

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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SECRETARY

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STATE PROJECT: 8.1830501 (R-2206C)

COUNTY:

Lincoln

DESCRIPTION:

Bridge on NC 16 over Killian Creek

SUBJECT:

Geotechnical Report – Bridge Foundation Investigation

This is a proposed 4 lane dual structure on new location. The bridge is on proposed NC 16 (-L-) over Killian Creek. Each structure is comprised of 3 spans at lengths of 24, 30, and 24 meters. Skew angles for each bent are essentially 90 degrees with some variance of less than 1 degree. The width of each structure is 11.74 meters with composite, continuous 1372mm prestressed concrete girders.

Foundation test borings were performed with a CME-550 drill machine utilizing NW Casing, NXWL, hollow stem augers and automatic drop hammer. The field investigation for this project was conducted in June and July of 2003.

Physiography/Geology

Geologically this site is part of the Charlotte Belt and is underlain by metamorphosed quartz diorite and granitic rock. The topography at the bridge site is heavily wooded with Killian Creek surrounded by a flood plain approximately 60 meters in width. On either side of the flood plain boundary the ground rises steeply away from the creek.

Alluvial soils were encountered in the floodplain of Killian Creek. Alluvium encountered at interior bent locations consists of 2 to 3 meters of very loose to loose silty sand (A-2-4) with gravel. Residual soils were encountered at all boring locations, and consists of 2 to 6 meters of medium stiff to hard micaceous sandy silt (A-4, A-5), medium stiff micaceous silty sandy clay (A-7-5, A-7-6) and loose micaceous silty sand (A-2-4). All borings encountered weathered rock at depth and terminated on or in hard rock.

Sheet 1A

(R-2206C) Killian Creek

Foundation Materials

End Bent 1:

This proposed bent is located east of Killian Creek. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Residual soils beginning at the ground surface and extending to depths between 3.2 and 6.1 meters consist of medium stiff brown-tan-black micaceous silty sandy clay (A-7-5, A-7-6), stiff to hard tan-brown micaceous sandy silt (A-4, A-5), and loose tan-brown-gray micaceous silty sand (A-2-4). Beneath residual soil lies weathered rock between elevation 236.22 to 234.27 meters. All borings achieved auger refusal on hard rock after penetrating through 0.2 to 1.5 meters of weathered rock.

Bent 1:

This proposed bent is located in the floodplain on the east side of Killian Creek. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Alluvium was found at all boring locations and consists of 2 to 3 meters of loose tan-brown-gray silty sand (A-2-4). Beneath alluvium between elevation 230.62 and 232.0 meters, residual soil is encountered. Residual soils consist of 2.0 to 3.6 meters of medium stiff to hard tan-black-white micaceous sandy silt (A-4). Underlying residual soil is a thin layer of weathered rock followed by hard rock. Weathered rock occurs between elevation 227.82 and 230.1 meters while the hard rock horizon occurs between elevation 220.77 and 224.73 meters. Hard rock was cored at all boring locations along this bent to evaluate its engineering properties.

Bent 2:

This proposed bent is located in the floodplain on the west side of Killian Creek. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Alluvium was found at all boring locations and consists of 2.3 to 2.8 meters of very loose to loose gray-brown silty sand (A-2-4) with gravel. Beneath alluvium at approximate elevation 231.1 meters, residual soil is encountered. Residual soils consist of 2.2 to 6.4 meters of medium stiff to hard gray-white micaceous sandy silt (A-4). Underlying residual soil lies weathered rock followed by hard rock. Weathered rock occurs between elevation 225.64 to 228.79 meters while the hard rock horizon occurs between elevation 224.74 and 227.1 meters. Hard rock was cored at all boring locations along this bent to evaluate its engineering properties.

End Bent 2:

This proposed bent is located west of Killian Creek. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Residual soils beginning at the ground surface and extending to depths between 1.94 and 4.16 meters consist of medium stiff to very stiff tan-brown micaceous clayey sandy silt (A-4), soft to medium stiff tan-brown-black micaceous sandy clay (A-7-5, A-7-6) and dense brown-tan micaceous silty sand (A-2-4). Beneath residual soil lies weathered rock between elevation 231.17 to 234.14 meters. All borings achieved auger refusal on hard rock.