



# Lake Waubesa, Wisconsin

Residential Shoreline Seawall Replacement • Stormwater Management

McFarland, Wisconsin; Summer 2007

## ***Project background***

In early August, 2007, a homeowner on Lake Waubesa near Madison, Wisconsin contacted Agrecol Corporation about their Envirolok Vegetated Retaining Wall System. The homeowner wanted to replace a failing lake wall with an environmentally-friendly shoreline. The old wall was built with creosote railroad ties.

## ***Identifying problems***

During the initial site visit, it was determined that the site also presented several stormwater management challenges:

- A stormwater discharge pipe in the backyard, which collects stormwater from the upper end of the property, was undirected, causing erosion in the backyard and resulting in pockets of standing water.
- The impervious runoff came from these sources: the roof of the house, half of the run-off from the neighbors roof, the patio, the surrounding city streets, and the turf areas of the lawn.

In late August of 2007, near record rain caused flash floods, mudslides and high water all over the Midwest. The seawall failed completely, breaking apart and drifting into the lake. The water on Lake Waubesa was so high that the county suspended all recreational activities on the lake.



*Existing railroad-tie wall*



*Stormwater pipe*

## Building the Envirolok Wall

Because of the high water, most of the construction had to take place below water, though still short of the ordinary high water mark. A sixty-five foot by three foot sand/soil bag wall was constructed, and three feet of the wall was embedded below the waterline

A floating turbidity barrier was installed to protect the lake during the removal of the old railroad tie wall; it prevents sediment and phosphorous into the lake during construction.



*Turbidity barrier*



*Turbidity barrier*



*Removing the old wall*

The bottom of the lake was excavated to a depth of 6 inches to allow for embedment and the bank was excavated to a 4:1 slope to facilitate the install. This work was done with a rubber tracked mini-excavator.

During this excavation, three previously unknown springs were discovered, and while this didn't change the engineering of the project, it did reinforce the need for a drain tile with sock at the inside base of the system to eliminate internal hydraulic pressure.

The embedded foundation course of the retaining wall, complete with bag stabilizing material, was laid perpendicular to the bank in the excavated area of the lake bed.

The second and third courses were laid parallel to the shoreline using cinching, twining and spiking to create

the strongest structure possible. The drain tile with sock was installed behind the third course to alleviate hydrologic pressure that may have been present behind the wall. The drain tile was back-filled with free draining sand.

The subsequent courses were laid using the cinching, twining and spiking methods, and as with all of the courses, the bags were tamped.

Approximately six-hundred native wetland plants were planted along the new wall.

During the construction of each course, live plants were installed between the bags. The wall below the waterline was vegetated with emergent zone native plants. As the wall progressed upwards out of the water, they changed to mesic plants.



