

Case Study

application Follow-Up: Base Course Reinforcement/Separation
location Raleigh, NC
product Mirafi® HP370 (13,000 SY)

job owner
engineer
contractor
installed

City of Raleigh
Withers and Ravenel
Brinley Contracting
January 2003

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

The contractor had to complete roughly one-half of a mile of flexible pavement roadway in January of 2003. The two roads, Marvino Lane and Country Trail, are the main collector roads that service the 300+ home and strip mall development. To make matters worse, this area's natural soil deposits have high silt contents which tend to be problematic for the longevity of flexible pavements.

THE DESIGN

Due to the probable inconsistencies in the subgrade soils, especially during winter construction, the city required the contractor to use a biaxial geosynthetic placed under the 8" of graded aggregate base course typically required. While little strain would be induced in the geosynthetic during installation (unlike stabilization applications), the addition of a high tensile modulus geosynthetic that also separates would provide additional benefits to the pavement when the subgrade soils soften and lose support over time.

THE CONSTRUCTION

Most of the subgrade soil conditions appeared to be relatively firm during the construction of the flexible pavement. The wide rolls of Mirafi® HP370 allowed the contractor to place the panels three wide with the required amount of overlap on these wide collector roads. The use of TenCate Mirafi® geosynthetics allowed the contractor to maintain the flexible pavement construction schedule for the project.

THE FOLLOW-UP

When our original case study was completed in February of 2007, photos were taken of a repre-

sentative area on Country Trail where the geosynthetic was used as well as a section of Parkstone Drive constructed without the benefit of a geosynthetic about 6 months prior.



Mirafi® HP370 and base course being placed on the relatively firm subgrade.



Country Trail 2007: Pavement looked as if it were newly installed.



2007: Without the benefit of geosynthetics, Parkstone showed signs of premature deterioration.

In February of 2011, these same areas were investigated and new photos were taken noting any changes that have occurred. The sections of Country Trail and Marvino Lane where the Mirafi® HP370 was installed showed no major pavement deterioration. The asphalt has shown a bit of wear, but nothing that would indicate a deteriorating subgrade or any base course problems. The Parkstone Drive area constructed without a geosynthetic has continued to deteriorate. It appears as though a section of the pavement has been replaced and areas adjacent to the repair are starting to show major signs of fatigue. Another area of pavement with signs of premature deterioration was observed further into the development on Country Trail, beyond where geosynthetics were used. This part of Country Trail was built approximately 1 year after the first pavement areas that incorporated geosynthetics.

THE PERFORMANCE

Roadway areas that used Mirafi® HP370 continue to perform much better than the other areas that did not use any geosynthetics in their construction. In addition, the pavement sections where Mirafi® HP370 was used look to have a higher ADT than the other two areas. The ability of the geosynthetic to provide reinforcement, confinement of the graded aggregate base course and separation of the base course from the silty subgrade conditions added over 10% to the structural number of the unreinforced pavement section. This additional structural number benefit nearly doubles the allowable ESAL's under the same subgrade conditions.

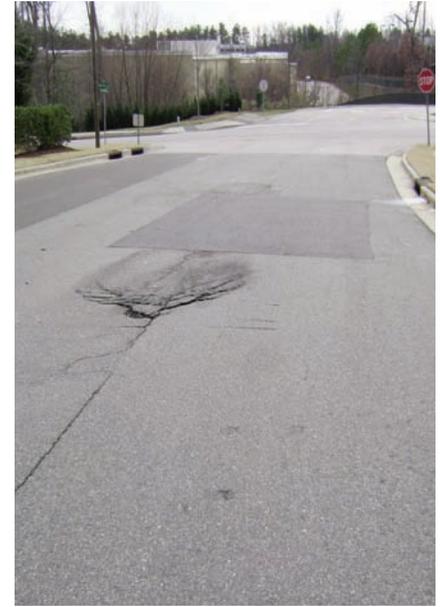
Using standard installation costs associated with the base course and asphalt, the unreinforced section costs were approximately \$18/SY. With the installation of Mirafi® HP370 adding less than 20% additional cost, its use was easily justified for the observed increase in each pavement area's service life.



Country Trail without Mirafi® HP370 in 2011 already had areas re-sealed and shows signs of major alligator cracking.



Country Trail with Mirafi® HP370 in 2011, still performing very well.



Parkstone 2011: Pavement deterioration continues where the area was replaced.

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365 South Holland Drive Tel 800 685 9990 Fax 706 693 4400
 Pendergrass, GA 30567 Tel 706 693 2226 www.mirafi.com

