
11.0 EARTHWORK

11.1 Construction Requirements

11.1.1 Clearing and Grubbing

Trees, logs, limbs, stumps, brush, and trash and etc. cleared and grubbed from the Project shall be removed from the Site to an offsite location.

11.1.2 Excavations and Embankments

To provide for adequate sulfate resistance in all concrete supplied, Severity of Potential Exposure shall be Class 2 for this Project. The Contractor may at his own expense have a certified laboratory test the sub grade as per the Field Materials Manual. Testing shall be at the same schedule and frequency as required for a preliminary soil survey. The Contractor may propose a different Class of Exposure for the Project to the CDOT Project Director for Acceptance based on those test results.

11.1.2.1 Materials Requirements

Except as required below, embankment material shall have a minimum resistance value (R-value) of 10 or greater when tested by the Hveem Stabilometer. The embankment material shall meet all stability requirements per Colorado Procedure – Laboratory 3102. The embankment material shall have a plasticity index less than 30, shall be nonswelling when tested at 200 psf, and have water-soluble sulfate levels less than 2%.

US-36 Mainline Widening

The top two feet of Subgrade shall have a minimum resistance value (R-value) of 60 when tested by the Hveem Stabilometer. The minimum horizontal limits for this material shall be the outer limits of the Pavement Structure plus two feet on each side.

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See Section 10.2.2.3 for minimum requirements for material below the pavement structure and subgrade treatment. Unless otherwise specified, rock shall be excavated to a minimum depth of 0.5 foot and a maximum depth of 1 foot below subgrade, within the limits of the roadbed. Approved embankment material shall be used to bring the rock-excavated areas to subgrade elevations.

In embankment areas supporting the roadway shoulders and pavement structure, the A-2-4 material shall be underlain by 6 feet of nonswelling material with a plasticity index less than or equal to 30 and an R-value of 10 or greater. This material shall be compacted to 2% wet of optimum. If the distance between the bottom of the A-2-4 and the bottom of the embankment is less than 6 feet, the R-value 10 or greater material shall be placed from the bottom of the A-2-4 to the base of the embankment. Material with an R-value less than 10 may be utilized beneath the R-value 10 material; however, the material shall have a % swell less than or equal to 3 percent when tested at 200 psf. Material placed beneath the R-value 10 material shall be compacted to +/- 2% of optimum.

Unless otherwise stated, embankment shall be constructed in 8-inch lifts, and have a maximum dry density not less than 90 pounds per cubic foot.

Other Roadways

Conduct additional investigations, and determine pavement design, subgrade, and embankment material according to requirements set forth in the City and County of Broomfield Standards and Specifications.

11.1.2.2 Compaction Requirements

The minimum relative compaction of the A-2-4 or better material shall be 95% plus or minus 2% of optimum using AASHTO T180. Unless otherwise specified, all other compaction for the Project shall be per section Book 2, Section 19 (Section 203 - Embankment). Depth of moisture-density control for this Project shall be full depth for all embankments and 6 inches for bases of cuts and fills.

11.1.4 Reuse of Materials

The Contractor may use broken concrete or broken asphalt or asphalt millings as embankment material in selected areas of the roadway template unless otherwise stated and only in conformance with Book 2, Section 19 (Section 203 – Embankment).as Approved by CDOT. The existing sub-grade may remain in place if Approved by the CDOT Project Director and subject to the following conditions:

1. The Contractor shall conduct a soil survey confirming that the existing sub-grade to remain in place meets the R-value requirements / soils classifications specified above and in the Standard Specifications.