Origination Form

Specifications

Name:	Kelly Shishlova	**Standard Specification Section:**	145
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Date:	2025-06-05T16:53:12Z	**Associated Specs:**	514

Summary:

(1) 145-3.1: Removed language about rolls being in unopened packages and added roll numbers as part of the labels needed on the rolls. (2) 145-5: Changed the certification requirements to a proof of purchase or ownership statement that includes the product name and roll numbers. (3) 145-6.1.3: Moved language about sampling material and sending to SMO and added the Engineer will confirm the product is listed on the APL and appropriate for the reinforcement application. (4) Miscellaneous editorial changes.

Justification:

(1) 145-3.1: Current language requires the contractor to bring geosynthetic material in unopened packages, however, based on the pay structure, contractors may use rolls across multiple jobs and use previously opened packages. Therefore, this language needs to be removed. Additionally, the language was missing the roll number as part of the labels needed on the material, an important piece of information for tracking manufacturer QC data. (2) 145-5: The current language requires a certification that is job-specific signed by the manufacturer or supplier. However, this may not be possible for rolls being used on across multiple jobs, therefore, language needs to be updated to allow more options for proving the product that is being used on the job is the APL product to accommodate different situations. (3) 145-6.1.3: Language regarding geosynthetic samples sent to SMO for verification was under the incorrect section as this is an acceptance requirement and should be under 145-6 Acceptance Program. Lastly, the language is missing the Engineer's responsibility to check the product being used on the job is on the APL and appropriate for the reinforcement application, and SMO's role in the verification process.

Do the changes affect other types of specifications?

Neither

List Specifications Affected:

Other Affected Documents/Offices	Contacted	Yes/No
Other Standard Plans		No
Florida Design Manual		No
Structures Manual		No

Basis of Estimates Manual		No
Approved Product List		No
Construction Office		No
Maintenance Office		No
Materials Manual		No
Traffic Engineering Manual		No

Are changes in line with promoting and making progress on improving safety, enhancing mobility, inspiring innovation, and fostering talent; explain how?

Yes, the changes ensure the geosynthetics being used on Department jobs for reinforcement applications meet the engineering requirements to perform as designed.

What financial impact does the change have; project costs, pay item structure, or consultant fees?

No impact.

What impact does the change have on production or construction schedules?

No impact.

How does this change improve efficiency or quality?

The change ensures geosynthetics used for reinforcement applications are the correct type and have the required engineering properties to perform their designed function avoiding premature failures and increasing the quality of our roadways and structures.

Which FDOT offices does the change impact?

Materials and Construction.

What is the impact to districts with this change?

Districts will need to enforce the new requirements and ensure our CEI firms are appropriately verifying the geosynthetic materials.

Does the change shift risk and to who?

No, the change does not shift risk.

Provide summary and resolution of any outstanding comments from the districts or industry.

Comments and Responses are available on the Track the Status of Revisions hyperlink located on the Specifications landing page: https://www.fdot.gov/programmanagement/Specs.shtm

What is the communication plan?

Through the established specification revision process (e.g., Internal and Industry Review)

What is the schedule for implementation?

The Standard Specifications eBook and Workbook are effective July 1st every year.

GEOSYNTHETIC REINFORCEMENT
(REV 6-5-25)

ARTICLE 145-3 is deleted and the following substituted:

145-3 Materials.

Meet the following requirements:

Structural Geosynthetic ~~Material~~Type R-2, R-3, and R-4*……Section 985

*Use products listed on the Department's APL.

145-3.1 Geosynthetic Materials: Ensure the geosynthetic materials received at the job site are ~~in unopened shipping packages and the packages are~~ clearly labeled with the manufacturer's name, product name, style number, roll dimension, roll numbers, and LOT number, otherwise, the Engineer will reject the material. Store geosynthetic materials in accordance with the manufacturer's instructions ensuring to protect the geosynthetic material from physical damage, debris, and temperatures greater than 140° F. Prevent mud, fluid concrete, asphalt, or other deleterious materials from coming in contact with the geosynthetic materials that could impact the performance of the geosynthetic material. Replace geosynthetic materials with defects, tears, punctures, flaws, deterioration, or other damage at no additional cost to the Department.

145-3.2 Geosynthetic Reinforced Soil Slopes:

145-3.2.1 Backfill Materials: Use only free draining backfill material in the reinforced fill volume as shown in the Plans meeting the following gradation limits as determined in accordance with AASHTO T 27 and FM 1-T 011:

Table 145-1	
Sieve Size	Percent Passing
3-1/2 inches	100
3/4 inch	70 to 100
No. 4	30 to 100
No. 40	15 to 100
No. 100	5 to 65
No. 200	0 to 15

Do not use backfill material containing more than an average of 2.0% by weight of organic material, as determined by FM 1-T 267 and by averaging the test results for three randomly selected, representative samples from each stratum or stockpile of a particular material. Consider the stratum or stockpile unsuitable for construction of the reinforced fill volume if an individual test value exceeds 3.0%.

