STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

June 20, 2013

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

FROM: for David S. Chang, Ph.D., P.E.
State Hydraulics Engineer

Subject: Preliminary Hydraulic Information for the Proposed Replacement of Bridges No. 133 and 134 on SR 1722 (Three Bridge Road) over the Black River and Black River Overflow respectively, Harnett County, WBS No. 38406.1.1, TIP No. B-4544

Hydraulic Structure Recommendations:
The recommended replacement structure for Bridge No. 133 is a 70 ft. bridge at approximately 90° skew. The recommended replacement structure for Bridge No. 134 is a 70ft. bridge at approximately 90° skew. To minimize approach work, utility conflicts, and environmental impacts, the bridges should be built at the existing location and at approximately the same elevation as that of the existing bridges with a minimum 0.3% gradient to facilitate deck drainage. An off-site detour is recommended. However, if an on-site detour is necessary to replace Bridge No. 133, an 70 ft. temporary detour bridge would be required located on the western side (upstream) of the existing bridge at approximately the same grade and elevation of the existing bridge to minimize wetland impacts. Also, if an on-site detour is necessary to replace Bridge No. 134, an 70 ft. temporary detour bridge would be required located on the eastern side (downstream) of the existing bridge at approximately the same grade and elevation of the existing bridge to minimize wetland impacts.

Existing Structure:
The existing structure Bridge No. 133 is a three-span bridge, comprised of the following spans: 1 @ 18 ft.-0 in., 1 @ 17 ft.-0 in., and 1 @ 18 ft.-0 in. totaling 53 ft.-0 in. in length. It is skewed approximately 90° to the existing roadway and was built in 1957. The superstructure consists of reinforced concrete deck and timber joists. The vertical end bents and interior bents are constructed of timber caps and timber piles with steel crutch bents. The bridge roadway deck is situated approximately 16 ft. above the river bed. A normal water depth of approximately 7 ft. was observed at the existing bridge. The existing low chord is 6.7 ft. above the normal water depth. The current 100 year water surface elevation at this crossing of the Black River does not overtop the existing roadway.

The existing structure Bridge No. 134 is a three-span bridge, comprised of the following spans: 1 @ 18 ft.-0 in., 1 @ 17 ft.-0 in., and 1 @ 18 ft.-0 in. totaling 53 ft.-0 in. in length. It is skewed approximately 90° to the existing roadway and was built in 1957. The superstructure consists of reinforced concrete deck and timber joists. The vertical end bents and interior bents are constructed of timber caps and timber piles with steel crutch bents. The bridge roadway deck is situated approximately 13 ft. above the river bed. A normal water depth of approximately 3 ft. was observed at the existing bridge. The existing low

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1020 BIRCH RIDGE DRIVE
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chord is 8.1 ft. above the normal water depth. The current 100 year water surface elevation at this crossing of the Black River Overflow does not overtop the existing roadway.

Floodplain Management:
Harnett County is a participant in the National Flood Insurance Program, administered by the Federal Emergency Management Agency (FEMA). Based on the most current information available from the NC Floodplain Mapping Program (FMP), this stream crossing is in a designated flood hazard zone which is within a Limited Detailed flood study reach, having a regulated 100-year non-encroachment width regulated as a floodway. The proposed bridge replacement will provide equivalent or greater conveyance than that of the existing bridge. The Hydraulics Unit will coordinate with the FMP, the delegated state agency for administering FEMA's National Flood Insurance Program, to determine the status of the project with regard to applicability of NCDOT'S Memorandum of Agreement with FMP, or approval of a Conditional Letter of Map Revision (CLOMR) and subsequent final Letter of Map Revision (LOMR). This project involves construction activities on or adjacent to a FEMA-regulated stream. Therefore, the Division shall submit sealed as-built construction plans to the Hydraulics Unit upon completion of project construction, certifying that the drainage structures and roadway embankment that are located within the 100-year floodplain were built as shown in the construction plans, both horizontally and vertically.

Environmental Considerations:
The crossings of the Black River and the Black River Overflow are located within the Cape Fear River Basin and have a combined drainage area of 37 square miles. The current land use in the watershed is primarily forestland, agriculture, and rural residential with some urban development. The river and river overflow locations carry a best usage classification of Class C; Sw by NC Division of Water Quality and are listed in the U.S. Fish and Wildlife Service National Wetlands Inventory. 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/PA/rce

Cc: Mr. Jay Bennett, P.E. (Roadway Design Unit)
Mr. Phil Harris, III, P.E. (PDEA, Natural Environment Unit)
Mr. Greg Perfetti, P.E. (Structure Design)
Mr. John L. Pilipchuk, L.G., P.E. (Geotechnical Engineering Unit)
Mr. Keith Johnston, P.E., PLS (Photogrammetry Unit)
Mr. Charles W. Brown, P.E., P.L.S. (Location and Surveys Unit)
Mr. Aaron Earwood, P.E. (Area Bridge Construction Engineer)
Mr. Greg Burns, P.E. (Division Engineer)