

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 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 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: _____.

(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 - 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 (S_1) _____
- 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.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. Provide aggregate with 3/4 inch or greater maximum nominal aggregate size.

(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.

(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 |
|-------------------------------------|----------------------------------|---------------|
| 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 |

(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
_____ lb.