

SECTION 02215 - HORIZONTAL DIRECTIONAL DRILLING

PART 1 - GENERAL

SUMMARY

Section Includes. Specifications for installation of pipelines by horizontal directional drilling where called for on the Drawings or chosen by CONTRACTOR.

Work shall include piping connections to existing piping, or to pipes installed by other methods.

For potable water mains, the Work shall include pressure testing, cleaning and disinfection as required in Section 02660, Water Distribution.

For pumping mains, the Work shall include all testing as required in Section 15070, Pressure Process Piping.

Products Installed But Not Supplied Under This Section. Unless otherwise noted on the Drawings, or stated in this Section, all piping shall be furnished under Section 15070, Pressure Process Piping, and installed under this Section of the Work.

All necessary joint and coupling materials, including bolts, nuts and gaskets, wall castings or sleeves, supports, anchors, blocking, harnesses and other necessary closure pipe sections, pipe locating wire or markers and standard or special fittings shall be furnished under Section 15070, Pressure Process Piping.

Related Sections

Section 02660	Water Distribution
Section 02740	Sewage Force Mains

SUBMITTALS

Pipe Logs. The requirements for the necessary pipe location logs are found in detail under Field Quality Control. Submit a written report to ENGINEER documenting location and depth of pipe.

Submit logs and summary of stresses on pipe during installation

Equipment Data. Furnish data on tracking systems that will be used. Data shall include depth and accuracy capabilities of equipment.

Drilling Fluids. Submit manufacturer's data.

Pipe Design. Submit design calculations.

REFERENCES

Chevron Phillips Chemical Company LP, Plexco Pipe, Technical Note "Trenchless Technology Bulletin No. 1," revised March 2000, may be used as guideline for HDPE pipe design.

PART 2 - PRODUCTS

DRILLING FLUID

Drilling fluid shall be bentonite clay mixture. CONTRACTOR may use a polymer additive at CONTRACTOR's option.

PIPE

Pipe shall be DIP, HDPE or steel as specified in Section 15070, Pressure Process Piping.

CONTRACTOR shall determine the pipe SDR required based on the proposed installation procedures, and the following analysis:

Tensile Pull Load: (Based on pipe weight, pipe friction on the ground, pipe friction in the borehole, flotation loads, and submersion load; tensile load shall be calculated for a minimum of three conditions: when the pipe enters the borehole, midway through insertion, and as the pipe leaves the ream hole.)
Limit tensile stress to 1600 PSI.

Bending stress on pipe sidewalls during installation

Net longitudinal compressive stress, based on bending stresses.

Total longitudinal axial stress from sustained loads.

External differential pressure collapse/buckling resistance.

Earth load on pipe following installation at maximum depth.

Summarize results in a tabular format including values used for pipe physical properties.

Include sketches to show critical installation dimensions.

The SDR used shall be the lower of that specified by ENGINEER in Section 15070, Pressure Process Piping or that required by the above analysis.

DIP pipe shall be manufactured by US Pipe and shall be TR Flex type or approved equal, with polyethylene encasement.

HDPE pipe shall be manufactured from high density PE 3408 polyethylene resin, having a dimension ratio (DR) of 11 or less. The DR is calculated as the outside diameter of the pipe divided by the minimum wall thickness.

TRACER WIRE

Tracer wire shall be used as specified in Section 15070, Pressure Process Piping.

PART 3 - EXECUTION

SITE CONDITIONS

CONTRACTOR shall examine the site(s) indicated. The limits of surface excavation are shown on the Drawings. CONTRACTOR shall be responsible for locating the borehole and receiving hole sufficiently back from the limits of excavation to allow connection to the horizontally drilled pipe.

PROTECTION

Provide all required sediment and erosion control measurements to prevent drilling fluid or borehole cuttings from entering the wetlands areas or surface waters.

INSTALLATION

Pilot hole shall establish the horizontal plane of the pipeline. A plot of length versus elevation versus left/right variance will dictate the actual as-built plan and profile of the pipeline. Data feedback and electronic guidance systems are supplemental surface tracking systems and shall be used to provide confirmation of position.

Minimum depths are indicated on the Drawings. Pipe may be installed at greater depths to facilitate the installation if the proposed greater depth is reviewed and approved by ENGINEER before installation.

Reaming shall consist of using a appropriate tool to open the pilot hole to a slightly larger diameter than the carrier pipeline. The percentage over size shall depend on soil types, soil stabilities, depth, drilling fluid hydrostatic pressure, etc. Normal oversizing shall be from 120 percent to 150 percent of the carrier pipe diameter. Drilling fluid shall be forced down the hole to stabilize the hole and to removed soil cuttings.

Pull back the entire pipeline length in one segment back through the drilling fluid along the reamed hole pathway. Proper pipe handling, cradling, bending minimization, surface force readings, constant insertion velocity, drilling fluid flow circulation/exit rate, and footage length installed shall be recorded. The pull-back speed shall be within the pipe manufacturer's recommendations.

The as-built drawings are finalized based on the final course followed by the reamer and the installed pipeline. The gravity forces may have caused the reamer to go slightly deeper than the pilot hole and the buoyant pipe may be resting on the crown of the reamed hole.

Any bits, drills, reamers, or other tools lost or stuck in the hole shall be removed at CONTRACTOR's expense. If tools cannot be readily removed, CONTRACTOR may at CONTRACTOR's option abandon the hole. No payment shall be made for any lost equipment, material, or work on abandoned holes.

Allowable Tolerances In Pipe Grade. A variation greater than 6-inches from the horizontal plan or designated grade is sufficient reason for rejection of the pipe, and pipe shall be re-bored to proper grade if so directed by ENGINEER at no cost to Municipality .

Drilling Fluid. Drilling fluid to be used to facilitate installation of the pipe shall be adjusted within acceptable limits such that ground heaving and subsurface cavity formation through erosion are prevented.

CLEAN-UP AND RESTORATION

Spent drilling fluid and cuttings shall be confined to vicinity of drilling rig.

Any drilling fluid which enters the pipe shall be removed by flushing or other suitable means.

CONTRACTOR shall be responsible for cleanup and restoration, should the borehole blow out due to excessive pressure in the drilling fluid. No additional payment shall be made for cleanup costs required by OWNER, ENGINEER, or regulatory agencies due to a loss of drilling fluid.

Restoration. Pits excavated to permit connection of bored pipe shall be backfilled, and disturbed surface shall be restored as described under other Division 2 Section specifications.

FIELD QUALITY CONTROL

Pipe Logs. Logs shall be kept giving the horizontal and vertical position of the transmission main or force main at 25-foot intervals along the pipe points to confirm its conformance to specified depth and line and grade shown on the Drawings. No payment for any length pipe shall be made without a log accompanying it.

END OF SECTION 02215