SPECIAL PROVISIONS
FOR
CEMENT STABILIZATION

Polk County
STBG-SWAP-1945(852)--SG-77

Effective Date
December 21, 2021

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

151121.01 GENERAL PROVISIONS.

A. The Contractor shall follow all provisions herein when constructing Cement Stabilized Subgrade.

B. The Contractor shall construct the cement stabilized subgrade by uniformly mixing the existing subgrade materials, Portland cement, and water to a depth as specified in the project documents. The final mixture shall be of uniform gradation and free of soft areas.

151121.02 MATERIALS.

Materials used in the construction of the cement stabilized subgrade shall meet the following requirements with proper certification standards:

A. Cement: Meet the requirements of AASHTO M 85 for Portland cement.

B. Water: Meet the requirements of Section 4102 of the Standard Specifications.

151121.03 EQUIPMENT.

Equipment used in the construction of cement stabilized subgrade shall meet the following specifications.

A. Reclaimer Machine.
The mine and blend machine shall meet the following additional requirements:

1. Capability of pushing a supply tanker or distributor via interlocking hitch.

2. Computerized water proportioning system being capable of monitoring water application with regard to depth of blending, width of blending, speed, and material density. Non-contact flow meters shall be employed to measure liquid volumes and the control systems shall be

proportional to the machine's advance speed and shall be capable of maintaining accurate mixing regardless of changes in the machine's working speed.

3. The water applied directly into the mixing chamber.

4. A machine able to uniformly mix material into a uniform gradation.

5. A machine able to make "on the fly" changes to quantities of materials being added to the subgrade, regardless of the machine's speed.

6. Machine must be able to measure liquid volumes and include automated nozzle cleaning and partial spray bar use.

7. All pumps on the machine must be in working condition and the operator able to verify that all nozzles are open and working properly. The operator shall be able to switch nozzles on and off for working at reduced or extended widths.

8. All pumps shall be separately controlled by the automatic system in the operator's cabin. During automatic operation, the system will allow liquids to be added only when the machine is in motion. There shall be a system allowing the operator to verify that the nozzles on the spray bars are open and working from the operator's cabin.

9. The pump shall spray liquid into the mixing chamber through a single spray bar with 16 spray nozzles. The nozzles shall be self-cleaning and the operator shall be able to switch off any number of individual nozzles, for working at reduced widths, from the control console in the operator's cabin.

10. Any damage caused by the Contractor's equipment riding on the subgrade shall be repaired at the Contractor's expense.

151121.04 CONSTRUCTION OF CEMENT STABILIZED SUBGRADE.

A. Weather.

The Contractor shall not begin stabilization work if the following weather conditions are to happen within 24 hours after stabilization:

- Frozen Subgrade.
- Temperature is below 40°F or expected to drop under 40°F for 4 hours.
- Rain.
- Wind speeds of 15 mph or greater unless approved by the Engineer prior to stabilization work.

B. Tolerance.

Before the cement application and blending process, the subgrade must be toleranced. The subgrade shall be trimmed with equipment using automatic grade control of the cutting edge. The subgrade tolerance shall be 0.00 inch to -1.0 inch of the grades shown on the plans. There shall be no mass grading after the cement is blended into the subgrade.

C. Cement Application and Blending.

1. The approved rate of Portland cement indicated in the contract documents will be incorporated into the roadway subgrade. The deviation from target range will not exceed 0.5% ± the approved mix design rate. Calibration and yield checks will be required daily by the Contractor to ensure the Portland cement is being applied within the tolerance allowed in this project. The Engineer may request a yield check at any time.

2. The Portland cement will be distributed via computerized vane feeder on the subgrade prior to mixing. Dumping or blowing of Portland cement onto the subgrade will not be allowed.

Portland cement shall not be spread over puddle water. The Contractor shall exercise care in application of Portland cement to minimize the loss of cement as dust.

3. The application and mixing of Portland cement into the subgrade shall be continuous in nature so that no section of mixed material is left undisturbed or finished for 20 minutes. Compaction shall begin immediately after the incorporation of water. Finishing shall be completed within 2 hours from the time of cement application. The blending operation shall take place immediately after the Portland cement is fed onto the subgrade.

4. The first 150 feet of roadway section shall be considered a test section. The test section will be used to determine whether the Special Provisions have been met. The Engineer shall determine if the work done by the Contractor is satisfactory prior to continuation of the cement stabilization process. The Contractor shall correct or modify procedures accordingly until it is acceptable to the Engineer. The Contractor shall correct any deficiencies at no cost to the City.

D. Compaction.

1. The compaction procedure shall take place immediately after the blending operation. The mixture shall be homogenous in nature with uniform density throughout the section. Moisture content shall be within ±2% of the optimum moisture immediately prior to compaction. If this requirement is not met, the Contractor shall moisten the section until the mixture meets this requirement. No section shall be left undisturbed for longer than 30 minutes during compaction operations.

2. Compaction shall be carried out simultaneously with lay down operations. The vibratory sheepsfoot/vibratory pad roller shall be used on the mixture until the pads of the roller penetrate the surface a maximum of 0.5 inch. A pneumatic roller or vibratory steel drum roller will then be used until the surface is tightly bound and the subgrade shows no signs of rutting or displacement. The subgrade shall be compacted to the maximum density as specified in the plans.

E. Finishing.

As the compaction process is completed, the subgrade will be continuously shaped and/or cut to the final subgrades as per the project plans and specifications. The prescribed tolerance shall not exceed ±0.5 inch. Compaction shall proceed until the specified density is obtained. During compaction, the surface shall be kept moist by spraying water on the surface. Upon completion, the surface shall be free of cracks, ridges, or loose material. All finishing operations shall be completed within 2 hours from start of mixing.

F. Soft Areas.

Proof rolling will be utilized to identify "soft or unstable areas" after the compaction process. If "soft or unstable areas" appear after operations due to poor compaction, the area shall be repaired by the Contractor. The Contractor will rework the blended base to obtain adequate compaction. The cost of re-working the subgrade shall be included in the bid price for cement stabilized subgrade.

G. Application of Water.

Water shall be applied as needed to secure required results. The cement treated surface shall be kept damp until placement of an overlying aggregate subbase and/or pavement.

H. Maintenance.

Maintenance shall include immediate repairs of the subgrade. If repairs on processed material need to be made, full depth vertical cuts shall be used with cement processed material used as backfill.

I. Contractor Operations.
The Contractor must have an individual on site at all times capable of making decisions and recommendations to the Engineer as field conditions change throughout the project to assure the best possible product.

151121.05 METHOD OF MEASUREMENT.
The area of the proposed pavement under which subgrade treatment is provided, plus 2 feet on each side, will be measured in square yards.

151121.06 BASIS OF PAYMENT.

A. Payment will be at the unit price per square yard for each type used.

B. Payment is in addition to subgrade preparation.

C. Work includes, but is not limited to, furnishing, placing, and incorporating the subgrade treatment material.