

## **SECTION 205: SUBGRADE PREPARATION**

### **205.1 DESCRIPTION**

This work shall consist of preparing and maintaining the upper portion of the embankment, identified as the Subgrade Preparation Area, for subsequent placement of aggregate base materials as per the contract or, if not included in the contract, as per City of Rio Rancho Standard Details.

The following definition is provided for clarity:

1. Subgrade Preparation includes the upper one (1) foot of the subgrade measured from the top of finished subgrade down. Embankment materials placed in this area shall meet the Design R-Value requirements of the contract.

### **205.2 MATERIALS**

#### **205.2.1 Suitable, Unsuitable, Unstable and Borrow Materials**

See Section 202.2.1 of these specifications for Material Classifications for suitable, unsuitable, unstable subgrade, and borrow materials in the subgrade preparation area.

#### **205.2.2 Particle Sizes**

No materials larger than two and one-half (2-1/2) inches in greatest dimension shall be placed in the subgrade preparation area.

#### **205.2.3 Design R-Value**

The top one (1) foot of the finished subgrade shall have a minimum Resistance Value (R-Value), as determined by ASTM D-2844, equal to or greater than the design R-Value for the pavement section as indicated in the contract. On small projects, in areas that involve replacement of existing roadway items or when no design R-Value has been established, this design R-Value requirement may be waived if authorized by the City Engineer or designee.

### **205.3 CONSTRUCTION REQUIREMENTS**

#### **205.3.1 General**

Subgrade preparation shall be performed after completion of earthwork construction, subsurface utility installation, and trenching backfill within the limits specified in the contract, as directed by the City Engineer or designee. The subgrade preparation area shall be loosened by plowing or scarifying so the material is broken and uniformly blended to a depth indicated in the contract or as specified in City of Rio Rancho Standard Details.

Areas on which roadway pavement items are to be placed shall be compacted uniformly to the required subgrade density at the same time. Obtaining the required subgrade density in trench areas at a different time than obtaining the required subgrade density in the adjacent pavement areas shall not be permitted.

Prior to placement of aggregate base course materials, the subgrade shall be proof-rolled with either a pneumatic roller weighing a minimum of 25 tons or a 4000-gallon water tank filled to capacity, and shall exhibit no displacement when proof-rolled. Areas that exhibit displacement are considered unstable subgrade areas.

The Contractor shall protect utilities and structures during construction operations and repair any damage caused by their operations at the Contractor's expense. This may require the Contractor to install temporary protection features. Should any damage occur to these existing features due to the Contractor's operations, the City Engineer or designee may withhold payment until the damage is remediated or require the damaged items to be replaced at the Contractor's expense.

### **205.3.2 Preparation Extents**

Subgrade preparation shall extend to one (1) foot beyond the limits of the improvement to be placed on the subgrade except when that improvement abuts an existing structure and/or the limits of the right-of-way. Where an improvement abuts an existing structure and/or the limits of right-of-way, the subgrade preparation shall extend to the edge of the existing structure and/or the limits of right-of-way, as specified in the plans, specifications, supplemental technical specifications, or as directed by the City Engineer or designee.

Where existing structures are in the right-of-way or construction easements, subgrade preparation shall extend to the face of the structure, as specified above. Subgrade preparation shall not extend below the bottom of the foundation of an existing structure without specific authorization by the City Engineer or designee.

Subgrade preparation for roadway improvements shall extend the full width of the roadway to either one (1) foot beyond new curb and gutter, and/or to the face of existing structures, and or the limits of right-of-way, as specified in the plans and specifications, as directed by the City Engineer or designee.

Subgrade preparation for sidewalks, multi-use trails, and drive pads shall extend a minimum of one (1) foot beyond the free edge of the improvement, and/or to the limits of right-of-way, and/or to the face of existing structures.

