203 SOILS CONSTRUCTION – GENERAL

203.01 DESCRIPTION

These specifications include general requirements that are applicable to all types of soils construction. The work shall consist of the formation of embankments, roadbeds and backfilling of trenches, structures, etc., to the lines, grades and cross sections specified including trimming and finishing.

Payment for work required by this section shall be under the various pay items in these specifications.

Terms used in these specifications for the construction of soils foundations are in accordance with AASHTO M 146.

203.02 MATERIALS

Materials for earthwork shall meet the following requirements:

Soils for embankments - 804.02

Soils for trench backfill - 804.05

Soils for base courses and structural backfill - 804.04

Geotextile Fabrics and Membranes – 213

203.03 CONSTRUCTION REQUIREMENTS

(A) DENSITY AND MOISTURE REQUIREMENTS.

(1) DENSITY REQUIREMENTS. The Standard Density requirements for soils and aggregate base courses and recycled materials shall be defined as the Maximum Dry (Laboratory) Density obtained by AASHTO T 180, Method D.

The in-place or required density shall be determined in accordance with AASHTO T 191 or AASHTO T310, and is expressed as a percentage of the Standard Density. If the in-place density sample contains material larger than 3/4 inch, the field density shall be adjusted for the material retained on the 3/4 inch sieve before direct comparison with the Standard Density.

The minimum in-place density shall be as specified in Table 203.03, Density Requirements.

(2) MOISTURE REQUIREMENTS. Soils materials used in construction shall have a uniform moisture content suitable for compaction to the specified density. When necessary, the Chief Engineer may direct that the soil be moistened or dried to obtain suitable uniform moisture content.

If the materials are of such nature that heaving, pumping, rutting, or shearing occurs in the compacted soil under the action of the construction equipment, even though the density of the soil satisfies the above requirements, the moisture content of the soil will be considered unsatisfactory and shall be adjusted such that no heaving, pumping, rutting or shearing occurs in the compacted soils under the action of the construction equipment.

(B) PROOF ROLLING OF IN-SITU MATERIAL. Prior to placing any base course material and after the in-situ material has been properly compacted and fine graded to the correct elevation, the sub-grade shall be checked under the action of a loaded tandem or 10-wheeled dump truck or similar equipment. If soft spots are detected, or pumping, rutting or heaving occurs at the sub-grade, the roadbed shall be considered unsatisfactory and the soil in these areas shall be replaced to the depth indicated by the Chief Engineer. Materials used to replace unsatisfactory soil material in the sub-grade shall meet the requirements of 804.04 and 213. The improved sub-grade shall then be compacted to the density specified in Table 203.03 and fine graded to the correct elevation.

Upon satisfactory completion of the sub-grade layer, the base course layer shall be placed meeting the requirements of 209.06, properly compacted and fine graded to the correct elevation as shown the contract documents.

Where shallow utilities or similar construction conditions prohibit proof rolling or correction by replacement and the soils foundation is not suitable for hauling over directly, the Contractor shall provide approved means for protecting the soils foundation against damage caused by equipment moving over it. If an approved means is used for protecting the soils foundation around shallow utilities or similar construction against damage caused by equipment moving over it, the unsatisfactory soil in these areas shall be replaced, as directed by the Chief Engineer, to a depth below the utilities or similar construction by material meeting the requirements of 804.04 and 213 and compacted to the density specified in Table 203.03.

(C) FORMATION OF EMBANKMENTS. All excavated material meeting the applicable requirements of 203.02 may be used in the formation of any embankment, or similar construction. All other materials shall be disposed of outside the limits of the project.

During the construction, the embankment shall be maintained in such condition that it will be well drained at all times, and the grade shall be shaped and rolled to drain when precipitation is imminent and at the end of each day.

After precipitation, all soft wet material on the grade shall be removed at the Contractor's expense before additional material is placed. No fill shall be placed in natural drainage ditches until necessary pipes or culverts have been installed.

No material used in embankments shall be placed in a loose lift thickness in excess of 6 inches. Each loose lift shall be compacted to the density requirements of Table 203.03 before another loose lift is placed. Frozen material shall not be used nor shall material be placed on frozen embankment foundation, embankment or base course.

Compacting equipment shall meet the requirements of 902. Any portion of the embankment or embankment foundation that is not accessible to the roller shall be compacted to the specified density by an approved mechanical tamper. Puddling or jetting is prohibited. The Chief Engineer may permit compaction with types of equipment other than those specified above, provided that the use of the alternate equipment will consistently produce requisite densities. The Chief Engineer's permission shall be in writing and shall set forth the conditions under which the equipment is to be used.

The Contractor shall be responsible for the stability of all constructed soils foundations and shall replace any portions that, in the opinion of the Chief Engineer, have become displaced or

disturbed due to careless or negligent work, or to damage resulting from any kind of storms and not attributable to the unavoidable movement of the natural underlying ground on which the constructed soils foundation rests. No pavement materials shall be placed on any base, roadbed or soils foundation until it has been approved by the Chief Engineer.

TABLE 203.03 DENSITY REQUIREMENTS

DESCRIPTION	MINIMUM DENSITY REQUIRED, PERCENT OF THE MAXIMUM DRY DENSITY AS DETERMINED BY AASHTO T180 D
Embankments, Trench Backfill and Borrow Trench Backfill	93 percent per each layer up to 6 inches below sub grade.
	95 percent for top 6 inch layer of sub grade.
	95 percent for full depth of embankments in confined areas where the use of clean sand is permitted.
Upper 6 inches of Roadbed (Top 6 inches of sub grade)	93 percent under curb, gutter, sidewalk, driveway entrances and alley entrances.
	95 percent under PCC roadway pavement areas.
	100 percent if full depth bituminous concrete pavement is used.
Existing and New Aggregate Base Courses, base, pavement or sidewalk.	95 percent for PCC
	100 percent for bituminous concrete pavement.
Structural Backfill	95 percent.
Backfill for undercut areas	95 percent
Backfill for undercut areas underneath footing and mat foundation	100 percent
Tree Space	85 percent