



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

June 28, 2013

MEMORANDUM TO: Mr. William T. Goodwin, P.E.,
Project Development – Bridge Unit

FROM: *Sen* David S. Chang, Ph.D., P.E.
State Hydraulics Engineer *Hyd R. May*

Subject: Preliminary Hydraulic Information for the Proposed
Replacement of Bridges No. 8 & 9 on NC 251 over Ivy
Creek, Madison County, WBS No. 38548.1.1,
TIP No. B-4777

Hydraulic Structure Recommendations:

The recommended replacement structures for both bridges No. 8 & 9 are bridges 240 feet long each and both with 120° skews. The bridges should be built at the same location and approximately the same elevation of the existing bridges. A minimum 0.3% gradient is recommended to facilitate deck drainage. Staging either bridge to accept temporary two-way traffic as an on-site detour is recommended. However, if an on-site detour is necessary a 240 ft. temporary detour bridge would be required.

Existing Structures:

The existing structure #8 is a five-span bridge comprised of the following spans: 5 @ 47' 6", totaling 238 ft. in length. It is skewed approximately 120° to the existing roadway and was built in 1939. It consists of reinforced concrete deck girders with reinforced concrete post & web piers. The bridge roadway deck is situated approximately 28 ft. above the creek bed. A normal water depth of approximately 4 ft. was observed at the existing bridge. The existing clear roadway width between rails is 30 feet of which only 15 feet is currently being used. The 100 year water surface elevation at this crossing of Ivy Creek does not overtop the existing roadway.

Existing structure #9 is a five-span bridge comprised of the following spans: 3 @ 47' 11", 1 @ 47' 5" and 1 @ 47' 10", totaling 237 ft. in length. It is skewed 120° to the existing roadway and was built in 1957. It consists of reinforced deck girders on reinforced concrete posts & beams. The bridge roadway deck is situated 30 feet above the creek bed. A normal water depth of approximately 5 feet was observed at the existing bridge. The existing clear roadway on the bridge between curbs is 28 feet of which only 18 feet is currently being used. The 100 year water surface elevation at this crossing of Ivy Creek does not overtop the existing roadway but the existing 100 year water surface elevation of the French Broad River does overtop the existing roadway.

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LOCATION:
CENTURY CENTER COMPLEX
BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Floodplain Management:

Madison County is a participant in the National Flood Insurance Program, administered by FEMA. The effective FEMA floodplain mapping indicates that this crossing of Ivy Creek is located within a flood hazard zone designated as Zone AE, for which 100-year base flood elevations have been established in a Limited Detailed Flood Study.

The Hydraulics Unit will coordinate with FEMA to determine if a Conditional Letter of Map Revision (CLOMR) and a subsequent final Letter of Map Revision (LOMR) are required for the project. If required, the Division Resident Engineer shall submit sealed as-built construction plans to the Hydraulics Unit upon project completion certifying the project was built as shown on the construction plans.

Environmental Considerations:

This crossing of the Ivy Creek is located within the French Broad River Basin and has a drainage area of 158 square miles. The current land use in the watershed is primarily agricultural with some residential and business uses. This stream location carries best usage classifications of WS-II, HQW by NC Division of Water Quality. The project is not within the water supply critical area, nor within the hazardous spill basin boundary. NCDOT's *Best Management Practices for Protection of Surface Waters* (March 1997) will be followed throughout the design and construction of the project. A State Stormwater Permit is not anticipated for this project.

DSC/SRM/khg

cc: Mr. Jay Bennett, P.E. (Roadway Design Unit)
Mr. Philip Harris III, P.E. (PDEA, Natural Environment Unit)
Mr. Greg Perfetti, P.E. (Structure Design Unit)
Mr. John Pilipchuk, P. E. (Geotechnical Engineering Unit)
Mr. Keith Johnston, P.E., P.L.S. (Photogrammetry Unit)
Mr. Charles W. Brown, P.E., P.L.S. (Location and Surveys Unit)
Mr. Cameron Cochran, P.E. (Area Bridge Construction Engineer)
Mr. Jay Swain, Jr., P.E. (Division Engineer)