



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

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STATE PROJECT: 8.1741401 (I-4025A)
W.B.S: 34209.1.1
F. A. PROJECT NO. IMS-77-1(141)83
COUNTY: Yadkin-Surry

DESCRIPTION: Bridge No. 13 on I-77 SBL over Yadkin River, Yadkin Valley Railroad, and NC 268

SUBJECT: Geotechnical Report – Inventory

Project Description

The project would replace the I-77 SBL bridge immediately upstream (west) of the existing bridge. The existing and proposed structures span the river and associated floodplain, a railroad, and existing NC 268. The existing bridge is approximately 760' in length. The roadway approaches for the new structure will require excavation of existing cut slopes and widening of the existing approach embankment on the south end. Cut slope typical heights are 25 to 30 feet. The embankment height is near 40 feet maximum. The embankment side slopes will encroach on a small tributary stream (Fall Creek). The preliminary design that we worked from indicates a retaining wall to minimize stream impact. The stream is unnaturally straight and is bordered by embankment/rock fill on the I-77 side. It was probably relocated by the original construction.

The Geotechnical Field Investigation focused primarily on the proposed cut slopes and the potential retaining wall. Standard Penetration Test borings were conducted with a CME-550 drill utilizing 8" hollow stem augers. Access along the base of the embankment side slope became more and more restrictive approaching the end slope, due to the tributary stream on the left and boulder sized rip-rap on the existing slope. The rip-rap also prevented penetration of the drill augers, forcing abandonment of some planned borings. The abandoned borings are not shown on the attached plan and cross-section sheets, but were used along with visual inspection and probe/rod soundings to interpolate the extent of the rip-rap materials.

Areas of Special Geotechnical Interest

The existing fill slope on the left from approximate Station 23 ahead to the existing end slope is plated with large rip-rap. The rip-rap is exposed from a point about 20 feet down from the crest,

to the toe of slope. Further, a berm at the base of the slope appears to be constructed largely of the same rock. Probes made horizontally into the stream bank toward the roadway also encountered rip-rap. There is a considerable amount of this rip-rap. Stone size appears to range from 5" to 20" with a median around 12". It is obviously associated with the I-77 construction, although it is not clear if was part of the original construction or a later slope repair.

Alluvial soils are present in the same area. They extend from approximate Station 21+50 ahead to beyond the end slope. These sediments are up to 16' thick. At the surface they consist of loose sandy silts, some of which are deposited over rip-rap. This overlies intermittent soft clays, and basal sand with gravel.

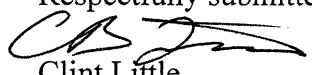
Soil Descriptions

Geology: The Yadkin River in this area is coincident with a series of mapped thrust faults in the area where the Sauratown Mountains Anticlinorium, Inner Piedmont Belt, and Blue Ridge Belt meet. All of the soils that we encountered were deeply weathered. We did not make any attempt to assign source formations. The soil descriptions are consistent with biotite gneiss and schist; the most likely source based on existing mapping. There is likely a variety of bedrock types present as well as shear zones, fault gouge, etc. The structure investigation to come later should provide additional data.

Residual Soils: We performed several Standard Penetration Test (SPT) borings along the top of the existing cut slopes to evaluate the widening of cuts. A-4 and A-5 silts were predominant, with lesser A-2-4 silty sand. A-7 fine sandy clay was encountered in one boring. SPT blow counts ranged from 4 to 25 with an average near 9. A thin seam of 100+ material was encountered near grade at Sta. 18+50.

Alluvial Soils: As previously discussed, alluvial soils are present along the left side of the proposed construction and probably under some portion of the existing embankment. The general pattern is silt overlying intermittent clay (or rip-rap), over basal sands with gravel. These sediments are, at least in part, associated with the tributary stream. The main floodplain of the Yadkin River is under the proposed bridge, and is not addressed in this investigation.

Existing Roadway: We did not perform any test borings along or through the existing pavement. Much of the existing roadway is in cut section and is assumed to be on residual soils similar to those found in the cut slope borings. The south approach to the existing bridge is on embankment. Review of the topography suggests that much of the embankment rests on residual soils. However, at the end bents and along the left side as previously discussed, the embankment rests on alluvial (floodplain) soils. We did not obtain a test boring through the embankment at this time, but expect to during the bridge foundation investigation.

Respectfully submitted,

Clint Little
Project Engineering Geologist