Subgrade preparation for roadway construction without curb and gutter, shall extend one (1) foot beyond the edge of the pavement, and/or to the face of existing structures, and/or to the limits of right of way, as specified in the plans and specifications, as authorized by the City Engineer or designee.

Subgrade preparation shall extend the full width of roadway medians four-feet (4') wide or less. In areas that the medians are wider than four (4) feet, the subgrade compaction shall extend one (1) foot beyond the median edge of the pavement or back of the median curb.

### **205.3.3 Compaction**

#### **205.3.3.1 Lift Thickness**

The maximum lift thickness of subgrade preparation area material placed is eight (8) inches in loose condition.

#### **205.3.3.2 Density**

The subgrade preparation area shall be compacted to 95% of maximum density based on ASTM Designation D 1557.

#### **205.3.3.3 Moisture Content**

The moisture content of the subgrade material, at the time of compaction, shall be optimum moisture content plus or minus two (2) percent. Perform plowing or scarifying as required to obtain the proper moisture content.

#### **205.3.4 Testing**

Contractor and Agency testing for subgrade preparation and Design R-Value shall be as per the New Mexico Transportation Department Minimum Testing Requirements at:

[http://www.dot.state.nm.us/content/dam/nmdot/Construction/INDEPENDENT\\_ASSURANCE\\_PROGRAM\\_5-29-13.pdf](http://www.dot.state.nm.us/content/dam/nmdot/Construction/INDEPENDENT_ASSURANCE_PROGRAM_5-29-13.pdf)

A sample of each type of soil encountered shall be classified in accordance with the requirements of ASTM Designation 2487, the moisture density relationship determined in accordance with ASTM Designation D-1557, and an estimated resistance Design R-value assigned based on plasticity index (PI) and percent material passing the No. 200 sieve.

The Contractor is required to submit potential borrow sources to the City Engineer or designee at the preconstruction conference to ensure any necessary testing is performed prior to placement of materials on the project. Refer to Section 202.2.1.4, Borrow Material, of these specifications.

In areas where field testing fails, the area must be re-worked or material replaced and a passing test performed before placement of any subsequent materials.

#### **205.3.5 Tolerances**

Finish the subgrade surface at any one location to within 0.25 inches above to 0.25 inches below the subgrade elevations shown on the plans before placing any aggregate base materials.

Subgrades upon which pavement, sidewalk, curb and gutter, drive pads, or other structures are to be placed shall not vary more than  $\pm 0.25$  inches per 10 feet in any direction from the specified grade and cross section. Subgrades upon which base material is to be placed shall not vary more than  $\pm 0.25$  inches per 20 feet in any direction from the specified grade and cross section.

**205.3.6 Subgrade Maintenance**

Upon completion of subgrade preparation, the Contractor shall maintain the compacted subgrade density and moisture content at the specified levels until aggregate base material is placed. The Contractor shall provide continuous moisture protection of the subgrade by either sprinkling water or by the application of a prime coat, as directed by the City Engineer or designee. For projects with state or federal funding, the only method allowed will be the application of a prime coat.

**205.4 METHOD OF MEASUREMENT**

Measurement for payment of subgrade preparation will be by the square yard to the limits required, as authorized by the City Engineer or designee.

**205.5 BASIS OF PAYMENT**

<b>Pay Item</b>	<b>Pay Unit</b>
Subgrade Preparation	Square Yard

When the contract includes an item for Subgrade Preparation, payment shall be considered all-inclusive of costs of the work including: loosening, blending and compacting the material, replacing any unsuitable or unstable material with suitable material, and maintaining the prepared subgrade moisture and density until aggregate base material is placed.

No additional payment will be made for rehandling or reworking material to meet moisture and density requirements.

No additional payment will be made for any excavation or borrow materials associated with subgrade preparation work.

When the contract does not include an item for Subgrade Preparation, all the costs associated with preparing the subgrade shall be considered as included in the price paid for other items of work and no additional compensation will be allowed therefor.