

## **Storm Water Management Projects At University Of Michigan-Ann Arbor**

### **Bioretention: State Street Commuter Lot**

For the State Street Lot, the expense for the bio-retention areas was approximately \$1,500 and the cost of the infiltration swale and detention area along the drive was \$5,000. This was a small part of the overall cost of the project.

### **Underground Storm Water Detention: Elbel Field Parking Lot**

The cost of this system was about \$10 per cubic foot of storage because the underground storm water detention system material was pre-purchased for a tax exempt rate. In the market, it goes up to \$12 per cubic foot installed. The overall detention system cost was about \$37,500 for Elbel field. The total cost of this project was about 1.5 times the cost of a similar project without a detention system. Information on the system is available at <http://www.invisiblestructures.com/index.html#DC2GO>.

### **Manufactured Treatment: Mitchell Field Parking Lot**

For the Mitchell field lot, the vortex separator is Vortechtechnics Model 9000 and the cost was \$36,000. Vortechtechnics web site is [www.vortechtechnics.com](http://www.vortechtechnics.com)

### **Porous Pavement: W-16 Parking Lot (Madison, Packard, & Thompson)**

The cost of the project was under \$80,000 for 1,533 square yards. This included construction fence/traffic control, removing existing inlet, 2x2 concrete inlet w/ frame and covers, removing existing asphalt, excavating and removing soil/subgrade preparation, furnishing and installing geotextile fabric, inlet protection, 8-in diameter perforated HDPE, AASHTO No. 3 Course Aggregate, 1-inch choker course, furnishing and installing pervious asphalt, curb removal and replacement, bituminous waterstop, 6" sleeves, and parking lot striping.

The unit price for porous paving was \$40.26 per square yard - this was bid for fall work so the price may be slightly higher than spring or summer work. On previous parking lots with conventional asphalt and no detention, the unit price ranged from \$23-27 per square yard.

The maintenance protocol for the porous pavement is available.

### **Storm Water Detention Basin: Palmer Drive/Life Sciences Institute.**

This 1,000,000 gallon detention basin is constructed under a parking structure and handles storm water flow from the Palmer Drive area as well as some flow from south of the area that was rerouted to help alleviate flooding issues. The basin acts as a settling tank for silt and other debris. A pump introduces the detained storm water into the storm line after the storm event has subsided. The cost of the project was \$2.9 million. Pictures of the construction are available at <http://www.plantext.bf.umich.edu/plantext/projects/palmer/Park/photos.html>.

*Storm Water Management System and Constructed Wetland: North Campus.* This recently completed storm water management system is located next to the Art & Architecture Building on Bonisteel. The system has a storage volume of 11 acre-feet and controls runoff from approximately 91 acres of North Campus. The system allows for both detention and retention/infiltration. The system is composed of four cells: an energy dissipation and sedimentation basin, a floodplain cell, a wetland cell, and a discharge channel for any flow that is not retained in the system. The cost of the project was \$2.3 million.

**For More Information About These Projects**

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Storm Water Website Address: <http://www.oseh.umich.edu/stormwater/>  
This website includes information on a variety of non-structural BMPs on campus, including the winter deicing program which has resulted in a 42% reduction in salt use.