SPP00596A (01-01-21) *(This section requires SPP00530,*

 *SPP02001, & SPP02560.*

*Requires SPP00440 when leveling pads or wet cast concrete modular block facing*

*is required. Requires SPP00540 when precast concrete panel facings are required.)*

***(Follow all instructions. If there are no instructions above a subsection, paragraph, sentence or bullet, then include them in the project but make necessary modifications to only include project specific specifications.  Delete specifications that do not apply to the project.  Remove all instructions before preparing the final document.)***

### Section 00596A – Mechanically Stabilized Earth Retaining Walls

Comply with section 00596A of the Standard Construction 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. 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** - 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 "™" 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 orange parentheses that does not apply and delete all orange 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 (*SS*). \_\_\_\_\_\_\_\_\_
* Long period spectral acceleration coefficient (*S1*) \_\_\_\_\_\_\_\_\_
* Site class \_\_\_\_\_\_\_\_\_
* Peak seismic ground acceleration coefficient

modified by zero period site factor (*As*) \_\_\_\_\_\_\_\_\_

* Horizontal seismic acceleration coefficient (*kh*) \_\_\_\_\_\_\_\_\_

(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 (*PAE*) \_\_\_\_\_\_\_\_\_\_ 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.11(c) Modular Block Core Drainage Backfill** - Replace this subsection, except for the subsection number and title, with the following:

Furnish 3/4" - No. 4 PCC Aggregate Material meeting the requirements of 02690.20(a) through (d) and 02690.20(f).

(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 TM, LANDMARKTM, or MESATM wall systems are specified in 00596A.01.)

**00596A.16 Concrete Modular Block Facing Connection Devices** -

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

For KeySystem I TM 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 LANDMARKTM wall system is specified.)

For LANDMARKTM 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 MESATM wall system is specified.)

For MESATM 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, 73% ± 2% ASTM D4101

 Class 1, Grade 2

 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 MESATM 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, 68% ± 3% ASTM D1248

 Class A, Grade 5

 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.31(b) Initial Wall Construction** ‑ Replace the paragraph that begins " Submit daily field observation reports…" with the following paragraph:

Submit daily field observation reports no later than noon of the next Day of wall construction. Include the following information in the daily field observation reports:

Replace the bullet that begins "Description of all Work observed…" with the following bullet:

Description of wall construction observed and on-site technical assistance provided to the Contractor for proper construction procedures according to the manufacturer’s field construction manual.

***(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, but 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 referenced standard drawings and details such as architectural treatments, geomembrane barriers, drainage pipes and geocomposite drainage panels.***
* ***Items associated with incidental work, such as scour protection, dewatering, or foundation improvement.***
* ***Larger structures such as culverts.***
* ***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 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.