Use backfill material with a maximum plasticity index of 6 as determined by AASHTO T 90, and a maximum liquid limit of 15 as determined by AASHTO T 89. Use backfill material with a pH between 5.0 and 10.0 as determined by FM 5-550. For polyester geosynthetic reinforcement, use backfill material with a pH between 5.0 and 9.0. Do not use soil cement or lime stabilized backfill unless approved by the Engineer.

145-3.2.2 Slope Face Treatment: For reinforced soil slopes, provide slope face material, if applicable, as shown in the Plans and listed on the APL.

145-3.3 Geosynthetic Reinforced Foundations Over Soft Soils: Use backfill material meeting the requirements of Section 120, all Contract Documents, and any other applicable specification requirements. Meet the pH criteria specified in 145-3.2.1 as determined by FM 5-550.

145-3.4 Geosynthetic Reinforced Embankment: Use backfill material meeting the requirements of Section 120 for Embankment, Section 160 for Stabilization, Section 200 for Rock Base, and Section 204 for Graded Aggregate Base, all Contract Documents, and any other applicable specification requirements. Meet the pH criteria specified in 145-3.2.1 as determined by FM 5-550.

SUBARTICLE 145-4.1 is deleted and the following substituted:

145-4.1 General: At least fourteen days prior to installation of geosynthetic materials, submit ~~the product sample and~~ certification and the product sample in accordance with 145-5 and 145-6.1.3. Install in accordance with ~~M~~manufacturer's i~~I~~nstructions.

SUBARTICLE 145-4.2.2 is deleted and the following substituted:

145-4.2.2 Geosynthetic Placement: Place the geosynthetic at the proper elevation, location and orientation as shown in the Plans. In general, place the geosynthetic used for slope stabilization such that its primary direction of tensile strength is perpendicular to the plan face of the slope. Pull the geosynthetic material tight and secure it as necessary to lay flat against the soil prior to fill placement.

Place adjacent rolls of geosynthetic to maintain 100% horizontal coverage at the face of the slope. When placing geosynthetic for curved embankments, do not allow less than 50% horizontal coverage or an unreinforced horizontal spacing greater than 3 feet at the end of the reinforcement farthest from the face of the slope. Do not allow vertical spacing of the geosynthetic layers to exceed the spacing shown in the shop drawings.

Do not make any splices or seams in the primary direction of tensile strength in the geosynthetic without approval of the Engineer. When splices in the primary direction are approved, make splices full width of the geosynthetic strip by using a similar material with similar strength. Use a splice mechanism that allows a minimum of 95% load transfer from piece to piece of geosynthetic. Make only one splice per length of geosynthetic. Do not place splices within 6 feet of the slope face, within 6 feet below top of slope, or horizontally adjacent to another splice.

Place only that amount of geosynthetic material, including facing and drainage material, which will be covered in a single day'~~'~~s production.

Do not operate equipment directly on the geosynthetic. Operate equipment such that no turning movements occur on the areas where geosynthetic is in place with less than 12 inches of fill cover. Fill and compact ruts of more than 3 inches in depth as they develop. Replace or repair any rejected geosynthetic at no additional cost to the Department.

ARTICLE 145-5 is deleted and the following substituted:

145-5 Certification.

For geosynthetic materials, submit to the Engineer a ~~certification from the manufacturer confirming that the material is appropriate for the intended use. The manufacturer's certification shall be attested to within the past one year by a person having legal authority to bind the manufacturing company, and must include the project number, APL product number, LOT number, and product name.~~

~~In addition, provide two 8-inch by 10-inch samples of geosynthetic materials for product identification to the Engineer. The acceptance of the geosynthetic material is subject to the approval of the State Materials Office (SMO).~~ proof of purchase or ownership statement at least fourteen days prior to placement. Proof of purchase or ownership statement shall include the product name and roll numbers.

For backfill materials, submit to the Engineer a signed and sealed certification by a Professional Engineer registered in the State of Florida, that the pH meets the requirements of 145-3.

SUBARTICLE 145-6.1 is deleted and the following substituted:

145-6.1 General Requirements:

145-6.1.1 Equipment Comparison: Meet the requirements of 120-10.1.1 "Equipment Comparison."

145-6.1.2 Density over 105%: Meet the requirements of 120-10.1.2 "Density over 105%" except as modified herein.

