



# Green Infrastructure & Stormwater Management CASE STUDY

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## UW Arboretum Secret Pond & Channel Restoration

**Location:** Madison, WI

**Client:** State of Wisconsin, University of Wisconsin-Madison

**Design Firm(s):** Strand Associates

**Landscape architect/Project contact:** Gary A. Brown, FASLA

**Email:** [gbrown@fpm.wisc.edu](mailto:gbrown@fpm.wisc.edu)

**ASLA Chapter:** Wisconsin

### Project Specifications

**Project Description:** The project will construct a stormwater treatment pond that is connected to an unnamed tributary to Lake Wingra. An existing stormwater pond (Secret Pond) built in the 1980's is approximately 350 feet downstream from the proposed pond. The proposed design includes removal of the existing energy dissipation structure; construction of the connected stormwater pond; reshaping, armoring and planting the existing waterway channel from Manitou Way to Secret Pond; and sediment removal and re-vegetation of the existing Secret Pond. The project will provide stormwater quality treatment for the 1,674-acre watershed that enters Lake Wingra from the Odana Ponds, Manitou Way and Nakoma portions of the watershed prior to its discharge to Lake Wingra and its adjacent wetland complex. Secret Pond currently receives 513 acre feet of stormwater annually with pulses of over 300 cubic feet per second of stormwater during large rainfall events. Annual runoff into Lake Wingra from these sub-watersheds comprises approximately 40 percent of the total stormwater runoff into the lake. This amount of water has widened and down cut the constructed waterway that leads to the existing Secret Pond. Construction of this facility will protect fragile wetland landscapes and protect Lake Wingra from urban sedimentation build up.

### Project Type:

Institutional/education

A retrofit of an existing property

**Design features:** Bioretention facility and bioswale.

**This project was designed to meet the following specific requirements or mandates:**

State statute, local ordinance, developer/client preference, project helps city of Madison meet WisDNR required TSS removal rates.

**Impervious area managed:** greater than 5 acres

**Amount of existing green space/open space conserved or preserved for managing stormwater on site:** greater than 5 acres

**The regulatory environment and regulator was** supportive of the project.

**Did the client request that other factors be considered, such as energy savings, usable green space, or property value enhancements?** UW Arboretum staff asked that we design in research capabilities to measure the effectiveness of various native plant restoration solutions in a variety of stormwater facility areas (ie. within the bioswale at various moisture regimes, along the edges of the bioretention facility, etc.)

## Cost & Jobs Analysis

**Estimated Cost of Stormwater Project:** \$1,000,000-\$5,000,000 (Public funding: State, local - local funds provided by City of Madison as a percentage match)

### Related Information:

- Construction cost: \$ 915,900
- AE design fees: \$ 105,000
- Other fees: \$ 42,100
- Contingencies: \$ 137,000
- Total Project cost: \$1,200,000

**Was a green vs. grey cost analysis performed?** Yes, conventional stormwater piping was one of the many alternatives reviewed during project design but based on stormwater volume and the need to improve water quality flowing into the lake system, the proposed solution was defined as most appropriate. More costly and less effective ecological solutions (in stream vegetated swales) were also evaluated but deemed unacceptable due to need for improving sediment capture and TSS removal.

### Cost impact of conserving green/open space to the overall costs of the site

**design/development project:** Conserving and preserving greenspace upstream as well as downstream of the stormwater facility helped minimize costs and provide for a solution that best meets the needs of all involved.

**Cost impact of conserving green/open space for stormwater management over traditional site design/site development approaches (grey infrastructure)?** Slightly reduced costs (1-9% savings).

**Number of jobs created:** unknown at this time

**Job hours devoted to project:**

Planning and Design: 1500 hours (estimated)

Construction: unknown, project will be constructed in 2011/2012

Annual Maintenance: unknown at this time

## Performance Measures

**Stormwater reduction performance analysis:**

Secret Pond currently receives 513 acre feet of storm water annually with pulses of over 300 cubic feet per second of stormwater during large rainfall events. Annual runoff into Lake Wingra from these sub-watersheds comprises approximately 40 percent of the total stormwater runoff into the lake. This amount of water has widened and down cut the constructed waterway that leads to the existing Secret Pond. The waterway and Secret Pond will be vegetated with native wetland species and Secret Pond will be allowed to revert back to wetland. The new pond will capture 52 percent of the 78 tons/year of total suspended solids (TSS) currently discharging from the storm sewer outfall. The new pond will reduce the peak discharge into the waterway and ultimately into Lake Wingra for the 1-year through the 25-year storm events.

**Community & economic benefits that have resulted from the project:** The project will provide flood protection for nearby and upstream residences. The project will provide a demonstration facility on how to handle large volumes of urban stormwater runoff while protecting a natural area, Lake Wingra and the downstream regional lake system.