

The Bridge Survey & Hydraulic Design Report and the Preliminary General Drawing are in English units with feet as the primary unit of length.

### 3.0 SCOPE OF INVESTIGATION

#### 3.1 FIELD TESTING

The as-drilled locations for the soil test borings were located by personnel from Trigon using the existing bridge for reference. Elevations at the as-drilled boring locations, along the existing ground surface at the bent locations, and along the structure profile were surveyed by personnel from Trigon using the "BL-5" benchmark elevation (Elevation 771.85 feet) established by an NCDOT survey crew as a reference point. The end bent borings were offset in towards the -L- centerline from the proposed end-of-bent locations due to the proximity of the end-of-bent locations to the existing embankment slopes, while the interior bent locations were offset out from the proposed outside drilled shaft locations due to the area occupied by the barge deck when the barge was placed next to the existing bent supports. As-drilled boring locations are shown on the Boring Identification Diagram (Drawing No. 2).

The subsurface exploration for the proposed bridge was conducted between May 5 and May 26, 2005. This exploration consisted of eight soil test borings; two borings at each proposed bent location. In addition, one auger probe boring (EB1-B1) was performed on the right side of the proposed End Bent-2 in order to obtain undisturbed samples of potential scourable materials. The end bent borings and Boring EB1-B1 were drilled with an ATV-mounted CME 45 drilling machine equipped with a 140-pound manual hammer. The interior bent borings were drilled within the lake using a skid-mounted CME-45 drilling machine operated from a barge and equipped with a 140-pound manual hammer. The end bent borings and Boring EB1-B1 were advanced through soil and weathered rock material utilizing 0.5-foot (O.D.) continuous-flight hollow-stem auger techniques, while the interior bent borings were advanced through soil utilizing 0.33-foot tricone/wash-drilling techniques with lake water alone used as the drilling fluid.

Standard Penetration Tests were performed in the soil and weathered rock materials in general accordance with NCDOT guidelines. In conjunction with this testing, split-barrel soil and weathered rock samples were recovered for visual classification and potential laboratory testing. Two undisturbed (Shelby Tube) samples of representative potential scourable material were obtained from Boring EB1-B1 for potential EFA testing.

Rock coring was performed at the interior bent borings in order to evaluate the nature of the weathered rock/crystalline rock. The cored weathered rock/crystalline rock was returned to our laboratory for further classification and possible testing. The rock coring was performed with an NQ size hollow double-tube core barrel. Lake water alone was used as the drilling fluid during rock coring.

#### 3.2 LABORATORY TESTING

Laboratory soil testing was performed on nineteen representative split-barrel samples to aid in the assessment of AASHTO soil classification and to provide data for evaluation of engineering properties. The laboratory testing on the samples consisted of Natural Moisture Content, Atterberg Limit, and grain size analysis with hydrometer. In addition, two Unconfined Compressive Strength (Qu only) tests were performed on selected samples of the recovered rock core from the interior bent borings. Laboratory tests were performed in general accordance with AASHTO and NCDOT specifications. The results of the soil laboratory tests are included on Sheet 26. A Summary of Rock Test Data table is also included on Sheet 26. Laboratory results of the rock testing are also included under separate cover in Appendix A.

#### 3.3 SITE GEOLOGY

The site of the proposed project is located near the juncture of the Carolina Slate Belt and the Charlotte Belt of the Piedmont Physiographic province. Carolina Slate Belt rocks are comprised of metamorphosed sedimentary and volcanic rocks intruded by a variety of plutons, while Charlotte Belt rocks are Late Proterozoic to Cambrian mafic gneisses, amphibolites, metagabbros, and metavolcanic rocks (Butler et al., 1991).

According to the 1985 Geologic Map of North Carolina, the site is located near the confluence of areas generally consisting of granitic rock, metamorphosed granitic rock, and metamorphosed gabbro and diorite. The crystalline rock encountered in our test borings generally consisted of moderately weathered to fresh metamorphosed granitic rock. This metamorphosed granitic rock is more indicative of the Carolina Slate Belt rocks described on the Geologic Map for the general site vicinity than they are of the Charlotte Belt rocks described on the map for areas in the general site vicinity. The crystalline rock cored ranged in quality from very poor to very good, with the majority of the crystalline rock recovered being good to very good in quality. The overlying residual soils at the site are the product from the physical and chemical weathering of the underlying crystalline rock.