145-6.1.3 Geosynthetic: At least fourteen days prior to placement, submit two 8-inch by 10-inch samples of the geosynthetic materials to the Engineer. The Engineer will confirm the product is listed on the APL and is appropriate for the intended use. The acceptance of the geosynthetic material is subject to the approval of the State Materials Office (SMO). The SMO will evaluate the submitted sample matches the APL product and the product name and the roll numbers stated in the proof of purchase or ownership statement.

SUBARTICLE 145-6.2.1.2 is deleted and the following substituted:

145-6.2.1.2 Soil Classification and Organic Content Testing: Perform soil classification tests on the sample collected in 145-6.2.1.1, in accordance with AASHTO T 27 and FM 1-T 011, AASHTO T 89, AASHTO T 90, and FM 1-T 267. Classify the soil in accordance with AASHTO M 145 to determine compliance with soil utilization requirements as specified in Standard Plans, Index 120-001. Meet the testing parameters set forth in 145-3.2.1.

SUBARTICLE 145-6.2.1.4 is deleted and the following substituted:

145-6.2.1.4 Density Testing Requirements: Meet the requirements of 120-10.2.2 "Density Testing Requirements" except as modified herein. For select backfill, obtain a density in each LOT of at least 95% of the maximum density as determined by FM 1-T 180.

Alternatively, for A-3 and A-2-4 backfill materials, obtain a minimum density of 100% of the standard Proctor maximum dry density as determined by FM 1-T 099.

The combined width from both reinforced fill volume and retained fill material may be considered the same LOT if both volumes comprise the same material and both are compacted with the same procedure, lift thickness, equipment, and compacting effort.

SUBARTICLE 145-6.3 is deleted and the following substituted:

145-6.3 Department Verification: Meet the requirements of 120-10.3 "Department Verification" except that the Engineer will conduct Verification tests to accept all materials and work associated with 145-6.2.

SUBARTICLE 145-6.4 is deleted and the following substituted:

145-6.4 Payment for Resolution Tests: Meet the requirements of 120-10.5 "Payment for Resolution Tests."

ARTICLE 145-7 is deleted and the following substituted:

145-7 Verification Comparison Criteria and Resolution Procedures.

145-7.1 Geosynthetic Reinforced Soil Slopes:

145-7.1.1 Maximum Density Determination: The Engineer will verify the QC test results in accordance with the procedures specified in 120-10.6.1 "Standard Proctor Maximum Density Determination" except replace FM 1-T099 with FM 1-T180. If the Contractor selects the optional acceptance criteria, the Engineer will verify the QC test results of FM 1-T099 in accordance with 120-10.6.1 "Standard Proctor Maximum Density Determination."

145-7.1.2 Density Testing: Meet the requirements of 120-10.6.2 "Density Testing."

145-7.1.3 Soil Classification, Organic Content, and pH Testing: The Engineer will verify the QC test results if the verification test results meet the limits set forth in 145-3.2.1 for gradation (AASHTO T 27 and FM 1-T 011), liquid limit (AASHTO T 89), plasticity index (AASHTO T 90), organic content (FM 1-T 267), and pH (FM 5-550) testing. Otherwise, the Engineer will test the sample retained in 145-6.2.1.1. The State Materials Office (SMO) or an AASHTO accredited laboratory designated by the SMO will perform resolution testing.

If the resolution test result satisfies the required gradation limits, liquid limit, plasticity index, organic content, and pH, then the LOTs will be verified. If the resolution test results do not verify QC test results, then reconstruct the LOTs with acceptable material. The Engineer will perform new verification testing post reconstructing the LOTs.

145-7.2 Geosynthetic Reinforced Foundations Over Soft Soils: Meet the verification comparison criteria and resolution procedure for embankment material in accordance with Section 120. In addition, ~~the Engineer will verify the QC tests results~~ if the verification test results for pH tested in accordance with FM 5-550 meet the limits set forth in 145-3.2.1, ~~for pH in accordance with FM 5-550.~~ the Engineer will verify the QC tests results. Otherwise, the Engineer will follow the resolution procedures specified in 145-7.1.3.

145-7.3 Geosynthetic Reinforced Embankment: Meet the verification comparison criteria and resolution procedure for embankment material in accordance with Section 120, Stabilization requirements in accordance with 160, Rock Base requirements in accordance with Section 200, and Graded Aggregate Base with Section 204. In addition, ~~the Engineer will verify the QC tests results~~ if the verification test results for pH tested in accordance with FM 5-550 meet the limits set forth in 145-3.2, ~~for pH in accordance with FM 5-550~~the Engineer will verify the QC tests results. Otherwise, the Engineer will follow the resolution procedures specified in 145-7.1.3.