

Our investigation identified recent alluvial sediments underlain by marine/marginal-marine sediments and the Black Creek Formation. Without additional evidence to identify the marine/marginal-marine sediments as part of the Black Creek Formation, we have grouped them as Coastal Plain Undivided (CPU). Alluvial sediments consist of a surface layer of muck and organic sand, underlain by sand (A-3, A-2-4). We interpret these soils to be Quaternary-aged (<2 million years ago) sediments. The CPU sediments consist of sand (A-3, A-2-4, A-2-6) with interbedded clay (A-7-6). The Black Creek Formation consists of sand (A-3, A-2-4, A-2-6, A-1-b), underlain by clay (A-7-6, A-7-5). Roadway embankment fill consisting of sand (A-2-4) overlies the alluvium along the approach (Highway NC 87) to the existing bridge.

3.0 FOUNDATION MATERIALS

Boring logs describing subsurface conditions at each of the boring locations are included in this report. Generalized profiles, Drawings 4 and 10, depict subsurface conditions along the proposed bridge locations, 17 meters left and 3 meters right of -L-REV, respectively. Generalized cross-sections, Drawings 5 to 8 and 11 to 14, depict subsurface conditions along the bents for the proposed left and right lane structures, respectively.

3.1 Subsurface Conditions

Subsurface materials encountered during our investigation are divided into four major geologic strata: including Roadway Embankment Fill, Alluvium, Coastal Plain Undivided and Black Creek Formation. These four strata are divided into six material units that generally occupy the following relative vertical positions downward from the surface:

Roadway Embankment Fill

- Sand

Alluvium

- Muck and Organic Sand
- Sand

Coastal Plain Undivided

- Sand and Interbedded Clay

Black Creek Formation

- Sand
- Clay

3.1.1 Roadway Embankment Fill: Sand

Roadway Embankment Fill: The sand material unit consists of very loose to loose, dry to moist, silty, fine sand (A-2-4) with roots. The unit ranges in thickness from approximately 0.80 to 1.10 meters at boring locations, but is possibly two to three meters thick directly under Highway NC 87 at the existing bridge. The base of the roadway embankment fill is approximately at the elevations of 39.73 to 40.30 meters MSL and overlies alluvium.

3.1.2 Alluvium: Muck and Organic Sand

Alluvium: The muck and organic sand material unit consists of very soft and very loose, saturated, cohesive and granular soils. The channel bed (bulk sample S-1) consists of sand (A-3), but the

surficial soil in the swamp is generally a cohesive muck. The unit ranges in thickness from approximately 1.00 to 2.10 meters. The unit was not found in right-lane borings at end-bent 2. The base of the muck and organic sand unit is approximately at the elevations of 38.21 to 39.43 meters MSL and overlies alluvial sand.

3.1.3 Alluvium: Sand

Alluvium: The sand material unit consists of very loose to dense, saturated, silty, fine to coarse sand (A-3, A-2-4) with trace organics to organic sand layers. The sand unit ranges in thickness from approximately 1.90 to 4.30 meters. The base of the alluvial sand unit is approximately at the elevations of 35.49 to 36.31 meters MSL and overlies coastal plain undivided sand and interbedded clay.

3.1.4 Coastal Plain Undivided: Sand and Interbedded Clay

Coastal Plain Undivided: The sand and interbedded clay material unit consists of very loose to very dense, moist to saturated, silty, clayey, fine to coarse sand (A-3, A-2-4, A-2-6) with trace organics and trace gravel; and interbedded soft to very stiff, moist to wet, micaceous, fine sandy, silty clay (A-7-6) with very thinly bedded sand. The sand and interbedded clay unit is predominantly sand, and ranges in thickness from approximately 4.10 to 6.10 meters. The base of the sand and interbedded clay unit is approximately at the elevations of 29.91 to 33.10 meters MSL and overlies Black Creek Formation sand.

The clay interbeds range in thickness from approximately 0.63 to 3.00 meters and are discontinuous. The clay was not found at end-bent 1.

3.1.5 Black Creek Formation: Sand

Black Creek Formation: The sand material unit consists of loose to very dense, moist to saturated, micaceous, silty, clayey, fine to coarse sand (A-3, A-2-4, A-2-6, A-1-b). The sand unit ranges in thickness from approximately 10.10 to 15.00 meters. The base of the sand unit is approximately at the elevations of 18.23 to 20.80 meters MSL and overlies the Black Creek Formation clay material unit. The unit thickens from bent 1 to end-bent 2.

3.1.6 Black Creek Formation: Clay

Black Creek Formation: The clay material unit consists of stiff to hard, moist to wet, micaceous, fine sandy, silty clay (A-7-6, A-7-5). All borings drilled by MACTEC and the NCDOT, with the exception of B2-A LL, were terminated in this unit. Boring B2-A LL was terminated in the overlying unit.

4.0 SURFACE/GROUNDWATER

Depth to groundwater ranged from 0.09 to 0.62 meters below ground surface (elevations 40.40 to 40.96 meters MSL) in borings advanced through roadway embankment fill along the right lane. Groundwater was at the mudline at both left lane end-bent boring locations. Surface water was 0.10 to 0.30 meters deep at left lane interior bent locations. The water surface elevation in Reedy Meadow Swamp was 40.34 meters MSL on April 28, 2004.