STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

# MANUAL CHANGE TRANSMITTAL		NO. **26-3**
TITLE: Department of Transportation *Construction Manual*	APPROVED BY:  Ramon Hopkins, Chief Division of Construction	DATE ISSUED: **08-03-2026**
SUBJECT AREA Sections 4-96	ISSUING UNIT Division of Construction	
SUPERSEDES Section 4-96 of July 2019	DISTRIBUTION All Requested Manual Holders	

The purpose of this manual change transmittal is to announce updates and corrections to the Caltrans *Construction Manual.* Please note the updates and print new sections for your manual as needed. Updated sections are published on https://dot.ca.gov/programs/construction/construction-manual and are indicated by the date listed in the right-hand column on that page. Content changes, not including edits for clarity, are enumerated.

Section 4-96, "Geosynthetics"

Revisions to Sections 4-9601, "General," 4-9602, "Before Work Begins," and 4-9603, "During the Course of Work," provide guidance to Construction staff on how to review geosynthetic submittals and perform inspections during construction. Submittal guidance includes calculation review and notes on installation reduction factors. Links and references to the American Association of State Highway and Transportation Officials (AASHTO) Product Evaluation and Audit Solutions DataMine website have been updated. Additional guidance is provided for field staff on inspections for earthwork, subdrains, and geosynthetic reinforcement installation.

Chapter 4 Construction Details

Section 96 Geosynthetics

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4-9601 General

Section 96, “Geosynthetics,” of the *Standard Specifications* provides material requirements for various types of geosynthetics for use as geotechnical subsurface reinforcement, geocomposite wall drain, geosynthetic pavement interlayer, paving mat, paving grid, paving geocomposite grid, geocomposite strip membrane, filter fabric, subgrade enhancement geotextiles (SEG), biaxial geogrids, silt fence fabric, gravel-filled bags, sediment filter bags, and temporary cover for water pollution control.

Geosynthetic pavement interlayer is used as an interlayer in asphalt concrete overlays to minimize surface water infiltration and to minimize reflective cracking through the overlay. Filter fabric is placed between a freely draining aggregate and soil to allow passage of water and to retain fine soil particles. Rock slope protection (RSP) fabric serves the same purpose. As with filter fabric, RSP fabric is placed between RSP and the underlying foundation material. Geocomposite wall drains provide drainage in backfill applications on retaining walls and structure approaches. Geotechnical subsurface reinforcement stabilizes embankments. SEG are placed between the pavement and the subgrade providing filtration and separation of the base materials. Biaxial geogrids stabilize the subbase or the base aggregate by interlocking with the apertures in the geogrid.

The following sections of the *Standard Specifications* give geosynthetic placement requirements:

- Section 13, “Water Pollution Control,” provides specifications for placing silt fence fabric, gravel filled bags, sediment filter bags, and temporary cover.
- Section 19, “Earthwork,” details the requirements for placing subsurface reinforcement and SEG.
- Section 26, “Aggregate Bases,” provides the placement requirements for biaxial geogrids.
- Section 39, “Asphalt Concrete,” includes requirements for placing geosynthetic pavement interlayer.
- Section 68, “Subsurface Drains,” provides requirements for placing filter fabric used with underdrains and edge drains, and placement of geocomposite wall drains.
- Section 72, “Slope Protection,” provides specifications for placing RSP fabric.

4-9602 Before Work Begins

Before work begins, verify that Form DOT-CEM-3101, “Notice of Materials to Be Used,” includes geosynthetics. Refer to Section 6-202, “Responsibilities for

Acceptance of Manufactured or Fabricated Materials and Products," of this manual for details.

Review and verify the following during the submittal process:

- Proposed geosynthetics to be used for each PRXXXX and SRXXXX type, geocomposite, and geotextiles.
- Minimum average roll value.
- Roll widths, lengths, and quantities of the geosynthetics.
- Certificates of compliance.
- Geosynthetics listed on Form DOT CEM-3101, "Notice of Materials to Be Used," are on the American Association of State Highway and Transportation Officials (AASHTO) Product Evaluation and Audit Solutions DataMine website for Geosynthetic Reinforcement (REGEO) or Geotextiles and Geosynthetics (GTX) products at:

  https://datamine.transportation.org/Home/Index

Calculations of nominal long-term strength and reduction factors used for each primary geosynthetic reinforcement type, the tensile strength of secondary geosynthetic reinforcement type, and corresponding backfill materials. Refer to AASHTO Test R69, and Sections 19-6.02B, "Geosynthetic Reinforced Embankment"; 96-1.01C(2), "Geosynthetic Reinforcement"; and 96-1.02D, "Geosynthetic Reinforcement," of the *Standard Specifications*.

