



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 6.529005T (R-2610A)  
COUNTY: Chatham  
DESCRIPTION: US 421 from approximately 200 meters south of SR 1007 at Gulf to approximately 930 meters north of SR 1010

SUBJECT: Geotechnical Report – Inventory

**Project Description**

The project is located in south western Chatham County near Sanford. The proposed construction consists of upgrading the existing 9.0 m two-lane roadway to a divided four-lane facility. The length of the project is 7.5 km.

A geotechnical investigation was conducted from August 2000 to December 2000 utilizing a truck-mounted B-47 drill machine and an ATV-mounted CME 45C drill machine. Borings were advanced with continuous flight and hollow stem augers. Standard Penetration Tests were conducted at selected locations and representative soil samples were obtained for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

Subsurface information is provided for the following alignments:

<u>Line</u>	<u>Station</u>
-L-	10+00 to 85+00
-Y3REV-	11+01 to 13+24
-Y9-	10+00 to 11+95
RP-D-@ -Y10-	10+60 to 13+43

**Areas of Special Geotechnical Interest**

1) Groundwater: Groundwater was found to be within 2 meters of proposed subgrade at the following locations:

<u>Line</u>	<u>Approximate Station</u>
-L-	21+80 to 23+20
-L-	31+50 to 33+80
-L-	53+80 to 55+00
-L-	69+30 to 70+50
-Y3REV-	11+20 to 11+80

2) Hard Rock: Hard rock was encountered within 2 meters of proposed subgrade at the following locations.

<u>Line</u>	<u>Approximate Station</u>
-L-	60+10 to 62+20
-L-	64+90 to 65+10

**Physiography and Geology**

The project is located northwest of Sanford within the Piedmont Physiographic Province. The project has topography typical of the Piedmont with gently rolling terrain and wide, well defined stream valleys. The southern third of the project is drained by several small unnamed tributaries of the Deep River. The middle third is drained by Cedar Creek and its tributaries and the northern third is drained by Bear Creek and its tributaries each of which flows into Deep River. Geologically, the project is underlain by sedimentary rocks of the Triassic Basin from the beginning to approximately -L- Sta. 42+30. The northern portion of the project from approximately -L- Sta. 42+30 to the end is underlain by felsic meta-volcanic rocks of the Carolina Slate Belt.

**Soil Properties**

Soils present on this project are separated into three major categories based on origin. These categories are Triassic, residual and roadway embankment..

Triassic soils are the most prevalent soil type in the southern half of the project and are derived from the weathering of the underlying Triassic sedimentary rocks. These soils predominantly consist of red-brown, orange-brown, and tan-brown sandy/ silty clay (A-6, A-7) with lessor amounts of sandy/ clayey silt (A-4, A-5). Granular soils (A-2-4) occurred in isolated areas. These Triassic clays have low to moderate and occasionally high plasticity indices (12 to 51) but were predominantly below 25 for this portion of the project.

Residual soils were present on the northern half of the project and are derived from weathering of the underlying felsic metavolcanic rocks. These soils generally consist of tan-brown, gray-brown, and orange-brown sandy silts (A-4) and sandy/silty clays (A-6, A-7) with lessor amounts of silty sands (A-2-4). These residual clays have low to moderate plasticity indices (11 to 30) and were predominantly below 25 for this portion of the project.

Some roadway embankment was encountered in the areas near the end of the project where partial grading of the proposed widening was performed during construction of the original roadway. These soils generally consist of tan-brown, gray-brown and orange-brown sandy silts (A-4) sandy/silty clays (A-6, A-7) taken from the adjacent cut sections.