Section 02220 - WORK IN RAILROAD RIGHTS-OF-WAY

1. SCOPE. The Contractor shall coordinate the work in the railroad rights-of-way with the railroad engineering department. The Contractor shall make all necessary arrangements, and pay all cost charged to the crossing by the railroad. Upon completion of the Project, and prior to final payment, the Contractor shall submit to the Owner, in duplicate, a written statement from the railroad stating that the work in connection with the crossing has been accomplished in accordance with their requirements and satisfaction and that all their charges in connection with the crossing have been paid in full.

2. APPROVAL. The Contractor shall notify the railroad in writing, with a copy to the Owner, 5 days prior to the time work is expected to begin in the railroad rights-of-way. No work shall be done within the railroad right-of-way except when the railroad's inspector or other approved personnel is on the site unless the railroad forwards written permission to the contrary.

3. INSURANCE. The Contractor shall submit to the railroad's general attorney insurance policies or certificates of same for approval before any work on railroad rights-of-way commences. Unless otherwise shown in SPECIAL CONDITIONS, the railroad companies will require the following insurance while Contractor is engaged in work on railroad rights-of-way: Workman's Compensation and Employer's Liability insurance and Public Liability insurance covering bodily injury in the amount of $500,000 for loss of life or injury to each person and $1,000,000 for each occurrence. The property damage insurance should be in the amount of $1,000,000, and should include a Contractual Liability Endorsement to cover obligations assumed by the Contractor.

4. ACCIDENT PREVENTION. Caution shall be exercised by the Contractor al all times for the protection of all persons, work and property. Hazardous conditions shall be guarded against or eliminated. Necessary bracing, bulkheads, shields, etc., shall be required to ensure complete safety to rail traffic at all times during progress of the work.
other plugs shall be threaded PVC.

5. BORING OR JACKING. In addition to the requirements specified in the boring and jacking section, the jacking pits shall be sufficient length to accommodate the pipe sections plus blocking, jacks, etc. The width of the pits shall be a minimum of 4 feet wider than the diameter of the encasement pipes. Pits shall be sheeted and shored if necessary. The face of shoring or sheeting shall be a minimum of 12 feet from the center line of track. The initial length of pipe to be jacked beneath the track shall have a "cutter" section. The Contractor shall keep the pits and adjacent areas dewatered during construction. Trenches and ditches shall be kept free from water.

6. TUNNEL LINERS.

6.01. The Contractor shall furnish and install tunnel liners suitable for the installation of the interceptor sewer or water main at locations shown on the contract drawings. The tunneling operation shall conform to the requirements of the American Railway Engineering Association Specifications, Part 5, Pipelines, or the AASHO Standard Specifications for Highway Bridges.

6.02. The tunnel liner plates shall be fabricated from structural quality, hot rolled, carbon steel sheets or plates conforming to ASTM A569. The mechanical properties of the plates and sheets before cold rolling shall be a minimum 42,000 psi tensile strength, 28,000 psi yield strength, and 30 percent elongation in 2 inches. Thickness tolerances shall conform to paragraph 14 of AASHTO M167.

6.03. The tunnel shall be installed using plates of the gage (thickness), size and dimension indicated, and shall conform with the line and grade shown on the contract drawings.

6.04. Tunnel liner plates shall be 4 flanged to permit complete erection from the inside. All plates shall be connected by bolts on both longitudinal and circumferential joints. All plates shall be bituminous coated.

6.05. Bolts and nuts shall not be less than 1/2 inch in diameter for plate thicknesses up to and including 0.179 inches (7 gage) and not less than 5/8 inch for plate thickness equal to or greater than 0.209 inches (5 gage). Bolts and nuts shall be quick acting coarse thread and shall conform to ASTM A307, Grade A.

6.06. Liner plates shall be assembled in accordance with manufacturer's instructions. Courses of plates shall be staggered 1/2 plate when the course contains all whole plates. When the course contains 1/2 plate, the course shall be staggered 1/4 plate with the half plates being placed on opposite sides of the tunnel in alternate courses.

