



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 8.2700501 (B-3403)  
F. A. PROJECT: BRZ-1422(3)  
COUNTY: Alleghany  
DESCRIPTION: Bridge No. 53 on SR-1422 Over Brush Creek

SUBJECT: Geotechnical Report – Foundation Investigation

The following text has been revised from a previous report submitted in June 2001. The revisions reflect the updated stationing and alignment.

**Site Description**

This project is located in rural northeastern Alleghany County, approximately 1.2 miles from the Hooker Community. The replacement bridge will be constructed approximately 35 feet upstream from the existing structure. The new structure will implement the following three spans for a total length of 135 feet. One at 35 feet; one at 65 feet; and one at 35 feet. All bents are to be built on a skew angle of 108 degrees.

Brush Creek is slow moving, approximately 35 feet wide, with water depths approximately 1.5 feet at the proposed alignment crossing. The creek bed is floored with silt, sand, cobbles, and boulders. The channel bank is also composed of these deposits and covered with grass, bramble, and brush. A floodplain width of approximately 800 feet has been developed by the creek. It is covered with trees, brush, bramble, and grass.

The subsurface investigation was conducted with a CME-550 ORV drill machine equipped with an automatic hammer for Standard Penetration Testing (SPT) through NX casing with advancer. Rock core specimens were retrieved with NXWL drill rods.

**Foundation Materials**

Embankment, fill, alluvium, weathered rock, and hard rock comprise the foundation materials revealed in borings at the site.

Embankment was found only at Boring EB1-A. Here, two feet of dark brown silty sand with gravel has been placed over alluvium. Fill material is confined to End Bent Two and consists of dark brown, slightly micaceous, silty sand. From three to five feet of this soil has been placed over alluvium and hard rock.

The alluvial sequence at this site typically consists of loose, silty sand with gravel deposited over very dense sand, gravel, cobbles, and boulders. Borings revealed these deposits to be between three to ten feet thick.

Weathered rock occurs as a one to three foot thin lens beneath the alluvium. This horizon has a silty sand texture and is present along the width of both bents.

Hard rock was penetrated in all test borings done at the proposed bridge location. The rock is a mica schist and phyllite unit of the Alligator Back Formation in the Blue Ridge Belt (symbol Zabs on the 1985 North Carolina Geologic Map). Locally, core specimens revealed slightly weathered to fresh, moderately hard to hard, interlayered mica schist and muscovite-biotite gneiss. Fracture spacing ranged from widely spaced to very close, with joint angles between 50 and 75 degrees. Elevations to the hard rock interface varied from 2491 to 2504 feet.

**Groundwater**

At the time of the investigation, groundwater was found within approximately five feet of the surface, usually in the alluvial horizons.

**Geologic Foundation Recommendations**

<u>Location</u>	<u>Foundation</u>	<u>Elevation</u>
EB1-A	Footing	2496 (Weathered Rock)
EB1-B	Footing	2496 (Weathered Rock)
B1-A	Footing	2493 (Weathered Rock)
B1-B	Footing	2493 (Weathered Rock)
B2-A	Footing	2496 (Hard Rock)
B2-B	Footing	2494 (Hard Rock)
EB1-A	Footing	2502 (Hard Rock)
EB2-B	Footing	2503 (Hard Rock)