SECTION 26 05 34

UNDERGROUND HDPE PATHWAYS FOR ELECTRICAL SYSTEMS

BASED ON DFD MASTER SPECIFICATION DATED 03/01/21

Notes to A/E:

This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.

Revision History:

New section.

1. GENERAL

SCOPE

The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to complete directional drilling, testing and other work, as required in these specifications, on the drawings, and as otherwise deemed necessary to complete the work.

Included are the following topics:

[PART 1 - GENERAL](#_Toc64292270)

[SCOPE](#_Toc64292271)

[Related Work](#_Toc64292272)

[Submittals](#_Toc64292273)

[As-Built Documents](#_Toc64292274)

[PART 2 - PRODUCTS](#_Toc64292275)

[Conduit, Fittings and Splices](#_Toc64292276)

[Tracer Wire](#_Toc64292277)

[Drilling Fluid](#_Toc64292278)

[PART 3 - EXECUTION](#_Toc64292279)

[General](#_Toc64292280)

[Excavation, Backfill and Compaction](#_Toc64292281)

[Conduit Installation](#_Toc64292282)

[Drilling](#_Toc64292283)

[Joining Pipe](#_Toc64292284)

[Ream and Pullback](#_Toc64292285)

[Tracer Wire](#_Toc64292286)

Related Work

Applicable provisions of Division 1 govern work under this Section.

Section 01 91 01 or 01 91 02 – Commissioning Process

Section 26 08 00 - Commissioning of Electrical.

Edit to include applicable sections.

Section 02 32 00 – Geo Technical Investigation

Section 30 05 00 – Common Work Results for All Exterior Work

Section 31 25 00 – Erosion Control

Section 31 20 00 – Earthmoving

Section 31 23 16.13 – Trenching

Submittals

Submit shop drawings, catalog data, and manufacturer’s technical data showing complete information on resin, pipe and fittings material composition, physical properties, and dimensions of the new pipe and fittings. Include manufacturer’s recommendations for handling, storage, and repair of pipe and fittings if damaged. Furnish a certificate of compliance with specified pipe material requirements.

Provide written drilling plan outlining proposed equipment and construction methods, including the following:

* Detailed description of the procedures including construction techniques to provide the access required to install the pipeline
* Dimensioned drawings of any proposed changes in the pipe alignment or profile
* Literature describing in detail the drilling system to be used, including drill steering and locating system.
* Drawings showing: Layout of boring and receiving locations and associated equipment at each location, grade and alignment control system details, groundwater control provision of drilling equipment.
* Qualifications and experience record of the drilling superintendent and machine operators.
* Drilling fluid generation and management

Provide a directional drilling contingency plan that accounts for the following:

* Unforeseen obstructions that stop or delay the progress of drilling equipment
* Deviation from planned line and grade in excess of allowable tolerances
* Loss of drilling fluid
* Damage to other utilities
* Soil settlement or heaving

Provide written copies of quality assurance test results and reports performed by or for the contractor.

Within 48 hours of completing the pilot hole for each run of pipe, provide the log of the drilling operation and guidance system records documenting the line and grade of that pilot hole to the DFD Construction Representative and the AE. Note the location of any utilities or difficult drilling that was encountered.

As-Built Documents

Provide printed record of actual horizontal and vertical location of installed pipe from borehole survey instrumentation in addition to marked up drawings.

1. PRODUCTS

Conduit, Fittings and Splices

Conduit

Schedule 80

Continuous length smooth-wall HDPE conduit for electrical applications per ASTM F2160.

Conduit shall be listed by a Nationally Recognized Testing Laboratory (NRTL).

Color:

* Power – Black or Black with red stripes.
* Communications -- Orange

Fittings and Splices

See PART 3.

Couplings and Fittings shall be listed.

Marking

Each length of pipe and each fitting shall be clearly and durably marked on their outer surface with their manufacturing details.

Marking shall include Material Type, listing and the date of manufacture.

Fittings shall be clearly and durably marked, including manufacturer’s name or trademark, material type, class of pipe, listing and a date or code of manufacture..

Spacing of labeling on pipe shall not exceed 10-feet.

Tracer Wire

Tracer wire shall be #10 stainless steel wire with 45 mil HDPE jacket.

Alternately, tracer wire may be embedded in conduit wall.

Drilling Fluid

ANSI/NSF 60 (Drinking Water Treatment Chemicals – Health Effects) certified bentonite-based drilling fluid.

1. EXECUTION

General

Comply with the requirements of applicable specification sections for the utility line being installed.

Conduct any necessary field surveys, subsurface investigations and geotechnical investigations necessary to complete the work.

