

## SECTION 4

### EARTHWORK

#### 4.1 GENERAL

This section defines the requirements for excavation and backfill for structures, construction requirements for embankments and fills, and subgrade preparation for pavements and other surface improvements.

#### 4.2 EXCAVATION PERMIT REQUIREMENTS

Before any excavation in a City street can begin, an excavation permit with required fee must be obtained from the City. The applicant must show proof that a competent licensed contractor will do the work, present evidence of sufficient public liability insurance, and post required cash bonds (returned upon satisfactory completion of project).

#### 4.3 CLEARING AND GRUBBING

The ground within the right-of-way shall be cleared of all trees, stumps, brush, weeds, roots, and other objectionable materials. All branches of trees close enough to the roadway surface to be considered an obstruction to traffic or sight distance shall be carefully removed. All trees, stumps, roots, etc., are to be removed to a depth of not less than three (3) feet below the subgrade.

All excavations made by removal of trees, stumps, etc., shall be filled with suitable material, which shall be compacted so as to make the surface at this point conform in contour and density to that of the surrounding ground.

#### 4.4 EXCAVATION FOR STRUCTURES

All structures shall be founded on undisturbed original subsoil. All authorized excavation below the specified structure subgrade shall be replaced with concrete, monolithic with that of the slab above or with coarse gravel material conforming to classification A-1-a AASHTO designation and compacted to 95% of maximum dry density as measured by AASHTO T-99.

Subgrade soil for all concrete structures, regardless of type or location, shall be firm, dense, thoroughly compacted and consolidated; shall be free from mud and muck and free from organic material, roots, limbs, etc.; shall be compacted to 95% of dry density as measured by AASHTO T-99; and shall be sufficiently stable to remain firm and intact under the feet of the workmen engaged in subgrade surfacing, laying reinforcing steel, and depositing concrete. Coarse gravel or crushed stone may be used for subsoil reinforcement if results satisfactory to the City Engineer can be obtained thereby. Such material shall be applied in layers, not

exceeding six (6) inches in thickness, each layer being embedded in the subsoil by thorough tamping. All excess soil shall be removed to compensate for the displacement of the gravel or crushed stone and the finished elevation of any subsoil reinforced in this manner shall not be above the specified subgrade. Proper foundation stabilization may also be required.

#### 4.5 BACKFILL AROUND STRUCTURES

Backfill around structures shall be placed to the lines shown in the approved Drawings. After completion of foundation footings and walls and other construction below the elevation of the final grades, and prior to backfilling, all forms shall be removed and the excavation shall be cleaned of all trash and debris. Material for backfilling shall consist of excavated material or borrow of sand, gravel, or other suitable material, and shall be placed in layers not exceeding six (6) inches in uncompacted thickness. Each layer shall be compacted by suitable method to a density equal to 95% of maximum dry density as measured by AASHTO T-99.

Backfill around curb, gutter, and sidewalk to the finish grade level. Backfill shall extend 18 inches beyond outside of the concrete gutter and sidewalk.

#### 4.6 CONSTRUCTION OF EMBANKMENTS AND FILLS

Unsuitable materials that occur in the foundations for embankments and fills shall be removed by clearing, stripping, and/or grubbing. Where suitable materials occur, after stripping, the foundation shall be scarified to a depth of not less than six (6) inches, and the loosened material shall be moistened and compacted as hereinafter specified for each layer. All materials in embankments and fills shall be placed, moistened, and compacted as provided in the following paragraphs.

When the embankment or fill exceeds the amount of excavation, sufficient additional material shall be obtained from borrow pits provided by the Contractor. All material proposed to be imported shall be subject to the review and approval of the City Engineer prior to starting of hauling operations.

The materials used for embankment and fill construction shall be free from sod, grass, trash, frozen earth, rocks larger than six (6) inches in diameter, and all other material unsuitable for construction of compacted fills.

Grading of completed embankments and fills shall bring the surfaces to a smooth, uniform condition with final grades being within 0.1 feet of the design grade.

#### 4.7 CONSTRUCTION OF RETAINING WALLS/STABILIZATION STRUCTURES

All retaining wall/stabilization structures in excess of 4' in height shall be designed and constructed per approved site plan, submitted to the city, and stamped by a Professional Engineer (P.E.).

#### 4.8 COMPACTING EARTH MATERIALS

The material shall be deposited in horizontal layers having a thickness of not more than six (6) inches after being compacted as hereinafter specified, providing that when mechanical equipment is used for placing and compacting the material on a sloping foundation, the layers may be placed parallel to the foundations. The distribution of materials shall be such that the compacted material will be homogeneous and free from lenses, pockets, or other imperfections.

Prior to and during compaction operations, the material shall have the optimum moisture content required for the purpose of compaction and the moisture content shall be uniform throughout the layers, insofar as practicable. Moistening of the material shall be performed at the site of excavation, but such moistening shall be supplemented, as required by sprinkling at the site of construction. If the moisture content is greater than optimal for compaction, the compaction operations shall be delayed until such time as the material has dried to the optimum moisture content. When the material has been conditioned as hereinbefore specified, the backfill or embankment shall be compacted as follows:

- A. Under Roadways and extending one foot beyond the proposed curb line, the fill or embankment material shall be compacted to a density equal to not less than 95% of maximum dry density as measured by AASHTO T-99.
- B. Under the Sidewalks, Driveways and other Structures, the fill or embankment material (to at least 6 inches each side of the edge of the slab) shall be compacted to a density equal to not less than 95% of maximum dry density as measured by AASHTO T-99.
- C. Other Fills and Embankments not listed above shall be compacted to a density equal to not less than 92% of maximum dry density as measured by AASHTO T-99.

#### 4.9 SLOPES

The slopes of excavations and/or fills shall be shaped to meet safety requirements dependent on soil types, but in no case shall the finished slope be in excess of 2:1 for cut areas or 3:1 for fill areas except as approved otherwise by all governing agencies.

All cut and fill slopes not included within a building lot shall be re-vegetated with vegetation native to the immediate area as determined by the City Engineer and shall be protected with appropriate erosion control.

#### 4.10 ROAD SUBGRADE PREPARATION

In both cut and fill areas, the paving subgrade shall be scarified to a depth of eight (8) inches and compacted to the equivalent of 95% of maximum dry density as measured by

AASHTO T-99. No rocks larger than four (4) inches in diameter, organic material, soft clay, spongy material, or other deleterious material will be permitted in this scarified subgrade layer. Rough subgrades shall be shaped and graded to within a tolerance of 0.10 foot of design grade, and drainage shall be maintained at all times.

During the rolling operation, moisture content of the subgrade layer shall be maintained at not less than 97% or more than 105% of optimum moisture content. Rolling shall be continued until the entire roadbed is compacted to the specific density to a minimum depth of eight (8) inches.

Contractor may be required to prove roll right-of-way subgrade.

#### 4.11 SUBDIVISION LOTS

All subdivision lots shall be left at or near the original grade as approved by the City Engineer. Lots shall be free of garbage, dead trees, and construction debris. A 10-day notice shall be given for developments found to be in violation. After the 10-day period, the City of Cedar Hills may, at its option, remedy the situation and collect reimbursement from the bond posted for that development.

All lots shall be graded and free of debris prior to release of the Performance Bond and initiation of the Durability Bond.