

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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GOVERNOR

SECRETARY

May 18, 2004

STATE PROJECT: 34517.1.1 (R-2911D)

COUNTY:

Rowan

DESCRIPTION:

Bridge on US 70 over Second Creek Between SR 1951 & SR 1728

SUBJECT:

Geotechnical Report – Bridge Foundation Investigation

This report encompasses the proposed dual structures on the US 70 widening job over Second Creek. Existing bridge #85 will be replaced on location with the proposed left lane structure while the proposed east right lane structure will be located upstream. A 66 inch steel girder design is proposed for each structure over 3 span lengths of 60', 120', and 60' on a 90° skew. Total structure width will be 39' 3" and end bent slopes are proposed at 1 ½:1 with class II Rip Rap slope protection.

Foundation test borings were performed with a CME-550 drill machine utilizing NW Casing, NXWL, Tri-Cone roller bit and automatic drop hammer. The field investigation for this project was conducted in April of 2004.

Physiography/Geology

The project corridor is located in the piedmont region of North Carolina in Rowan County west of the city of Salisbury. Geologically this site is part of the Charlotte Belt and is underlain by metamorphosed mafic rock types. Topography in the vicinity of the bridge site ranges from flat to gently sloping with mature trees, shrubs and grasses present around Second Creek.

Soil categories encountered at the site include roadway fill, alluvium, and residual soils. Roadway fill was encountered along existing US 70 at each end bent of the proposed left lane structure. Roadway fill consists of very soft to medium stiff silty sandy clay (A-7-6). Alluvial soil was encountered at each boring location and consists of very soft to medium stiff silty sandy clay (A-7-5, A-7-6, A-6), very loose to loose clayey sand (A-2-4, A-3, A-1-b), and soft gray clayey sandy silt (A-4). Residual soils are comprised of medium dense to very dense silty sand (A-2-4, A-1-b), and very stiff clayer sandy silt (A-4).

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Weathered rock was encountered at all boring locations and is generally succeeded by hard rock in our test borings.

Foundation Materials

End Bent 1Left and Right Lane:

This bent is located west of Second Creek with borings for the left lane structure taken atop of the existing US 70 roadway fill and right lane borings performed in the creek floodplain. A total of four borings were performed for this bent location. Roadway fill was encountered for the first 15.4 feet of the left lane structure and consists of very soft to medium stiff gray-white silty sandy clay (A-7-6). Alluvial soils were encountered next and traverse from beneath the left lane fill to natural ground along the right lane structure. Alluvium is 12 to 14 feet in thickness and consists of very soft to medium stiff gray silty sandy clay (A-7-6), and very loose to loose gray clayey sand (A-1-b, A-2-4, A-3). Beneath alluvium residual material is encountered between elevation 641 and 643 feet. Residual soils are 7 to 16.5 feet in thickness and consist of medium dense brown-white silty sand (A-2-4). The transition from residual soil to weathered rock occurs at approximate elevation 634 feet in left lane borings and 627 feet in right lane borings. The only boring along this bent to achieve refusal on hard rock was EB1-B RT LN.

Bent 1:

This bent is located just west of Second Creek and all borings were performed over natural ground in the creek floodplain. Alluvium encountered at the ground surface extends 21.5 to 24.5 feet deep and consist of very soft to soft tan-brown silty sandy clay (A-7-6), soft tan-brown-gray clayey sandy silt (A-4) and very loose to loose gray clayey sand (A-2-4, A-3). The residual soil horizon is encountered next between elevation 633 and 634 feet. Residual soil is comprised of medium dense to dense gray-brown silty sand (A-2-4) and medium stiff to very stiff brown-gray clayey sandy silt (A-4). Weathered rock was encountered below residual soil at elevation 630 feet in left lane borings but varies in elevation between 632.5 and 621.4 feet in right lane borings. Hard rock was encountered and cored at all boring locations for evaluation purposes. Elevation to the top of hard rock lies between 616 and 618.5 feet

Bent 2:

This bent is located just east of Second Creek and 4 borings were performed on natural ground in the creek floodplain. Alluvium extends 20 to 23.5 feet below the ground surface and consists of very soft to medium stiff tan-gray-brown clayey sandy silt (A-4) and very loose to loose gray sand (A-2-4, A-3). An unknown quantity of wood chunks/debris was noted in the alluvial layer at boring B2-A RT LN around elevation 645 feet. Beneath alluvium at elevation 632.5 to 634.8 feet residual soil is encountered and consists of 5 to 10 feet of medium dense to very dense tan-gray-white micaceous sand (A-2-4, A-3). The weathered rock boundary underlies residual soil around elevation 623.5 to 625 feet for left lane borings and 624 to 629.8 feet for right lane borings. The elevation where hard rock is encountered is basically flat across the entire bent at elevation 623 to 624 feet. Hard rock was cored at all boring locations for evaluation purposes.