QUANTITIES

General

The quantities of the various materials involved in the construction of a project are needed for determining the estimated cost of the project and for establishing a base for the contractor's bid and payment.

Upon completion of structural design and detailing of plans, the quantities of materials in the construction of the project shall be computed. Quantities are to be computed and checked independently. Final quantities to be listed in the Special Provisions and Bid Proposal sheet are to be calculated to have an accuracy of +/- 1 percent.

Method of measurement for the various materials shall be in accordance with the ITD *Standard Specifications for Highway Construction*, current edition, and Supplemental Specifications.

Section 210 – Structure Excavation and Compacting Backfill

Structure Excavation, Schedule No. 1, shall include excavation for bridges, box and stiffleg culverts, and Structure Excavation, Schedule No. 2, shall include excavation for all other structures.

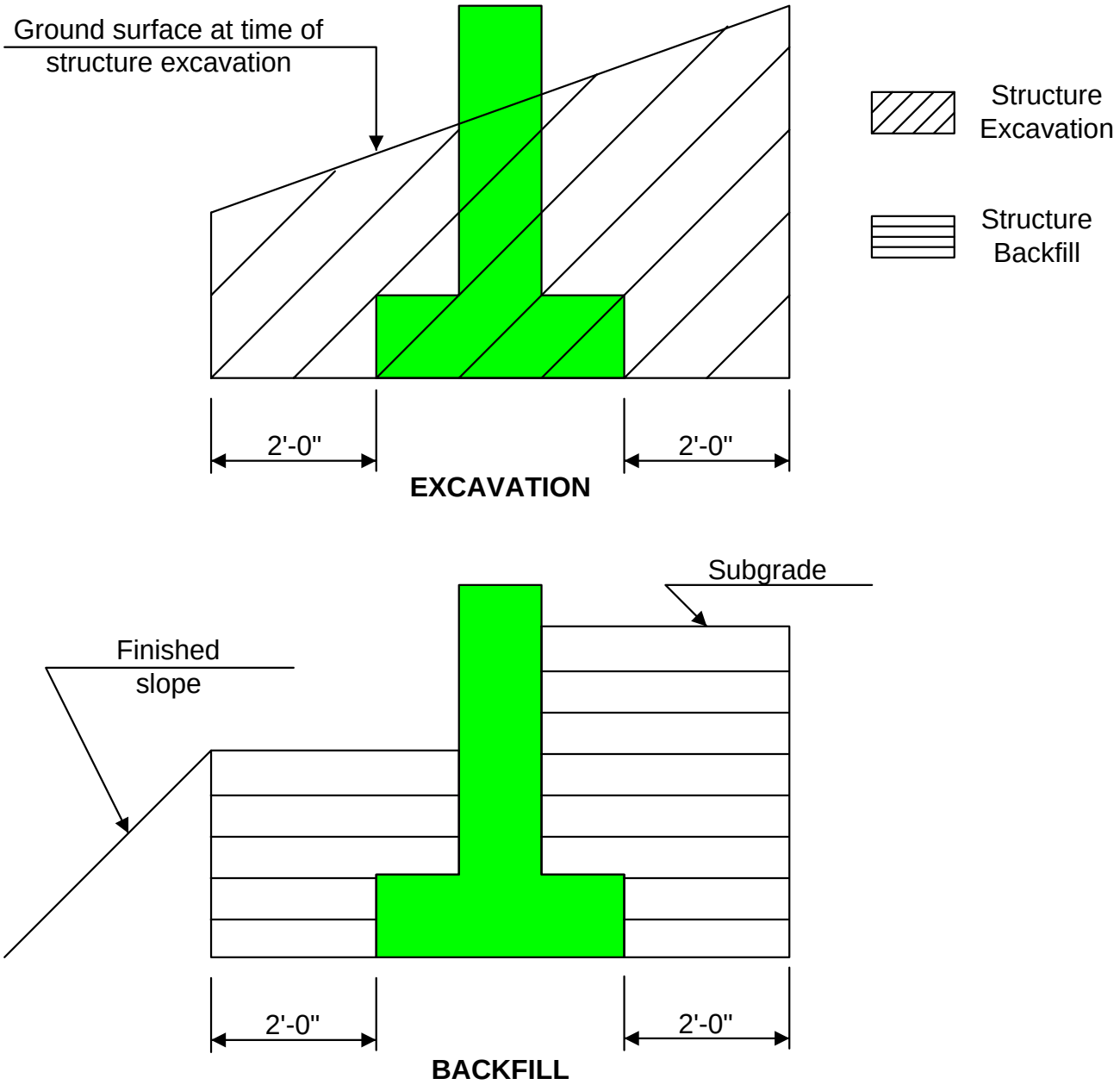
Structure excavation will be measured by the cubic yard of material in its original position, using the average end area method. The volume of material actually removed shall be measured within a prism with limiting planes as follows:

1. Conduit and Structural Plate Pipe: As shown on the plans.
2. Other Structures:
    a. The bottom of the foundation.
    b. The vertical planes 2 ft. outside of and parallel to the outside lines of the structure, in the case of bents with individual column footings, the entire bent shall be considered as one structure.
    c. With upper limits as follows:
        (1) In embankment sections, the existing ground surface as cross sectioned.
        (2) In roadway cut sections or channel changes, the planes of the roadway cut or channel change as excavated.

