

CITY OF KALAMAZOO  
SPECIAL PROVISION  
FOR  
**HORIZONTAL DIRECTIONAL DRILLING**

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a. **Description.** This work consists of providing all investigation, planning, geotechnical work, materials, equipment, labor, etc. necessary to properly install the proposed directional bores as shown on the plans and described herein using horizontal directional drilling (HDD) technology.

Work Included Under Other Contract Items

Water Main and Fittings  
Connect to Existing Main

Submittals

Qualifications: Upon request, the HDD Contractor shall submit documentation supporting the directional drilling Contractor's qualifications and experience. This shall include a list of all equipment to be used and a list of personnel and their qualifications and experience. The equipment listing shall include the directional drilling equipment, guidance system, drilling fluid system, and all other equipment to be used.

Bore Plan: A bore plan for each HDD location shall be prepared by the drilling contractor and submitted to the Engineer for review prior to installation. The plan shall show the finished grade along the bore path, the deflection and radii of the pilot bore, the length of each bore, and the vertical and horizontal clearances between the bored pipe and any existing/proposed conflicting pipes, conduits, walls, or other obstructions. Clearances shall not be less than the guidance system's accuracy tolerance.

Record Drawings: The HDD locations and elevations shall be shown on the Record Drawing. The Contractor shall locate the beginning, ending and the surface locations of the driller's log readings, and the locations shall be indicated on the record drawings. The information provided by the HDD Contractor shall be depicted on the record drawing and identified as having been provided by the HDD Contractor.

b. **Materials.** Provide ductile iron pipe materials in accordance with the City of Kalamazoo 2021 Standard Specifications for Water Main and Service Installation. Boltless, flexible restrained joints for HDD applications shall be utilized as specified.

Joints shall meet the requirements of ANSI/AWWA C111/A21.11 and be ball and socket pipe or U.S. Pipe's "TR FLEX" or approved equal. Products delivered under this specification shall be manufactured only for water distribution pipe and couplings conforming to ANSI/AWWA C151/A21.51.

HDD pipe shall be wrapped with HDPE polywrap encasement for piping in accordance with the City of Kalamazoo 2021 Standard Specifications for Water Main and Service Installation prior to HDD installation.

c. **Construction.** Complete all work in accordance with the Standard Specifications, the City of Kalamazoo 2021 Standard Specifications for Water Main and Service Installation, and the manufacturer's recommendations.

Furnish all material, equipment, transportation, tools, and labor to install pipe by directional drilling method and all related work for a complete installation.

The recommended Safe Pulling Force shall be supplied by the pipe manufacturer. The HDD Contractor shall utilize appropriate instrumentation to ensure that these loads are never exceeded.

Only experienced personnel shall be used to install pipe. A responsible representative who is thoroughly familiar with the equipment and type of work to be performed must be in direct charge and control of the operation at all times.

Pipe shall be handled, stored and joined in accordance with manufacturer's specifications.

Required directional drilling pits shall be excavated and maintained to minimum dimension. All excavations shall be adequately barricaded, sheeted, braced, and dewatered, as required, in accordance with the applicable portions of the Standard Specifications.

Pre-excavate pipe entry and receiving areas to provide a gradual entry of the pipe without stress to the pipe or joints and to allow free movement into the bore hole at an acceptable depth. Carefully guide pipe in such a manner as to avoid deformation of, or damage to, the pipe. Do not use chains, cables or hooks inserted into the pipe ends. Handle the pipe in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Slings or pipe rollers shall be used for pipe assembly during final product pull back.

The Guidance system shall use an electronic "walkover" tracking system, a Magnetic Guidance System (MGS), or a proven gyroscopic probe and interface for a continuous and accurate determination of the location of the drill head during the drilling operation. The guidance system shall be capable of tracking in any soil condition, including hard rock. It shall enable the driller to guide the drill head by providing immediate information on the tool face, azimuth (horizontal direction), and inclination (vertical direction). The system must be capable of being remotely steered and permit electronic monitoring of tunnel depth and location. The guidance system must be accurate and calibrated to the manufacturer's specifications of the vertical depth. The system shall be accurate to within 2% vertically and two feet horizontally.

Every effort shall be made to maintain pipe installations at the proper alignment and at a depth of 60 inches (minimum) for water mains. Deviations from the plans may be made only with approval of the Engineer.

The drilling mud shall be bentonite slurry or approved equal and shall be contained and disposed of in accordance with state/federal regulations and permit conditions.

The pipe shall be installed in a manner that does not cause upheaval, settlement, cracking, movement, or distortion of surface features.

If unexpected subsurface conditions are encountered during the bore, the procedure shall be stopped. The installation shall not continue until approval has been given by the Engineer.

When back reaming, the bore hole shall not exceed 1.5 times the outside diameter of the pipe or pipe joint/coupling for pipe up to 12 inches in diameter.

In the case of a pull-back where the bore will be abandoned, the HDD Contractor shall inject an approved grout into the annular space. This action will be in conjunction with the removal of the bore tool to insure against collapse of the cover material.

Depths of all existing utilities must be confirmed by the contractor prior to the crossing to avoid conflicts.

- d. **Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item.

**Pay Item**

**Pay Unit**

Water Main HDD, \_\_inch,.....Foot

Water Main HDD, \_\_inch includes payment in full for furnishing all material, labor and equipment necessary to perform the work specified herein and shown on the plans.

All labor, equipment and materials required for any connections to existing mains including excavation, disposal, and backfill shall be included in other pay items. Connections from the HDD water main to the other new water main shall not be paid separately but shall be considered incidental to the Water Main HDD, \_\_inch pay item.