforced concrete street with curbs and gutters. Although the project did not require an Ohio EPA Construction General Permit, and consequently any post-construction stormwater controls, the Village recognized the opportunity to enhance aesthetics by replacing an existing concrete island with landscaping, while at the same time incorporating a unique way to purify stormwater runoff before it is discharged to West Creek.

The challenge of incorporating stormwater controls on the existing 7% grade was addressed by designing three tiered cells that perform independent of each other. Stormwater runoff generated by the street enters each cell through curb cuts, where it then infiltrates through the soil media before discharging through a common underdrain system. These practices were selected based on their proven performance to successfully trap and/or treat the myriad of pollutants typical of street runoff, including but not limited to hydrocarbons, heavy metals, chlorides and suspended solids.

The three bioretention cells are designed to meet standards contained within the State of Ohio's *Rainwater & Land Development Manual*. The primary design features include a 6-inch ponding depth, a layer of double-shredded hardwood mulch, a 30-inch layer of soil media, placement of woven geotextile along the four sides of each cell along with a layer of non-woven geotextile on the bottom of each cell, and 4-inch perforated underdrains centered within a 10-inch layer of #57 gravel. Approximately 7,400 square feet of total drainage area is conveyed to the combined 200 square feet of effective treatment surface area, resulting in the treatment of a water quality volume (WQv) calculated to be 370 cubic feet. Each cell is designed to allow the WQv to infiltrate through the soil profile in a maximum of 40 hours. Native plant species were selected based on deer resistance, salt tolerance, nutrient absorption, deep root penetration, low maintenance requirements and general aesthetic appeal.

The portion of the total project cost was \$16,200. Partial funding for this project was provided by the Northeast Ohio Regional Sewer District (NEORS) in the amount of \$5,000. The long term maintenance will be approximately \$300 per year for removing excess plant growth, top-dressing with fresh mulch and occasional plant replacement.

Client:

Village of Brooklyn Heights

Client Contact:

Mayor Mike Procuk
345 Tuxedo Avenue
Brooklyn Heights, OH 44131

Location:

Brooklyn Heights, Ohio

Approximate Project Budget:

\$16,200

Start Date:

June, 2011

Completion Date:

August, 2011

Developer/Client/Owner:

Village of Brooklyn Heights

www.brooklynhts.org

Designer/Consultant:

Chagrin Valley Engineering, Ltd.

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Key Features:

The project was placed on a 7% slope, which required the 3 individual bioretention cells to be terraced. Underdrains were connected through a common collector drain. Plants were selected for salt tolerance and deer resistance.

Lessons Learned:

Make it clear to the contractor how and when the BMP is to be constructed in the relation to the larger project (road reconstruction in this case). A specific matter of importance was the need to ensure runoff flowing along the curb actually entered the BMP via each curb cut.

Project Cost: \$16,200

Maintenance Cost: \$300 per year for removing excess plant growth, top-dressing with fresh mulch and occasional plant replacement

Funding Sources / Incentives: Partial funding was provided by the Northeast Ohio Regional Sewer District: \$5,000

Applicable Zoning Regulations: None

Exiting Brooklyn Heights Office Park
(photo: Gregory SJ Soltis)