

GEOTECHNICAL UNIT FIELD SCOUR REPORT

WBS Element: 34209.1.1 ID: I-4025A COUNTY: Yadkin/Surry

F.A. Number: IMS-77-1 (141) 83
 DESCRIPTION(1): Bridge No. 13 on I-77 SBL over the Yadkin River, Yadkin Valley Railroad, and NC 268

INFORMATION ON EXISTING BRIDGES Information obtained from: field inspection
 microfilm(Reel: Pos:)
 other Bridge Survey and Hydraulic Design Report
 COUNTY BRIDGE NO. 13 BRIDGE LENGTH 760' NO. BENTS IN: CHANNEL 3 FLOOD PLAIN 7

FOUNDATION TYPE: Concrete deck supported by concrete girders with concrete abutments; reinforced post and web interior bents supported on spread footings at the interior bents.

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: No evidence of scour.
 INTERIOR BENTS: Localized scour pockets around Bents 3, 4, and 5 where eddies form. Silt and sand from the End Bent-1 slope has been deposited on top of the Bent-2 footing.
 CHANNEL BED: The channel bed between Bents 3 and 4 is deeper than the surrounding areas. Crescent-shaped scour pockets are present on channel back adjacent to Bent-5. Undercutting of the bank along the river is causing trees to fall into the channel. A large gully/depression is present between Bents 1 and 2, and in the open area between the northbound and southbound bridges (approx. 35' wide at its maximum width).
 CHANNEL BANKS:

EXISTING SCOUR PROTECTION:

TYPE(3): Only vegetation on the embankment slopes except for large rip rap and boulders on the west side and extending partially around to the north side of the embankment at End Bent-1.
 EXTENT(4): Vegetation on all slopes; rip rap and boulders at End Bent-1 begin about 20 feet south of the bent and extend around to underneath the existing bridge.

EFFECTIVENESS(5): Minimal
 OBSTRUCTIONS(6) (DAMS,DEBRIS,ETC.): These is a large debris pile (trees, limbs, etc.) lodged against the upstream side of Bent-4, and there is a sand deposit extending above the water surface behind the debris pile. There is also a large tree lodged in the channel between the bank and Bent-3.

DESIGN INFORMATION

CHANNEL BED MATERIAL(7) (SAMPLE RESULTS ATTACHED): Three SPT samples were taken within the channel bed; the tested alluvial material consists of fine to coarse SAND and gravel (A-1-b and A-3), while the tested residual material consists of coarse to fine sandy SILT (A-4).
 CHANNEL BANK MATERIAL(8) (SAMPLE RESULTS ATTACHED): Variably silty coarse to fine SAND with gravel (A-1-b and A-2-4), and clayey, fine sandy SILT (A-4)
 CHANNEL BANK COVER(9): Hardwood, brush, and grass/weeds; exposed sand at ground surface in some places.
 FLOOD PLAIN WIDTH(10): Approximately 550 feet
 FLOOD PLAIN COVER(11): Hardwood, brush, and grass/weeds; exposed sand at ground surface in some places.

DESIGN INFORMATION CONT.

STREAM IS X DEGRADING AGGRADING (12)
 OTHER OBSERVATIONS AND COMMENTS: Boulder and cobble size rocks are resting in the channel near the scour depressions around Bent-5. A large tributary (Fall Creek) feeds into the main channel of the Yadkin River from the south approx. 50' upstream of the existing bridge.

CHANNEL MIGRATION TENDENCY (13): Lateral migration potential exists on both sides of the river, but the meander bend direction seems to favor migration towards the south side.

REPORTED BY: Paul M... DATE: 5/26/2004
 Trigon Engineering Consultants, Inc.

GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14): We agree with the Pier Scour Data provided in the Bridge Survey and Hydraulic Design Reports, dated 1/28/04 and 3/30/04, for Bents B1 CS, B2 SS, B4 CS, B3 SS and B5 CS. The geotechnical adjusted scour elevations (GASE) for B2 CS, B1 SS and B3 CS are as follows:

	B2-A CS	B2-B CS	B1-A SS	B1-B SS	B3-A CS	B3-B CS
100-yr scour	856.4	853	858.1	855.1	857.2	858
500-yr scour	856.4	853	858.1	855.1	857.2	858

REPORTED BY: Bradley D... DATE: 7-20-04
 NCDOT GEOTECHNICAL UNIT INSTRUCTIONS

- (1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
- (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.)
- (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.)
- (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
- (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
- (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
- (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
- (9) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC.)
- (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING
- (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.