

SECTION 31 23 16 EXCAVATION

PART 1 GENERAL

1.01 DEFINITIONS

- A. Common Excavation: Removal of material not classified as rock excavation.
- B. Rock Excavation:
 - 1. Excavation (Excluding Trench Excavation): Excavation of solid material which by demonstration cannot, in Contracting Officer's opinion, be reasonably loosened or ripped by single-tooth, hydraulically operated ripper mounted on crawler tractor in good condition and rated at minimum 300 flywheel horsepower; and which must be systematically broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to removal.
 - 2. Trench Excavation: Excavation of solid material which by demonstration cannot, in Contracting Officer's opinion, be reasonably excavated with minimum 135-hp backhoe in good condition and equipped with manufacturer's standard boom, two rippers, and rock points or similar approved equipment; and which must be and is systematically broken by power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means prior to excavation.
 - 3. Term "rock" as used in this section is defined as being such by required means of excavation as specified above and does not necessarily correspond to "rock" as implied by names of geologic formations.
 - 4. Excavation of boulders larger than 1 cubic yard will be classified as rock excavation, if breaking them apart with power-operated hammer, hydraulic rock breaker, expansive compounds, or other similar means is both necessary and used for their removal.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Excavation Plan, Detailing:
 - a. Methods and sequencing of excavation.
 - b. Proposed locations of stockpiled excavated material.
 - c. Proposed onsite and offsite spoil disposal sites.
 - d. Numbers, types, and sizes of equipment proposed to perform excavations.

- e. Anticipated difficulties and proposed resolutions.
- f. Temporary excavation slopes.
- 2. Excavation Equipment Technical Data Including:
 - a. Manufacture information for crawler excavator to be used for soil and rock excavation including:
 - 1) Manufacture.
 - 2) Model number.
 - 3) Flywheel power.
 - 4) Operating weight.
 - 5) Bucket size and type.
 - b. Manufacture information for hydraulic hammer to be used for rock breaking/loosening including:
 - 1) Manufacture.
 - 2) Model number.
 - 3) Working weight.
 - 4) Impact frequency.
 - 5) Impact energy.

1.03 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized over excavation.

1.04 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32 degrees F shall not be used as fill or backfill until material completely thaws.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.05 SEQUENCING AND SCHEDULING

- A. Excavate only after adequate erosion and sediment controls are in place and in accordance with Section 01 57 13; Temporary Erosion and Sediment Control.
- B. Demolition: Complete applicable Work specified in Section 02 41 00, Demolition, prior to excavating.
- C. Clearing, grubbing, and stripping for vegetation and soil management, refer to Section 01 35 00, Environmental Protection and Special Controls.
- D. Excavation Support: Install and maintain as necessary to support sides of excavations and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
- B. All disturbed rock should be removed. If this results in over excavation then backfill per Section 31 23 23; Fill and Backfill.
- C. Do not over excavate without written authorization of Contracting Officer.
- D. Remove or protect obstructions as shown and as specified in Section 01 50 00, Temporary Facilities.
- E. Use of explosives is not allowed for excavation.
- F. Use of expansive compounds shall be approved by the Contracting Officer.

3.02 CLASSIFIED EXCAVATION

- A. Excavation is classified; see Article Definitions for classifications of common excavation and rock excavation. Notify Contracting Officer whenever material that may be classified as rock is encountered.
- B. Before beginning rock excavation, comply with following requirements:
 - 1. Remove overlying material as common excavation and expose rock surface for examination by Contracting Officer.
 - 2. Demonstrate that removal of remaining material classifies as rock excavation unless waived by Contracting Officer.
 - 3. Assist Contracting Officer with measurement and documentation of rock excavation. Volume of rock excavation shall be determined by estimated quantity of in-place, undisturbed rock, and based on required subgrade elevation.
 - 4. Assist Contracting Officer with measurement and documentation of quantity of rock hauled offsite. Quantity of rock hauled offsite shall not be considered for measurement or documentation for efforts related to rock excavation.

- C. In event of disputed quantities, excavate additional correlation trenches to apparent rock as considered necessary by Contracting Officer to resolve dispute.

3.03 TRENCH WIDTH

- A. Minimum Width of Trenches:
 - 1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
 - a. Less than 4-inch Outside Diameter or Width: 18 inches.
 - b. Greater than 4-inch Outside Diameter or Width: 18 inches greater than outside diameter or width of pipe, conduit, direct-buried cable, or duct bank.
 - 2. Multiple Pipes, Conduits, Cables, or Duct Banks in Single Trench: 18 inches greater than aggregate width of pipes, conduits, cables, duct banks, plus space between.
 - 3. Increase trench widths by thicknesses of sheeting.
- B. Maximum Trench Width: 36 inches greater than the outside diameter or width of pipe.

3.04 PIPE BEDDING GROOVES FOR NONPERFORATED DRAIN LINES

- A. Semicircular, trapezoidal, or 90-degree-V.
- B. Excavated or plowed into trench bottom. Forming groove by compaction will not be acceptable.

3.05 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross sections shown, with proper allowance for topsoil or slope protection, where shown.
- B. Remove loose stones and rock that exceed 3-inch diameter. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.
- D. Install soil stabilization and erosion protection measures as specified in Section 01 57 13, Temporary Erosion and Sediment Controls, immediately upon completion of embankments or cut slopes.

3.06 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.
- C. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.
- D. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- E. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could cause damage by structural failure or settlement.

3.07 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.
- B. Dispose of debris resulting from removal of underground facilities as specified in Section 02 41 00, Demolition, for demolition debris.

END OF SECTION

