

SP00596A (Special Provisions for the 2024 Book) (Bidding on or after: ~~1109~~-01-26
Last updated: ~~076-2304~~-26
Requires SP00350, SP00440, SP02001,
SP02010, SP02320, SP02340 & SP02560
Requires SP02630 when base aggregate is required
Requires SP02690 when PCC Aggregate is required.)

SECTION 00596A - MECHANICALLY STABILIZED EARTH RETAINING WALLS

(Follow all instructions and make all edits with "Track Changes" turned on. If there are no instructions [purple text] above a subsection, paragraph, sentence, or bullet, then include it in the ~~p~~Project. Delete all purple text before preparing the final document. All other modifications to this Section will require ODOT Technical Resource and State Specifications Engineer approval.)

Comply with Section 00596A of the Standard Specifications modified as follows:

(Use the following subsection .01 and bullets when the ~~e~~C Contractor will be required to select a permanent proprietary MSE wall system. For "Bridge" retaining walls and "Highway" retaining walls, fill in the blank with the structure number. If the retaining wall does not have a structure number, delete the phrase ", structure no. ____,".)

00596A.01 Proprietary MSE Walls - Add the following to the end of this subsection:

Select one of the following preapproved proprietary MSE retaining wall systems for the wall, structure no. ____, as shown:

(Fill in the blanks with the proprietary retaining wall system name (including the "TM" symbol), company name and telephone number from the ODOT Geotechnical Design Manual, appendix 15-D.)

- _____ MSE Retaining Wall System,
provided by _____, telephone: _____.
- _____ MSE Retaining Wall System,
provided by _____, telephone: _____.
- _____ MSE Retaining Wall System,
provided by _____, telephone: _____.

00596A.04(a) Working Drawings - Replace the paragraph that begins "Working Drawings shall meet..." with the following paragraph:

Submit Working Drawings meeting the requirements of the Project documents and the AASHTO *LRFD Bridge Design Specifications*, as modified by the ODOT GDM, and are consistent with the preapproved Retaining Wall System.

00596A.04(a)(7) Facing Components - Replace the bullet that begins "Details necessary to construct ..." with the following bullet:

- Details necessary to construct the facing components. For two-stage MSE retaining walls, provide details for stage-1 wire facing and stage-2 concrete facing.

Replace the bullet that begins "Location of tension Soil ..." with the following bullets:

- Location and details of soil reinforcement and anchorage connections to the permanent facing. For two-stage MSE retaining walls, provide details and calculations demonstrating permanent anchorage and connection of stage-2 facing to the MSE wall.
- Unstamped Working Drawings for reinforcing steel in the stage-2 reinforced concrete facing are allowed unless changes are made to the details shown.

(Use the following subsection .04(b) to list proprietary wall geotechnical and seismic design parameters. Obtain information from the designer. Delete what does not apply. Delete the language in purple parentheses that does not apply and delete all purple parentheses. Copy and paste the structure number, station limits, and associated bullets for each separate retaining wall.)

00596A.04(b) Design Calculations - Replace the paragraph that begins "Design calculations shall meet..." with the following paragraph:

Submit design calculations meeting the requirements of the Project documents and AASHTO *LRFD Bridge Design Specifications*, as modified by the ODOT GDM, and are consistent with the preapproved Retaining Wall System. Retaining wall design parameters are listed below.

Add the following to the end of this subsection:

The following retaining wall design parameters have been established for this Project:

Structure No. _____ : Sta. _____ to Sta. _____ (Lt.)(Rt.)

- Foundation soil unit density _____ lbs./cu. ft.
- Foundation soil angle of internal friction _____ degrees
- Foundation soil nominal (unfactored)
- bearing resistance _____ lbs./sq. ft.
- Retained soil unit density _____ lbs./cu. ft.
- Retained soil angle of internal friction _____ degrees
- Reinforced soil unit density _____ lbs./cu. ft.
- Reinforced soil angle of internal friction _____ degrees
- Peak ground acceleration coefficient (*PGA*) _____
- Short period spectral acceleration coefficient (*S_S*). _____
- Long period spectral acceleration coefficient (*S₁*) _____
- Site class _____
- Peak seismic ground acceleration coefficient
- modified by zero period site factor (*A_s*) _____
- Horizontal seismic acceleration coefficient (*k_h*) _____

(Use the following bullet and sub-bullet when the Mononabe-Okabe method is not required. Repeat as necessary for variations in wall height and backslope along the wall.).

