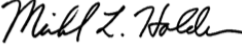




PAT McCRORY
Governor

NICHOLAS J. TENNYSON
Secretary

October 27, 2016

From: Michael L Holder, P.E. 
Chief Engineer

To: Division Engineers

Subject: Emergency Drainage Structure Replacement Protocol

On October 18, 2016, David Chang of the Hydraulics Unit met with Mr. John Dorman, the Director of NC Floodplain Mapping Program (FMP), to discuss the needed coordination between NCDOT and FMP on the replacement of drainage structures on FEMA regulated streams. To expedite FEMA's National Flood Insurance Program (NFIP) compliance review on the replacement of these damaged drainage structures (pipes, reinforced concrete box culverts, and bridges) within the Department's Rights of Way, both Messrs. Dorman and Chang have developed a protocol for the acceptable drainage design and NFIP compliance which is summarized below:

1. Pipe Replacement:

- Pipe can be either concrete pipe or metal of any shape (circular, arch, elliptical, etc.)
- Guiding documents are MOA and NCDOT Guidelines for Drainage Studies and Hydraulic Design.
- The State Hydraulics Engineer approves the design and/or NFIP compliance.
- NCDOT submits design information to FMP for the inclusion of future NFIP flood maps. No hydraulic (HEC-RAS) model or formal MOA submittal is required.

2. Reinforced Concrete Box Culvert or Bridge Replacement:

- RCBC can be either precast or cast-in-place box culvert.
- Guiding documents are MOA and NCDOT Guidelines for Drainage Studies and Hydraulic Design.



- The State Hydraulics Engineer approves the design and notifies Division for construction.
- For structures that are on FEMA regulated streams the Hydraulics Unit staff follows MOA to submit design reports to FMP for compliance review during or post construction. FMP Director or the State Hydraulics Engineer approves the design reports per MOA.
- For structures that are not on FEMA regulated streams the State Hydraulics Engineer or his staff approves the design reports.

Please be reminded that this protocol only applies to **Hurricane Matthew** and all future **emergency replacements**. For the Division-managed STIP projects and the routine maintenance tasks, the Divisions' staff should follow the MOA to ensure full compliance with FEMA's NFIP.

I ask that you share this with your staff and your contract consultants. If you have any questions, you may contact Messrs. David Chang or Jay Twisdale, Jr. of the Hydraulics Unit at (919) 707-6700.

MLH/dsc

Cc: Mr. John Dorman, CFM, Director of Floodplain Mapping Program
Mr. Tom Langan, P.E., CFM, Floodplain Mapping Program
Mr. Rodger Rochelle, P.E., Technical Services Administrator
Mr. Ronald Hancock, P.E., Deputy Chief Engineer
Mr. Scott Capps, P.E., State Maintenance Engineer
Mr. David Chang, Ph.D., P.E., State Hydraulics Engineer