

2011 LILY LAKE BIORETENTION

Project Summary

The Washington Conservation District (WCD) completed the Lily Lake sub-watershed stormwater retrofit assessment for the Middle St. Croix Water Management Organization (MSCWMO) that identified cost-effective stormwater BMPs. As a result of the assessment, 15 bioretention cells were installed at residential properties within catchments Lily-02 and Lily-03 that drain to Lily Lake through the storm sewer system. The bioretention cells will reduce the degradation of Lily Lake by infiltrating stormwater runoff.

Project promotion, design, and construction oversight were conducted by WCD with additional design funding from the Metro Conservation District's (MCD) Non-Point Engineering Assistance Program (NPEAP), and installation funding from the MSCWMO BMP Program and the Clean Water Fund (CWF) from the Clean Water, Land and Legacy Amendment. Long-term maintenance will be conducted by the landowners under an agreement with MSCWMO.



Project Specifications

Bioretention Cells Installed..... 15
Date Installed..... November 2011
Total Bioretention Area..... 3,100 ft²
Total Capacity 2,368 ft³
Watershed Treated 8.6 acres

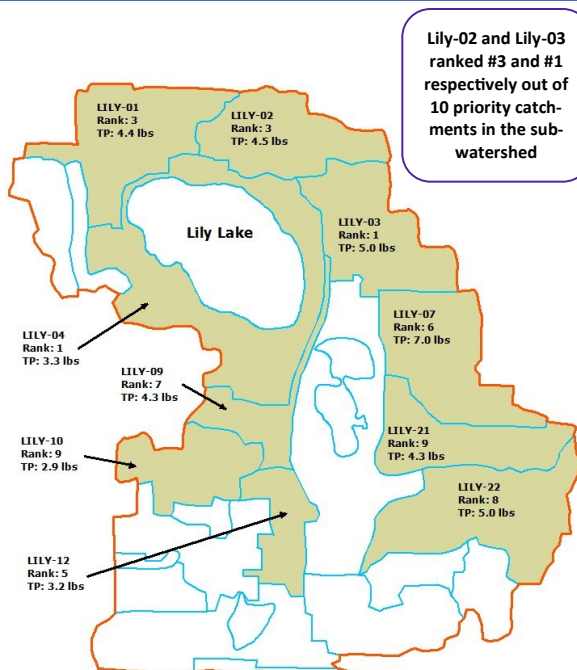
Installation Funding

MSCWMO..... \$5,180.00
CWF (MSCWMO)..... \$43,500.00
CWF (MCD) \$10,000.00
Total Project Cost \$58,680.00

Other Funding

Design.....\$11,100
Construction Oversight\$2,000
Promotion/Administration\$1,500
Ongoing Maintenance.....\$1,500/yr

Lily Lake Priority Catchments



Within the subwatershed assessment, catchments Lily-02 and Lily-03 were identified for several retrofit projects intended to:

- Decrease stormwater volume
- Decrease pollutant loads (TP, TSS)

The catchments consist of residential development with a high percentage of impervious cover. The table below highlights important characteristics of the catchment as well as WinSLAMM model outputs of total phosphorus (TP), total suspended solids (TSS), and volume contributions prior to bioretention cell installation.

Acres	63.4
Dominant Land Cover	Residential
Parcels	242
TP (lbs/yr)	94.9
TSS (lbs/yr)	29,851
Volume (acre-feet/yr)	81.0

Installation

Detailed analysis of the catchments resulted in the identification of high priority locations for bioretention placement. These locations were identified to maximize the effectiveness of the installed cells by ensuring close proximity to existing catch basins and large drainage areas. 15 curb-cut bioretention cells were installed in 2011 in conjunction with a City of Stillwater roadway reconstruction project. The figure to the right shows an overview of the catchments and the bioretention cell locations. The contributing drainage areas includes roadway, lawn, driveway, and roof.



