

pipe to exceed the width indicated on the Drawings. In no case will it be permitted to excavate pipe trenches with sides sloping to the bottom. Trenches shall be a minimum of five (5) feet below the grade of the road, when rough graded.

- B. In case of trenches of more than specified widths, the Engineer may require the Contractor to furnish concrete cradle or concrete encasement for the pipe at the expense of the Contractor.
- C. Where sheeting and shoring is used, the trench width shall be to the inside of the sheeting.

3.16 COMPACTED FILLS AND EMBANKMENTS

- A. Where compacted fills and embankments are indicated on the Drawings or required by the Engineer, deposit materials in layers not more than 9 inches thick and containing particles not to exceed 4" in any dimension; moisten by sprinkling as required; and thoroughly compact by rolling, tamping, or other approved means. Do not build compacted fills and embankments during freezing weather, nor of frozen materials, or when the materials already in place in the embankments or fill are frozen. If any compacted fill or embankment settle so as to be below the required levels for the proposed finished grades at any place, before the final acceptance of the work, supply additional materials and build up the low places as directed, at the Contractor's own expense.
- B. Structural fill shall be defined as granular material free of debris and organics, containing less than 15% particles passing the #200 sieve.
- C. For on-site and borrow materials intended for use in the backfilling operations, submit the results of a Modified Proctor Density (ASTM D1587) analysis and results of a sieve analysis (ASTM D422) and a determination of soil classification per the Unified Soil Classification System.
- D. Place, moisten and compact fill and embankment material in 9 inch layers until the density is not less than 95 percent of the maximum dry density of the material being placed as per Modified Proctor Density Tests and 90% maximum dry density as per Modified Proctor Density Test in all other areas.
- E. The Engineer will inspect to verify that the specified compaction is being obtained as well as to determine the in site moisture content.
- F. The Contractor is advised that drying of wet soils may be required and that acceptable moisture contents will be $\pm 3\%$ of optimum moisture as determined by the modified proctor test.

3.17 BACKFILLING

- A. As various structures are completed, refill the space outside and around the walls with suitable material. As the work progresses, make the compacted fills about the structures to the lines and elevations indicated on the Drawings. Carry backfilling and compacted fills to such elevations that, when settlement has occurred, the finished grade indicated on the Drawings will be obtained. Allow for 4 inches of topsoil where such is indicated on the Drawings or called for in these Specifications. Unless otherwise directed by the Engineer, remove all forms, bracing and lumber before backfilling.
- B. For backfilling, use only materials which are free from perishable and objectionable material and contain no stones larger than 6 inches in their largest dimension. Properly place and tamp or otherwise thoroughly compact the backfill material in 12 inch layers, in such a manner as to prevent after-settlement, and, if permitted, excavations may be flooded with water while backfilling is being done.
- C. Immediately adjacent to structures, place backfill in 9 inch layers and compact to avoid future settlement. Do not place backfill against foundation walls until the top slab has been placed and has set, in order to support the top of the wall.
- D. Shape or mold and compact bottom of trenches in earth to the contour of the outside of the pipe using bedding materials, as indicated on the Drawings, to give a full support to