

## **Section 207—Excavation and Backfill for Minor Structures**

### **207.1 General Description**

This work includes excavating, backfilling, or disposing of materials required to install a bridge culvert, box culvert, pipe, arch culvert, headwall and retaining wall according to the Specifications, the Plans, and the Engineer.

#### **207.1.01 Definitions**

General Provisions 101 through 150.

#### **207.1.02 Related References**

##### **A. Standard Specifications**

Section 104—Scope of Work

Section 109—Measurement and Payment

Section 205—Roadway Excavation

Section 206—Borrow Excavation

Section 208—Embankments

Section 810—Roadway Materials

Section 812—Backfill Materials

##### **B. Referenced Documents**

GDT 7

#### **207.1.03 Submittals**

General Provisions 101 through 150.

### **207.2 Materials**

Ensure that materials meet the requirements of the following Specifications:

| <b>Material</b>                             | <b>Section</b>      |
|---|---------------------|
| Foundation Backfill Material—Type I         | Subsection 812.2.01 |
| Foundation Backfill Material—Type II        | Subsection 812.2.02 |
| Imperfect Trench Backfill Material—Type III | Subsection 812.2.03 |

#### **207.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

### **207.3 Construction Requirements**

#### **207.3.01 Personnel**

General Provisions 101 through 150.

#### **207.3.02 Equipment**

General Provisions 101 through 150.

#### **207.3.03 Preparation**

General Provisions 101 through 150.

#### **207.3.04 Fabrication**

General Provisions 101 through 150.

**207.3.05 Construction****A. Locations and Elevations**

The Engineer will determine final locations and elevations of the structure. The locations and elevations shown on the Plans are approximate.

**B. Excavation**

The Engineer will determine the minimum requirements for length and depth of excavation for each structure. Assume the responsibility for the cost of installing necessary sheeting and bracing.

When excavating, follow these requirements:

- Excavate through rock or boulder formations to at least 1 ft (300 mm) below the bottom of the structure, except for where the entire concrete or masonry structure rests on solid rock.
- Backfill with Type I or Type II material to the proper subgrade elevation.
- As the embankment is constructed, excavate and place pipe on the new embankment. Pipe may be placed incrementally on steep gradients.
- Cut surfaces at structure trenches to prevent damage to the adjacent pavement when existing paved areas will be retained.
- Saw pavements deep enough to cause the edges to break in straight lines.
- Ensure that the width, depth, and vertical walls of an excavated imperfect trench conform to Plan details and dimensions within 2 in (50 mm).
- Dispose of surplus and unsuitable materials as directed by the Engineer.
- Consider excavated material as unclassified excavation according to Section 205, except that the Department will not pay for excavation for minor structures.
- Include the cost of fulfilling these requirements in the price bid for the pipe.

**C. Backfill**

Obtain backfill materials that meet the Specifications from sources approved by the Engineer.

## 1. Foundation Backfill Materials, Types I and II

Use the following materials as shown on the Plans or as directed by the Engineer:

- a. Use Type I material in dry structure trenches and Type II material in wet trenches.
- b. Use Type I material as a finishing course for Type II material when permitted by the Engineer.
- c. Backfill excavations beyond the specified limits with the same type of material required for the adjacent area; however, the Department will not measure excess backfill material for payment.
- d. Place Type I and Type II backfill material in layers of no more than 6 in (150 mm) loose.
- e. Compact each layer as follows:
  - 1) Type I Backfill Material: Compact to 95 percent of the theoretical dry density determined by GDT 7.
  - 2) Type II Backfill Material: Compact to a satisfactory uniform density as directed by the Engineer.

## 2. Imperfect Trench Backfill Material, Type III

Place this material as loose uncompacted backfill over pipe structures as shown on the Plans where imperfect trench backfill is specified.

## 3. Normal Backfill

Ensure that normal backfill material meets the requirements of Subsection 810.2.01, Class I or II. Place and compact according to Section 208 except as follows:

- a. Do not place rock more than 4 inches (100 mm) in diameter within 2 ft (600 mm) of any drainage structure.
- b. For backfill behind retaining walls, use a pervious material that meets the requirements of Case I or Case II as follows:
  - 1) Case I. Case I refers to backfills for retaining walls that support roadbeds and parking areas. Ensure that the backfill conforms to Section 208. Do not place rock more than 4 in (100 mm) in diameter within 2 ft (600 mm) of the retaining wall or finished surface.

- 2) Case II. Case II refers to backfills for retaining walls that do not support roadbeds or parking areas. Ensure that the backfill conforms to the requirements of Case I above, except compact the backfill to the density of the adjacent soil.

