

SECTION 02221 - TRENCH EXCAVATION AND BACKFILL

1. GENERAL

1.1 DESCRIPTION

- A. Work included but not limited to:
 - 1. Trench excavation, backfill and compaction
 - 2. Excavation support
 - 3. Pipe bedding
 - 4. Rough grading
 - 5. Restoration of unpaved surfaces
- B. Related Work
 - 1. Excavation for structures
 - 2. Grading and seeding
 - 3. Paving

1.2 QUALITY ASSURANCE

- A. Testing Agency:
 - 1. Compaction testing shall be performed by a certified soils testing laboratory approved by the Engineer and retained by the Contractor.
- B. Standards
 - Maryland Department of Transportation
 - State Highway Administration
 - Standard Specifications for Construction Materials
 - 2001 or latest Edition & Addendums
- C. Compaction Testing:
 - 1. Conduct eleven (11) compaction tests for each 1000 LF of pipeline. Conduct tests at locations as directed by the Engineer during backfilling operations.
 - 2. Perform tests in accordance with ASTM D1556 or ASTM D2922.

1.3 SUBMITTALS

- A. Certificates
 - 1. Prior to delivery of materials to the project site, the contractor shall submit a compliance statement attesting that pipe bedding material and select material backfill meets the specification requirements.
 - 2. Submit certified compaction test results from soils testing laboratory to the Engineer.

1.4 JOB CONDITIONS

- A. Excavation Classification
 - 1. All excavation work is unclassified and includes excavation and removal of all soil, rock, shale, boulders, fill and all other materials.
- B. Protection of Existing Utilities and Structures
 - 1. Take precautions and utilize all facilities required to protect existing utilities and structures. Notify each utility through the one call system. Notification shall be not less than three (3) nor more than ten (10)

working days in advance of beginning excavation or demolition work.
Telephone number 1-800-257-7777.

2. Report immediately any damage, leaks or break of lines, coating, etc. to the utility and the Engineer.
3. Allow free access to utility employees to maintain, repair or inspect facilities.

2. PRODUCTS

2.1 PIPE BEDDING

- A. Crushed stone or gravel aggregate conforming to Section 302 of:
Maryland Department of Transportation
State Highway Administration
Standard Specifications for Construction Materials
2001 or latest Edition & Addendums

2.2 SELECT MATERIAL BACKFILL

- A. Crushed stone or gravel aggregate conforming to Section 302 of:
Maryland Department of Transportation
State Highway Administration
Standard Specifications for Construction Materials
2001 or latest Edition & Addendums
- B. Suitable backfill material from top of pipe bedding envelope to subgrade. Trench excavated material free of stones larger than 4" in size, and free of wet, frozen or organic materials.

3. EXECUTION

3.1 MAINTENANCE AND PROTECTION OF TRAFFIC

- A. Coordinate work to minimize traffic inconvenience. Maintain traffic flow unless street closing is authorized.
- B. Provide and maintain signs, flashing warning lights, barricades, markers, etc. as required to maintain traffic flow and minimum restrictions.
- C. Comply with state and local regulations, permits and codes.

3.2 CUTTING PAVED SURFACES

- A. Make cuts in paved surfaces in a neat uniform fashion forming straight lines parallel with the centerline of the trench. Cut offsets at right angles to the centerline of the trench. Saw cut concrete surfaces; saw cut other hard surfaces or make straight cuts with jackhammer. No paving shall be broken except that which has been previously cut.
- B. Protect edges of cut pavement during excavation to prevent raveling or breaking; square edges prior to pavement replacement.

3.3 BLASTING

- A. No blasting will be permitted.

3.4 TRENCH EXCAVATION

- A. Topsoil stripping and stockpiling:

Strip topsoil encountered during trench excavation to its full depth and stockpile for reuse. Do not remove from the site until authorized by the Engineer.

B. Depth of excavation:

Gravity pipelines:

Excavate trenches to the depth and grade shown on the profile drawings for the invert of the pipe plus that excavation necessary for placement of pipe bedding material.

Excavation for laterals shall provide a straight uniform grade from the main pipeline or riser stack to the elevation at the right-of-way line, plus that excavation necessary for placement of pipe bedding material.

C. Width of excavation

Excavate trenches, including laterals, to a width necessary for placing and jointing the pipe and for placing and compacting bedding and backfill around the pipe.

Shape trench walls completely vertical from trench bottom to at least 24" above the top of the pipe.

D. Length of open trench.

Do not advance trenching operations more than 200' ahead of completed pipeline.

3.5 SUPPORT OF EXCAVATION

A. Support excavations with sheeting, shoring, and bracing or a "trench box" as required to comply with Federal and State laws and codes.

