Index 548-020 MSE Retaining Wall Systems -Permanent

Design Criteria

AASHTO LRFD Bridge Design Specifications; Structures Design Guidelines (SDG); AASHTO-AGC-ARTBA Task Force 27 (Ground Modification Techniques), Insitu Soil Improvement Techniques, January 1990.

Design Assumptions and Limitations

- 1. It is the responsibility of the Engineer of Record to determine that the maximum factored bearing pressure shown for the wall does not exceed the factored bearing resistance of the foundation for that specific wall location.
- 2. The wall Company is responsible for the internal stability of the wall. External stability design, including foundation and slope stability, is the responsibility of the Engineer of Record.
- 3. If there are manholes and/or drop inlets present, design and analysis for both internal and external stability shall be considered. See **SDG** Chapter 3 for more details.
- **4.** When a slope is necessary at the base of the front face of the retaining wall, and a flat area meeting the requirements of FDM 215.2.6 (10'-0" Min.) cannot be provided, then the flat area can be reduced up to a minimum of 4'-0".

Plan Content Requirements

In the Structures or Roadway Plans:

Prepare Wall Control Drawings and related drawings as specified in **SDM** Chapter 19 and FDM 262, and include them in the plans.

Complete the following Data Tables using the following instructions and include the Data Tables on the retaining wall supplemental detail sheets. See **FDM 115** for more information regarding use of Data Tables.

- 1. Complete the Notes and add/modify/delete as necessary.
- 2. List each wall in Note 3 separately, showing applicable wall systems.
- 3. Complete the "Geotechnical Information" table based on project soil conditions. See SDG Chapter 3 for required design based internal friction angle and unit weight of Reinforced Soil and Random Backfill.
- 4. Complete the "Retaining Wall Variables" and "Soil Reinforcement Lengths for External Stability" tables based on project requirements. If the Design High Water Elevation (DHW) is above the adjacent ground surface, include the elevation in the "Retaining Wall Variables" table. Otherwise include "N/A" in the appropriate column in the table. DHW refers to the controlling water elevation adjacent to the wall. See SDG 3.13.2. The Wall Heights in the "Soil Reinforcement Lengths for External"

Stability" table refer to the height above the leveling pad, measured to the top of the wall coping. See **SDG** Chapter 3 Figures for details.

- 5. Transverse Differential Settlement is only applicable for widening of existing embankments.
- 6. Include the pay item for Polyethylene Sheeting on Concrete Piles per Specification Section 459 (to minimize downdrag) for all piles and drilled shafts that are located within the wall limits.

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PERMANENT MSE RETAINING WALL SYSTEM DATA TABLES

GEOTECHNICAL INFORMATION Table Case 1-07-							
		Reinforced Soil & Random Backfill		Firm Fine Sand	Loose Clayey Fine Sand	Firm Clayey Fine Sand	
Depth Below Existing	Wall No. 1	-		•	•	•	
Ground Line (ft.)	Walt No. Z		•	•	•	•	
Effective Unit Weight (pcf)		•	•	•	•	•	
Cahesion (psf)		0	•	•	•	•	
Internal Friction Angle		•	•	•	•	•	

MOTE

If the unit weight and/or internal friction angle of the fill proposed by the Contractor differs from that shown above, the Project Engineer will contact both the District Geotechnical Engineer and the Wall Designer for a possible redesign.

	Table Dare 7-07-13				
			Design High Water Elevation		
Wall No. Long Term Short Ter		Shart Term			Differential
Wall No.	Settlement (in.)	Settlement (in.)	Longitudinal (%) (ft./100ft.)	Transverse (in.)	(ft.)
1	•	•	•	N≠A	•
2	•	•	•	Ny A	•

VOTE

Design walls for the settlements noted in the table. Long form settlement is measured from the end of wall fill placement. Transverse differential settlement is measured from the face of wall to the end of the soil reinforcement.

Г	SOIL REINFORCEMENT LENGTHS FOR EXTERNAL STABILITY Subtre Water 1-01-17							1-61-11			
1 .	Wall Height (ft.)	•	•	•	•	•	•	•	•	•	•
all No.	Reinforcement Length (ft.)	•	•	•	•	•	•	•	•	•	•
PМ	Factored Bearing Resistance (psf)	•	•	٠	٠	•	٠	٠	٠	•	•
- 2	Wall Height (ft.)	•	•	•	•	•	•	•	•	•	•
al) No.	Reinforcement Length (ft.)	•	•	•	•	•	•	•	•	•	•
Wa	Factored Bearing Resistance (psf)	•	•	•	•	•	•	•	•	•	•

NOTES

- The reinforcement strap lengths shown above are the minimum lengths required for external stability. The
 reinforcement lengths used in the construction of the retaining walls will be the longer of that required for
 external or internal stability (determined by proprietary wall companies).
- The Factored Bearing Resistances shown above are the critical (lowest) values from all the load cases analyzed using LRFD methodulugy

WOIES	/Notes	Date	09-01-19

- 1. Concrete facing panel surfaces treatment will be ______.
- If required, the soil reinforcement and Fasterers for the abutment back wall will be designed and formshed by the proprietary wall company.
 The soil reinforcement will be designed to resist a factored horizontal load of _____kips/ft, of back wall width. The cost of soil reinforcement and fasteroms (if required) will be included in the cost of the Actaining Wall System.
- 3. Applicable FOOT Wall Types for each wall location are listed below.

 See the Approved Products List for approved Wall Systems and Standard Plans Index 548-020 for allowable Wall Type substitutions.

 Wall No. 1 FOOT Wall Type

 Wall No. 2 FOOT Wall Type
- Concrete for Coping and/or Junction Stab shall be Class ______ (f'c = _____psi)
 with/without highly reactive pozzolans,
- 5. See Standard Plans Index 548-020 for General Notes and Details.

Payment

Item number	Item Description	Unit Measure
548-12	Retaining Wall System, Permanent, Excluding Barrier	SF
548-14	Retaining Wall System, Permanent - Widening, Attached To Existing Wall	SF
459-71	Polyethylene Sheeting on Concrete Piling	SY

Commentary: See **Standard Plans Instructions** for Index 521-600 Series for Traffic Railing/Junction Slab Pay Items as required.