



SPECIAL PROVISIONS
FOR
HORIZONTAL DIRECTIONAL DRILLING FOR WATER MAIN

Linn County

Project Numbers
NHSX-100-1(59)--3H-57 and
ESP-100-1(61)--2S-57

Effective Date
October 20, 2009

THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS,
SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND
ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL
OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

PART 1 GENERAL

1.01 - Submittals

- A. Shop Drawings:
 - 1. Description of how pilot hole drill will be steered and of how position and inclination of bore head will be monitored.
 - 2. Installation plan, including detailed plan and profile of bore plotted at scale no smaller than 1-inch equals 40 feet horizontal and vertical.
- B. Record Drawings: plan and profile showing as-constructed position of pipeline(s).

1.02 - Quality Assurance

- A. Provide key personnel and related experience with directional drilling and associated pipe installation with at least five (5) completed projects in the last five (5) years with a minimum of 5000 lineal feet of pipe installed by grade control horizontal directional drilling methods. Key personnel include field supervisor and operators of directional drilling equipment, including position monitoring and steering equipment. Project experience should include pipe consisting of a minimum 8 inches in diameter.

PART 2 PRODUCTS

2.01 - Water Main

- A. DIP Water Main materials shall consist of:
 - 1. SUPER-LOCK by Clow Water Systems Company
 - 2. AMERICAN FLEX RING pipe
 - 3. TR FLEX and HP LOK by US Pipe and Foundry Company
 - 4. Or approved equivalent
- B. DIP Water Main materials shall meet the requirements:
 - 1. Class 52 thickness (ANSI/AWWA C151/A21.51)
 - 2. Cement-mortar lined with asphaltic seal coat (ANSI/AWWA C104/A21.4)
 - 3. Polyethylene encasement (ANSI/AWWA C105/A21.5)

PART 3 EXECUTION

3.01 - General

- A. Comply with related SPECIAL PROVISIONS FOR WATER MAIN (SP-016225) associated with water main improvements on this Project.

3.02 - Preparations

- A. Locate positions of entry and exit pits. Establish elevation and horizontal datum for bore head control, and lay out pipe assembly area.
- B. Lay out and assemble pipe in manner that does not obstruct adjacent roads, nearby railroads, and commercial or residential activities adjacent to construction easements or municipal right-of-way. Elevate pipe over streets or railroads as necessary to avoid disruption to traffic.

3.03 - Drilling Pilot Hole

- A. Drill pilot hole from entrance point to exit point following vertical alignment shown.
- B. As pilot hole is advanced, plot actual horizontal and vertical alignment of pilot hole at intervals not exceeding 25 feet. Provide ENGINEER with position and inclination of pilot bore at each 25-foot interval.
- C. A written log of the interval locations of the pilot bore plotted on the profile drawing shall be supplied to and approved by the ENGINEER prior to pipe installation.

D. Alignment Requirements:

1. Pilot hole exit point shall be within one (1) foot horizontally of exit point location located by OWNER.
 2. Throughout its alignment, pilot hole shall be within one (1) foot of horizontal alignment shown, and have a grade within 0.2% of the design grade throughout its length.
 3. Alignment shall have no intermediate high or low points that will impede flow after pipe is installed.
 4. Pilot hole shall be within 0.3 feet vertically of the exit hole location.
 5. Throughout its alignment, the pilot hole shall be within 0.3 feet of the vertical alignment shown in the Contract Documents.
 6. Curvature of completed pilot hole shall not exceed that which after pipe installation will result in pipe wall stresses greater than 0.50 of yield stress.
 7. Perform open excavation for horizontal and vertical alignment checks at a minimum of every 150' and at every service wye, water main tee, valve or hydrant location.
- E. Acceptance: If pilot hole alignment fails to conform to specified requirements, drill new pilot hole with alignment meeting specified requirements.

3.04 - Reaming Pilot Hole and Pulling Pipe

- A. Obtain ENGINEER's approval to precede before enlarging pilot hole and pulling pipe into position.
- B. While pulling pipe, enlarge pilot hole ahead of pipe to diameter sufficient for pulling pipe into position.
- C. While pulling pipe, handle pipe in manner that does not overstress pipe. Limit radius of curvature along length of pipe during installation to minimum radius as specified per manufacturer's deflection tolerance. If pipe buckles or is otherwise damaged, remove damaged section and replace it with new pipe.
- D. Protect interior lining and exterior coating from damage.
- E. Pull pipe so that minimum of 10 feet of pipe is exposed at both ends of bore.
- F. For DIP Water Main: The DIP water main pipe installed by horizontal directional drilling shall be installed with a double polyethylene encasement wrap per ANSI/AWWA C105/A21.5. Any damage that occurs to the polyethylene wrap during pipe handling and throughout the construction process shall be repaired prior to pulling the pipe string into the bore path. The Contractor shall confirm the utilized securing method is working properly at all exposed connection points with the main.

3.05 - Cleaning Pipe Ends

- A. After pulling pipe, clean exposed ends for installation of fittings.

3.06 - Grouting

- A. Fill void around pipe with grout. Displace drilling mud as necessary to maintain specified grade control and completely fill annular space between pipe and walls of borehole.

3.07 - Handling and Disposal of Drilling Mud and Cuttings

- A. Make adequate provisions for handling and containing muddy water, drilling mud, and cuttings during drilling operations. Do not discharge these contaminants into waterways.
- B. Construct mud pits at entry and exit points in manner that completely contains mud and prevents its escape.
- C. When onsite provisions for storing muddy water, drilling mud, or cuttings onsite are exceeded, haul contaminants away to suitable legal disposal site.
- D. Conduct directional drilling operation in such manner that drilling mud is not forced through adjacent soil into areas where it might be objectionable.

3.08 - Pressure Testing

- A. Water Main: Refer to SPECIAL PROVISIONS FOR WATER MAIN (SP-016225) for Water Main Disinfection by Continuous Feed Method.

3. 10 - Pipe Abandonment

- A. In event of failure to install pipe, retain possession of pipe and remove it from site. Completely fill borehole with grout or sand so as to prevent future settlement.
- B. If pipe cannot be withdrawn, cut pipe off at least 3 feet below ground surface and cap ends of pipe with blind flange. Fill annular space with grout.

3. 11 – Record Keeping

- A. Contractor shall maintain a daily record of the drilling operations and a guidance system log with a copy given to the Engineer at the completion of the boring. As-built drawings shall be certified by the Contractor, for accuracy.