

## **CHAPTER 4**

### **EARTHWORK**

#### **SECTION 4.01 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.

#### **SECTION 4.02 EXCAVATION PERMIT REQUIREMENTS**

Prior to the excavation or encroachment within any City street, an Encroachment Permit with required fee must be obtained from the Lehi City Public Works Department. The applicant must show proof that a competent licensed contractor will do the work, present evidence of sufficient public liability insurance, post the required cash bond (returned upon satisfactory completion of project), and provide a proctor for the backfill material. Failure to contact the Public Works Department prior to commencement of work will result in the requirement to remove all asphalt and/or backfill at the contractor/developer's expense. Also, surrendering of all fees submitted for the Encroachment Permit may be requested.

#### **SECTION 4.03 EXCAVATION FOR STRUCTURES**

- A. 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 thoroughly compacted into place.
- B. 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 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 or City Inspector can be obtained thereby. Such material shall be applied in layers, not exceeding 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 sub-grade.

#### **SECTION 4.04 BACKFILL AROUND STRUCTURES**

- A. 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 eight (8) inches in uncompacted thickness. Each layer shall be compacted by hand or by other suitable equipment to a density equal to 95% of maximum dry density as measured by AASHTO T-99. Backfill around curb and gutter in fill sections shall extend 18 inches beyond outside of the concrete gutter.

#### **SECTION 4.05 CONSTRUCTION OF EMBANKMENTS AND FILLS**

- A. 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 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.
- B. 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 or City Inspector prior to starting of hauling operations.
- C. The materials used for embankment and fill construction shall be free from sod, grass, trash, frozen earth, rocks larger than 6 inches in diameter, and all other material unsuitable for construction of compacted fills.
- D. 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.

#### **SECTION 4.06 COMPACTING EARTH MATERIALS**

- A. The material shall be deposited in horizontal layers having a thickness of not more than 6 inches after being compacted as hereinafter specified, provided 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, packets, or other imperfections.
- B. 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 less than optimum 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:

1. Under Roadways and extending one foot beyond the proposed top back of curb 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.
2. Under the Sidewalks, Driveways and other Structures the fill or embankment material (to at least one foot 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.
3. Other Fills and Embankments not listed above shall be compacted to a density equal to not less than 90% of maximum dry density as measured by AASHTO T-99.

#### **SECTION 4.07 SLOPES**

- A. 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 2:1 for fill areas except as approved otherwise by all governing agencies.