

STATE PROJECT: 33405.1.1 (B-4039)
FA. PROJECT: BRZ -1127(7)
COUNTY: Burke
DESCRIPTION: Bridge 91 on SR 1127 (Scott Road) over Silver Creek
SUBJECT: Report of Structure Subsurface Investigation

Engineering Consulting Services, Ltd. has completed the authorized geotechnical investigation for the above referenced project in Burke County, North Carolina. The purpose of this exploration was to investigate the subsurface conditions at the proposed bridge bent locations.

1.0 SITE DESCRIPTION

The project site is located in Burke County at the approximate location shown on the Site Location Map (Drawing No. 1) located in Appendix A. The site for the proposed project is located at Bridge 91 on SR 1127 (Scott Road) over Silver Creek between SR 1126 and Interstate 40. The site topography is rolling terrain including existing flood plain and residential properties. The existing ground cover consists of riparian trees on stream banks, fallow farm land and a tree farm.

2.0 PROJECT DESCRIPTION

Information for the proposed structures was obtained from Preliminary General Drawings, dated January 4, 2005, and the Bridge Survey & Hydraulic Design Report, dated October 21, 2004. The proposed bridge will be a two span structure, 120 feet in length and 40 feet wide. A skew angle of 75° 00' 00" is proposed for all bents. Slope inclinations of 1.5:1(H:V) with rip rap or concrete protection are proposed for each end bent.

The Preliminary General Drawings are in English units with feet (ft) as the primary unit of length. All distances and elevations in this report are feet unless noted otherwise.

3.0 SCOPE OF INVESTIGATION

3.1 FIELD TESTING

The subsurface exploration was conducted on February 14 through February 16, 2005. The exploration consisted of six (6) soil test borings. The soil test borings were advanced with a CME-550X ATV drilling machine utilizing hollow stem auger and rotary drilling techniques and using a 140 pound automatic hammer to perform the standard penetration tests.

Standard Penetration Tests were performed in general accordance with NCDOT guidelines. In conjunction with testing, split-barrel soil samples were recovered for visual classification and laboratory testing.

Two borings were extended below auger refusal and SPT refusal depths to obtain rock core samples of the underlying bedrock. The core samples were nominally 2.5 inches in diameter and

were obtained using HQ size drilling techniques. The core samples were returned to our laboratory for visual classification and testing.

Using existing site features and bench marks established by the NCDOT, the borings were surveyed for elevation and location by personnel from ECS. As-drilled boring locations are shown on the Boring Location Diagram (Drawing No. 2 included in Appendix A).

3.2 LABORATORY TESTING

Laboratory testing was performed on twelve (12) representative split-barrel samples and two (2) grab samples to aid in the assessment of AASHTO soil classification and to provide data for evaluation of engineering properties. The laboratory testing consisted of natural moisture content determinations, Atterberg Limits testing, and grain size analysis with hydrometer. Rock core specimens were obtained for unconfined compressive strength testing. Laboratory tests were performed in general accordance with AASHTO and NCDOT specifications. The results of the laboratory tests are included in Appendix A.

3.3 GEOLOGY

The project site is located in 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 Migmatitic Granitic Gneiss of the Inner Piedmont Belt dating from Cambrian to Ordovician ages. The overlying residual soils are the product of the physical and chemical weathering of the underlying bedrock. Floodplain deposits are recent alluvium sands of Quaternary age. Based on the rock core specimens obtained at the site the rock type consisted of a Granitic Gneiss. The cored rock recovery and Rock Quality Designation (RQD) data indicated consistent, very good and competent bedrock conditions. A 3 inch zone of weathered rock was noted from 38.9 to 39.2 feet in boring B1-B.

3.4 FOUNDATION MATERIALS

Foundation materials at the end bents and interior bent locations include fill, alluvial, residual soil, weathered rock, and rock.

The borings encountered Roadway Embankment fill and Artificial fill at the ground surface and extended to depths of 6.0 feet (elevations ± 1086 to ± 1080). The Roadway Embankment fill consisted of moist soft and stiff clayey fine sandy silt (A-5) and the Artificial fill consisted of wet to moist soft clayey fine sandy silt (A-4) and moist very soft to soft silty fine clayey sand (A-2-7) and moist soft to medium stiff fine sandy silty clay (A-7-5). The Roadway Embankment fill and Artificial fill did not indicate evidence of debris or trash. Alluvial soil was encountered from elevations ± 1084 feet to ± 1065 feet and consisted of very loose to dense silty fine to coarse sand with rock fragments and cobbles. Residual soil was encountered at elevations ± 1072 feet to ± 1049 feet and consisted of loose to very dense slightly micaceous silty fine to coarse sand (A-2-4, A-2-5, and A-1-b). Weathered rock was encountered from elevations ± 1067 feet to ± 1051 feet and consisted of a tan brown Granitic Gneiss. Hard rock was encountered below elevations ± 1067 feet to ± 1049 feet and consisted of a gray, white, and black Granitic Gneiss.

3.5 GROUNDWATER

Groundwater was present in all boring locations at elevations of ± 1073 feet to ± 1075 feet. Fluctuation of groundwater levels can occur with seasonal and climatic variations.