



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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GOVERNOR

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SECRETARY

May, 2004

STATE PROJECT: 33410.1.1 (B-4044)  
F. A. PROJECT: BRZ-1515(2)  
COUNTY: Burke

DESCRIPTION: Bridge No. 4 on SR 1515 over Smokey Creek – Approaches

SUBJECT: Geotechnical Report – Subsurface Investigation

***Site Description***

This project is located in northern Burke County approximately 1 mile south of the Lenoir-Morganton Airport and the Caldwell County Line. SR 1515 crosses Smokey Creek approximately 1 mile from its mouth at Rhodiss Lake on the Catawba River. The terrain at the site is one of low hills with gentle slopes. Relief on the project is about 80 feet. Smokey Creek is 15 to 20 feet wide in a floodplain about 300 feet wide. The entire project area, except the existing roadway, is in dense forest composed of mature hardwoods on the floodplain and immature pine on the slopes.

Plans call for the existing bridge to be replaced on an alignment 80 feet upstream, on a grade about 30 feet above the channel. The new alignment -L- begins at Station 10+00 and ends at Station 27+59. It will require fills of 20 feet over the floodplain on both approaches, a through-cut of 18 feet and less on the slope west of the floodplain, and a Right Side cut where the new roadway begins to merge with the existing roadway at Station 23+00 and beyond. Only minimal cuts and fills are called for on the approach east of the floodplain.

The Geotechnical Engineering Unit conducted a subsurface investigation in April, 2004. Nine borings were made on -L- between Stations 13+50 and 26+50. The borings were made using a CME 45 track-mounted, power drilling machine equipped with 8-inch, hollow-stem augers. Standard Penetration Tests (SPT's) were made at intervals of 5 feet or less, and quality samples were taken representing all soil strata. Several additional samples were taken from residual soils for moisture testing, and one undisturbed Shelby Tube sample was taken from fine soil on the floodplain. All the samples were submitted for testing at a DOT laboratory.

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LOCATION:  
CENTURY CENTER COMPLEX  
BUILDING B  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC 27610

***Items of Special Geotechnical Interest***

Soft Foundation Soil and Groundwater within 3 feet of Ground Surface

Soft alluvial clay (A-6) can be expected from the ground surface to depths of 6 feet between Stations 14+50 to 16+00. A Shelby tube was taken in the clay at depths of 2 to 4 feet at Station 13+50 and submitted for triaxial testing.

The static groundwater table at those stations is within 0.5 to 2 feet of the ground surface, giving rise to soft, wet conditions that might impede the movement of machinery during construction.

Hard Rock in Cuts

Hard rock may be encountered near the ditch line in cuts near Station 22+00.

Ledges of hard rock interlayered with weathered rock and soil will be encountered in a cut on the Right Side between Stations 26+00 and 26+50.

***Soil and Rock Characteristics***

The principal soil materials on this project are residual soils on the slopes and alluvial soils on the floodplain.

Residual soils comprise a surficial layer 7 to 9 feet thick composed of red, medium stiff to stiff, sandy clay-silt (A-5) or sandy clay (A-7-5), and an underlying saprolitic layer composed of yellow-orange, brown or gray, loose to medium dense, fine mica sand or micaceous silty sand (A-2-5). The total thickness of residual soils varies from 15 to more than 20 feet overlying weathered rock and hard rock.

Alluvial soils consisting chiefly of clay and silt were penetrated by two borings on the floodplain. They are yellow-red to yellow, soft to medium soft, fine sandy clay (A-6) and clay-silt (A-4) in deposits 3.5 to 6.0 feet thick. A foot of loose, silty sand (A-2-4) overlies the fine soil in a boring near the proposed east End Bent.

Three and a half feet of red, very soft, sandy clay colluvium (A-6) lies at the base of the slope on the west side of the floodplain, as found in a boring at Station 18+05. The colluvial clay overlies hard rock.

Only very thin zones of weathered rock, less than one foot thick, were found in the transition from soil to hard rock in most borings. The major exception was weathered rock repeatedly interlayered with soil and hard rock throughout a boring at Station 26+50, at the far west end of the project. Some of the other borings were terminated on hard rock less than 10 feet below the proposed grade, without coring.