Locate all known utilities located adjacent to or crossing the utility line being installed. Excavate to expose utilities prior to initiating drilling and as required to verify applicable clearances. Clearance shall meet applicable code requirements and the requirements of the directional drilling process.

Locate and verify the clearance of known structures and foundations/footings located adjacent to or crossing the utility line being installed.

Excavation, Backfill and Compaction

Excavate insertion and receiving pits, and other access points as necessary to complete the work.

Conduit Installation

HDPE conduit may only be used in horizontal directional drilling applications. Installation must be in accordance with NFPA 70 National Electrical Code and be direct buried or encased in concrete.

HDPE shall not be routed such that it is exposed above grade.

Storage and handling of polyethylene pipe shall not result in damage to or deformation of the pipe. Protect polyethylene pipe from long-term exposure to temperature fluctuations and sunlight.

Prepare pipe on a relatively smooth surface, free of sharp rocks, sticks, or debris. Utilize cribbing, pipe stands, rollers, or other equipment as necessary to support the pipe.

Lift and move piping using ropes, slings, or straps. Do not use unprotected chains, hooks, or clamps to lift pipe.

When lifting and moving pipe, provide a minimum of two points of support. Do not support pipes at butt-fused joints.

Sections of pipes with cuts and gouges exceeding 10 percent of the pipe wall thickness or kinked sections shall be removed and rejoined at the Contractor’s expense.

Plug all pipes at end of each workday. Provide a watertight plug to prevent entry of foreign materials into the pipe.

Drilling

Drilling methods shall generally consist of drilling a pilot hole the length of the bore, followed by reaming and pullback of the pipeline. Ream borehole multiple times, as necessary. The equipment and methods used to complete the bore and install piping shall be determined by the Contractor, but subject to the Contract Documents.

The drill staging area shall be kept neat and orderly and disturb as little area as possible. The pipe staging area shall disturb as little area as needed to accommodate workers and equipment, and to string, fuse, and inspect the pipe.

Install all pulleys, rollers, bumpers, alignment control devices and other equipment required to support and protect the new pipe from damage during installation.

Utilize a drilling fluid cleaning/recycling system. Entry and exit pits shall be sized and constructed to completely contain drilling fluid.

Install boring to line and grade shown on drawings. Alignment shall be within tolerances specified in applicable utility specification sections.

Borehole survey instrumentation shall be used to monitor line and grade of the pilot hole. Contractor shall maintain records documenting the line and grade of the pilot hole.

Contractor shall notify the DFD Project Representative upon completion of the pilot hole to observe alignment prior to reaming and pullback.

Joining Pipe

Joints between lengths of conduit and between conduit and couplings, fittings and boxes shall be by an approved method using either Heat Fusion, Electrofusion or listed Mechanical Fittings. Glue and/or solvents are NOT approved.

Any joining method employed shall be in accordance with manufacturer recommendations.

The tensile strength at yield of the butt-fusion joints shall not be less than the pipe.

Ream and Pullback

Back-ream Pilot hole reamed to accommodate pipe. Select reamer size and number of passes required.

Pull pipe back using swivel to prevent torsion of pipe.

Monitor tension forces on pipe during pullback. Do not exceed maximum stresses recommended by the pipe supplier.

Support pipeline during pullback operations. Provide supports/rollers in accordance with manufacturer’s recommendations. Supports and rollers shall allow for free movement of the pipeline and prevent damage to the pipe.

Use a drilling fluid in conjunction with the installation of the pipe to fill the annular space around the installed pipeline. Contractor is responsible for determining the type of fluid to use.

Properly dispose all excess drilling fluid and slurry material recovered from the hole during drilling operations and displaced by the pipe during installation.

Unless otherwise noted on the drawings, terminate and cap carrier pipe 5’ above the proposed ground surface.

Tracer Wire

General

Install Tracer Wire (unless embedded in conduit wall) during pullback operations.

Terminate Tracer Wire at conduit end points and at all intermediate pull points in a fashion as to make it available for locating.

Allow the manufacturer’s recommended amount of time for cooling and relaxation due to tensile stressing prior to connecting pipe to adjacent pipe sections, fittings, or structures, or backfilling of the insertion pit. Provide sufficient excess length of new pipe at insertion pits to allow for cooling and relaxation.

Continuity Testing:

Test continuity of the Tracer Wire using an ohmmeter prior to demobilizing.

Tracer Wire Resistance shall be no greater than 105% of the specified unit resistance times installed length.

Conduct testing in the presence of the DFD Project Representative unless this requirement is waived.

Provide a written report describing equipment used, test methods, and detailed test results.

In the event of a failed test, make all necessary repairs required to provide a tracer wire system that complies with the performance requirements of this section.

END OF SECTION