If backfill includes gravel, pay attention to the reduction factors for installation damage used for the calculations. Gravel, especially angular gravel, will cause more damage to geosynthetic reinforcements, which in turn will increase installation reduction factors and reduce the long-term strength.

4-9603 During the Course of Work

- Do not permit the use of geosynthetics until certificates of compliance covering the material have been submitted.
- Verify that certificates of compliance are received for each type of geosynthetic.
- Make sure that geosynthetics are properly covered for protection against damage.

4-9603A Geosynthetic Reinforced Embankment

After geosynthetics are delivered to the job site and color markings are applied on geosynthetic rolls, do the following:

- Inspect the geosynthetic reinforcement rolls for their label and marking. Refer to Section 19-6.02B, “Geosynthetic Reinforced Embankment,” *of the Standard Specifications*.
- Inspect if color marking on each geosynthetic reinforcement roll is consistent with the label on each roll, and corresponding PRXXXX and SRXXXX types as identified on the shop drawings and plans. Each geosynthetic roll must have a shipping label for inspection. Refer to Section 19-6.02B *of the Standard Specifications.*
- Inspect geosynthetic rolls, including geosynthetic reinforcements. Refer to Section 96-1.02D, “Geosynthetic Reinforcement,” *of the Standard Specifications.*
- Inspect filter fabric. Refer to Section 96-1.02B *of the Standard Specifications.*
- Inspect geocomposite drain for any damage. Refer to Section 96-1.02C, “Geocomposite Wall Drain,” *of the Standard Specifications.*
- For each geosynthetic type and product, obtain a 3-foot-long by 2-foot-wide geosynthetic sample with color marking.

4-9603B Earthwork

During earthwork and completion of each lift, do the following:

- Inspect if backfill is compliant with the gradation, plasticity index, and potential for hydrogen (pH) requirements. Refer to Section 19-6.02B of the *Standard Specifications*.
- Inspect if backfill is compacted as required, especially near the slope face. Refer to Section 19-5.03C, “Relative Compaction (90 Percent),” of the *Standard Specifications*.
- Inspect if receiving surface is graded to receive the full length of geosynthetic reinforcement.

4-9603C Subdrain Installation

During subdrain installation, refer to the project’s shop drawings and plans, and do the following:

- Check the width and spacing of geocomposite drains.
- Inspect the direction of geocomposite drains. The side with filter fabric must face the retained soil, the excavated slope face, to allow groundwater to flow through.
- Verify the minimum geocomposite overlap.
- Verify the minimum filter fabric overlap.

- Visually check the gradation of permeable material.
- Inspect the placement of perforated pipes.
- Inspect the spacing of the solid drainpipes and grade.

4-9603D Geosynthetic Reinforcement Installation

Before each layer of geosynthetic reinforcements is ready to be covered with backfill, refer to Section 19-6.03E, "Geosynthetic Reinforced Embankment," of the *Standard Specifications* and the project's shop drawings and plans, and take the following steps:

- Check the elevation of the surface receiving geosynthetic reinforcements.
- Inspect if the types of geosynthetic reinforcement installed are correct based on the color marking on the edges of each roll.
- Inspect if the terminating stations between adjacent types of geosynthetic reinforcements are correct.
- Check if primary reinforcements are perpendicular to the slope alignment.
- Check if primary reinforcements are butted edge-to-edge at the slope face.
- Check the length of primary reinforcement. Geogrids must be cut flush at the nearest transverse bar beyond the design length.
    - Transverse bar end of geogrids must be placed at the slope face.
- Check if secondary reinforcements are unrolled and installed along the slope alignment.
- Check if damaged reinforcements are repaired.
- Check if geosynthetic reinforcements are pulled tight and without wrinkles.
- Check if geosynthetic reinforcements are secured with staples, pins, or small piles of backfill.
    - Check if the wrapping of geosynthetics reinforcements and geotextiles are neat and compliant with the line and grade requirements.

4-9604 Payment

Payment clauses are included in the *Standard Specification* sections or special provisions providing for placement of the various types of engineering fabrics.