BACKGROUND

Wetlands function as natural filters for impaired water absorbing sediment, nutrients, and other pollutants as water passes through. Constructed wetlands are manmade structures designed to provide ecological functions comparable to natural wetlands, with the purpose of treating contaminated stormwater and wastewater.

For a water body to be considered a wetland, it must meet specified criteria. First, the area must be dominated by flora that only grow in wetland environments are used as indicators. Second, wetland areas must have long or permanent periods of soil saturation. More precisely, the surface of the soil must be saturated for a week or more during the growing season. Wetland areas can be identified using USGS topographic maps, the National Wetland Inventory, or the USDA Soil Conservation Service Soil Surveys and Hydric Soils List. When using these online sources to identify wetlands, an onsite evaluation of the area is also necessary to identify more accurate boundaries and characteristics.

SITE LOCATION

The Garden of Memory is located on the Auburn University campus in Auburn, Alabama. It can be found at the southwest corner of the intersection of Mell Street and Samford Avenue.

PROBLEM STATEMENT

The Auburn University Garden of Memory is no longer the appealing location for recreation and reflection that it once was. Here are some of the problems:

- Turbid, discolored water in the pond and stream
- Excessive algal growth, leaf litter accumulation in lower pond
- Poorly drained, saturated soil in the lawn surrounding the pond
- The university has decided to restore the garden to a state that will encourage its use by students and the public.
- Minimize of water turbidity
- Enhance aesthetic appeal of water features
- Alleivate lawn soil saturation

Acknowledgements

Thanks to: Dr. David M. Biersch – Advisor; Also Benjamin Burmester, Dr. Eve Brandley, and Dr. Christian Anderson

OBJECTIVES

- Clean up water and beautify surroundings
  - Design wetland in lower pond, populated with attractive, indigenous plant life
  - Wetland must be capable of treating nutrient load from leaf litter, lawn fertilizer application, and nearby parking lot runoff
- Maintain the ADEM fish and wildlife freshwater pond water quality standards (Admin. Code r. 335-6-10-09 (5)) currently met:
  - Phosphorous: < 1 ppm
  - Dissolved oxygen: > 5 ppm
  - Turbidity: < 100 NTU
  - pH: 6.0-8.5
- Restore functionality of lawn surrounding the pond
- Prevent soil saturation with enhanced drainage
- Lawn Saturation Remediation
  - Cover lawn with nonwoven geotextile, which allows for aquifer recharge
  - Fill with 8” of HST stone, with 4:1 slope to pond bank
  - Roll out EZ Roll Grass pavers and fill with sandy loam soil: can support $2,600 lb/ft^2
  - Install sod on top of pavers; roots will anchor sod and pavers to stone substrate

MAINTENANCE PLAN

- Sediment and organic matter removal
- Plant inspections
- Invasive plant removal
- Water-quality testing
- Maintenance History

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- Maintenance records should be kept in a single location through the life of the practice
- Professionals should note, implementation, bank stability, sediment accumulation, plant distribution, and wildlife presence.

CONSTRUCTED WETLAND DESIGN

- Recirculation System
  - A Little Giant 10ENH pump will be installed in the last settling pool, returning water to the pond at 25-30 gpm
  - Water will exit pipe via a rock waterfall, adding aesthetic value and preventing scouring of the bank
  - Recirculation increases water velocity through pond and wetland, reducing stagnation and litter build-up
  - Creates multiple passes through system, increasing effective hydraulic residence time
- Turbidity Reduction
  - Upper and lower ponds will be dredged with a hydraulic pumping system to prevent damage to lawn and existing wetland
  - Wetland Design
    - Three large settling pools, each 3 feet deep, connected by a sinusoidal 1 foot deep channel
    - Two small settling pools at storm drain outlets
    - Zones along sinusoidal channel will be filled with gravel, sand and soil to create shallow areas with 3 to 6 inches of water depth
    - A weir will be installed at the end of the wetland area to raise the water surface by 6 inches

PLANT SELECTION

- American Waterlily
- Pickerelweed
- Mistflower

The vegetation provides oxygen to bacteria in the root zone, as well as promoting sedimentation and nutrient uptake. The planting specifications have been designed to ensure that the total nutrient uptake capacity will meet or exceed potential nutrient loading.

COST ESTIMATE

- Grass power roll
- HST stone
- Soil
- Grass sod
- Pump
- PVC
- Additional labor estimated at 100% of material cost
- Equipment

Total: $92,234

SUMMARY

Restoring the former grandeur of the Garden of Memory will be accomplished in three stages without exceeding the $100,000 budget. Increasing the lawn elevation will alleviate soil saturation. Dredging the muck from the upper and lower ponds to eliminate the nutrient source for excess algal growth and constructing a recirculating wetland will minimize stagnation and turbidity. Planting the wetland with a variety of native flora will process nutrient influx from the watershed.