

## **SECTION 33 05 20 BACKFILLING TRENCHES**

### **PART 1 GENERAL**

#### **1.1 SECTION INCLUDES**

- A. Trench backfill materials.
- B. Trench backfilling requirements.
- C. Surface restoration requirements.

#### **1.2 DEFINITIONS**

- A. Bedding: That surface of the Excavation or portion of the Pipe Zone below the pipe.
- B. Pipe Zone: That zone in a backfilling operation which supports, and surrounds the pipe barrel, and extends to 1 foot above the top of the pipe barrel.

#### **1.3 SUBMITTALS**

- A. Submit maximum laboratory dry density and optimum laboratory moisture content for:
  - 1. Subgrade material, and
  - 2. Each type of fill to be used.
- B. Upon ENGINEER's request, submit a written quality control Inspections and testing report describing source and field quality control activities performed by CONTRACTOR and its Suppliers.

#### **1.4 QUALITY ASSURANCE**

- A. Do not change material sources, or aggregate without ENGINEER's knowledge.
- B. Reject backfill material that does not comply with requirements specified in this section.

#### **1.5 STORAGE AND PROTECTION**

- A. Storage:
  - 1. Safely stockpile backfill materials.
  - 2. Separate differing materials, prevent mixing, and maintain optimum moisture content of backfill materials.
- B. Protection:
  - 1. During installation or repair, plug end of pipe or fitting except when installing next section of pipe or fitting.
  - 2. Avoid displacement of and injury to Work while compacting or operating equipment.
  - 3. Movement of construction machinery over Work at any stage of construction is solely at CONTRACTOR's risk.

#### **1.6 SITE CONDITIONS**

- A. Do not place, spread, or roll any backfill material over material that is damaged by water. Remove and replace damaged material at no additional cost to OWNER.
- B. Control traffic and erosion. Keep area free of trash and debris. Repair settled, eroded, and

ruted areas.

- C. Reshape and compact damaged structural section to required density.
- D. Restore any damaged structure to its original strength and condition.
- E. Replace contaminated backfill at no additional cost to OWNER.

### 1.7 SEQUENCING

- A. Coordinate backfilling operation with pipeline commissioning requirements in Section 33 08 00.

### 1.8 ACCEPTANCE

#### A. General:

- 1. Native material may be wasted if there is no additional cost to substitute material acceptable to ENGINEER.
- 2. For material acceptance refer to.
  - a. Common fill, Section 31 05 13.
  - b. Crushed aggregate base.
  - c. Cement treated fill, Section 31 05 15.

#### B. Trench Backfilling: One test per Lot.

<b>Table 1: Lot Size for Trench Backfilling Operation</b>		
<b>Material</b>	<b>Test Criteria</b>	<b>Lot size</b>
Subgrade	Standard (a)	200 lineal feet
Common Fill	Standard (a)	200 lineal feet per lift 25 square feet of footing area per lift
Crushed Aggregate Base	Modified (a)	200 lineal feet per lift 25 square feet of footing area per lift
Flowable Fill	Strength (b)	50 cubic yards
NOTES		
(a) Proctor density, Section 33 05 05		
(b) Compressive strength, Section 31 05 15		
(c) Lift thickness above the pipe zone before compaction, 8 inches.		

### 1.9 WARRANTY

- A. Any settlement noted in Trench backfill or in structures built over the Trench backfill will be considered to be caused by improper compaction methods and shall be corrected at no cost to the OWNER.
- B. Restore structures damaged by settlement at no additional cost to OWNER.

## PART 2 PRODUCTS

### 2.1 BACKFILL MATERIALS

- A. Common fill, Section 31 05 13.
- B. Crushed aggregate base.
- C. Cement treated fill, Section 31 05 15.
- D. Slag or asphalt bearing material not allowed.