- Between Station _____ and Station _____ (Lt.)(Rt.):
 - Total (static plus seismic) external seismic thrust (P_{AE}) _____ lbs./ft.

(Use the following bullet and sub-bullets to specify minimum length of soil reinforcement. Repeat as necessary for variations in wall height, backslope, bearing resistance and other parameters which can change along the wall.)

- Between Station _____ and Station _____ (Lt.)(Rt.):
 - Minimum length of soil reinforcement for overall stability _____ ft.
 - Minimum length of soil reinforcement for external stability _____ ft.

00596A.04(b)(4) Internal Stability Calculations - Replace the bullet that begins "Calculations showing adequate resistance ..." with the following bullet:

- Calculations showing adequate resistance against soil reinforcement rupture, pullout, and reinforcement-facing connection failure. For two-stage MSE retaining walls include calculations showing adequate resistance against soil reinforcement rupture, pullout, and reinforcement to stage-1 wire facing connection failure; and calculations showing adequate resistance against failure for anchorage of the stage-2 concrete facing.

00596A.04(c) Manufacturer's Field Construction Manual - Replace this subsection, except for the subsection number and title, with the following:

Provide a field construction manual from the manufacturer that includes detailed instructions for constructing the retaining wall.

00596A.10(b) Nonproprietary Retaining Wall Systems - Replace this subsection, except for the subsection number and title, with the following:

Furnish Materials according to the applicable material Specifications.

00596A.11(b)(1) Material Passing No. 200 Sieve - Replace this subsection, except for the subsection number and title, with the following:

Ensure the amount of Material passing the No. 200 sieve does not exceed 15 percent by weight. Test according to AASHTO T 11.

00596A.11(b)(2) Plasticity Index - Replace this subsection, except for the subsection number and title, with the following:

Ensure the plasticity index of the Material passing the No. 40 sieve does not exceed 6. Test according to AASHTO T 90.

00596A.11(b)(4) Organic Content - Replace this subsection, except for the subsection number and title, with the following:

Ensure the organic content of material finer than the No. 10 sieve does not exceed 1.0 percent. Test according to AASHTO T 267.

00596A.12(b)(1) Aggregate, Strength, Freeze-Thaw Durability, Unit Weight, and Water Absorption - Replace the bullet that begins "Test, no longer than 18 months ..." with the following bullet:

- Test, no longer than 18 months before delivery, freeze-thaw durability of five test specimens made with the same materials, concrete mix design, manufacturing process, and curing method that are used on the Project. A weight loss of not more than 1 percent of the block's initial weight after 150 freeze-thaw cycles as tested according to ASTM C1262 is required in at least four of the five test specimens.

00596A.12(b)(7) Acceptance of Blocks - Replace this subsection, except for the subsection number and title, with the following:

Acceptance is determined on tolerances, visual inspection, compressive strength, water absorption, freeze-thaw durability, and unit weight. Acceptance of compressive strength, water absorption, and unit weight is based on production sublots. The maximum number of blocks per production subplot is 2,000 blocks. Test blocks at the frequency of one set for each production subplot. Acceptance of freeze-thaw durability is based on the freeze-thaw testing requirements of 00596A.12(b)(1).

00596A.12(b)(10) Rejection - Replace this subsection, except for the subsection number and title, with the following:

Blocks not meeting the requirements of this Subsection are rejected.

00596A.12(c)(1) Concrete - Replace this subsection, except for the subsection number and title, with the following:

Furnish Class 4000 structural concrete meeting the requirements of Section 02001. Furnish aggregate with 3/4 inch or greater maximum nominal aggregate size.

00596A.12(c)(7) Acceptance of Blocks - Replace this subsection, except for the subsection number and title, with the following:

Acceptance is determined by tolerances, visual inspection, and concrete strength. Concrete strength is based on production sublots. A production subplot is 20 blocks or a single Day's production, whichever is less. The production subplot is represented by a single compressive strength sample of one set of cylinders.

00596A.12(c)(8) Rejection - Replace the paragraph that begins "Blocks not meeting requirements ..." with the following paragraph:

Blocks not meeting requirements of this Subsection, or that exhibit any of the following defects, are rejected:

(Use the following subsection .12(e)(1) when precast concrete panel facing is required. Use one of the following options as instructed below. Delete the option that does not apply.)

