ITEM 132

EMBANKMENT

132.1 Description. This item shall govern for the placement and compaction of all suitable materials obtained from excavation of roadway right-of-way (Item 110), channels, and other drainage facilities (Item 120), structural and all underground utility excavation (Item 430), and borrow (Item 130), used in the construction of project fill and/or embankment.

132.2 Construction Methods. Prior to placing any embankment, all stripping and/or clearing and grubbing operations shall have been completed on the excavation sources and areas over which the embankment is to be placed. Stump holes or other small excavations in the limits of the embankments shall be backfilled with suitable material and thoroughly compacted by approved methods before commencing embankment construction. The surface of the ground, including plowed loosened ground or surface roughened by small washes shall be restored to approximately its original slope by blading or other methods and where indicated on the plans or required by the Engineer, the ground surface thus prepared shall be compacted in accordance with the Item 205, “Subgrade”.

Unless otherwise indicated on the plans, the surface of the ground of all unpaved areas, which are to receive embankment, shall be loosened by scarifying or plowing to a depth of not less than 4-inches. The loosened material shall be recompacted with the new embankment as hereinafter specified, and shall not exceed 8-inches in total depth.

Where indicated on the plans or as directed by the Engineer, the surface of the hillside to receive embankment shall be loosened by scarifying or plowing to a depth of not less than 4 inches, or cut into steps, benched or notched before embankment materials are placed. The embankment shall then be placed in layers, not to exceed 8-inches, as hereinafter specified, beginning at the low side in part width layers and increasing the widths as the embankment is raised. The material which has been loosened shall be recompacted simultaneously with the embankment material placed at the same elevation.

Where embankments are to be placed adjacent to or over existing roadbeds, the roadbed slopes shall be plowed or scarified to a depth of not less than 4-inches and the embankment built up in successive layers, as hereinafter specified to the level of the old roadbed before its height is increased. The top of the old roadbed shall be scarified and recompacted with the next layer of the new embankment. The total depth of the scarified and added material shall not exceed the permissible depth of layer.

Trees, stumps, roots, vegetation or other unsuitable materials shall not be placed in the embankment.

Except as otherwise required by the plans, all embankment shall be constructed in layers approximately parallel to the finished grade of the roadbed. Embankments shall be constructed to the grade established by the Engineer, and completed embankments shall correspond to the general shape of the typical sections shown on the plans and each section of the embankment shall correspond to the detailed section or slopes established by the Engineer. After completion of the roadway, it shall be continuously maintained to its finished section and grade until the project is completed.

Except as otherwise specified, earth embankment shall be constructed in successive layers for the full width of the individual roadway cross-section and in such lengths as are best suited to the sprinkling and compaction methods utilized.

Prior to compaction, the layers shall not exceed 6 inches in depth where pneumatic tire rolling is to be used and shall not exceed 8-inches in depth for rolling with other types of rollers. Layers of embankment may be formed by utilizing equipment which will spread the material as it is dumped, or they may be formed by being spread by blading or other acceptable methods, from piles or windrows dumped from excavating or hauling equipment in such amounts that the material is evenly distributed.

Each layer of embankment shall be uniform as to material and moisture content before compaction. Where layers of unlike materials abut each other, the material shall be mixed so as to prevent abrupt changes in the soil. No material placed in the embankment by dumping in a pile or windrow shall be incorporated in a layer in that position, but all such piles or windrows shall be moved by blading or similar methods. Clods or lumps of material shall be broken and the embankment material mixed by blading, harrowing, discing, or similar methods to the end that a uniform material is secured in each layer. Water required for sprinkling to bring the material to the moisture content necessary for maximum compaction shall be evenly applied and it shall be the responsibility of the Contractor to secure a uniform moisture content throughout the layer by such methods as may be necessary. In order to facilitate uniform wetting of the embankment material, the Contractor may apply water at the material source if the sequence and methods used produce the required results. Such procedure shall be subject to the approval of the Engineer.

Each layer shall be compacted to a minimum of 95% of standard proctor density (ASTM Test Method D698, “Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3), at a moisture content of between optimum and plus 3 percent of optimum. Soils shall not be compacted at less than the optimum moisture content.

After each layer of embankment or select material is complete, tests as necessary will be made by the Engineer. If the material fails to meet the

density specified, the course shall be reworked, as necessary, to obtain the specified compaction.

Should the subgrade, due to any reason or cause, lose the required stability, density or finish before the pavement is placed, it shall be recompacted and refinished at the sole expense of the Contractor. Excessive loss of moisture in the subgrade shall be prevented by sprinkling, sealing or covering with a subsequent layer of asphaltic or other approved material.

132.3 Quality Assurance. The Contractor is responsible for the control of the quality of materials incorporated into the construction and the quality of completed construction. The City of Deer Park will have the option to engage materials engineering services to provide quality assurance testing and inspection to assist the City Engineer in determining the acceptability of materials and completed construction. Quality assurance services provided by the City do not relieve the Contractor of his responsibility for quality control. The Engineer shall not have control of the means, methods, techniques, sequences, or procedures of construction selected by the Contractor.

The Testing Laboratory's representative will determine the moisture-density relationships in accordance with ASTM Method D698, on material secured from each type of material encountered.

The Testing Laboratory's representative will determine the in-place density in accordance with ASTM D2922, "Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods or ASTM D1556, "Test Methods for Density and Unit Weight of Soil in Place by Sand-Cone Method". The minimum level of testing will consist of at least three tests for each 1,000 feet per lane of roadway or 4,000 square feet of embankment, per lift.

132.4 Measurement and Payment. Embankment shall not be paid for directly, but shall be incidental to roadway excavation, excavation for channels and other drainage facilities, construction of underground utilities, including all sewers. This includes any transporting and stockpiling of material.

END OF ITEM 132