

SECTION 112 EARTHWORK

112.1 GENERAL

Work included in this section includes all work associated with earth moving operations and grading.

112.1.1 Related requirements specified in other sections of the Specifications:

- A. Section 103 - Site Clearing
- B. Section 106 - Seeding
- C. Section 110 - Curb and Gutter, Sidewalk, Misc. Concrete
- D. Section 111 - Street Construction & Repairing/Patching

112.2 EXECUTION

112.2.1 The work includes demolition, clearing and grubbing the site, dewatering, stripping and storing of topsoil, excavation, filling and backfilling, rough and finish grading over the areas indicated, erosion control, distribution of topsoil, and utility earthwork. Any water that accumulates in the excavations shall be promptly removed.

112.2.2 Any existing structures shall be carefully demolished and removed from the site. The demolition work shall be done carefully so as to not disrupt the Owner's operations, and so as to not endanger or harm adjacent property, structures or the public.

112.2.3 The entire area within the limit of work shall be cleared and grubbed and shall be cleaned of all debris. Topsoil shall be stripped from all areas to be graded, paved and built upon to the depth encountered and stored for reuse later in the work. Under the structures, paved, and fill areas, stumps, roots, logs, matted roots and other debris not suitable for foundation purposes shall be removed to a minimum depth of eighteen (18) inches below any subgrade. The resulting hole shall be backfilled with suitable material and compacted as specified hereinafter for backfill. Cleared material shall be completely removed from the site, and disposed of by the Contractor, at his expense. All areas to receive fill shall be stripped of root mat five feet beyond toe of anticipated fills. Topsoil, all vegetation, such as roots, brush, heavy sods, heavy growth of grass, and all decayed vegetable matter, rubbish and other debris within the area upon which fill is to be placed, shall be stripped or otherwise removed before the fill is started. In no case will such objectionable material be allowed to remain in or under the fill area. Sloped ground surfaces steeper than one vertical to four horizontals on which fill is to be placed shall be plowed, stepped, benched, or broken up in such manner that fill material will bond with the existing surface,

as directed. Before starting the fill or before placing structures or pavement, the area shall be proof rolled with a rubber tired vehicle, typically a loaded dump truck. Any soft, pumping, or rutting spots that are discovered shall have the soft material excavated and the void filled with suitable material, compacted as hereinafter specified.

- 112.2.4 Topsoil shall be carefully stripped to its full depth from all areas indicated to be graded, or to be built upon. Stripped topsoil shall be stored and protected for reuse later.
- 112.2.5 The Contractor shall store and use explosives in accordance with the Occupational Safety and Health Act and with other Federal, State and Local ordinances and regulations. The Contractor shall hold the Owner harmless for any injuries and for all damage caused by the explosives and shall satisfactorily correct and pay for all injuries and damage resulting from his use of explosives. Prior to firing blasts, the Contractor shall have a competent man, carrying a red flag, stationed at a reasonable distance from the blast at each avenue of approach to give warning of the blast. Blasting in the vicinity of any existing utilities shall be done carefully and with the knowledge and approval of the owner of the utility. The Contractor shall conduct pre-blasting inspection of nearby facilities and structures, and vibration monitoring during blasting.

112.3 EXCAVATIONS

- 112.3.1 All excavations shall be performed to the grades, slopes, and elevations indicated. All excavated materials which are not considered suitable for fill and any surplus of excavated material which is not required for fill shall be disposed of by the Contractor. Excavations shall extend a sufficient distance away from the walls to permit erection and removal of forms and installation of drains and other permanent work. Excavations shall be carefully made to the depths indicated, with the bottoms level, free of loose material, and free of all loam, organic material and other unsuitable material as hereinafter specified. All excavations shall be approved by the Engineer prior to the placing of any concrete. Sloping rock shall be stepped, as directed. Excavations carried below the required depth, other than that specified for occasional rock outcropping, shall be backfilled with trench stabilization material, except general rock areas where the backfill shall be concrete.
- 112.3.2 The Contractor shall clear and grub all vegetation, debris and any other material encountered within the limits of grading and as required for trenches and ditches indicated to be worked on, but where grading contours are not shown. All material from the demolition, the clearing and grubbing and debris removal shall be disposed of off the site by the Contractor at his expense.
- 112.3.3 Filling, Backfilling, and Compaction