6.07. Coated plates shall be handled in such a manner as to prevent bruising, scaling, or breaking of the coating. Any plates that are damaged during handling or placing shall be replaced by the Contractor at his expense, except that small areas with minor damage to the coating may be repaired by the Contractor as directed by the Engineer.

6.08. The tunneling operation shall proceed only a distance sufficient for placing one section of tunnel liner. The tunnel liner must be placed before proceeding further. At no time will jetting be allowed.

6.09. The void between the outside of the tunnel liner plates and the excavation shall be grouted with 1:3 Portland Cement Pressure Grout. The grout shall be pumped into the void at not less than 50 psi through 2-inch diameter openings on 4-foot centers located in the overt of the tunnel. The grouting operating shall progress with the installation of the

tunnel encasement in such a manner so that at no time will the grouting operation be further than 25 feet from the front end or head of the tunnel construction.

6.10. The entire void between the tunnel and the excavation shall be grouted immediately upon completion of excavation work and installation of the tunnel liner plates. Grout will be forced into each grout hole. If grout from one hole should plug the next hole, the plugged hole shall be opened by punching through the grout layer so that each hole may be used for grouting. The grouting operation shall be conducted at each hole until all voids outside the liner are filled and no more grout will flow at the required pressure.

6.11. No blasting of rock will be permitted within the railroad's rights-of-way. If rock is encountered the Contractor shall drill and shale off the rock with air hammer or remove by other conventional means. If a boulder is encountered and removed, a bulkhead will be formed immediately after removal of the boulder and the area filled with grout before preceding with the tunneling operations.

6.12. If there is any indication of a vertical split in the rock formation, or any indication of settlement of the railroad during the tunneling operations, all operations shall be stopped and the railroad's engineer shall be notified immediately. If the vertical split is not determined to be of too great a magnitude or too close to the rails, the split shall be filled with grout at a pressure specified by the railroad's engineer, allowed to set and tunneling operations may be continued. If it is determined that the vertical split is too great of a magnitude or too close to the rails, the railroad's engineer shall advise as to the proper method to be used to correct the vertical split. If settlement of the railroad occurs, the railroad's engineer will advise the Owner and his Contractor as to the proper steps to be taken to correct the settlement.

6.13. The entire operation shall be subject to inspection by the railroad's engineer or inspector on the project, who shall have full authority to stop work if, in his opinion, it shall cause any damage to the railroad. All materials shall be subject to inspection by the railroad.

6.14. If required, the method of shoring the pits for tunneling operations shall be submitted and approved by the railroad prior to any work beginning at the site.

6.15. After installation of the tunnel liner plate, a paved invert shall be poured using 2,500 psi concrete. The invert shall be poured at grade to facilitate installation of the carrier pipe on line and grade shown on the contract drawings. Support blocks shall be used to refrain lateral movement of the carrier pipe. After the alignment, grade and elevations of the carrier pipe have been checked and approved by the Engineer, both ends of the tunnel shall be bricked up the void space between the carrier pipe and the tunnel liner shall be filled with 2,500 psi concrete.

6.16. The Contractor shall make all necessary repairs or he shall reimburse the Board, and subsequently, he shall reimburse the railroad for repair costs, should any settlement

or damage result to the railroad within 1 year period after completion of the tunneling operation.

6.17. The Contractor or any of his Subcontractors performing work on railroad right-of-way in connection with the tunneling operation shall carry a certificate of insurance in an amount required by the railroad for bodily injury and property damage before beginning any work at the site. The certificate is to provide for explosion, collapse and underground insurance coverage.

6.18. It will be the responsibility of the Contractor and/or his Subcontractor to furnish and keep in force the insurance requirements for a period of 1 year after completion and acceptance of the work by the Owner and the railroad. The certificate is to be countersigned by an authorized North Carolina Resident Agent with the name and address of the agent thereon. The certificate shall make reference to the project and country.

End of Section