

STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS  
REVISION TO STANDARD SPECIFICATIONS (OLD BUSINESS ITEM)

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The need has arisen for more clarity to the frequency of payment for particular temporary construction signs.

PROPOSED SOLUTION: Add Road Closure Sign Assemblies to the language stating which temporary construction signs will only be paid for once regardless of how many times they are moved or replaced during the contract, and reinstate previously removed language about "how many times each is altered to change the sign message" for temporary construction signs paid for once.

APPLICABLE STANDARD SPECIFICATIONS: 801.18

APPLICABLE STANDARD DRAWINGS: N/A

APPLICABLE DESIGN MANUAL SECTION: N/A

APPLICABLE SECTION OF GIFE: N/A

APPLICABLE RECURRING SPECIAL PROVISIONS: N/A

PAY ITEMS AFFECTED: Road Closure Sign Assembly.....EACH

Submitted By: James W. Keefer

Title: Ft Wayne District Construction Engineer

Organization: INDOT

Phone Number: 260-969-8245

Date: December 13, 2013

APPLICABLE SUB-COMMITTEE ENDORSEMENT: Ad Hoc: Jim Keefer, Tom Keefer

REVISION TO STANDARD SPECIFICATIONS (OLD BUSINESS ITEM)  
PROPOSED NEW RSP 801-C-XXX TEMPORARY CONSTRUCTION SIGNS

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801-C-XXX TEMPORARY CONSTRUCTION SIGNS

(Adopted XX-XX-13)

The Standard Specifications are revised as follows:

SECTION 801, BEGIN LINE 1126, INSERT AS FOLLOWS:

Each construction sign, barricade, temporary worksite speed limit sign assembly, road closure sign assembly, ~~portable changeable message sign~~, or flashing arrow sign will be paid for only once regardless of how many times each is moved, ~~or~~ replaced, *or how many times each is altered to change the sign message*. Payment will not be made for signs or barricades used for the convenience of the Contractor.

Additional materials necessary to place the ~~PCMS~~ *portable changeable message sign* in a secure and level manner for site conditions shall be included in the cost of the pay item. All costs to furnish, install, program, activate, deactivate, change messages, *move, replace*, and maintain the PCMS shall be included in the cost of the pay item. The cost of IP cellular phone service shall be included in the cost of the pay item.

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Addendum 01  
 Item No.04 11/22/13 (2014 SS) (contd.)  
 Mr. Keefer  
 Date: 12/19/13

COMMENTS AND ACTION

(OLD BUSINESS ITEM)

NEW RSP 801-C-XXX TEMPORARY CONSTRUCTION SIGNS

<p>Motion:          Second:          Ayes:          Nays:</p>	<p>Action:  <input type="checkbox"/> Passed as Submitted  <input type="checkbox"/> Passed as Revised  <input type="checkbox"/> Withdrawn</p>
<p>Standard Specifications Sections affected:</p>	<p><input type="checkbox"/> 2016 Standard Specifications Book  <input type="checkbox"/> Revise Pay Items List</p>
<p>SECTION 801.18 pg 742.          Recurring Special Provision affected:</p>	<p><input type="checkbox"/> Create RSP (No. _____)          Effective _____ Letting          RSP Sunset Date: _____</p>
<p>NONE</p>	<p><input type="checkbox"/> Revise RSP (No. _____)</p>
<p>Standard Sheets affected:</p>	<p>Effective _____ Letting</p>
<p>NONE</p>	<p>RSP Sunset Date: _____</p>
<p>Design Manual Sections affected:</p>	<p>Standard Drawing Effective _____</p>
<p>NONE</p>	<p><input type="checkbox"/> Create RPD (No. _____)</p>
<p>GIFE Sections cross-references:</p>	<p>Effective _____ Letting</p>
<p>NONE</p>	<p><input type="checkbox"/> Technical Advisory</p>
<p></p>	<p>GIFE Update Req'd.? Y ___ N ___</p>
<p></p>	<p>By _____ Addition or _____ Revision</p>
<p></p>	<p>Frequency Manual Update Req'd? Y ___ N ___</p>
<p></p>	<p>By _____ Addition or _____ Revision</p>
<p></p>	<p>Received FHWA Approval? _____</p>

SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS  
REVISION TO SPECIFICATIONS (REVISED AGENDA ITEM)

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Due to a need for additional instruction, changes are necessary to portions of the 731 mechanically stabilized earth (MSE) retaining wall specification section & 735 temporary wire-faced MSE retaining wall specification section.