00596A.12(e)(1) Portland Cement Concrete - Add the following paragraph to the end of this subsection:

[Option 1 - Use the following paragraph when an ARES™ wall system is not specified.]

Furnish Class 4000 structural concrete meeting the requirements of Section 02001.

[Option 2 - Use the following paragraph when an ARES™ wall system is specified.]

For ARES™ retaining wall systems, furnish Class 4500 structural concrete meeting the requirements of Section 02001, except the maximum water-cementitious material ratio shall not exceed 0.44. For all other retaining wall systems use Class 4000 structural concrete meeting the requirements of Section 02001.

00596A.12(e)(5)(b) Soil Reinforcement Connection Devices - Replace the bullet that begins "Retention slots within ..." with the following bullet:

- Retention slots within ± 1 inch of the plan location. Do not exceed 1/8-inch slot openings. Check all slot openings with a Manufacturer supplied feeler gauge according to the manufacturer's recommendations. Panels from where the feeler gauge is pulled from the slot are rejected.

00596A.12(e)(6) Acceptance of Panel Concrete Strength - Replace this subsection, except for the subsection number and title, with the following:

Acceptance is according to 00540.17 except:

- Acceptance of concrete strength is determined based on production sublots. A production subplot will consist of either 40 panels or a single Day's production, whichever is less. Cast one set of cylinders for each production subplot.
- Precast panel concrete strength may be conditionally accepted if the 7-Day initial strength exceeds 85 percent of the required 28-Day strength. Final acceptance of precast panel concrete strength is based on the required 28-Day test results.

00596A.12(e)(9) Rejection - Replace this subsection, except for the subsection number and title, with the following:

Panels not meeting the requirements of this Subsection are rejected.

00596A.14(f)(1) Geotextile - Replace this subsection, except for the subsection number and title, with the following:

Furnish geotextile according to Section 02320.

00596A.14(f)(2) Geogrid - Replace this subsection, except for the subsection number and title, with the following:

Furnish geogrid according to Section 02320.

(Use the following subsection .16 when KeySystem I™, LANDMARK™, or MESA™ wall systems are specified in 00596A.01.)

00596A.16 Concrete Modular Block Facing Connection Devices - Add the following to the end of this subsection:

(Use the following paragraph when the KeySystem I™ wall system is specified.)

For KeySystem I™ wall systems, furnish connection pins that conform to AASHTO M 32 and are galvanized after fabrication according to AASHTO M 111.

(Use the following paragraph and table when the LANDMARK™ wall system is specified.)

For LANDMARK™ wall systems, furnish lock bars that are made of a rigid, polyvinyl chloride polymer conforming to the following requirements:

Property	Limits	Specification
Specific Gravity	1.4 (min.)	ASTM D792
Tensile Strength (at yield)	2,700 psi (min.)	ASTM D638

(Use the following paragraphs and tables when the MESA™ wall system is specified.)

For MESA™ wall systems, furnish block connectors for block courses with geogrid reinforcement that are glass fiber reinforced, high density polypropylene conforming to the following minimum material requirements:

Property	Limits	Specification
Polypropylene: Group 1, Class 1, Grade 2	73% ± 2%	ASTM D4101
Fiberglass Content	25% ± 3%	ASTM D2584
Carbon Black	2% (min.)	ASTM D4218
Specific Gravity	1.08 ± 0.04	ASTM D792
Tensile Strength (at yield)	8,700 psi ± 1,450 psi	ASTM D638
Melt Flow Rate	(0.37oz. ± 0.16 oz.)/10 minutes	ASTM D1238

For MESA™ wall systems, furnish block connectors for block courses without geogrid reinforcement that are glass fiber reinforced, high density polyethylene (HDPE) conforming to the following minimum material requirements:

Property	Limits	Specification
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HDPE: Type III, Class A, Grade 5	68% ± 3%	ASTM D1248
Fiberglass Content	30% ± 3%	ASTM D2584
Carbon Black	2% (min.)	ASTM D4218
Specific Gravity	1.16 ± 0.06	ASTM D792
Tensile Strength (at yield)	8,700 psi ± 725psi	ASTM D638
Melt Flow Rate	(0.11 oz. ± 0.07 oz.)/10 minutes	ASTM D1238

00596A.41 Excavation and Foundation Preparation - Replace the bullet that begins "Do not construct backfill ..." with the following bullet:

- Do not construct backfill when the backfill, the foundation, or the embankment it would be placed on is frozen, or unstable.

