

SECTION 1505
EXCAVATION, TRENCHING, PIPE LAYING
AND BACKFILLING FOR UTILITIES

1505-1 DESCRIPTION

Perform all excavation, undercut, foundation conditioning, pipe laying, bedding, backfill and pavement, sidewalk and driveway repair necessary for installation of utilities.

1505-2 MATERIALS

Refer to Division 10.

Item	Section
Portland Cement Concrete, Class B	1000
Select Material	1016

Use Class III, IV, V or VI select material for foundation conditioning and bedding.

1505-3 CONSTRUCTION METHODS

Excavate, trench, lay pipe, bed and backfill utilities in conformance with the applicable requirements of Division 1, Division 2 and Articles 300-1, 300-4 and 300-6. Comply with AWWA and ASTM standards along with the product manufacturer requirements for installing utilities.

(A) Shoring

Excavate trenches and pits for the installation of utilities that are safe for the workers and roadway users and that protect the roadway and other property from damage. Provide appropriate groundwater and surface water controls to stabilize the excavation and foundation and to provide a clean working area.

(1) Worker Safety

Provide any necessary shielding or shoring to protect workers.

(2) Roadway Users

Provide shielding or shoring as required under Sections 150 or as required elsewhere in the contract.

(3) Roadbed and Foundation Protection

Provide shoring of excavations less than one horizontal to one vertical from existing or proposed pavement to prevent failure or weakening of the roadbed. Provide plans and designs demonstrating the methods and techniques proposed and their adequacy. Provide engineered shoring systems as required for the actual conditions.

(B) Foundation Conditioning

Undercut and replace weak or saturated soils below the pipe trench with select material to provide a firm foundation.

(C) Bedding

Provide excavations with sufficient width for placing and compacting bedding around the utility. Bed utilities in select material. Place bedding material to stable ground on both sides and to at least 2" below and above the pipe bells. Provide at least 6" of bedding material between rock and piping. Shape the bottom of trenches to fit the pipe. Compact bedding material completely in the pipe haunches. Provide recesses in the bedding to accommodate pipe joints.

Section 1505

(D) Pipe Laying

Lay pipe in accordance with the specifications and the manufacturer's recommendations. Except where necessary in making connections with other lines or as authorized by the Engineer, lay pressurized pipe with the bells facing in the direction of laying.

Where possible, keep joints exposed for visual inspection during testing.

During the progress of the work and until the completion and final acceptance, keep the pipelines and their appurtenances clean throughout and remove any obstructions or deposits. Provide secure watertight seals on pipe when work is not in progress.

Lay gravity sewer pipe upgrade with the spigot ends pointing in the direction of flow. Lay each pipe to form a close concentric joint with the adjoining pipe and to prevent sudden offsets of the flow line.

(E) Thrust Restraint

Provide thrust restraint for pressurized pipelines and appurtenances. When shown in the plans, construct as specified with modifications to match the actual field conditions. When not shown, engineer the thrust restraint system with a factor of safety of 1.25 for the test pressure specified and for the actual field conditions.

Provide thrust restraint on the existing piping system as necessary.

Use joint restraint methods, such as integral restraining bells and spigots, restraining retainer glands, restraining gaskets or restraining clamps and lugs with tie rods. Use concrete reaction backing and thrust collars where joint restraint is impractical.

Where any section of a main is provided with concrete thrust restraint for fittings, controls or hydrants, perform the hydrostatic pressure test after the concrete reaches appropriate strength.

(F) Backfilling

Backfill in accordance with Article 300-7 and compact to the density required by Subarticle 235-4(C).

1505-4 REPAIR OF PAVEMENTS, SIDEWALKS AND DRIVEWAYS

Repair sidewalks and driveways that are disturbed by excavation and trenching to an original or better condition in accordance with Section 848.

Use asphalt plant mix to repair or replace pavement damaged by utility work. Perform all work in accordance with Section 654. Immediately upon completion of the utility removal or installation, make repairs to the pavement.

1505-5 CONCRETE ENCASEMENT OF UTILITY LINES

Encase existing or proposed utility lines in concrete for protection in areas as shown on the utility plans or as directed. Place the concrete completely around the line with a minimum thickness of 6".

1505-6 MEASUREMENT AND PAYMENT

Foundation Conditioning material will be measured and paid as provided in Section 300.

Asphalt Plant Mix for pavement repair will be measured and paid as provided in Section 654.

Class B Concrete for Encasing Utility Lines will be measured and paid in cubic yards of concrete, measured in place.

___" Concrete Sidewalk and *___" Concrete Driveways* will be measured and paid in accordance with Article 848-4.

1 Trenching, excavation, pipe laying, bedding, backfilling and disposal of unsuitable materials
2 for utility construction are included in the contract price for the applicable utility item and no
3 separate measurement or payment will be made.

4 The following work and items are included in the contract price for the applicable utility item
5 and no separate measurement or payment will be made for items (A) through (F) below:

6 (A) Undercut or Wet Excavation,

7 (B) Dewatering of Excavation,

8 (C) Shoring and Sheet piling (except temporary shoring for maintenance of traffic covered
9 elsewhere in the contract),

10 (D) Thrust Restraint,

11 (E) Bedding Material, or

12 (F) Select Material for Backfill.

13 Payment will be made under:

Pay Item

Class B Concrete for Encasing Utility Lines

Pay Unit

Cubic Yard

14 **SECTION 1510**
15 **WATER LINES**

16 **1510-1 DESCRIPTION**

17 Provide water lines suitable for use in transporting potable water.

18 **1510-2 MATERIALS**

19 Refer to Division 10.

Item

Water Pipe and Fittings

Section

1036

20 The Contractor may use any of the water pipe specified under Section 1036 except where
21 a particular type pipe is specified in the plans or required by environmental regulations or
22 Departmental policy. The Contractor shall verify that the pipe is appropriate for the test
23 pressure of the system and the external loading.

24 Use ductile iron fittings on water lines 4" or larger.

25 Use #12 AWG solid-copper wire with blue insulation for the utility locator wires.

26 Use 2" plastic marking tape colored blue with "Caution Water Line" or similar wording,
27 permanently printed at 36" centers.

28 Protect steel rods and other metal clamps and lugs by galvanizing or painting with approved
29 bituminous paint.

30 **1510-3 CONSTRUCTION METHODS**

31 **(A) General**

32 Meet the installation standards of AWWA or ASTM for water line construction.

33 Apply Section 1505 for excavation, trenching, pipe laying and backfill to water line
34 installation.

35 Install small diameter pipe (4" or less) under existing pavement by a trenchless method at
36 no additional cost to the Department.