



(DRAFT)

# BULLETIN

SUBJECT Change to Subsection 3.5.6 Bridge Abutments on MSE Retaining Walls and the accompanying commentary subsection C3.5.6	DRAFT NUMBER	EFFECTIVE DATE 00/00/00	SUPERSEDES 00/00/00
	SECTION Geo/Environmental	APPROVED SIGNATURE /s/ Section Manager or Chief Engineer	
UPDATES GUIDANCE DOCUMENT(S) ODOT Retaining Structures Manual	WEB LINK(S) <a href="http://www.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/geology_geotechnical.shtml#Retaining_Structures_Manual">http://www.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/geology_geotechnical.shtml#Retaining_Structures_Manual</a>		

## PURPOSE

The purpose of this bulletin is to update subsection 3.5.6 “Bridge Abutments on MSE Retaining Walls” and the accompanying commentary subsection C3.5.6 to align them with recommendations by FHWA, AASHTO and the ODOT Bridge Section.

## BACKGROUND/REFERENCE

FHWA Demonstration Project 82 Reinforced Soil Structures MSEW and RSS (FHWA-SA-96-071, August 1997)

Mechanically Stabilized Earth Walls and Reinforced Slopes (FHWA NHI-00-043, March 2001)

AASHTO LRFD Bridge Design Specifications, 3rd Edition, 2004

ODOT Retaining Structures Manual

## GUIDANCE

Replace the existing **3.5.6 Bridge Abutments on MSE Retaining Walls** with the following:

All MSE abutment walls will be designed using inextensible reinforcements.

For MSE abutments supporting spread footings, limit the bearing capacity on the reinforced volume to 2 tsf (4 ksf). Require a clear distance of 18 inches between the back face of the facing panels and the front edge of the footing.

For MSE abutments with pile foundations, provide a clear horizontal distance of at least 18 inches between the back of the panels and the front edge of the pile and a clear distance of at least 6 inches from the back of the panels to the face of the pile cap.

Facing for all MSE abutment walls will be reinforced concrete or CMU block. Installing a concrete wall on or in front of the face of a wire faced MSE wall system complies with this requirement.

Replace the existing **C3.5.6 Bridge Abutments on MSE Retaining Walls** with the following:

Bridge Section has expressed concern with the potential for long term creep and overall wall performance when using extensible MSE reinforcements. It has been ODOT practice to require inextensible reinforcements on any project where a bridge spread footing will be placed on reinforced MSE backfill. In addition, Bridge Section has requested that all MSE abutments be constructed using inextensible reinforcement, regardless of bridge foundation type. As ODOT knowledge grows, this may change.

Originally, the maximum allowable bearing pressure exerted on an MSE wall from a bridge abutment spread footing was limited to 2.5 tsf. It is believed that this limitation originates back to the earlier review and acceptance work between the FHWA and the proprietary retaining wall companies. However, FHWA Demonstration Project 82, "Reinforced Soil Structures MSEW and RSS" (FHWA-SA-96-071, August 1997) and the subsequent manual "Mechanically Stabilized Earth Walls and Reinforced Slopes" (FHWA NHI-00-043, March 2001) both recommend that the maximum allowable bearing pressure on MSE reinforced backfill be limited to 2.0 tsf.

"AASHTO LRFD Bridge Design Specifications, 3rd Edition" and FHWA Demonstration Project 82, "Reinforced Soil Structures MSEW and RSS" (FHWA-SA-96-071, August 1997) and the subsequent Mechanically Stabilized Earth Walls and Reinforced Slopes (FHWA NHI-00-043, March 2001) all recommend that footings on MSE walls be placed so that the leading edge of the footing is no less than 6 inches behind the back of the wall facing. They also state that for a pile supported foundation, the leading edge of the piles be no nearer to the back of the wall face than 18 inches. ODOT agrees in regards to the positioning of piles vis a vis the wall face, but believes 6 inches is too near to the wall face to place a spread footing. Originally, the ODOT Retaining Structures Manual specified that the leading edge of a footing could be no closer than 3 feet from the back of the wall face. After conversations with Bridge Section, this was changed to 18 inches.

Some bridge abutments have been recently constructed using wire faced MSE walls without concrete facia. The concern expressed has been both from an aesthetic standpoint and from the concern that, if flood waters come in contact with an MSE wall, the water could remove fine soil particles from behind the wall.

This would be exacerbated as the flood waters are receding. Therefore, ODOT now requires that MSE abutment walls have either reinforced concrete or CMU block facings. This does not preclude the use of a system using, for example, a precast reinforced concrete fascia wall attached to a wire MSE wall such as the Hilfiker Eureka or the Terratrel systems.

## **EXPLANATION/COMMENTARY**

See “Replace the existing **C3.5.6 Bridge Abutments on MSE Retaining Walls...**” above.

## **RESPONSIBILITIES**

Use this guidance to determine the design of MSE bridge abutments.

## **ACTION REQUIRED**

Provide feedback on effectiveness of this guideline to the Retaining Wall Program Coordinator.

## **SPECIAL INSTRUCTIONS**

May be used immediately.