



Attack the Threat



CASE STUDY

Moisture Mitigation under Steepened Slopes

PRODUCT

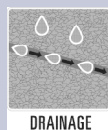
Mirafi[®] H₂Ri

APPLICATION

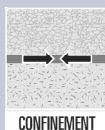
Moisture Mitigation under Steepened Slope Repair

LOCATION

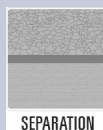
Kelso, WA



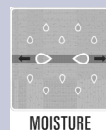
DRAINAGE



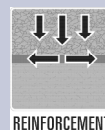
CONFINEMENT



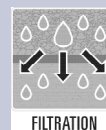
SEPARATION



MOISTURE MANAGEMENT



REINFORCEMENT

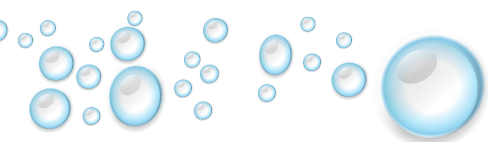


FILTRATION

THE CHALLENGE

Repair an unstable slope by relieving underlying moisture issues

The Old Pacific Highway is the original freeway section which runs parallel to the current Interstate 5. Nestled up in the hillside, a global stability issue created a slide of the natural slope and a large crack in the pavement section. This project was treated like a deep patch repair and initial repair strategies conceptually included the removal and disposal of the existing asphalt roadway and aggregate subbase, over-excavation of native subsurface soils to a depth anticipated between 2-6 feet, the installation of 4 layers of geogrid in combination of CSBC, and HMA surfacing. However, during geotechnical exploration, an area of high saturation was noted at the bottom of the slip zone, approximately 6 ft. down from existing road surface. The project team was worried that if they repaired this section without addressing the moisture issue, it wouldn't be long until it the same section of roadway required additional repair.

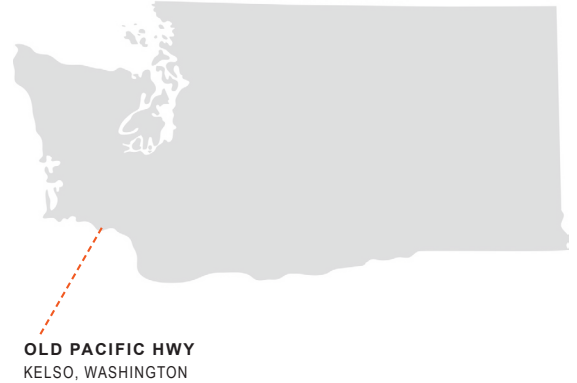


JOB OWNER City of Kelso, Washington
ENGINEER Gibbs and Olson
CONTRACTOR Nutter Corporation
DATE OF INSTALLATION June 2018

TENCATE
GEOSYNTHETICS

THE DESIGN

The project team did not want to have over excavate any further, because the reinforcement lengths of the repaired slope would extend beyond the area they planned to repair. The revised design included a way to manage the saturated zone without over excavation. A drainage zone was constructed beneath the deep patch repair consisting of Mirafi® H₂Ri at the bottom of the excavated zone to remove moisture and strengthen the soils in that zone, and Mirafi® RS380i at the top of the drainage zone for separation and reinforcement (this took the place of a geogrid and separation fabric combination). The re-designed section provided the required strength and a long-term defense against a saturated zone reemerging in the slip sensitive zone.



THE CONSTRUCTION

The existing asphalt roadway and aggregate subbase was removed to a depth of 6 feet. The bottom of the excavated area was graded to direct water flow from the back cut of the excavation to the slope face and Mirafi® H₂Ri was installed at the bottom of the excavation. Eight (8) inches of six inch minus gravel backfill was used between the H₂Ri and RS380i. Above the RS380i, a reinforced slope was constructed using layers of biaxial geogrid (BXG120) and Miramesh® for the facing (which takes the place of secondary reinforcement with a 75-year exposed design life and an erosion control blanket to promote vegetative growth). CBSC with a top size of ¾" was used for the steepened slope fill. The Miramesh® will allow for quick vegetation and soon the repair will be hidden amongst the natural greenery.

THE PERFORMANCE

The Mirafi® H₂Ri system was selected because it provides a long-term defense against saturated soils under the steepened slope. The main goal was to prevent accumulation of moisture below the slope repair, where there is a known slip plane which has been problematic. The project team acknowledged that the saturated zone would be a continuing problem. The Miramesh® facing met aesthetic requirements and long-term performance. The revised solution did not deviate much from the anticipated repair plan and allowed the project team to move forward without over excavation and increased reinforcement lengths.

