

#### 4.4 Site Geology

The surficial materials consisting of very fine to medium grained sandy clay and clayey sand are Coastal Plain sediments of the early to late Pliocene aged Duplin Formation. Many of the surficial sediments appear to have been reworked through natural weathering mechanisms such as flooding. To assist in consistency between subsurface nomenclature, all shallow surficial (<3m BLS) materials are considered to be part of the Duplin Formation.

The Duplin beds consist of sands, sandy and silty clays, and very shelly sands which commonly overlie a phosphatic basal conglomerate (Ward, Bailey and Carter, 1991). The Duplin formation within the area of investigation is comprised of an approximately two to five meter thick layer of silty sand and sand containing shelly quartz sand and a diverse molluscan assemblage, gastropods, and other fossils. This layer is underlain by approximately two meters of grayish-blue, sandy clay which contains a low diversity molluscan assemblage and overall reduction in abundance of fossils and fossil fragments present. The basal portion of this formation is a thinner (<1m) bed of sand containing abundant detrital phosphate, rip-up clasts, and lignitized wood fragments.

Underlying the Duplin Formation is the Cretaceous aged Peedee Formation. The formation is dominantly a dark-greenish to gray, sparingly micaceous and glauconitic, argillaceous sand that commonly appears to be massive. Calcareous cemented concretions occur both sporadically or aligned at a uniform stratigraphic level. Dark marine clays are decidedly subordinate although locally they would be up to two meters thick (Sohl and Owens, 1991). Borings were not advanced into the Peedee Formation during this phase of the project.

#### 5.0 SUBSURFACE DESCRIPTION

Surficial soils encountered along the area of investigation from the beginning of the project to approximate station -L- 178+00 consist primarily of interfingering layers of clayey/silty sands, sand clay/silt mixtures, and clay (A-3, A-2, A-4, A-6, and A-7). The interbedded/alternating clay and sand units extend on average from ground surface to an elevation of roughly 42 to 44 meters MSL. The surficial sandy material encountered exhibited fair to good engineering characteristics on average. The material was usually non-plastic with N-values of 10 and above. The silty/clayey sediments typically exhibit fair to poor engineering properties which include relatively high moisture content, moderate to high percentage on average passing 200 sieve, and moderate to high plasticity. The sandy material is commonly not present from existing land surface to an elevation of roughly 41 meters MSL ahead of station -L- 178+00. Clay and silt was identified from station 178+00 to the end of the project extending from existing land surface to the contact with the underlying sand. The clay and silt typically were medium stiff to very stiff with trace amounts of fine grained sand. Clayey, very fine to medium grained sand (A-2 and A-3) is present from directly below the surficial materials to an approximate elevation of 35m MSL. A few isolated lenses of coarse grained material was identified sporadically throughout the project interbedded in the sand unit. The sand is commonly loose to very loose with no to low plasticity. Very stiff to hard clay to sandy clay with medium to high

plasticity was identified underlying the sand extending to the termination of the borings the deepest of which extended to an elevation of roughly 27m. Fill depths along the project average roughly 2.3 meters with the highest fill depth of 8.7 meters on alignment -RC- at Station 14+20.

#### 6.0 GROUND WATER

Ground water data was collected during October 2001 and January 2002. The region is experiencing severe to extreme drought conditions, thus the surficial water tables should theoretically be higher than measured during this investigation. However, ground water elevations recorded during the investigation of R-0513C (investigated in March through April of 1999) indicated that the average elevations recorded during this portion of the investigation may be representative of the actual elevations, and not influenced as heavily by low rainfall as anticipated. The surficial water table along the majority of the project corridor typically lies between 3 to 5m BLS. The 24-hour measurements were recorded at a rather consistent elevation of approximately 43 to 44m. During wet seasons or after significant rainfall, ground water may be within 0.5 meter of the existing ground surface or stand at the surface in areas not bisected by drainage ditches and creeks.