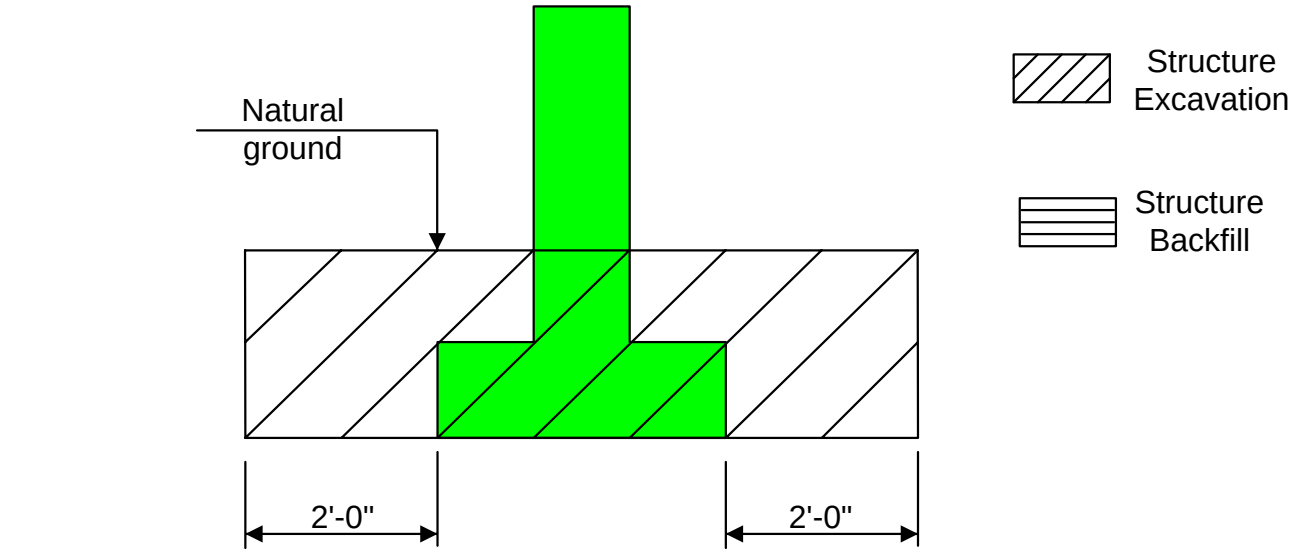
Compacting backfill will be measured by the cubic yard of backfill material placed. The volume will be determined as follows:

1. Conduit: As shown on the plans.
2. Other Structures:
    a. Below the original ground surface: A volume equal to the volume of structure excavation less the volume of the permanent structure including opening, contained within the limits of measurement for structure excavation.
    b. Above the original ground surface: The volume contained between the outside walls of the structure and vertical planes 4 ft. outside thereof; the original ground surface; and a horizontal plane 1 ft. above the top of the structure or of the subgrade, whichever is the lesser.
    c. Volumes of backfill placed through water around abutments, wing walls and piers, will not be included in the measurement of quantities for compacting backfill.