B. Install adequate excavation supports to prevent ground-movement or settlement to adjacent structures, pipelines or utilities. Damage due to settlement because of failure to provide support or through negligence or fault of the Contractor in any other manner, shall be repaired at the Contractor's expense.

C. Withdraw shoring, bracing, and sheeting as backfilling proceeds unless otherwise directed by the Engineer.

3.6 CONTROL OF EXCAVATED MATERIAL

A. Keep the ground surface, within a minimum of 2' of both sides of the excavation free of excavated material.

B. Provide temporary barricades to prevent excavated material from encroaching on private property, walks, gutters, and storm drains.

C. Maintain accessibility to all fire hydrants, valve pit covers, valve boxes, curb boxes, fire and police call boxes, and other utility controls at all times. Keep gutters clear or provide other satisfactory facilities for street drainage. Do not obstruct natural water courses. Where necessary, provide temporary channels to allow the flow of water either along or across the site of the work.

D. In areas where pipelines parallel or cross streams, ensure that no material enters the stream course. Remove cofferdams immediately upon completion of pipeline construction.

3.7 DEWATERING

A. Keep excavations dry and free of water. Dispose of rain and subsurface water clear of the work.

- B. Maintain pipe trenches dry until pipe has been jointed, inspected, and backfilled, and concrete work has been completed. Prevent trench water from entering pipelines under construction.
- C. Intercept and divert surface drainage away from excavations. Maintain storm drainage facilities, gutters, and natural surface water courses open and in operation. Provide and install temporary facilities to maintain excavations free of water as required. Design surface drainage systems so that they do not cause erosion on or off the site, or cause unwanted flow of water. When mechanical equipment is utilized to control water conditions, provide and maintain sufficient standby units onsite.
- D. Comply with Federal and State requirements for dewatering to any watercourse, prevention of stream degradation, and erosion and sediment control.

3.8 PIPE BEDDING REQUIREMENTS

- A. Shape recesses for the joints or bell of the pipe by hand. Assure that the pipe is supported on the lower quadrant for the entire length of the barrel. See Section 303 of:

Maryland Department of Transportation
State Highway Administration
Standard Specifications for Construction Materials
2001 or latest Edition & Addendums

3.9 PIPE LAYING

- A. Lay pipe as specified in the appropriate section of these Specifications for pipeline construction.

3.10 BACKFILLING TRENCHES

- A. After pipe installation and inspection, backfill trenches from trench bottom or from the top of pipe bedding material, whichever is greater, to 12" above the crown of the pipe with specified backfill material hand placed and carefully compacted with hand-operated mechanical tampers in layers of suitable thickness to provide specified compaction around and under the haunches of the pipe. Backfill and compact the remainder of the trench with specified backfill material.

- B. Exposed Joints for Testing:

The Contractor has the option to test the pipe prior to backfilling the trench. If this option is selected, install reaction blocks where required and place 2' of thoroughly compacted backfill over the pipe leaving pipe joints partially exposed. If the Contractor elects to completely backfill the trench prior to testing he shall be responsible for locating and uncovering leaks which may cause the test to fail.

- C. Lift Thickness Limitations:

Backfill trenches in accordance with Section 302 of:

Maryland Department of Transportation
State Highway Administration
Standard Specifications for Construction Materials
2001 or latest Edition & Addendums

- D. Uncompacted Backfill:
Where uncompacted backfill is indicated on the Contract Drawings, backfill the trench from one foot above the pipe to the top of the trench with material excavated from the trench, crowned over the trench to a sufficient height to allow for settlement to grade after consolidation.
- E. Unsuitable Backfill Material:
Where the Engineer deems backfill material to be unsuitable and rejects all or part thereof due to conditions prevailing at the time of construction, remove the unsuitable material and replace with select material stone backfill or suitable foreign backfill material.

3.11 DISPOSAL OF EXCAVATED MATERIAL

- A. Excavated material remaining after completion of backfilling shall remain the property of the Contractor, removed from the construction area, and legally disposed of.

3.12 ROUGH GRADING

- A. Rough grade areas disturbed by construction to a uniform finish. Form the bases for terraces, banks, lawns and paved areas.
- B. Grade areas to be paved to depths required for placing subbase and paving materials. Rough grade areas to be topsoiled and seeded to 3" below indicated finish contours.

3.13 RESTORATION OF UNPAVED SURFACES

- A. Restore unpaved surfaces disturbed by construction to equal the surface condition prior to construction.
- B. Restore grassed areas in accordance with section 02485 Grading and Seeding.

3.14 UTILITY MARKING TAPE

- A. Install detectable utility marking tape above all plastic pipelines, 12"-18" below final grade.
Minimum 2" wide, orange color, metalized core plastic foil with the words "CAUTION - Pipeline Buried Below" printed in bold black letters.

END OF SECTION 02221