Enforcing Soil in Place

Top photo: Composite turf reinforcement matting installation. Bottom photo: Erodible onsite loess soils.

Steep, long slopes and erosive loess soils do not add up to ideal conditions for post-construction erosion and sediment control measures. These exact harsh conditions were encountered and mastered at a construction site located in Sioux City, IA. Proper planning, design, and product selection coupled to produce an impressive erosion control and revegetation project.

Task at Hand

Cut slopes were created following the construction of a store and parking lot at the site. The slopes were approximately 300 ft long. A majority of the slopes were created at a slope of 2H:1V, but some sections were steeper. Successful erosion control and revegetation was vital to protect the store and parking lot located at the toe of the slope. A diverse project team was formulated to tackle the challenging task at hand.

Project Team

Jered Morris, Olsson and Associates out of Lincoln, NE, was assigned as project engineer to design an erosion and sediment control plan for the site. Colorado Structures, Colorado Springs, CO, was the primary contractor on the project and K & L Construction, Bluff, IA, was sub-contracted to handle excavating activities. The team came from different locations, but all members shared the same common goal of successful erosion control and revegetation.

First Things First

Phase II of the National Pollution Discharge Elimination System (NPDES) requires sites of one acre or more in size to follow the proper permitting process. Before any land was disturbed, a Storm Water Pollution Prevention Plan (SWPPP) was created for the site. The plan detailed how to successfully control soil erosion and storm water runoff by outlining where the cut slopes would be located and how they would be protected from soil erosion.

Executing the Plan

The project team was ready to execute the plan after the appropriate permits were obtained and approved. Excavation and stabilization of the cut slopes began in fall 2002. The long length of the slopes was a concern early in the planning stages. To address the issue, Morris decided to break up the length of the slope with benches. Three paved and guttered benches were constructed on the hillside perpendicular to the slope to collect and redirect anticipated storm water runoff. A fourth gutter system was constructed across the toe of the slope to collect and redirect runoff before it was able to reach the parking lot.

Value Engineering

The next step in the plan called for erosion control measures to protect the slopes. Initially, the project was designed with a composite turf reinforcement mat (TRM) that combines a long-term biodegradable matrix with permanent components. Morris decided to utilize a different product after speaking with representatives from American Excelsior Company (AEC). John Merthan, Territory Manager, and Tony Johnson, National Research Director, put their heads together and assessed the project

conditions. The AEC team recommended Curlex® Enforcer® QuickGrass® for the site. The product is a composite TRM, which contains dyed-green excelsior wood fibers and heavy duty, UV-stabilized polypropylene netting in a blanket-like configuration that provides surface cover to reduce erosion and hasten vegetation establishment. It was selected for the project based on the following four facts: 1.) Anticipated hydraulic forces would not require the performance level of the original product specified. 2.) Wood fiber biodegradable component enhances vegetation establishment better than long-term biodegradable matrices. 3.) Cost of erosion control materials would be reduced, while obtaining equal or better results. 4.) Green color of the product provides a finished look until vegetation becomes established. In addition, the project team liked the fact that the product provides permanent reinforcement to the vegetation.

Installation of Erosion Control Products

Before the erosion control products were installed, six inches of topsoil material were spread across the graded slopes to help combat the highly erosive native loess soils. All disturbed land was seeded with native grasses and wildflowers. Oats were also included in the seed mixture to provide a quick cover. An eight man crew was used to install the erosion control products on site. The crew protected the top of the slope first and worked their way down to the toe of the slope. Nearly 50,000 yd^2 of the composite TRM material was installed to protect the slopes at the project.

A Minor Bump in the Road

This project went smoothly from start to finish, but Mother Nature always seems to find a way to educate us. The area experienced some heavy rainfall events shortly after the benches were constructed and the erosion control material was installed. The system design withstood two separate heavy rainfall events that produced approximately three inches of rainfall followed by two inches. The third major storm event, nearly four inches, caused minor problems at the site. Storm drains on the benches had been covered because excavation activity was still occurring on the slope. The largest storm occurred before the covers were removed from the drains. Water over topped the bench and channelized into an erosive river. When the event was over, only a small section of the 50,000 yd^2 project was affected. An area approximately 24 ft wide x 20 ft long needed to be repaired. Merthan stated, "We are all fortunate the system held up the way it did. The conditions encountered were not planned for, yet the design of the slopes endured the curve ball Mother Nature threw us."

Protected slopes shortly after the completion of installation.

Successful Solution

Today, the system of benches and composite TRMs is an aesthetic, successful erosion control solution. The store and parking lot below the massive slope are permanently protected because the project team devised and executed a perfect erosion and sediment control plan. **L&W**

For more information contact American Excelsior Company, 850 Avenue H East, P.O. Box 5067, Arlington, TX 76005-5067, 1-800-777-SOIL, email: info-curlex@curlex.com.

Plush, aesthetic vegetation now covers the once feared slopes.