

SUBJECT: GEOTECHNICAL REPORT

DESCRIPTION: CURRITUCK AND KNOTTS ISLAND FERRY BASINS

WBS ELEMENT: 36722.1.1

TIP: F-4700

F.A. NUMBER: N/A

1.0 PROJECT DESCRIPTION

1.1 Background

The purpose of this investigation was to obtain geotechnical information for foundation design and construction of the proposed ferry docks and bulkheads at the Currituck and Knotts Island Ferry Basins, Currituck County, North Carolina (Sheet 6). Our understanding of this project comes from visits to the site; conversations with NCDOT Geotechnical Unit personnel; and from documents and drawings provided by the Geotechnical Unit including a Request for Proposal dated September 9, 2003, and electronic files on the NCDOT ftp site.

The project includes two new ferry docks to replace the existing docks at the Currituck and Knotts Island Ferry Basins. The bridge structures will extend out into Currituck Sound approximately 100 feet and 80 feet from land at the Currituck and Knotts Island Ferry Basins, respectively, and provide vehicle access to the ferry. The existing bulkhead at the Currituck Ferry Basin is also to be replaced.

End Bent 1 occurs in the flat, dry land of the Currituck Ferry site. Overhead and underground utilities are present at the site. Interior Bents 1 and 2 occur in Currituck Sound in approximately 1 to 8 feet of water, depending on wind conditions, and within the Currituck Ferry Basin. Bulkhead borings were performed approximately 10 feet behind the existing bulkhead, in the flat, dry land of the Currituck Ferry site.

Bent 3 occurs in Currituck Sound in approximately 1 to 4 feet of water, depending on wind conditions, and within the Knotts Island Ferry Basin. End Bent 2 occurs in the relatively flat, dry land of the Knotts Island Ferry site. Overhead and underground utilities are present at the site.

This geotechnical report describes the results of our subsurface investigation performed during November and December, 2003.

1.2 Field Testing

MACTEC advanced 11 borings at the locations shown on the Boring Location Plans (Sheets 7 and 38). Eight borings were advanced at the Currituck Ferry Basin (Sheet 7) and three borings were advanced at the Knotts Island Ferry Basin (Sheet 38). Land borings were drilled with a CME 45 trailer-mounted drill rig using mud-rotary drilling techniques. Water borings were accessed with MACTEC's barge and drilled with a CME 45 trailer-mounted drill rig using mud-rotary drilling techniques. Bulkhead borings (BH-1 to BH-4) were drilled to depths specified by NCDOT personnel of 35 feet. The ferry dock borings (EB-1, B-1 to B-5, EB-2) were drilled to depths that satisfy criteria specified by NCDOT personnel for 75 tons allowable pile capacity (150 tons

ultimate pile capacity) for concrete pile embedment utilizing the NCDOT Ultimate Pile Capacity Charts.

Our borings were offset from proposed locations where necessary to avoid overhead and underground utilities, and where shallow water conditions prevented access to proposed locations. Northing and easting coordinates at boring locations were determined utilizing GPS and conventional survey techniques. GPS collected coordinates were corrected as necessary using post-processing differential correction. Conventional survey techniques were used to establish the collar elevations at boring locations. GPS points established at the sites by NCDOT personnel were used as benchmarks.

Standard penetration tests (SPT) were conducted and soil samples collected at approximately five foot intervals within the soil profile using a split-spoon sampler and a 140 lb. safety hammer in accordance with procedures described in ASTM D 1586.

1.3 Laboratory Testing

Laboratory testing consisting of AASHTO classification and grain-size distribution tests were performed on split-spoon samples SS-1 through SS-35. The natural moisture content was determined for cohesive soils.

Laboratory testing was performed in accordance with applicable ASTM/AASHTO/NCDOT specifications. Test results for AASHTO classification, grain-size distribution, and moisture content are included in the Appendix.

2.0 PHYSIOGRAPHY AND GEOLOGY

2.1 Site Description

The Currituck Ferry site is located in a generally flat, low-lying, coastal setting on the west side of Currituck Sound. Bulkheads exist on the north and east sides of the site. The site is open with some trees and shrubs planted near the Currituck Ferry buildings, and with roadways and parking areas for ferry traffic. Ground surface elevations at the site range from 4 to 5 feet mean sea level (MSL).

The Knotts Island Ferry site is located in a generally flat, low-lying, coastal setting on the north side of Currituck Sound. A rip-rap protected slope exists on the south side of the site. The site is open with roadways and gravel parking areas for ferry traffic. Ground surface elevations at the site range from 7 to 8 feet MSL.

The elevation of the mudline of Currituck Sound ranges from -1.2 to -6.9 feet MSL and -1.2 to -1.4 feet MSL at the Currituck and Knotts Island Ferry Basins, respectively. Currituck Sound is tidally-influenced. However, we did not observe significant fluctuations in water levels during the time of our fieldwork due to tidal fluctuation. The water surface elevation of Currituck Sound is most influenced by wind conditions. Winds out of the north tend to push water out of the sound and winds from the south tend to push water into the sound. The water surface elevation of Currituck Sound ranged from a high of 0.9 feet MSL on 12/30/03 to a low of -0.4 feet MSL on 12/03/03. Site photographs included in this report show site conditions during our field investigation.