25. ROCKFILL

1. SCOPE

The work shall consist of the construction of rockfill zones of embankments and other rockfills required by the drawings and specifications, including bedding where specified.

2. MATERIALS

Materials for rockfill and bedding shall be obtained from the specified sources, unless otherwise specified in Section 10 of this specification. The materials shall be excavated, selected, processed, and handled as necessary to conform to the specified gradation requirements.

3. FOUNDATION PREPARATION

Foundations for rockfill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.

Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities, and test pits or other cavities shall be filled with compacted earthfill of approximately the same kind and density as the adjacent foundation material.

Rock foundation surfaces shall be cleared of all loose materials not conforming to the specifications for the rockfill.

Abutments for rockfill zones of embankments shall be prepared as specified above for foundations.

Rockfill and/or bedding shall not be placed until the foundation preparation is completed and the foundation and excavations have been inspected and approved.

4. BEDDING

When a bedding layer beneath rockfill is specified, the bedding material shall be spread uniformly on the prepared subgrade surfaces to the depth indicated. Compaction of the bedding material shall be as specified in Section 10 of this specification.

5. PLACEMENT

Method 1 The rock shall be dumped and spread into position in approximately horizontal layers not to exceed three (3) feet in thickness. It shall be placed in a manner to produce a reasonably homogeneous stable fill that contains no segregated pockets of large or small fragments or large unfilled spaces caused by bridging of the larger rock fragments.

Method 2 The rock shall be dumped and spread into position in approximately horizontal layers not to exceed three (3) feet in thickness. The rock shall be placed so that the completed fill shall be graded with the smaller rock fragments placed in the inner portion of the embankment and the larger rock fragments placed on the outer slopes. Rock shall be placed in a manner that will produce a stable fill that contains no large unfilled spaces caused by bridging of the larger fraction.

6. CONTROL OF MOISTURE

The moisture content of rockfill material shall be controlled as specified in Section 10 of this specification. When the addition of water is required, it shall be applied in a manner to avoid excessive wetting of adjacent earthfill. Except as specified in Section 10 of this specification, control of the moisture content will not be required.

The moisture content of the bedding material shall be controlled to ensure that bulking of the sand materials does not occur during compaction operations.

7. COMPACTION OF ROCKFILL

Rockfill shall be compacted as described below for the class of compaction specified or by an approved equivalent method.

Class I Compaction. Each layer of fill shall be compacted by a minimum of four (4) passes, over the entire surface, with a steel-drum vibrating roller having a minimum weight of five (5) tons and exerting a vertical vibrating force of not less than 20,000 pounds at a frequency not less than 1200 times per minute.

Class II Compaction. Each layer of fill shall be compacted by a minimum of four (4) passes over the entire surface by a track of a crawler-type tractor weighing a minimum of twenty (20) tons.

Class III Compaction. No compaction will be required beyond that resulting from the placing and spreading operations.

Heavy equipment shall not be operated within two (2) feet of any structure. Vibrating rollers shall not be operated within five (5) feet of any structure. Compaction by means of drop weights operating from a crane, hoist or similar equipment will not be permitted.

When compaction other than Class III compaction is specified, rockfill placed in trenches or other locations inaccessible to heavy equipment shall be compacted by means of manually controlled pneumatic or vibrating tampers or by equivalent methods approved by the Engineer.

8. COMPACTION OF BEDDING

Bedding shall be compacted according to the following requirements for the Class of compaction specified:

Class A Compaction. Each layer of bedding shall be compacted to a relative density of not less than 70 percent as determined by ASTM Method D 4254.

Class I Compaction. Each layer of bedding shall be compacted by a minimum of two (2) passes, over the entire surface, with a steel-drum vibrating roller weighing a minimum of five (5) tons and exerting a vertical vibrating force not less than 20,000 pounds at a frequency not less than 1200 times per minute, or an approved equivalent method.

Class II Compaction. Each layer of bedding shall be compacted by one of the following methods or by an equivalent method approved by the Engineer:

a. A minimum of two (2) passes, over the entire surface, with pneumatic rubber-tired roller exerting a minimum pressure of 75 pounds per square inch (psi). A pass is defined as at least one passage of the roller wheel, track, tire or drum over the entire surface of the bedding layer.

b. A minimum of four (4) passes, over the entire surface, with the track of a crawler-type tractor weighing a minimum of 20 tons.

c. Controlled movement of the hauling equipment so that the entire surface is traversed by a minimum of one (1) tread track of the loaded equipment.

Class III Compaction. No compaction will be required beyond that resulting from the placing and spreading operations.

Heavy equipment shall not be operated within two (2) feet of any structure. Vibrating rollers shall not be operated within five (5) feet of any structure. Compaction by means of drop weights operating from a crane, hoist or similar equipment will not be permitted.

When compaction other than Class III is specified, bedding placed in trenches or other locations inaccessible to heavy equipment shall be compacted by means of manually controlled pneumatic or vibrating tampers or by equivalent methods approved by the Engineer.

9. MEASUREMENT AND PAYMENT

For items of work for which specific unit prices are established in the contract, the volume of each type of rockfill, including bedding, with the zone boundaries and limits specified on the drawings or established by the Engineer will be measured and computed to the nearest cubic yard by the method of average cross-sectional end areas.

Payment for each type of rockfill will be made at the contract unit price for that type of fill. Except as otherwise specified in Section 10 of this specification, such payment will constitute full compensation for all labor, equipment, materials, and all

other items necessary and incidental to the performance of the work, including furnishing, placing and compacting the bedding material.

Compensation for any type of work described in the contract but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in Section 10 of this specification.