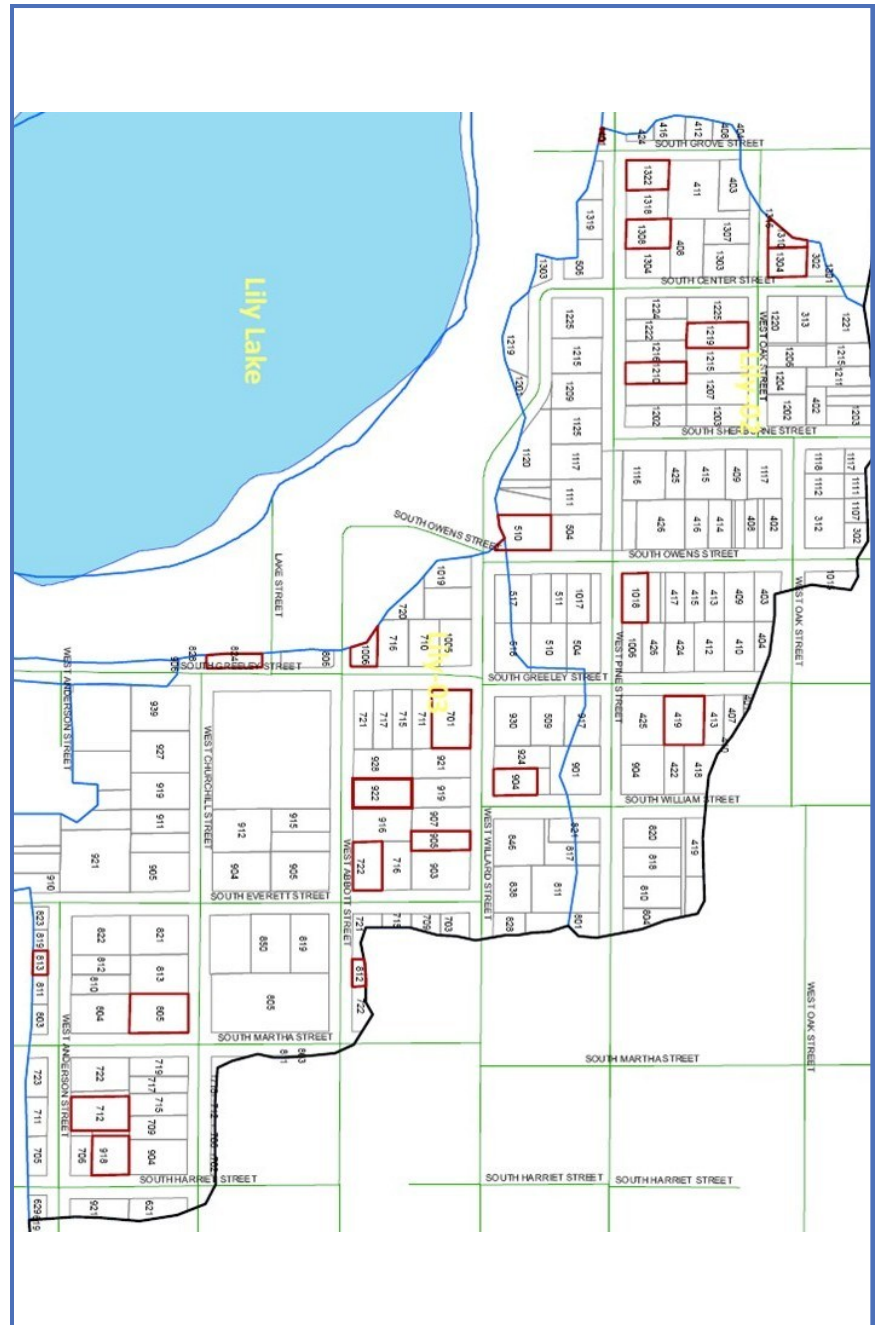
Bioretention cell installed, curb cut not yet constructed.

Bioretention cell installed, curb cut not yet constructed.

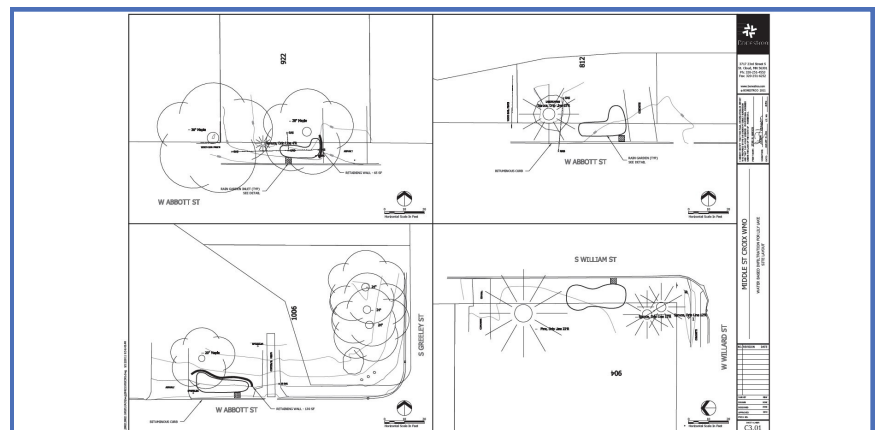


Bioretention cell installed, curb cut not yet constructed.

Rock at curb cut inlet has captured some sediment and debris; this material should be removed to maintain maximum function.



Project locations within catchments Lily-02 and Lily-03



Example site designs from engineering plan, developed by Bonestroo using NPEAP funding. WCD staff also created color-rendered planting plans using these base designs.

Modeled Pollutant Reductions

WinSLAMM modeling was used to estimate reductions in water volume, total suspended solids (TSS), and total phosphorus (TP) following bioretention cell installation. The table to the right highlights these reductions for the combined drainage areas within Lily-02 and Lily-03 in which a bioretention cells were installed. Water quality benefits to receiving water bodies associated with these reductions include:

- Groundwater recharge
- Increased water clarity
- Decreased pollutant loading
- Decreased nutrient loading

Cost/Benefit Analysis	Volume Reduction	TSS Reduction	TP Reduction
Annual Project Total	158,335 ft³	5,617 lbs	12.9 lbs
30 Yr Project Total	4,750,050 ft³	168,510 lbs	387.0 lbs
Benefit / \$100 Spent* (over 30 years)	4,016 ft³	142 lbs	0.33 lbs
30 Yr Cost* / Unit	\$1,084.68/acre-ft	\$0.70/lb	\$305.63/lb

* Includes install., design, oversight, administration, and 30 year maintenance cost

Site Monitoring/Post-Project

Post-project monitoring verified acceptable vegetation establishment and proper pretreatment function following storm events. Monitoring will continue to ensure proper long-term functionality and vegetation quality.



Completed bioretention cell with inlet pretreatment box to prevent debris and sediment entry into the bioretention cell.