

STATE PROJECT: 8.2511001 (B-3696)

FEDERAL PROJECT: BRZ-2579(1)

COUNTY: Rockingham

DESCRIPTION: Bridge 84 over Jones Creek on SR 2579 (Brooks Road)

SUBJECT: Geotechnical Report of Subsurface Exploration

Project Description:

Geoscience Group, Inc. (Geoscience) has completed the authorized geotechnical investigation for the above referenced project in Rockingham County, North Carolina. The bridge will be located in southeastern Rockingham County, east of Reidsville. More precisely, the bridge will be located on SR 2579 (Brooks Road) at its crossing of Jones Creek. A Site Vicinity Map is included in the following pages. The project will consist of the construction of a single-span steel girder bridge with an overall length of 90 feet, a width of 32 feet and a skew angle of 110° 00' 00". Fill depths of 6 and 3 feet are proposed at end bent-1 and end bent-2, respectively. The 1.5H:1V end bent slopes are to be protected with rip rap.

The purpose of this exploration was to investigate the subsurface conditions at the proposed bridge bent locations. The subsurface exploration was conducted on August 19, 2003. This exploration consisted of the execution of four (4) soil test borings. Using the surveyed points provided by Geoscience personnel, the actual boring locations were measured for location using a tape measure and approximate right angles. Using an NCDOT provided benchmark, the boring locations were surveyed for elevation by the project engineer. Drilled boring locations are shown on the Boring Identification Diagram included in the following pages.

The soil test borings were advanced using a CME 550x drilling machine utilizing hollow-stem auger drilling techniques. In each boring, Standard Penetration tests were performed in general accordance with NCDOT guidelines. In conjunction with this testing, split-barrel soil samples were recovered for visual classification in the field. The split-barrel soil samples were returned to our laboratory for testing. Two (2) Shelby Tube samples of the alluvial soils were collected for EFA testing by NCDOT.

Laboratory testing was performed on representative split-barrel samples to aid in the assessment of AASHTO soil classification and to refine data for evaluation of engineering properties. The laboratory testing consisted of natural moisture content determinations, Atterberg Limits tests, and grain size analyses with hydrometer. The soil laboratory tests performed were in general accordance with AASHTO and NCDOT specifications. The results of the soil laboratory tests are included in the following pages.

Physiography and Geology:

The project site is located in the Milton Belt of the Piedmont Physiographic Province of North Carolina. According to the 1985 Geologic Map of North Carolina, the site is located in an area consisting of biotite gneiss and schist of Cambrian to Late Proterozoic in age. The map characterizes the crystalline rock as inequigranular and megacrystic and may be interlayered with, among other rock types, mica schist. The split-barrel samples of the weathered and crystalline rock obtained on-site consist of grey-white biotite gneiss. The overlying residual soils are the product of the physical and chemical weathering of the underlying bedrock. Site topography slopes predominantly downward from the west towards Jones Creek and is relatively flat east of the crossing for approximately 500 feet.

Foundation Materials:

The foundation materials encountered at the site include roadway embankment fill, alluvial and residual soils, weathered rock, and crystalline rock. Considering the subsurface consistencies, subsurface strata will be described across the site.

Roadway embankment fill is present in each boring. The roadway embankment fill consists of wet soft micaceous fine sandy silty clay (A-6). A blow count of 3 blows per foot (bpf) was measured in the zones of roadway embankment fill.

Alluvial soil is present along each bent. The alluvial soil begins at elevations ranging between 589 and 591 feet. The alluvial soil consists of wet and saturated very soft to medium stiff micaceous fine sandy silt (A-4), saturated very soft fine sandy silt (A-4), and wet medium stiff fine sandy silty clay (A-6). Blow counts of WOH (weight of hammer) to 5 bpf were measured in the alluvial soil.

Residual soil is present below the alluvium along end bent-1. The residual soil begins at elevations of 578 and 579 feet. The residual soil consists of moist very dense silty coarse to fine sand (A-1-b). Blow counts of 59 and 81 bpf were measured in the residual soil.

Weathered rock is located in each boring beginning at elevations ranging between 575 and 578 feet. The weathered rock consists of grey-white weathered biotite gneiss.

Crystalline rock is present in each boring beginning at elevations ranging between 572 and 576 feet. The crystalline rock consists of grey-white biotite gneiss. Each of the borings was terminated with Standard Penetration Test refusal at elevations ranging between 565 and 575 feet.

Groundwater:

After completion of each boring, temporary piezometers (slotted PVC pipe) were installed in the borings. Piezometers were used to measure stabilized groundwater levels at least 24 hours after the completion of drilling. Groundwater elevations range between 586.5 and 582.1 feet. Due to the existing creek, groundwater will tend to fluctuate with creek levels.