- A. Suitable material for fill, backfill and subgrade preparation shall be GW, GP, GM, GC, SW, SP, SM, ML, CL, or SC as classified in the Unified Soil Classification System in accordance with ASTM D 2487-69 (R1975). The suitability of material to be used as fill shall be determined by the classification method specified and by the moisture density tests in accordance with ASTM D698. Testing shall be by an independent soils laboratory, at the Owner's expense, and the results shall be approved by the Engineer prior to the soil's use. Suitable material removed from the excavation shall be used in forming the necessary fill. Material shall be free of debris, roots and organic matter. Frozen material shall not be used as fill or backfill. Any additional material necessary for establishing the indicated grades shall be excavated from the approved borrow sites as shown on the plans by the Contractor and approved by the Engineer as part of this contract. The maximum particle size shall be six inches largest dimension, except in the uppermost lift, where the maximum particle size shall be two inches largest dimension. Fill material shall be placed in successive horizontal layers not to exceed eight (8) inches of loose material, and then thoroughly compacted as hereinafter specified.
- B. Fill or backfill adjacent to the foundation and retaining walls shall be placed in eight (8) inch horizontal layers, each layer being moistened or dried and compacted as hereinafter specified. Special care shall be taken to prevent wedging action as the backfill proceeds.
- C. Embankment slopes shall be constructed by filling one (1) foot beyond the proposed finished slope surface for each lift. Compaction equipment shall work to the edge of each lift. After the entire fill is placed and compacted, the outside foot of the slope shall be trimmed to the design slope with a dozer. No slopes shall be steeper than 3 horizontals to 1 vertical.
- D. Unsuitable materials shall be those materials not meeting the requirements specified hereinbefore for suitable materials.

112.3.4 Compaction and Testing

- A. Compaction shall be performed by hand compaction equipment adjacent to the structures. General area compaction equipment shall be the Contractor's option, subject to the approval of the Engineer. The compaction in grassed areas shall be 90 percent of maximum density obtained in the procedure in ASTM D698. The compaction under pavement areas shall be 98 percent of maximum density in ASTM D698. The materials shall be aerated or moistened, as required to provide a moisture content that falls within 3 percentage points of either side of optimum, unless otherwise approved by the Engineer. Moisture

determinations shall be made. Field density tests and moisture tests shall be performed at the Contractor's expense by an independent soils testing laboratory, approved by the Engineer, on each lift at locations selected by the Engineer to assure that the correct compaction has been performed. If any test fails, additional testing at the Contractor's expense shall be performed to determine the extent of the improperly compacted material. The improperly compacted material shall then be removed, replaced and re-compacted, and the area shall then be retested to insure proper compaction.

112.3.5 Finish Grading

- A. Finish grading shall be done as required to establish the slopes indicated. The grades shall be formed to easy contours sloping toward inlets and ditches. The grading shall eliminate low spots and pockets that do not drain. Ditches shall be excavated to the sections and elevations shown and shall be excavated on smooth slopes to avoid low spots and pockets that do not drain.
- B. The surface of all excavations and fill and all disturbed areas shall be finished to a smooth surface, with the grades sloping away from the buildings. Swales and ditches shall be finished so that effective drainage results. Proper allowance shall be made for topsoil and for pavement thickness. Any settling or washing prior to acceptance of the work shall be repaired at no additional expense to the Owner. Topsoil and seeding of all disturbed areas shall be performed in accordance with the Section "Seeding."

112.4 MEASUREMENT AND PAYMENT

- 112.4.1 Measurement shall be either lump sum and per cubic yard, whichever is indicated on the Bid Schedule. Unless otherwise indicated all excavation is unclassified except solid rock in utility line ditches.
- 112.4.2 Payment will be made as a percentage of lump sum excavation complete or if bid by the cubic yard, actual quantity excavated.

END OF EARTHWORK