PROPOSED SOLUTION: Reinstate the limit on ACBF used as structure backfill type 3 to only be size No. 8. Indicate what value shall be used for F\* when designing MSE wall systems. Require dynamic cone penetrometer testing to verify compaction of the MSE foundations, and more clearly state what the Department expects for design calculations.

APPLICABLE STANDARD SPECIFICATIONS: 731, & 735

APPLICABLE STANDARD DRAWINGS: none

APPLICABLE DESIGN MANUAL SECTION: 410-5.0

APPLICABLE SECTION OF GIFE: none

APPLICABLE RECURRING SPECIAL PROVISIONS: create new RSP

PAY ITEMS AFFECTED: none

Submitted By: Greg Pankow

Title: State Construction Engineer

Organization: INDOT

Phone Number: 232-5502

Date: November 25, 2013

APPLICABLE SUB-COMMITTEE ENDORSEMENT: ad hoc committee consisting of: David Holtz, Yuhui Hu, Mark Miller, Greg Pankow, Jim Reilman, and Nayyarzia Siddiki.

REVISION TO SPECIFICATIONS (REVISED AGENDA ITEM)  
PROPOSED NEW RSP 731-B-XXX MSE RETAINING WALL REQUIREMENTS

731-B-XXX MSE RETAINING WALL REQUIREMENTS

(Adopted XX-XX-XX)

The Standard Specifications are revised as follows:

SECTION 211, BEGIN LINE 111, DELETE AND INSERT AS FOLLOWS:

**(c) Type 3**

Structure backfill in accordance with 904.05, except only nominal size aggregates 1 in., 1/2 in., No. 4 or No. 30, and coarse aggregate No. 5, No. 8, No. 9, No. 11, or No. 12 shall be stone ~~or ACBF~~. *ACBF meeting the size requirements for coarse aggregate No. 8 may also be used.*

SECTION 731, BEGIN LINE 60, INSERT AS FOLLOWS:

**731.03 Design Criteria**

The internal stability shall be the responsibility of the Contractor. The design by the Engineer will consider the external stability of the wall mass including the applied bearing pressure, overturning, sliding, and stability of temporary construction slopes. The design for internal stability shall be in accordance with the AASHTO LRFD Bridge Design Specifications and the requirements specified herein. *The design submittal shall include connection strength design. Each design case shall present maximum tension capacity, soil overburden pressure and horizontal pressure at each reinforcement level, pullout capacity at each reinforcement level, the length of embedment in the resisting zone,  $L_e$ , and the total length of reinforcement at each level.*

*The value of the pullout resistance factor,  $F^*$ , used in design calculations shall be obtained from the AASHTO LRFD Bridge Design Specifications figure 11.10.6.3.2-1.*

SECTION 731, BEGIN LINE 80, DELETE AND INSERT AS FOLLOWS:

*The material used as backfill in the reinforced backfill zone shall be assumed to have a unit weight of 120 lb/cu ft unless lightweight fill has been specified. The  $\phi_r$  angle for the internal design of the reinforced backfill shall be assumed 34°. The  $\phi$  angle of the backfill behind the reinforced portion of the MSE volume shall be assumed 30° for design. The  $\phi$  angle for the internal design of the foundation soils shall be assumed obtained from the geotechnical report and shall not exceed 30° for design. For the external design parameters, such as but not limited to, bearing capacity, sliding, overturning, eccentricity, and global stability, the actual soil strength parameters used shall be obtained from the geotechnical report.*

*The coefficient of uniformity,  $c_u$ , of the reinforced backfill for all designs using the ribbed steel strips curve from AASHTO LRFD Bridge Design Specifications figure 11.10.6.3.2-1 shall be 4.0.*

SECTION 731, AFTER LINE 134, DELETE AND INSERT AS FOLLOWS:

**(d) Other Criteria**

**1. Traffic Load Considerations**

Traffic load shall be considered as live load surcharge. The load factor of traffic load shall be 1.75 in accordance with AASHTO LRFD Bridge Design Specifications table 3.4.1-1.