*Building the wall*



*Planting the courses*

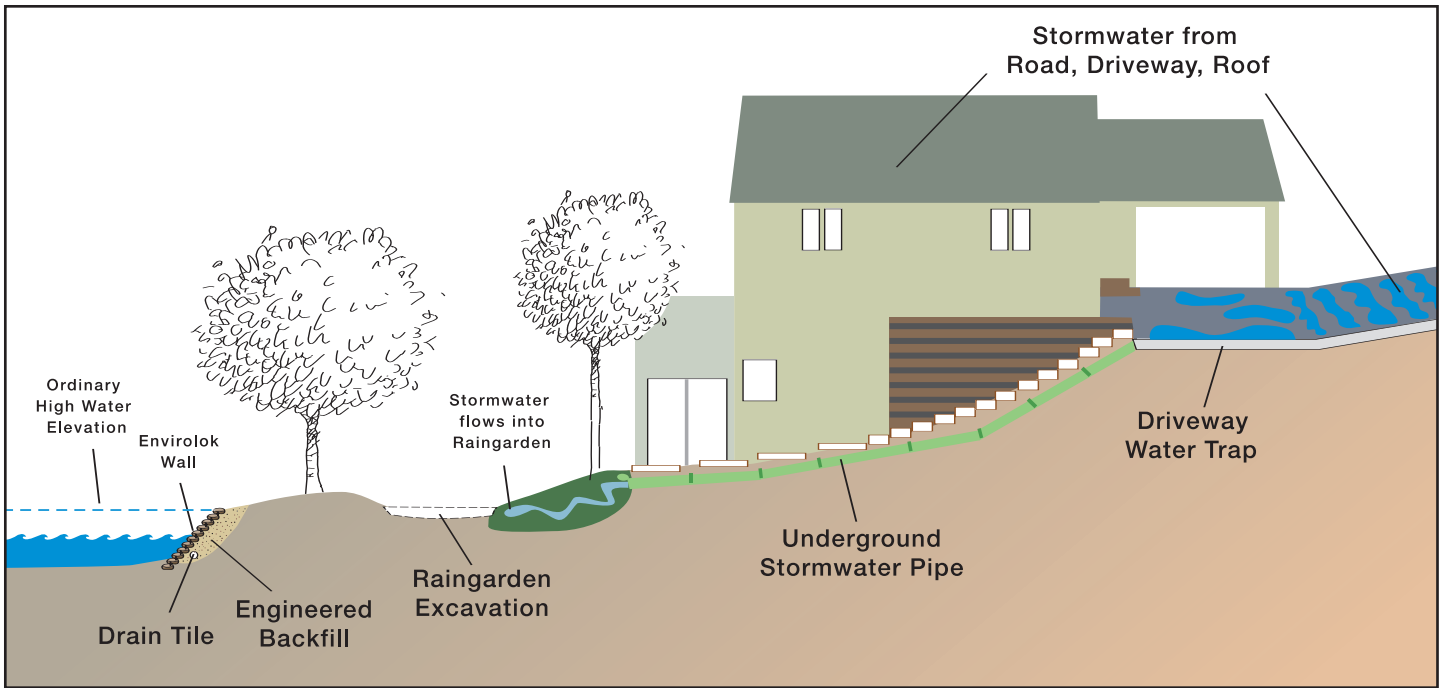


*Completed wall*

# Lake Waubesa - Living Shoreline

Shoreline Seawall Replacement • McFarland, Wisconsin; Summer 2007

## Stormwater Management

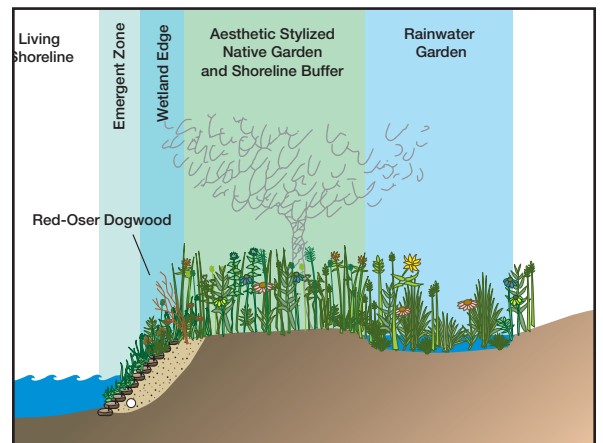


## Rainwater Garden and Shoreline Buffer Zone

A Rainwater Garden and Shoreline Buffer Zone was constructed downslope from the stormwater discharge pipe. A 1,000 square foot garden was planted and approximately 1,800 native plants were planted.

The rainwater garden and native buffer will capture this water and allow it to collect and filter to groundwater, before it enters the lake.

The plants were installed according to Zones. Those plants that are more suited to a wet environment were placed at the bottom of the slope, graduating to mesic species at the rise of the slope.



Planting the rainwater garden



Planting the rainwater garden



Two weeks after planting

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Before



After

## Permits

### Permits from State of Wisconsin DNR:

Waterway General Permit and Application (Form 3500-108)  
(Check Box: "Seawall Replacement")

State / Federal Application for Water Regulatory  
Permits and Approvals (Form 3500-053)

APPLICATION FOR WETLAND WATER  
QUALITY CERTIFICATION

Department of Natural Resources (Form 3500-53N)

## Distributor



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**NOTE:** Do not burn native vegetation growing on the Envirolok system. The bag fabric is flammable. When fully vegetated, bags retain their integrity up to 200 years, depending on conditions.

**NOTE:** Advice from an engineer is recommended when building walls more than 4' in height, or when site conditions include unusual erosion or weak soil conditions.



[www.agrecol.com](http://www.agrecol.com)

Go to [agrecol.com](http://agrecol.com) for more information, specifications, standard detail drawings, photos and installation guides.

Envirolok™ is a registered trademark of Agrecol Corporation.

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