

**SECTION 02135
EXCAVATION FOR ROADWAY**

PART I: GENERAL

1.1 GENERAL REQUIREMENTS

- A. Excavation and compaction of materials for roadways.
- B. Excavation and compaction of materials for roadside ditches.

1.2 MEASUREMENT AND PAYMENT

- A. Unit Prices:
 - 1. Payment for roadway excavation shall be on a cubic yard basis.
 - 2. No payment will be made for material excavated under the following conditions:
 - a. More than two feet (2 Ft) outside of vertical planes behind back of curbs.
 - b. For portion within limits of trench for utilities twenty-four inch (24 In) and greater constructed by open-cut methods.
 - c. As indicated otherwise on the Drawings.
 - 3. Refer to Section 01270 – Measurement and Payment for unit price procedures.
- B. Stipulated Price (Lump Sum):
 - 1. If Contract is Stipulated Price Contract, payment for work in this Section shall be included in Total Stipulated Price.

1.3 REFERENCES

- A. ASTM – American Society for Testing and Materials.
 - 1. ASTM D698 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12.44 ft-lbf/ft³).
 - 2. ASTM D2216 – Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.
 - 3. ASTM D2922 – Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
 - 4. ASTM D3017 – Standard Test Method for Water content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
 - 5. ASTM D4318 – Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- B. CFTS – City of Friendswood Technical Specifications.
- C. TCEQ – Texas Commission on Environmental Quality.
- D. TDH – Texas Department of Health.
- E. RRC – Railroad Commission of Texas.

PART II: PRODUCTS

2.1 MATERIALS

- A. Provide topsoil conforming to requirements of Section 02905 – Topsoil.
- B. Provide backfill which is excavated material, graded free of roots, lumps greater than six inches (6 In), rocks larger than three inches (3 In), organic material and debris.
- C. Provide structural backfill which is select material meeting following requirements:
 - 1. Plasticity index: Not less than twelve (12) or more than twenty (20).
 - 2. Maximum liquid limit: Forty-five (45).

PART III: EXECUTION

3.1 PREPARATION

- A. Identify required lines, levels and datum. Coordinate with Section 01725 – Field Surveying.
- B. Identify and flag surface and aerial utilities.
- C. Notify utility companies to remove or relocate utilities.
- D. Identify, stake and flag known utility locations below grade. Make temporary or permanent relocation of underground pipes, ducts or utilities where indicated on the Drawings.
- E. Upon discovery of unknown or badly deteriorated utilities or concealed conditions, discontinue work. Notify the Project Manager and obtain instructions before proceeding in such areas.
- F. Obtain approval of top soil quality before excavating and stockpiling.

3.2 PROTECTION

- A. Protect following from damage or displacement:
 - 1. Trees, shrubs, lawns, existing structures and other features outside of grading limits.
 - 2. Utilities either above or below grade, which are to remain.

3.3 TOPSOIL REMOVAL

- A. Strip off topsoil from area to be excavated to minimum depth of six inches (6 In), unless indicated otherwise on the Drawings.
- B. Stockpile topsoil in designated location for reuse. Stockpile topsoil to depth not exceeding eight feet (8 Ft). Cover to protect from erosion.

3.4 SOIL EXCAVATION

- A. Excavate to lines and grades shown on the Drawings.
- B. Remove unsuitable material not meeting specifications. Backfill with embankment materials and compact to requirements of Section 02115 – Embankment.

- C. Record location and plug and fill inactive water and oil wells. Conform to Texas Department of Health, Texas Commission on Environmental Quality and Texas Railroad Commission requirements. Notify the Project Manager prior to plugging wells.
- D. At intersections, grade back at minimum slope of one inch per foot (1 In/Ft). Produce smooth riding junction with intersecting street. Maintain proper drainage.
- E. When area is inadvertently over-excavated, fill area in accordance with requirements of Section 02115 – Embankment at no additional cost to the City.
- F. Remove material not qualified for use and excess soil not being reused from site in accordance with requirements of Section 01580 – Waste Material Disposal.

3.5 COMPACTION

- A. Maintain optimum moisture content of subgrade to attain required density.
- B. Compact to following minimum densities at moisture content of optimum to plus or minus three percent ($\pm 3\%$) optimum as determined by ASTM D698, unless otherwise indicated on the Drawings:
 - 1. Areas under future paving and shoulders: Minimum density of ninety-five percent (95%) of maximum dry density.
 - 2. Other areas: Minimum density of ninety percent (90%) of maximum dry density.

3.6 TOLERANCES

- A. Top of Compacted Surface: Plus or minus one-half inch ($\pm 1/2$ In) in cross section or in sixteen feet (16 Ft) longitudinally.

3.7 FIELD QUALITY CONTROL

- A. Testing shall be performed under provisions of Sections 01470 – Testing Laboratory Services and 01475 – Quality Control Testing Procedures.
- B. Test and analysis of soil materials shall be performed in accordance with ASTM D4318, ASTM D2216 and ASTM D698.
- C. Compaction testing shall be performed in accordance with ASTM D698 or ASTM D2922 and ASTM D3017.
- D. A minimum of three (3) tests shall be taken for each one thousand linear feet (1000 Lf) per lane of roadway at random locations as specified by the the Project Manager.
- E. When tests indicate work does not meet specified compaction requirements, recondition, recompact and retest at no additional cost to the City.

3.8 PROTECTION

- A. Prevent erosion at all times. Maintain ditches and cut temporary swales to allow natural drainage in order to avoid damage to roadway. Do not allow water to pond.
- B. Distribute construction traffic evenly over compacted areas, where practical, to aid in obtaining uniform compaction. Protect exposed areas having high moisture content from wheel loads that cause rutting.
- C. Maintain excavation and embankment areas until start of subsequent work. Repair and recompact slides, washouts, settlements or areas with loss of density.

END OF SECTION