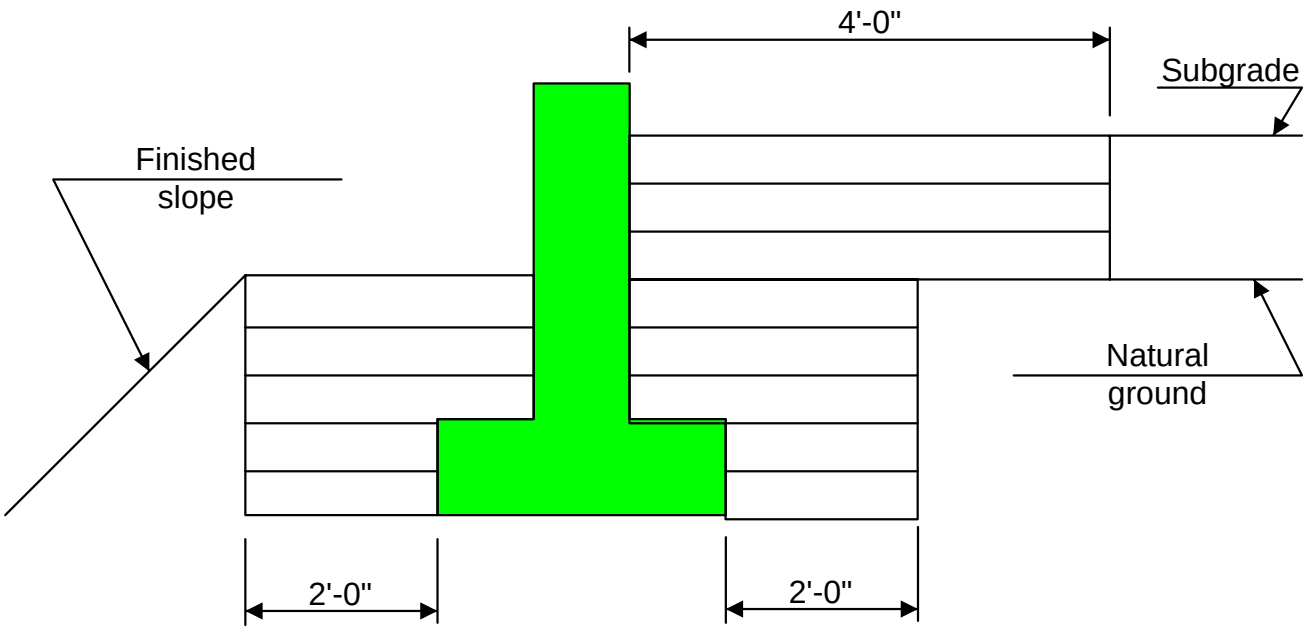
STRUCTURE IN EMBANKMENT



STRUCTURE IN NATURAL GROUND

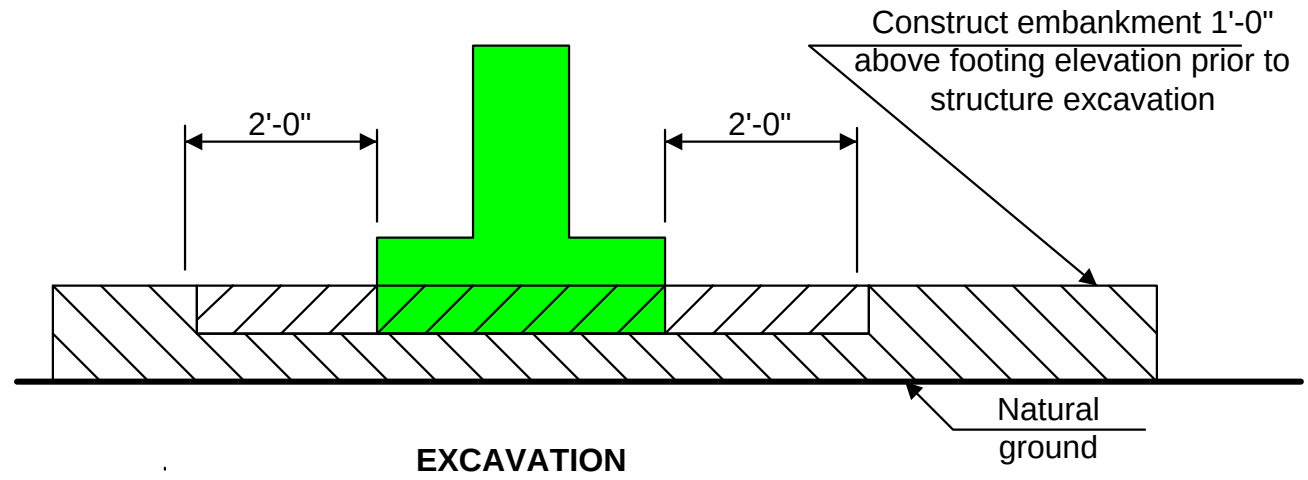


EXCAVATION

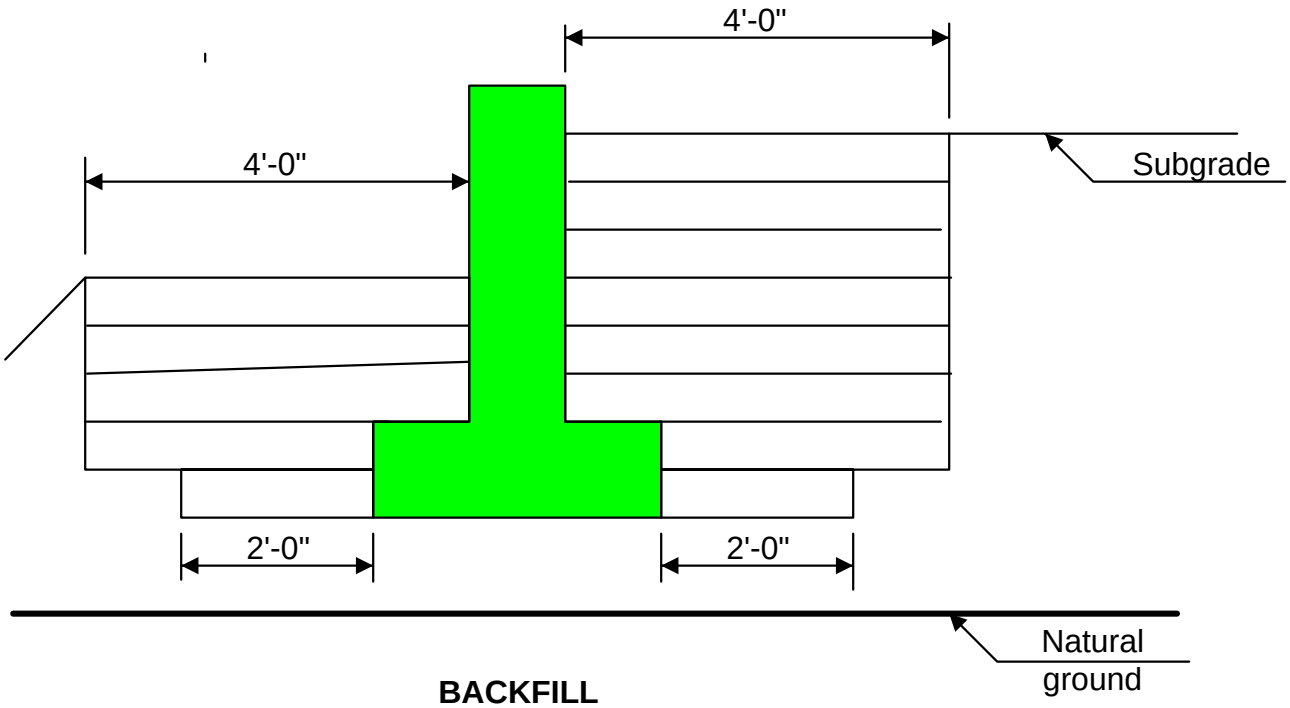


BACKFILL

STRUCTURE ABOVE NATURAL GROUND



EXCAVATION



BACKFILL

Precision of Units

The precision of the units to be shown on the Cost Estimate is shown in the following table.

ITEM NUMBER	DESCRIPTION	UNIT PRECISION
205-F	Granular Borrow	Whole CY
210-005A	Structure Excavation Sch. No. 1	Whole CY
210-015A	Compacting Backfill	Whole CY
502-005A to 502-350A	Concrete – All classes	Nearest 0.1 CY
502-400A to 502-422A	Prestressed Girders	Nearest 0.1 FT
502-430A	Concrete Parapet	Nearest 0.1 FT
502-435A	Approach Slab	Nearest 0.1 SY
502-440A to 502-500A	Prestressed Slabs, T-beams, Box Beams	Nearest 0.1 LF
503-005A to 503-020A	Metal Reinforcement	Nearest LB
