

**218.4.01 Limits**

General Provisions 101 through 150.

**218.5 Payment**

Payment will be made under:

Item No. 218	Blanket for fill slopes	Per cubic yard (meter)
--------------	-------------------------	------------------------

**218.5.01 Adjustment**

General Provisions 101 through 150.

**Section 219—Crushed Aggregate Subbase****219.1 General Description**

Specifications for this work will be included elsewhere in the Contract.

**Section 221—Special Subgrade Compaction and Test Rolling****221.1 General Description**

This work includes rolling subgrades using a special roller described in this Section and repairing weak places discovered during rolling.

The Item does not take the place of compaction or subgrade improvement specified elsewhere in the Specifications. It consists of the following complete operations:

- Test rolling and performing final compaction and preparation of the finished subgrade using special rolling and compaction equipment
- Replacing or repairing weak areas that develop in the finished subgrade from manipulating the test rolling equipment
- Continuing test rolling to compact repaired areas until the entire subgrade remains firm
- Protecting culverts and bridges from damage according to specified construction methods

**221.1.01 Definitions**

General Provisions 101 through 150.

**221.1.02 Related References**

General Provisions 101 through 150.

**221.1.03 Submittals**

General Provisions 101 through 150.

**221.2 Materials**

General Provisions 101 through 150.

**221.2.01 Delivery, Storage, and Handling**

General Provisions 101 through 150.

**221.3 Construction Requirements****221.3.01 Personnel**

General Provisions 101 through 150.

**221.3.02 Equipment**

Use the following equipment for special subgrade compaction and test rolling. Do not vary from these Specifications except by written permission from the Engineer.

### 221.3.03

#### A. Roller

Use a pneumatic-tired roller with these features:

- Single-axle base with four wheels
- Gross weight adjustable from 35 to 50 tons (31 to 45 Mg) as determined by the Engineer
- Wheels constructed to allow free rocking and oscillation
- Roller no more than 10 ft (3 m) wide overall with a turning radius of 15 ft (4.5 m) or less

Have a separate tractor unit pull the roller unless a self-propelled roller meets all of these requirements.

Use 18:00 x 25 tires inflated to the pressure recommended by the manufacturer for the wheel load but to not less than 90 psi (620 kPa).

Ensure that the gross contact area (entire surface of the tire on a flat surface) is no more than 331 in<sup>2</sup> (0.213 m<sup>2</sup>) per tire and the net contact area (treads) is no more than 166 in<sup>2</sup> (0.107 m<sup>2</sup>) per tire.

#### 221.3.03 Preparation

Prepare the surface to be test rolled to the proper grade and cross-section. Ensure the top 8 in (200 mm) of the surface is within 3 percentage points of the optimum moisture content when rolling.

#### 221.3.04 Fabrication

General Provisions 101 through 150.

#### 221.3.05 Construction

##### A. Subgrade Preparation

When required, stabilize in the specified areas according to the Specifications before test rolling.

##### B. Extent of Rolling

Test roll on all portions of the subgrade under the proposed base, subbase, or pavement, plus a 2 ft (600 mm) width on each side. Exclude ramps servicing private property.

1. Roll frontage roads, spur connections, crossovers, and intersections according to the same requirements. The cost of rolling is considered incidental to the Item.
2. Test roll parallel to the centerline, with the forward speed of the roller between 2 and 5 miles (3 and 8 km) per hour.
3. Roll one outer edge then the other outer edge. Progress uniformly toward the center section until passing over the entire surface area at least twice.
4. Roll the entire width in segments long enough so that each segment takes about half a day.
5. Stop rolling during extreme moisture. If the moisture content of the subgrade is deficient, correct it by adding water.
6. Roll in the presence of the Engineer, who will mark the extent of weak areas and depressions immediately.

##### C. Repairs to Subgrade

Repair depressions and weak spots discovered while rolling.

1. The repairs may consist of removing unsatisfactory materials, replacing them with satisfactory materials, and strengthening or stabilizing the materials in place.
2. The Engineer will decide what repairs to make. Place and compact materials in the roadbed as specified for embankment or subgrades, whichever is appropriate.
3. Test roll again after making the repairs until the repaired areas are satisfactory according to these Specifications.

##### D. Test Rolling at Structures

Protect structures and prevent damage to them. Repair or replace damage caused by the test rolling at no expense to the Department.

##### 1. Bridges

Do not allow the rolling unit within 10 ft (3 m) of bridge ends or bridge approach slabs.

Do not allow the rolling unit to cross a bridge on its own wheels when the unit's weight exceeds 23,000 lbs (10 433 kg) for a 1-axle loading.

## 2. Culvert Type Structures

When a culvert type structure falls within the limits of the test rolling area and the finished surface of the subgrade is less than 4 ft (1.2 m) above the exterior of the structure, do not allow the rolling unit within 10 ft (3 m) of the structure. Do not allow the rolling unit to cross any portion of the structure, except by one of the following methods selected by the Contractor.

Follow these protection methods. Assume responsibility for damage to a structure.

- a. Detour the rolling unit off the roadway and around the structure to the opposite side where rolling is resumed.
- b. Transport the rolling unit across the structure if the gross weight of the loaded transporting unit does not exceed 23,000 lbs (10 433 kg) for a 1-axle loading.
- c. Construct an embankment ramp over the structure to provide a minimum cover of 4 ft (1.2 m) over the top. The ramp must extend to the same elevation on each side for a minimum distance of 10 ft (3 m) from its exterior.

Place and remove the ramp at no expense to the Department.

### 221.3.06 Quality Acceptance

General Provisions 101 through 150.

### 221.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

## 221.4 Measurement

### A. Test Rolling

Special subgrade compaction and test rolling is measured in miles (kilometers) along the center of the road—excluding bridges (regardless of the width and number of lanes to be rolled).

Frontage roads, spur connections, crossovers, and intersecting roads (including their ramp connections) falling within the right-of-way and within the limits of the Project are included in the overall length of the roadway shown for the Item, or included in the distance for any portion specified on the Plans.

### B. Repairs to Subgrade

Materials removed under this Specification, regardless of their nature, are measured for payment according to Section 205 as Unclassified Excavation.

If the moved materials are laid aside or stockpiled and later used again, excavating these materials and placing them in the roadbed is measured for payment as Unclassified Excavation.

If new materials are required, they will be measured and paid for at the Unit Price bid for the materials according to Section 205 or Section 209, as applicable.

### 221.4.01 Limits

General Provisions 101 through 150.

## 221.5 Payment

### A. Test Rolling

Special subgrade compaction and test rolling will be paid for at the Unit Price bid per mile (kilometer) completed and accepted. Payment is full compensation for preparing the surface, transporting the roller, moving the roller across or around prohibited areas, rolling as specified, watering, and providing incidentals necessary to complete the Item.

No separate payment will be made for protecting structures. Include the cost in the Unit Price bid for special subgrade compaction and test rolling.

### B. Repairs to Subgrade

Payment for repaired subgrades will be according to Section 205 and Section 209, where applicable.

Payment will be made under:

Item No. 221	Special subgrade compaction and test rolling	Per mile (kilometer)
--------------	--	----------------------

### 221.5.01 Adjustment

General Provisions 101 through 150.