



Case Study

application | **Bridge Abutment**
location | **STH 40, WI**
product | **Mirafi® HP770PET**

job owner
engineer
contractor
date of installation

WI Department of Transportation
Bob Arndorfer, WI DOT – District 1
Mattison Contractors, Knapp, WI
November - May 2012

TenCate develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

In Chippewa County, WI, the existing bridge over Hay Creek was to be reconstructed. This was a first time project in the State of Wisconsin using FHWA EDC Initiative for a GRS-IBS project (Geosynthetic Reinforced Soil-Integrated Bridge System). The project site was selected in November 2011.

THE DESIGN

The site was selected as part of a larger roadway project. GRS is an engineered structure using layers of geosynthetically reinforced aggregate. The bridge was to be a 40' single span, cast-in-place bridge. The Department of Transportation (DOT) used standard design methodology including: hydraulic analysis, geometry, load analysis, external and internal stability and a complete plan set. FHWA Design Manuals were used as well as the completion of FHWA standard plan sheets. The innovative Design Aspects included the slab-span superstructure, use of modular blocks and the existing soft soils beneath the abutment. A reinforced soil foundation (RSF) was used in the area of soft soils after removal.



Overview of the project site after the first courses of block were installed



Backfilling behind the precast block. The geotextile, block, and aggregate work together to form a reinforced earth system.



Placing the Mirafi® PET770 reinforcement layer.

Protective & Outdoor Fabrics
Aerospace Composites
Armour Composites

Geosynthetics
Industrial Fabrics
Synthetic Grass

THE CONSTRUCTION

Modular block was used as the facing units for the abutment. A 4800 lb/ft tensile strength geotextile (standard FHWA recommendation) was called out for the bridge approach area, in the reinforced zone, the bearing bed, and the RSF. It was determined that Mirafi® HP770PET woven geotextiles would be used. The abutments were built in lifts using a 1.25" dense graded base in the bridge approach and RSF. A standard open graded base was used within the walls.

THE PERFORMANCE

The construction of the GRS-IBS took approximately one week to construct. This schedule was two weeks less than standard driven pile abutments. The construction of a GRS-IBS will allow less construction time and the utilization of much lighter, more mobile equipment. The abutments will be monitored for both horizontal and vertical movement. There was much learned during the design and construction of this project. WisDOT will continue to review and promote GRS-IBS on future abutments where applicable.



Hand placing the precast block.



The completed project with both abutments and the roadway placed and ready for traffic.

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