504-005A to 504-015A	Structural Steel	Nearest LB
504-025A to 504-040A	Railing	Nearest 0.1 FT
505-020A to 505-110A	Furnish & Drive Piling, Test Piling	Nearest LF
510-005A	Concrete Overlay	Nearest 0.1 CY
511-005A	Concrete Waterproofing System	Nearest 0.1 SY
623-005A	Concrete Slope Paving	Nearest 0.1 SY
624-005A or 624-015A	Riprap	Whole CY
632-005A to 632-010A	Concrete Bridge Deck Removal	Nearest 0.1 SY
S501-06A	Expansion Joints	Nearest 0.1 FT
S501-60A	Textured Concrete Surface	Nearest 0.1 SY
S501-70A	Paint Concrete	Nearest 0.1 SF
S501-30A	Pre-drilling for Piles	Nearest 0.1 FT
S501-30A	Rail Retrofit	Nearest 0.1 FT
S501-17A	MSE Wall	Nearest 0.1 SF
S501-18A	Coping for MSE Wall	Nearest 0.1 FT
S501-51A	Patch & Repair Concrete Surface	Nearest 0.1 SF
S501-30A	Crack Preparation	Nearest 0.1 FT
S501-50A	Crack Injection	Whole GAL
S501-35A	Remove Asphalt Overlay	Nearest 0.1 SY