#### **D. Pavement Replaced**

Replace pavement removed at structure trenches in kind where adjacent pavements will be retained. An equal or better material may be used when approved by the Engineer.

Backfill and maintain a smooth riding surface until repaving is complete.

#### **207.3.06 Quality Acceptance**

General Provisions 101 through 150.

#### **207.3.07 Contractor Warranty and Maintenance**

General Provisions 101 through 150.

### **207.4 Measurement**

#### **A. Excavation**

The following considerations are not measured for payment:

- Excavation for minor structures, including undercut for backfill materials as shown on the Plans
- Excavation for an imperfect trench which is required at locations specified in the Plans but which is not measured for payment
- Removal of water
- Removal of material from any area required to be reexcavated
- Excavation and backfill of temporary drainage ditches

#### **B. Extra Depth Excavation**

The following extra depth excavations are not measured for payment:

1. Extra depth excavation because of Contractor negligence.
2. Extra depth excavation (required by the Engineer) below the original Plan elevation of the bottom of the footing or the flow line of a culvert pipe that does not exceed 3 ft (1 m).

If the Engineer relocates the structure or orders the elevation of the bottom of the footing or the flow line of the pipe to be lowered or undercut more than 3 ft (1 m), the Contractor will be compensated for the extra depth excavated below the 3 ft (1 m) limit according to Subsection 104.04 and Subsection 109.05.

Calculate the width of extra depth excavation using the diameter of the pipe or the width of the footing plus 2 ft (600 mm).

The length of extra depth excavation is equal to the length of that portion of the structure that is lowered more than 3 ft (1 m) below Plan elevation.

#### **C. Backfill Materials Types I, II, and III**

1. Types I and II

These materials (in place and accepted) are measured in cubic yards (meters) compacted.

Lateral measurements are confined to an area bounded by vertical planes lying not more than 1 ft (300 mm) outside of and parallel to the limits of the structure.

Length and depth measurements are confined to the dimensions of compacted material in place as specified by the Engineer. Materials placed outside the above limitations are not measured for payment.

2. Type III

The Department measures Type III material (complete, in place, and accepted) in cubic yards (meters).

Lateral measurements of Type III material are confined to an area bounded by vertical planes lying directly above the outside walls of the structure.

Longitudinal measurements are confined to the length of treatment installed as specified. Measurements of depth are the dimensions shown on the Plans or as directed.

207.4.01

**D. Normal Backfill**

This Item is not measured separately, but is included in the measurement of the Items of excavation from which normal backfill materials are obtained.

**207.4.01 Limits**

General Provisions 101 through 150.

**207.5 Payment**

**A. Excavation for Minor Structures**

This Item will not be paid for separately except as provided in Subsection 207.4.B.

**B. Sheeting and Bracing**

Sheeting and bracing will not be paid for separately unless these materials are left in place at the written direction of the Engineer. In this case, the Contractor will be paid at invoice cost plus 10 percent.

**C. Backfill Materials**

Backfill material Type I, (measured as shown in Subsection 207.4.C.1) will be paid for according to Section 205 or Section 206.

The Department will pay for Types II and III separately at the Contract Unit Price per cubic yard (meter). This payment is full compensation for furnishing the materials from sources inside or outside the right-of-way, loading, unloading, hauling, handling, placing, and compacting the material.

**D. Normal Backfill**

This Item will not be paid for directly but will be paid at the Unit Price for the applicable excavation item from which the normal backfill materials are obtained.

Payment will be made under:

|              |  |                        |
|--------------|--|------------------------|
| Item No. 207 | Foundation backfill material, type II        | Per cubic yard (meter) |
| Item No. 207 | Imperfect trench backfill material, type III | Per cubic yard (meter) |

**207.5.01 Adjustments**

General Provisions 101 through 150.

**Section 208—Embankments**

**208.1 General Description**

This work includes placing embankments, backfilling structures, and constructing earth berms and surcharges with suitable material excavated under Section 204, Section 205, Section 206, and Section 207.

Complete the work according to the lines, grades, and typical cross- sections shown on the Plans or established by the Engineer.

The work also includes preparing areas by backfilling stump holes and correcting surface irregularities where the embankment is to be constructed. This includes forming, compacting, and maintaining the embankment and placing and compacting approved material where unsuitable material has been removed.

Payment for this work is included in other appropriate Pay Items unless a specific Pay Item is set up in the Contract.

Apply all provisions of Section 161 to the work in this Section.

Perform Shoulder Construction according to Section 216.

**208.1.01 Definitions**

General Provisions 101 through 150.