



Florida Department of Transportation

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605 Suwannee Street
Tallahassee, FL 32399-0450

JIM BOXOLD
SECRETARY

December 23, 2015

Khoa Nguyen
Director, Office of Technical Services
Federal Highway Administration
3500 Financial Plaza, Suite 400
Tallahassee, Florida 32312

Re: State Specifications Office
Section **548**
Proposed Specification: **5480100 Retaining Wall Systems.**

Dear Mr. Nguyen:

We are submitting, for your approval, two copies of the above referenced Supplemental Specification.

The changes are proposed by Amy Tootle of the State Construction Office to require all construction-related documentation to be submitted by electronic means for consistency with the State Construction Office e-Construction initiative.

Please review and transmit your comments, if any, within two weeks. Comments should be sent via email to daniel.scheer@dot.state.fl.us.

If you have any questions relating to this specification change, please call me at 414-4130.

Sincerely,

Signature on file

Daniel Scheer, P.E.
State Specifications Engineer

DS/dt

Attachment

cc: Florida Transportation Builders' Assoc.
State Construction Engineer

RETAINING WALL SYSTEMS.
(REV 10-14-15)

ARTICLE 548-1 is deleted and the following substituted:

548-1 Description.

Construct permanent and temporary retaining wall systems in accordance with this Section and in conformance with the lines, grades, design, and dimensions shown in the Contract or established by the Engineer. Unless otherwise noted in the Plans, provide a wall system listed on the Department's Approved Product List (APL) based on the Department's Wall Type shown in the Plans. Sheet pile walls and cast-in-place walls are not included in this Section. All other wall systems used to cut back existing slopes are paid for under the same pay item numbers shown in 548-12. Construct all walls of a specific type (mechanically stabilized earth (MSE), counterfort, etc.), using the same wall system and supplier. If different types of wall systems must be used in such a manner that causes one wall to interact with or influence another wall, coordinate the detailing of these areas of interaction/influence with the assistance of the Contractor's Engineer of Record.

Obtain each precast concrete retaining wall system from a plant that is currently on the Department's Production Facility Listing. Producers seeking inclusion on the list shall meet the requirements of Section 105.

Ensure that each wall system component is permanently and legibly marked in accordance with 548-5.

Ensure that each shipment of products to the job site includes a signed or stamped delivery ticket in accordance with the Materials Manual, Section 8.2 Volume II, and the required written certification statement for each product shipped. ~~Provide~~ Submit these tickets and certifications to the Engineer.

SUBARTICLE 548-2.6.2 is deleted and the following substituted:

548-2.6.2 Compacted Select Backfill: Meet the requirements of Sections 105 and 120 except as noted within this Section. Have the backfill material tested for every soil type for pH, resistivity, sulfate and chloride content by a Department approved independent testing laboratory prior to placement. ~~Provide~~ Submit a signed and sealed certification ~~to the Engineer by a Professional Engineer registered in the State of Florida,~~ -that the results have met the requirements of this Section ~~and are signed and sealed by a Professional Engineer, registered in the State of Florida.~~

The pH, as determined by FM 5-550, shall not be lower than 5.0 and not higher than 9.0. Sources of select backfill material having a pH between 4.5 and 5.0 for wall utilizing metallic reinforcement and between 3.0 and 5.00 for walls utilizing geosynthetic reinforcement with no metallic elements or pipes placed within the backfill, as determined by FM 5-550, may be used provided the interior face of the MSE wall panels have three inches of concrete cover over the reinforcement and the concrete used in the panels contains the following ingredients and proportions:

1. The quantity of cement replaced with Type F fly ash is 10% to 20% by weight.

- weight.
2. The quantity of cement replaced with slag is 50% to 60% by weight.
 3. Portland cement is 30% by weight of total cementitious material.
 4. The total weight of the Type F fly ash and slag does not exceed 70% of total cementitious material.

In lieu of the mix design described above, a mix design with a fast pozzolanic material meeting the requirements of 346-2.3(6) silica fume, metakaolin and ultrafine fly ash, can be substituted. Examples of mix designs meeting this requirement are:

1. 8% silica fume plus 20% fly ash
2. 10% metakaolin plus 20% fly ash.

Provide proper curing for these materials to prevent surface cracking.

Do not place metallic pipe in backfill materials having a pH less than 5.0.

In addition, for permanent walls utilizing metallic soil reinforcement, use backfill that meets the following electro-chemical test criteria for determining corrosiveness:

Criteria	Test Method
Resistivity: > 3000 ohm --cm	FM 5-551
Soluble sulfate content: < 200 PPM	FM 5-553
Soluble chloride content < 100 PPM	FM 5-552

For constructing the retaining wall volume, do not use backfill material containing more than 2.0% by weight of organic material, as determined by FM 1-T267 and by averaging the test results for three randomly selected samples from each stratum or stockpile of a particular material. If an individual test value of the three samples exceeds 3%, the stratum or stockpile will not be suitable for constructing the retaining wall volume.

