



**SPECIAL PROVISIONS
FOR
REINFORCED SOIL SLOPES**

**Johnson County
BROS-3715(664)--8J-52**

**Effective Date
September 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.

156192.01 DESCRIPTION.

A. General.

Construction of reinforced soil slope.

B. Submittals.

Comply with Article 1105.03 of the Standard Specifications, as well as the additional requirements listed below. Submit to the Engineer the following drawings or details for approval prior to installation. One copy of each with the approval stamp shall be kept at the work site at all times.

1. Upon request, submit certification that products supplied comply with identified specifications.
2. Detailed design calculations (including soil bearing pressure), construction drawings, and shop drawings for all reinforced soil slopes, prepared by a Licensed Professional Engineer in the State of Iowa. Ensure the drawings include all details, dimensions, and cross sections necessary to construct the reinforced soil slopes, and include (but are not limited to) the following:
 - a. An elevation sheet or sheets for each reinforced soil slope.
 - b. An elevation view of the slope which includes:
 - 1) The elevation of the top of the slope at all horizontal and vertical break points and at least every 15 feet along the face of the slope.
 - 2) The length of soil reinforcing elements.
 - 3) The distance along the face of the slope to where changes in length of the soil reinforcing elements occur, and
 - 4) An indication of the final ground line and maximum calculated bearing pressures.
 - c. A typical cross section or cross sections showing the elevation relationship between ground conditions and proposed grades.
 - d. General notes pertaining to design criteria and wall construction.
 - e. The details for diverting soil reinforcements around obstructions such as pipes, catch basins, and other utilities.
 - f. General location of subdrain and outlets of the internal drainage system.

3. A detailed explanation of the design properties of geogrid reinforcement and quality control tests limits.

156192.02 MATERIALS.

A. Geogrid.

Provide geogrid as specified in the reinforced soil slope design from one of the following geogrid manufacturers:

- Strata Systems, Inc.;
- Tensar International Corporation;
- TenCate Geosynthetics;
- Maccaferri, Inc.;
- Propex Geotextile Systems, or
- Approved equal.

B. Granular Backfill Material.

Comply with Section 4133 of the Standard Specifications within the reinforced earth zone.

156192.03 CONSTRUCTION.

A. Excavation and Embankment

1. Prior to beginning reinforced soil slope construction, compact proposed embankment behind the reinforced soil slope according to the filed quality control requirements of Section 2104 of the Standard Specifications.
2. Excavate to the line and grade specified in the contract documents. Minimize over-excavation, install sheeting, shoring, or other retention systems as required to ensure the stability of the excavation.

B. Installation

1. Foundation Soil Preparation.

Excavate and compact 12 inches of native soil beneath the reinforced soil slope to 95% of maximum Standard Proctor Density.

2. Subdrains.

- a. Install subdrains as specified in the contract documents to maintain gravity flow of water to the outside of the reinforced earth zone. Outlet subdrains into a storm sewer or along a slope at an elevation lower than the lowest point of the pipe within the reinforced earth zone.
- b. Place porous backfill material around the subdrain to a minimum cover of 3 inches.
- c. Wrap porous backfill material with engineering fabric.

3. Backfill Material Placement.

- a. Place the backfill material in maximum 8 inch lifts, spread, and compact in such a manner that eliminates the development of wrinkles and/or movement of the geogrid reinforcement.
- b. Compact granular backfill material according to the field quality control requirements of Section 2010 with the following exception: ensure the moisture content falls within a range from 3% under optimum moisture to no more than the optimum moisture content.
- c. Use only hand-operated compaction equipment within 3 feet of the front of the wall face.
- d. Do not operate tracked construction equipment directly on the geogrid reinforcement. A minimum thickness of 6 inches of backfill material is required over the geogrid reinforcement prior to operation of tracked vehicles. Minimize turning of tracked vehicles to prevent tracks from displacing the fill and damaging the geogrid reinforcement.

- e. Rubber-tired equipment may pass over the geogrid reinforcement, if done according to the manufacturer's recommendations. Avoid sudden braking and sharp turning

4. Geogrid Installation.

- a. Install the geogrid reinforcement according to the manufacturer's recommendations.
- b. Do not overlap the geogrid in the design strength direction; use one continuous piece of material. The design strength direction is perpendicular to the reinforced soil slope face. Butt adjacent sections of geogrid in a manner to ensure 100% coverage after placement.
- c. Install the geogrid reinforcement under tension. Apply a nominal tension to the reinforcement and maintain it by staples, stakes, or hand tensioning. The tension applied may be released after the geogrid reinforcement has been covered and held in place with soil fill.

5. Erosion Control Material Installation.

Surface erosion control material shall be placed in accordance with Section 2602 of the Standard Specifications.

156192.04 METHOD OF MEASUREMENT.

A. Reinforced Soil Slope.

Vertical square foot measurements of the front face of the geosynthetic soil slope systems. The height will be measured from the bottom of the reinforced soil slope excavation to the top of the slope.

B. Granular Backfill Material.

Tons as stipulated in the contract documents for material used in connection with reinforced soil slope.

C. Excavation.

Classed and measured according to Section 2104 of the Standard Specifications for reinforced soil slope construction.

156192.05 BASIS OF PAYMENT.

A. Reinforced Soil Slope

1. Per vertical square foot.
2. Payment is full compensation for furnishing all materials, tools, and labor for the performance of wall work necessary to construct the reinforced soil slope system, according to the contract documents, including the design, foundation preparation, furnishing and placing geogrid, leveling pad, and shoring as necessary.

B. Granular Backfill Material.

Per ton as stipulated in contract documents for material furnished, hauled, placed, and compacted.

C. Excavation.

Article 2102.03, B, 1 of the Standard Specifications applies for each class of excavation for preparing the reinforced earth zone for construction of the reinforced soil slope. This will normally be included for payment with other excavation required by the contract documents.