



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 33198.1.1 (B-3652)  
F.A. PROJECT: BRSTP-4121 (2)  
COUNTY: Guilford  
DESCRIPTION: Bridge No. 20 on -L- (SR 4121, West Main St.) over Deep River at -L- Station 21+87.50.  
SUBJECT: Geotechnical Report - Structure Inventory

**Project Description**

A three-span bridge, 195 feet in length with a 90° skew, is proposed on -L- (SR 4121, West Main St.) over Deep River to replace the existing structure. The new bridge will be 26 feet longer than the existing bridge. Also, a temporary bridge will be constructed approximately 55 feet south of the permanent bridge. The project is located in Guilford County in Jamestown.

The subsurface investigation was conducted during April of 2004 using a CME 550-drill machine with an automatic hammer. Standard Penetration Test borings were performed at each of the four bent locations. All borings were advanced until crystalline rock was encountered except B2-A. Interior bent borings B1-A and B2-B were cored using NXWL core equipment to recover rock samples from crystalline rock. Representative soil samples were obtained for visual classification in the field and selected samples were sent to the Materials and Test Unit for laboratory analysis. Four rock core samples were also sent to the Materials and Test Unit to determine Unit Weight, Compressive Strength and Young's Modulus.

**Physiography and Geology**

The project is located in rolling terrain of the Piedmont Physiographic Province. The site is located within the Carolina Slate Geologic Belt and is underlain by metamorphosed granitic rock and metavolcanic rock.

**Soil Properties**

Soils encountered at the project site include roadway embankment, alluvial and residual soils.

Roadway embankment soils are present at the both end bent locations and range in thickness from 13.0 to 18.5 feet. These soils consist predominantly of tan-brown, moist, medium stiff to very stiff, sandy and silty clay (A-6, A-7-6). Embankment soils are underlain by alluvial and residual soils.

Alluvial soils were encountered at both interior bent locations and range in thickness from 6.5 to 15.5 feet. Alluvial soils consist of gray-tan and brown, moist to wet, soft to medium stiff, sandy silt (A-4) with some boulders. The alluvial soils were deposited on residual soil and/or weathered rock.

Residual soils were encountered in both end bents and interior bent borings B1-A and B2-B. The thickness ranges from 4.5 to 17.4 feet. The soils consist of tan-gray and brown, wet, very dense, silty sand (A-2-4) and green-gray to gray-brown, dry to wet, stiff to hard, saprolitic, sandy silt (A-4). Gray to dark brown and red-brown to tan-brown, dry to moist, stiff to very stiff, sandy and silty clay (A-6, A-7-6) is also present. Weathered rock and/or crystalline rock underlie residual soils.

**Rock Properties**

Weathered rock was derived from the underlying metamorphosed granite and metavolcanic rock and ranges in thickness from 2.0 to 4.0 feet. The top of weathered rock was encountered at elevations ranging from 717.5 at EB2-B to 710.6 feet at B1-A and B2-B.

The top of crystalline rock ranges in elevation from 717.9 at EB1-A and EB1-B to 701.8 feet at B2-B. Rock core was obtained from two of the interior bent borings. Crystalline rock in boring B1-A consists of gray-white, moderately weathered to fresh, hard to very hard, moderately close to very closely fractured, granite. Core recovery (REC) ranged from 66% to 100%. Rock Quality Designation (RQD) values ranged from 46% to 100%. Crystalline rock in boring B2-B consist of gray-green, slightly and very slightly weathered to fresh, very hard, very closely fractured, metavolcanic rock. Core recovery (REC) ranged from 90% to 100%. Rock Quality Designation (RQD) values ranged from 60% to 100%. More detailed rock descriptions can be found in the Core Boring Reports.

**Goundwater**

Groundwater was encountered at both interior bents and at the EB2-B bent location. Groundwater elevation ranged from 718.3 at EB2-B and 713.6 feet at B1-A.

**Temporary Detour Structure**

A temporary detour structure will be constructed south of the existing bridge at -DET- Station 16+30.

The top of crystalline rock ranges in elevation from 715.0 at EB1-A and 696.7 feet at EB2-C. Geologic conditions including soil and rock types generally correlate with the borings performed for the structure on -L-.

**Notice**

This Geotechnical foundation report is based on the bridge survey and hydraulic design report for bridge no. 20 on -L- (SR 4121, West Main St.) over Deep River dated November 20, 2003. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Respectfully submitted,

Joseph I. Milkovits, Jr.  
Project Geologist