## 2.2 ACCESSORIES

- A. Water: Make arrangements for sources of water during construction and make arrangements for delivery of water to site. Comply with local Laws and Regulations at no additional cost to OWNER when securing water from water utility company.
- B. Geotextile Fabric.
- C. Identification Tape: Permanent, bright-colored, continuous-printed magnetic plastic tape, intended for direct-burial service; not less than 6 inches wide by 4 mils thick. The tape shall read "**CAUTION: BURIED INSTALLATION BELOW**". Color of tape as follows.
  - 1. Red: Electric power lines, cables, conduit and lighting cables
  - 2. Yellow: Gas, oil, steam, Petroleum or gaseous materials
  - 3. Orange: Communications, alarm, signal, cables or conduits
  - 4. Blue: Potable water
  - 5. Purple: Reclaimed Water, irrigation and slurry lines
  - 6. Green: Sewer and storm drain lines

## PART 3 EXECUTION

### 3.1 PREPARATION

- A. Verify backfill material meets gradation requirements, foundation walls are braced to support surcharge forces imposed by backfilling operations, areas to be backfilled are free of debris, snow, ice or water, and Trench bottom is not frozen.
- B. If Subgrade is not readily compactable secure written authorization for extra excavation and backfill; Section 31 23 16.
- C. Avoid injuring and displacement of pipe and structures while compacting soil or operating equipment next to pipeline.
- D. Place geotextile fabrics.

### 3.2 GENERAL BACKFILLING REQUIREMENTS

- A. Protect Subgrade from desiccation, flooding and freezing.
- B. Do not damage corrosion protection on pipe.
- C. Repair or replace damaged pipe at no additional cost to OWNER.
- D. Withdraw sheathing, Shoring, piles, and similar supports as backfilling progresses. Backfill and compact all holes left by removals.
- E. Provide sufficient water quality facilities to protect downstream fish and wildlife, and to meet State water quality requirements.
- F. Water settling of Trench backfill is not permitted. "Jetting" of Trench backfill is prohibited.

### 3.3 PIPE ZONE

- A. Maintain uniform foundation along barrel of pipe with sufficient relief for joint connections.

- B. Use backfill materials meeting pipe manufacturer's recommendations. Maximum backfill particle size is 3/4 inch for plastic pipe.
- C. Do not permit free fall of backfill material which may damage pipe, pipe finish, or pipe alignment.
- D. Except where piping must remain exposed for tests, fill Pipe Zone as soon as possible.

### **3.4 TRENCH ABOVE PIPE ZONE.**

- A. Maximum lift thickness before compaction is 8 inches.
- B. Fill unauthorized Excavations with material acceptable to ENGINEER at no additional cost to OWNER.
- C. Do not damage adjacent structures or service lines.
- D. Install continuous plastic line marker directly over buried lines 18 inches below finished grade.

### **3.5 MODIFIED BACKFILL LAYER METHOD**

- A. At discretion of CONTRACTOR, backfill may be placed in thicker layers than indicated above subject to the following provisions.
  - 1. CONTRACTOR proves the ability of proposed method to achieve specified average compaction density.
  - 2. ENGINEER, on the basis of test results, approves the system in writing.
- B. Should CONTRACTOR find it necessary to change the method or any part of it, including the source of material, or the rate of placing the material, obtain approval of ENGINEER, who may require a further trial area.
- C. If testing shows a previously approved system is no longer producing the required degree of compaction, make changes to comply.
- D. Where vibration effects are creating environmental problems, make changes to eliminate problems.

### **3.6 COMPACTION**

- A. Compact backfill.
  - 1. A-1 soils: 95 percent or greater of a Modified Proctor Density.
  - 2. Other soils: 95 percent or greater of a Standard Proctor Density.

### **3.7 COMPRESSIVE STRENGTH**

- A. Where a flowable fill is used, provide compressive strength indicated in Section 31 05 15. Use fill which flows easily and vibration is not required.

### **3.8 SURFACE RESTORATION**

- A. Provide temporary paved surfaces where Trenches pass through roadways, Driveways or sidewalks.
- B. Restore paved surfaces.
- C. Finish landscaped surfaces with grass or with other ground cover.

### **3.9 CLEANING**

- A. Remove stockpiles from the site. Grade site surface to prevent free standing surface water.
- B. Leave borrow areas clean and neat.

END OF SECTION