



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 34357.1.1 (R-0977A)  
COUNTY: Cherokee  
DESCRIPTION: Bridge on EBL US-64 (Sta. 16+02.3 POT -LC1B-)  
Hiwassee River

SUBJECT: Geotechnical Report – Foundation Investigation

This proposed bridge is located on revised alignment at Station 16+02.3 -LC1B- over the Hiwassee River at the Murphy City limits. It is located slightly downstream from a previously planned structure on -LREV-. Bridge Survey and Hydraulic Design Report plans dated 9/10/03 call for three spans totaling 221 meters in length on a skew of 120 degrees. The site is entirely within the floodplain of the knee deep Hiwassee River. End Bent One and Bent One lie on the north side of the river near a defunct water treatment plant. Bent Two and End Bent Two are located on the south side of the river in a corn field.

Several large water mains and underground water tanks lie close to or under the proposed structure. A plastic groundwater drainage pipe discharges a steady flow of water into the river a little bit upstream of B2-A on the south bank.

The investigation was carried out in February 2003. Two borings were made at each bent using a CME-550 drill. Seven SPT core borings were made with -N- casing tipped with an advancer. One hollow stem SPT was also made.

#### Foundation Materials

Crystalline rock, in this instance a low grade metamorphic product of marine silts and fine sands identified as phyllite, is uniformly encountered across the site below shallow

alluvial cover soils and a thin veneer of weathered rock. Weathered rock is partially exposed in the riverbed.

The phyllite is composed dominantly of very small, clear muscovite mica scales with a mineral ground mass, all layered parallel to bedding. The light colored rock breaks easily along thin bedding planes which plunge at an average of 45 degrees to the southeast. Weathering tends to follow bedding into the crystalline rock to a depth of 4 to 11 meters. Core recovery rates were high; RQD values averaged from 0 to 68 percent.

#### End Bent One

Located near a buried water tank, End Bent One has 2 meters of medium stiff sandy silt fill across the bent. The fill is recycled on-site alluvium. Approximately one meter of alluvial silty sand with basal gravel underlies the fill. A thin rind of weathered rock underlies the above. Crystalline rock is present below elevation 462 meters. Core recovery was excellent across the bent and revealed that crystalline rock is weathered significantly and possesses low RQD values on the EB1-A side of the bent. The EB1-B side exhibits much less weathering and has RQD averaging 66 percent.

#### Bent One

Bent One is similar to EB1 except it lies closer to the riverbank and has not been dug up. Undisturbed alluvium consists of approximately 2.5 meters of very soft sandy silt with clay intermittently underlain by 0 to 1 meter of clayey sand. From 0.3 to 1.5 meters of weathered rock was encountered below the alluvium. Crystalline rock is present below elevations of 460.7 to 459.4 meters. The crystalline rock is much more weathered on the B1-A side with zero RQD to a depth of 12 meters. Below 12 meters RQD improves considerably. Crystalline rock on the B1-B side is hard and fresh at a shallow depth.

#### Bent Two

Bent Two has relatively uniform soils across the bent consisting of 2.5 to 3.8 meters of very soft to soft alluvial fine sandy silt with clay and an intermittent basal sand with clay and gravel. A rind of weathered rock 0.5 to 1 meter thick underlies the alluvium. Crystalline rock lies below elevation 461.1 to 461.8 meters. Crystalline rock exhibits variable weathering to a depth of 9.4 to 10.5 meters; below which it is generally hard and fresh.

#### End Bent Two

Layered alluvium consists of approximately 2 meters of very soft fine sandy clay to soft fine sandy silt underlain by basal sand with clay and gravel. A thin rind of weathered rock underlies all of the above. Crystalline rock is present below an elevation of approximately 461.2 meters. Crystalline rock is weathered to a much greater extent on the EB2-A side of the bent.