Section 2109. Natural Subgrade

2109.01 DESCRIPTION.
Shape and consolidate a prescribed portion of the subgrade in preparation for the placement of a pavement, pavement widening, base course, or subbase.

2109.02 MATERIALS.
Specified in the contract documents.

2109.03 CONSTRUCTION.

A. Natural Subgrade for Pavement, Pavement Widening, Base Course, or Subbase.

1. Construct the subgrade to have uniform stability for a width at least equal to that of the proposed pavement or base, plus 2 feet (1 m) on each side. Bring to an elevation such that after being rolled the surface is at the required elevation. Before preparing the subgrade, construct the roadbed to the full width and at least to the elevation of the finished subgrade.

2. When the composition or stability of the materials in the top 6 inches (150 mm) below the elevation of the subgrade is not reasonably uniform for the full width of the subgrade, scarify, mix and recompact, or otherwise treat the materials to produce a uniform condition. Meet the requirements of Article 2107.03, E, for recompaction on Primary projects and Article 2107.03, F, for recompaction on Secondary projects. Remove stones 4 inches (100 mm) or larger from the loosened portion of the subgrade. Remove the stones from the project as directed by the Engineer.

3. Fill depressions that develop during rolling with suitable material meeting the requirements of subgrade treatment as specified in the contract documents. Continue rolling until the subgrade is uniformly firm, properly shaped, and true to grade and cross section. Maintain the subgrade as constructed until the pavement is placed. Remove material, other than sand, which will not compact readily under the roller and replace with material which will compact readily. Roll that portion of the subgrade again. Use a roller that meets the requirements of Article 2001.05, B, except for work involving widening of such a width as to make use of a conventional roller impractical. Where a conventional roller is impractical, use a trench type roller meeting the requirements of Article 2001.05, E.

4. Extend rolling of the subgrade for at least 12 inches (0.3 m) outside each edge of the proposed pavement. Do not leave piles or ridges of earth or material on the shoulders that would seriously interfere with the operations of finishing pavement.

5. During the process of constructing subgrade, maintain the soil in a condition sufficiently moist to facilitate compaction and produce a firm, compact surface. Sprinkle or wet the finished subgrade as necessary to

ensure a reasonable moisture content at the time pavement or base is placed upon it.

6. If, in preparation of subgrade, it becomes necessary to excavate below the elevation of the earth shoulders, provide ditches or drains at frequent intervals to permit ready drainage of surface water from subgrade to side ditches.

7. Maintain the completed subgrade during subsequent construction activities. Loads in excess of the legal axle load will not be allowed on the completed subgrade. If rutting or any other damage occurs to the subgrade as a result of hauling operations, immediately repair the subgrade. This repair will include, if necessary, scarifying to a depth of 6 inches (150 mm), aerating, and recompacting, all at no additional cost to the Contracting Authority. Meet the requirements of Article 2107.03, E, for recompacting on Primary projects and Article 2107.03, F, for recompacting on Secondary projects.

8. Should traffic by others authorized to do work on the project be specifically permitted by the Engineer to exceed the Contractor's self imposed limit, the Contracting Authority will pay a share of repair costs set by the Engineer representing an increase in cost of repair of damage, if any, caused by such traffic.

9. Complete subgrade preparation sufficiently in advance of pavement or base work so that normal progress can be maintained.

10. Before the final template shape is made, proof roll the subgrade with equipment meeting the requirements of Article 2001.05. Correct depressions that develop using the same procedure as in Article 2109.03, A, 3. If the subgrade is to be cut to the final grade elevation with an automatically controlled subgrade machine, grade the prepared subgrade to an elevation that will permit the machine to accomplish the final cut in one continuous forward pass. The elevation of the subgrade surface will be indicated by grade stakes. Correct the surface in both profile and cross section to within 0.05 foot (15 mm) of the desired elevation. In irregular or short sections, check the subgrade by the most accurate practical method, subject to the Engineer’s approval.

B. Treatment of Subgrade for Concrete Pavement.

Unless the Engineer orders otherwise, ensure the subgrade, at the time of placing concrete for Concrete Pavement (Section 2301) or Concrete Base (Section 2201), is either:

- In a uniform moist, but not muddy condition to a depth of not less than 1 inch (25 mm), or
- Covered with a single layer of plastic film meeting the requirements of Section 4107. Lap adjacent strips of plastic film by at least 12 inches (0.3 m). Do not stretch plastic film to the extent that its width is noticeably reduced. Plastic film which has been used for curing concrete, salvaged in usable condition, may be used for subgrade treatment.

C. Special Compaction of Subgrade.
When special compaction of subgrade is required in the contract documents, construct the portion of the roadbed to be covered by the pavement or base course, plus 3 feet (1 m) beyond the outer limits of the pavement or base course, in the following manner:

1. Expose a planed surface 6 inches (150 mm) below the finished grade line. Soil removed in the operation may be placed along the sides of the roadbed. Place the soil as backfill material in the excavation. Scarify the underlying exposed surface for a depth of 6 inches (150 mm).

2. Pulverize the scarified material to the extent that, when tested, no soil particles will remain on the 2 inch (50 mm) sieve. Uniformly dry or wet the scarified material to a moisture condition which will permit obtaining the required compaction without subsequent rutting from the batch trucks or other paving equipment in the paving area. Immediately stop construction of the pavement if rutting occurs to the extent that the thickness of the flexible or rigid pavement being spread does not conform to the design dimensions. Rework the rutted subgrade before resuming construction of the pavement.

3. Ensure the material at the time of compaction is not drier than 6 percentage points below its optimum moisture. Also ensure the density is not less than 95% of maximum density as determined by Materials Laboratory Test Method No. Iowa 103.

4. Place the material used to bring the subgrade to the required finished profile and cross section according to the above requirements for pulverization, moisture content, density, and stability.

2109.04 METHOD OF MEASUREMENT.

A. Unless provided otherwise, work connected with construction of natural subgrade for pavement, base course, pavement widening, or subbase will not be measured for payment.

B. Special Compaction of Subgrade, in stations (meters), will be the quantity shown on the contract documents. This quantity will be determined along the center line of the roadbed.

2109.05 BASIS OF PAYMENT.

A. Unless otherwise provided, work connected with construction of natural subgrade for pavement, base course, pavement widening, or subbase will not be paid for directly. It is considered as associated work and incidental to the contract unit price for construction of the pavement, base course, or widening.

B. Special Compaction of Subgrade:

1. Payment will be the contract unit price per station (meter).

2. Payment is full compensation for excavating, manipulating, replacing, and compacting the material, and for furnishing all water required for the work.

C. Excavation in excess of 3 inches (75 mm) for preparation of subgrade at locations other than structures or existing pavements will be paid for according to Article 2102.05, or, if no contract unit price is provided, Article 1109.03, B.

D. When adjustments to profile grades cannot be made, fill required for preparation of subgrade at locations other than structures or existing pavements will be paid for according to Article 2102.05, or, if no contract price is provided, Article 1109.03, B.

E. When grading of the subgrade is a part of the contract, additional payment will not be made for excavation or fill necessary for preparation of subgrade.