Ensure that the material is non-plastic as determined by AASHTO T90 and the liquid limit as determined by AASHTO T89 is less than 15.

For walls using soil reinforcement, use backfill that meets the following gradation limits determined in accordance with AASHTO T27 and FM 1-T011:

Sieve Size	Percent Passing
3-1/2 inches	100
3/4 inch	70-100
No. 4	30-100
No. 40	15-100
No. 100	0-65
No. 200	0-12

SUBARTICLE 548-2.6.4 is deleted and the following substituted:

548-2.6.4 Coarse Aggregate Backfill: Provide coarse aggregate comprised of natural stones meeting the requirements of Section 901 with a size distribution of any of the listed aggregate gradations from Size No 57 through Size No 89, inclusive, except as noted on the Plans. Have all coarse aggregate backfill materials tested for pH, resistivity, sulfate and

chloride content by a Department approved independent testing laboratory prior to placement. ~~Provide~~ Submit a signed and sealed certification by a Professional Engineer registered in the State of Florida, ~~certification to the Engineer~~ that the results of these tests meet the requirements of 548-2.6.2 ~~and are signed and sealed by a Professional Engineer, registered in the State of Florida.~~

ARTICLE 548-3 is deleted and the following substituted:

548-3 Approved Product List (APL).

All proprietary retaining wall systems shall be listed on the APL. Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6, independently certified test reports, and calculations and drawings in accordance with the latest edition of the AASHTO LRFD Bridge Design Specifications and the Department's Structures Design Guidelines (SDG) signed and sealed by a Professional Engineer registered in the State of Florida. ~~Provide~~ Submit calculations and drawings showing details, notes, materials, dimensions, sizes, and other information as described below for a complete description of the retaining wall system.

1. Soil Reinforcement durability and/or corrosion data;
2. Differential settlement the wall system can tolerate without exceeding normal stress range of the soil reinforcement and wall facing, or the construction tolerances in this Section;
3. The effects of water flow;
4. Applicable environmental classifications as outlined in the SDG;
5. ~~Provide~~ Submit signed and sealed design calculations. Design calculations may be either by hand or by a wall company program with hand calculations verifying the program output. It is only necessary to include sample hand calculations for a 20 foot height for each soil condition.
6. Corrosion and durability design procedures for soil reinforcement elements;
7. Provide 11 inch x17 inch drawings showing:
 - a. Notes specific to the wall system;
 - b. Panel sizes and reinforcing;
 - c. Soil reinforcement connection to wall facings;
 - d. Wall panel abutment interfacing;
 - e. Slip joints;
 - f. Steps in leveling pad;
 - g. Soil reinforcing details around all vertical obstructions;
 - h. Filter fabric placement at panel joints and around all obstructions;
 - i. Details for skewing soil reinforcement (15 degrees maximum) without cutting;
 - j. Corner elements (required at all angle breaks greater than 5 degrees);
 - k. Bin wall details for acute corners (required at all acute corners where interior corner angle is less than 70 degrees);
 - l. Details showing how to accommodate long term (post construction) wall settlement in excess of four inches without attaching soil reinforcement to the abutment; and,
 - m. Details of how to ground the wall system.

8. Pull-out test data for the proposed wall/reinforcement connection, and size and type of soil reinforcement for wall system. Testing shall be done by an independent soil testing laboratory or testing agency certified by the Department. Ensure test data includes all sizes and types of soil reinforcement to be utilized on Department projects. Default AASHTO values may be used for conventional soil reinforcement. For soil reinforcement grids, include all various configurations and combinations of longitudinal and transverse wires.

9. Other information pertinent to the design and performance of the wall system as necessary.

10. A field construction manual describing construction requirements and sequencing for the wall system. Submit manual in 8.5-1/2 inch x 11 inch format in either pdf or MS Word format.

SUBARTICLE 548-8.1 is deleted and the following substituted:

548-8.1 General: Due to the unique nature of the structure and concept, procure from the wall supplier fully detailed shop drawings, technical instructions, guidance in preconstruction activities and on-site technical assistance during construction. Closely follow any instructions from the wall supplier, unless otherwise directed by the Engineer. ~~Submit a copy of any~~ instructions from the wall supplier to the Engineer. Verify all pertinent retaining wall information (soil parameters, wall alignment, utility locations, conflicting structures) prior to the wall supplier finalizing shop drawings. Bring any conflicts not shown in the Contract to the Engineer's attention.

ARTICLE 548-10 is deleted and the following substituted:

548-10 Certification.

~~Furnish a copy of~~ Submit all test reports which are necessary to document compliance with the Specifications, at least ten days prior to wall construction.

Also ~~furnish~~ submit to the Engineer a certificate of compliance certifying that the retaining wall materials, backfill and construction practices comply with this Section.

Acceptance of furnished material will be based on the certificate of compliance, accompanying test reports, and visual inspection by the Engineer.

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