NCDOT Guidelines for Post Installation Evaluation and Repair of Newly-Installed Drainage Pipe

NCDOT will require random video analysis on newly-installed drainage pipe to determine the condition of the pipe. Initial analysis should be performed if possible as soon as the pipe is installed to determine if any major problems exist with the contractor's installation methods. As the installation progresses, additional random inspections may be required to verify the quality of the installation and performance of the material. The video inspection may be performed by NCDOT or by an NCDOT-approved entity. However, the analysis of the video will be performed by an Engineer within NCDOT. The following criteria will be applied to all pipe material types and will be utilized to determine the course of action, if any, to be taken when there are cracks, deflections, bulges, creases, tears, spalls, or delaminations in the pipe. The final decision on course of action and acceptability will be determined by the NCDOT Engineer.

Cracks (Rigid Pipes):

- Cracks $\leq$ 0.01" typically do not require repair or remediation.

- Cracks > 0.01" and < 0.05" are acceptable. However, multiple cracks of this size in an 8' section may require minor repair.

- In accordance with AASHTO LRFD Bridge Construction Specifications Section 27.6.4, record cracks greater than 0.01" wide. Monitor these cracks in any subsequent inspections.

- If the pipe is located in an area of the state that exhibits corrosive soils, minor repair may be required.*

- Cracks > 0.05" but $\leq$ 0.10" are acceptable unless the following additional conditions exist:
    - Minor repair is required if the pipe is located in an area of the state that exhibits corrosive soils.*
    - If vertical offset across a crack is exhibited, the following guidelines shall be followed:
        - When vertical offset is less than 0.10" provide minor repair.
        - For vertical offset greater than 0.10" a determination will be made by the Department on the repair method or acceptability of the pipe.

- Cracks > 0.10" will be given consideration by the Department to replace the pipe or allow a Site Specific Major Repair. See the last section of these guidelines for details concerning Site Specific Major Repairs.

* For the following counties, Site Specific Repairs that fall outside the provided ranges may be necessary to prevent corrosion in the pipe's reinforcement: Beaufort, Bertie, Bladen Brunswick, Camden, Carteret, Chowan, Columbus, Craven, Currituck, Dare, Gates, Hertford, Hyde, Jones, Martin, New Hanover, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Tyrrell, and Washington. Other areas throughout the state may require repairs if the pipe is determined to be installed in a corrosive environment (hot rock, very high soil pH levels, very low soil pH levels, etc.).

Cracks or Tears (Flexible Pipes)

HDPE, PVC, or CMP exhibiting any crack/tear

- Consideration will be given by the Department to replace the pipe or allow a Site Specific Repair for any tear that is through the liner of HDPE or for any tear in the wall of CMP or PVC. See the repair section of these guidelines for details concerning Site Specific Repairs.

Deflection (Flexible Pipes)

- Base all deflection measurements on the inside pipe diameter supplied by the manufacturer or actual measurements obtained on the project.

- Pipe deflections > 0% but $\leq$ 5.0% typically do not require repair or remediation.

- Pipe deflections $\geq$ 5.0% but $\leq$ 7.5% will be evaluated by the Department and a determination made as to acceptability or replacement.

- Pipe deflections > 7.5% require replacement.

Joint Separation (All Pipe Types)

- For joints that are Soil Tight – If infiltration or exfiltration is observed and the joint gap is less than AASHTO guidelines and the manufacturer's requirements, provide minor repair. If not able to repair, replace as needed. If the joint gap is greater than AASHTO guidelines and greater than manufacturer's recommendations, provide Site Specific Major Repair or replace as needed.

Slabbing (Rigid Pipe)

- For pipe with slabbing, provide a site specific major repair or replace pipe.

Spalling (Rigid Pipe)

- For pipe with spalling that does not have exposed reinforcement, evaluate to determine if a minor repair is necessary.

- For pipe with spalling that has exposed reinforcement, evaluate to determine if site specific major repair will be appropriate. If not, replace the pipe.

Repairs (All Pipe Types)

Minor Repairs

Can be made with approved materials or methods and do not require a site specific analysis.

Examples of minor repairs can be found in ASTM C990 14.1 and the ACPA "Post Installation Evaluation and Repair of Installed Reinforced Concrete Pipe" Manual.

Other repair resources can be found by visiting the following link http://www.dot.state.fl.us/construction/ContractorIssues/PipeMatrix/MatrixMain.shtm and choosing the type of pipe under evaluation.

Site Specific Major Repairs

Will be designed by a Professional Engineer, sealed and submitted to NCDOT by the contractor for evaluation and approval. Examples of major repairs can be found in the CCPPA "Guidelines for Post Installation Evaluation and Repair of Installed Reinforced Concrete Pipe".

Any repairs made to the installed pipe must be certified by the contractor and the repair contractor. This certification will state that all repairs will have the same service life as newly-installed pipe.