

EXPERIMENTAL PROJECTS WORK PLAN

TenCate Mirafi® H₂Ri – High-Strength Woven Geosynthetic with Wicking Capability to Mitigate Frost Heave Distress

Location:	Valley County/Glendive District: Highway 117 (P-17), MP 7.17-7.36
Project Name:	FT Peck – NE
Project Number:	STPP 17-1(7)0
Experimental Project:	MT-13-13
Type of Project:	Frost Heave Mitigation
Principal Investigator:	Craig Abernathy: Experimental Project Manager (ExPM)
Technical Contact:	Donald Berg, Glendive District Geotechnical Manager

Description

A significant section of pavement distress was observed in the vicinity of Highway 117; reference points at 7.17 to 7.36 beginning near G-C Road. Residents have reported worsening roadway conditions in the winter, suggesting that frost heave is the underlying cause of the distress. For frost heave to develop; the soil must be frost-susceptible, temperatures must be sub-freezing, and there needs to be a source of water.

Based on the site investigation, it has been determined that all three of these conditions are met. The subgrade soils have been identified as Fat Clay, the northern climate is conducive for freezing temperatures, and adjacent wetlands and irrigated fields influence the soil moisture. Combined these conditions indicate a high potential for frost heave.

The proposed grade is higher than the present traveled way (PTW), which will help mitigate the frost heave. However, a capillary break is recommended to eliminate future pavement distress. Usually, this is accomplished with open-graded gravel with separation geotextile. The Department is interested in a newly available, high-strength woven geosynthetic product. The geotextile has wicking (or capillary) characteristics capable of breaking the vertical movement of moisture through the embankment. This accomplished by integrated hydrophilic and hygroscopic fibers that provide wicking action through the plane of the geosynthetic. It is recommended that **TenCate Mirafi® H₂Ri** be chosen an experimental feature in this project.

Experimental Design

The project will involve a 900 ft. (0.17 mile) section of roadway. Three (3) test sections at approximately 300 ft. each are proposed for this project. The following are the section layouts:

1. Typical Section (control)
2. TenCate Mirafi[®] H₂Ri Section – TS1
3. Separation/Special Borrow Section – TS2

Successful frost heave mitigation is heavily reliant on the reduction of the soil moisture. Measurement of soil moisture will be a key indicator of the performance. Therefore, the project will incorporate data loggers and imbedded sensors to determine the in-situ moisture and temperature at various depths in the road profile on all three sections. The frequency of instrumentation (placement of the sensors) will be determined based on available resources and will be detailed in the construction report. In addition, crack mapping of the sections, documentation of visual distress, and measurement of the International Rut Index (IRI) will be included as a performance indicator.

Evaluation Procedures

Construction Documentation: The Research Section will document the construction methods and equipment, material placement, weather, and specification conformance etc.,

Post Documentation: Will entail semi-annual site visits/inspections of the sections, collection/analysis of instrumentation data, and data interpretation for inclusion in to the annual and final reports; in addition to include any maintenance activities associated with the surface or base treatments.

Evaluation Schedule

Research will monitor and report on performance for a minimum period of five years annually, with every year up to *ten years (informally). This is in accordance with the Department's "Experimental Project Procedures". Delivery of a construction/installation report, interim, annual or semi-annual reports is required as well as a final project report (responsibility of Research). A web page will be dedicated to display all reporting from the project.

2015:	Installation/Construction Report
2016-2019:	Semi-Annual Inspections/ Annual Evaluation Reports
2020:	Final Evaluation/Final Report

*If considered the extra data collection and analysis will add value to the overall results of the project.

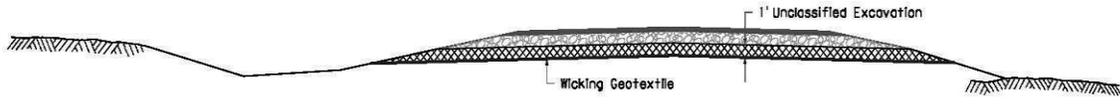
Proposed Project Control/Test Cross Sections



No Treatment

CONTROL

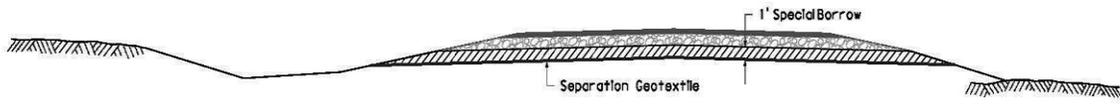
Station 377+00 to 380+00



Mirafi[®] H₂Ri Geotextile

TEST SECTION #1

Station 380+00 to 383+00



Separation/Special Borrow

TEST SECTION #2

Station 383+00 to 386+00

EXPERIMENTAL TEST SECTIONS

PROJECT: FT PECK NE
PROJECT NO.: STPP 17-1(9)0
CN: 5157001
DATE: 11/20/2013

Project Location and Section Layout