00596A.44(g)(1) Placement - Replace the paragraph that begins "Place geotextile wrapped ..." with the following paragraph:

Place geotextile wrapped-face construction according to Section 00350 and the ODOT GDM.

00596A.44(g)(2) Tolerances - Replace the bullet that begins "Maximum outward bulge ..." with the following bullet:

- Maximum outward bulge of the face between Soil reinforcement layers does not exceed 6 inches.

00596A.46(a) Inextensible Soil Reinforcement Components - Replace the paragraph that begins "To avoid horizontal obstructions ..." with the following paragraph:

To avoid horizontal obstructions, it is permissible to deflect Soil reinforcements up to 15 degrees along a vertical plane normal to the wall face (vertical skew). Construct soil reinforcement deflections that are gradual and smooth to avoid damage to the steel galvanization.

00596A.47(c)(3)(c) Spread Footing for Bridge Abutment on MSE Retaining Wall - Replace the bullet that begins "Extends to a depth ..." with the following bullet:

- Extends to a depth that is twice the footing width or 6 feet, whichever is greater.

00596A.47(c)(4)(b) Test Pad Method - Replace this subsection, except for the subsection number and title, with the following:

Determine the number of compaction Passes necessary to achieve the specified density by constructing a test pad that is at least 5 feet wide, 15 feet long, and 2 feet deep. Construct test pad fill in layers no more than 8 inches thick using the same Equipment and methods that are used to compact the wall backfill. Perform at least one density test according to AASHTO T 310 on each test pad layer. Construct and test a new test pad when changes in material occur or different Equipment is used during the construction of the wall backfill.

(NOTES to Specification Writer:

(1) The bid item quantity for MSE retaining walls is “Lump Sum,” and includes all labor, materials, and inclusive items necessary to complete the work. Items such as excavation, shoring, reinforced backfill, and standard copings are considered inclusive items to the wall pay item.

Items such as sidewalk copings, traffic barrier, moment slabs, guardrail and fencing are considered appurtenances along with the following items and should be included as separate bid items:

Items associated with project specific details such as architectural treatments, geomembrane barriers.

Items associated with incidental work, such as scour protection, dewatering, or foundation improvement, and items that cost more than 5 percent of the lump sum cost.

(2) For proprietary retaining wall systems, where details of wall construction are generally not known until after the construction contract is awarded, do not include estimated quantities for inclusive items.)

00596A.80 Measurement - Add the following to the end of this subsection:

The estimated quantities of retaining walls are:

(Provide wall area below. The wall area is bounded by the beginning and end of the wall, top of the wall (excluding wall coping), and top of the footing or leveling pad. If no footing or leveling pad exists, the bottom of the wall is used. Copy and paste more lines, as necessary, to list estimated areas for each retaining wall.)

Structure Number _____ :

Station Limits	Area
Sta. _____ to Sta. _____ (Lt.)(Rt.)	_____ (Wall area here) sq. ft.

(Use the following paragraph to list estimated quantities for nonproprietary retaining wall systems only. Ensure that the Wall (Bridge) Designer provides estimated quantities for all-inclusive items such as excavation, shoring, reinforced backfill, leveling pads, wall drainage backfill/geotextile, and standard coping. Copy and paste more lines, as needed, to list estimated quantities for each nonproprietary retaining wall.)

The estimated quantities of listed Materials are:

Structure No. _____ : **Sta.** _____ **to Sta.** _____ **(Lt.)(Rt.)**

Material	Estimated Quantities
_____	_____ cu. yd.
_____	_____ foot

00596A.90 Payment - Replace the paragraph that begins "In item (b) ..." with the following paragraph:

In item (b), the height of barrier is inserted in the blank.

Replace the paragraph that begins "Payment will be payment ..." with the following paragraph:

Payment will be payment in full for furnishing and placing all Materials, and for providing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

In the paragraph that begins "No separate or additional..." add the following bullet:

- Stage-1 and stage-2 facing for two-stage MSE retaining walls