



UNI-GROUP U.S.A.

Morton Arboretum

PROJECT:

Morton Arboretum
DuPage County, Illinois

ENGINEERING:

Christopher B. Burke
Engineering West, Ltd.
St. Charles, Illinois

CONSTRUCTION MANAGER:

Hanscomb, Faithful & Gould
Chicago, Illinois

GENERAL CONTRACTOR:

V3 Construction Corporation
Woodridge, Illinois

LANDSCAPE ARCHITECT:

Conservation Design Forum
Elmhurst, Illinois

PAVER CONTRACTOR:

LPS Pavement Company
Oswego, Illinois

CONCRETE PAVER MANUFACTURER:

Unilock Chicago
Aurora, Illinois

PAVERS:

Ecoloc®
3 1/8 in. (80mm)
Color Blend - 173,000 sq ft
UNI-Anchorlock®
3 1/8 in. (80mm)
Color Blend - 32,000 sq ft

Case Study



Over 173,000 square feet of Ecoloc® permeable interlocking concrete pavers were used in the Morton Arboretum's 500-car parking lot

The Morton Arboretum, located in DuPage County, IL, decided in the late 1990s to undertake a large-scale redevelopment of their 1700-acre outdoor museum. Established in the 1920s, the Arboretum has a proud history of preserving and enhancing the environment. It has primarily served as a research facility, however, the board of directors wished to increase visitation and undertook development of a large-scale, 20-year master plan that would include a new visitor center and gardens and a new, much larger parking area.

Since the facility had received a grant from the Illinois Environmental Protection Agency's (IEPA) Clean Lakes Program for a complete renovation of Meadow Lake, which lies adjacent to the visitor center and parking lot, an impervious asphalt lot was deemed inappropriate for the "low impact" design parameters of the project. An asphalt lot would produce significant concentrations of pollutants in the stormwater runoff and increase thermal loads in the lake, thereby degrading water quality and negatively impacting bio-diversity of the ecosystem.

To solve this problem, the designers for the project, Andrew J. Sikich, P.E. and Patrick D. Kelsey, CPSSc/SC of Christopher Burke Engineering West, Ltd., in St. Charles, IL, decided to construct a "green" parking lot that would incorporate a number of best management practices (BMPs) that would filter and infiltrate

stormwater prior to entering the lake, and eventually, the east branch of the DuPage River.

To facilitate construction of the parking lot, the Arboretum applied for and received an IEPA 319 Grant to construct BMPs within the parking area. The matching 60/40 grant would give the Arboretum up to \$1.2 million for the design and construction of the parking lot. The designers then had to consider the different BMPs available and decide which were most suitable for the project.

Project goals included a reduction in overall stormwater runoff and improvement in downstream water quality. Sikich and Kelsey wanted to design a parking lot that would have the exact opposite result of a traditional, non-pervious asphalt lot, which would increase stormwater runoff and pollutants that would degrade downstream water quality.



Permeable Ecoloc® and traditional UNI-Anchorlock® pavers were used for the project

After extensive research and site analysis, the designers chose Ecoloc® permeable interlocking concrete pavers and bio-swales for the parking area. In addition, a downstream created wetland was included in the project design. The EPA encourages the use of multiple BMP practices on a site to meet minimum management objectives. The bio-swales were ideally suited for the long, linear medians in the parking lot and would provide additional infiltration of stormwater using plants and permeable soil to filter pollutants.

The designers worked closely with UNI® manufacturer Unilock Chicago of Aurora, IL, on the pavement design. It was determined early in the design process that the pavement would need to be heavy duty. The designers felt that the Ecoloc® paver system would be the best choice over the long-term, due to its lower life-cycle cost and long-term durability, as well as environmentally beneficial infiltration capabilities.



The design included drains to remove excess water generated from extreme rain events

During initial analysis, it was found that 3-4 feet of unsuitable soils from the construction of Illinois Route 53 over 50 years ago had been deposited over the in-situ clayey sands and gravels at the site. The design team determined that once the unsuitable fill was removed, the existing site soils would be permeable enough to infiltrate significant amounts of stormwater.

The designers used Lockpave® Pro structural design software to calculate the pavement section. The pavement design includes a 12 in. (300mm) subbase of Illinois DOT CA-1 (63 to 25mm) crushed stone, a 6 in. (150mm) base of Illinois DOT CA-7 (25 to 5mm) crushed stone, a 1 1/2 in. (40mm) Illinois DOT CA-16 (Class A - 10 to 1mm) crushed stone bedding layer, and the Ecoloc® pavers.

The pavers were produced in a custom color, and the Arboretum chose a crushed granite for the void and joint fill material that matched the paver color. Over 173,000 square feet of Ecoloc® permeable interlocking concrete pavers, as well as 32,000 square feet of UNI-Anchorlock® solid interlocking concrete pavers were mechanically installed by LPS Pavement Company of Oswego, IL.

The collaborative design effort between the Morton Arboretum, engineers, landscape architects, regulators, contractors, and suppliers resulted in an end product that is not only beneficial for the environment, but also highly functional for its owner. After construction was completed, Unilock



Winter snow-plowing presented no problem for the facility

Chicago, Christopher Burke Engineering and the Arboretum decided to initiate a 2-year research study on the effectiveness of the BMPs utilized in the project. Plans call for monitoring the reduction in stormwater runoff entering the downstream receiving system and tracking of water quality improvements.

References:

The Morton Arboretum's Green Parking Lot, Andrew J. Sikich, P.E. and Patrick D. Kelsey, CPSSC/SC, StormCon Conference Proceedings, 2005

Note: Permeable interlocking concrete pavement systems are dependent on project design objectives, design storm requirements, available construction materials, existing soils, and local environmental conditions. For information on formulating design procedures and specifications, please contact your local UNI® Manufacturer. A qualified engineer or other design professional should be consulted for applications utilizing Ecoloc® or UNI Eco-Stone®.

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