**2. Traffic Impact Considerations**

Where traffic barriers are constructed above an MSE wall or reinforced backfill envelope, the MSE wall supporting traffic shall include computations showing that the extreme event II limit state due to traffic impact has been met.

Loadings for MSE wall design for the Extreme Event II limit state shall be in accordance with the following table:

*Maximum Nominal Tension Rupture and Pullout Impact Loads*

<i>Layer</i>	<i>Tension Impact Load</i>	<i>Pullout Impact Load</i>
<i>First Top Layer</i>	<i>2,300 lbs/ft</i>	<i>1,300 lbs/ft</i>
<i>Second Top Layer</i>	<i>600 lbs/ft</i>	<i>600 lbs/ft</i>

The Extreme Event II design for the top two layers shall be separately prepared and compared with the routine internal stability design.

**3. Tributary Area – Design Basis**

For internal stability analysis of MSE walls, each layer of reinforcement is assigned a tributary area,  $A_{trib}$  in accordance with FHWA publication no. FHWA-NHI-10-025, Design and Construction of Mechanically Stabilized Earth Walls and Reinforced Soil Slopes Volume II and as follows:

$$A_{trib} = (w_p)(S_{vt})$$

where:

$w_p$  = the wall system concrete panel width of the precast facing element,  
 and

$S_{vt}$  = the vertical tributary spacing of the reinforcement based on the location of the reinforcement above and below the level of the reinforcement under consideration.

For a wall system with steel reinforcement, within each tributary area, the factored reinforcement tensile resistance,  $T_r$ , and the factored pullout resistance,  $P_{rr}$ , shall be no less than the maximum factored tension load,  $T_{max}$ . If the calculated minimum number of strips is an uneven number, the minimum number required shall be rounded up to the next even number.

**731.04 Submittals**

REVISION TO SPECIFICATIONS (REVISED AGENDA ITEM)  
PROPOSED NEW RSP 731-B-XXX MSE RETAINING WALL REQUIREMENTS

The Contractor shall submit working drawings ~~and design calculations~~ in accordance with 105.02. *The Contractor shall submit design calculations in accordance with 105.02 and the following additional requirements. In case of discrepancy, the requirements listed below supersede those listed in 105.02. Design calculations shall show the complete design of the MSE wall. Calculations may be in either longhand or computer-printout format and must follow a systematic and logical methodology. A summary sheet that shows design assumptions and their source, controlling parameters and load cases, and other pertinent input and output information shall be attached to the calculations package.* Wall construction operations shall not begin until the Contractor receives written notice that the working drawings are approved.

SECTION 731, BEGIN LINE 208, INSERT AS FOLLOWS:

Fly Ash .....	901.02
Geotextile .....	918.02
Joint Spacers and Joint Covering .....	901.10(b)

SECTION 731, BEGIN LINE 239, DELETE AND INSERT AS FOLLOWS:

**731.07 Foundation Preparation**

**(a) General**

~~The~~*Prior to wall construction, the foundation for the structure shall be graded level for a width equal to or exceeding the length of the ground reinforcement or as shown on the plans. Prior to wall construction, the foundation, if not in rock, shall then be compacted in accordance with 203. After the foundation has been compacted, the resulting grade of the foundation shall be 1 in. per foot sloped from the back of the foundation downward toward the leveling pad. The portion of the foundation beneath the leveling pad shall not be sloped. The base of the wall excavation foundation shall be proofrolled with approved compacting equipment in accordance with 203.26. If unsuitable foundation material is encountered, it shall be removed and replaced with B borrow in accordance with 211.02 and compacted in accordance with 211.04.*

**(b) Leveling Pad Foundation**

*After the foundation has passed proofrolling, compaction of the portion of the foundation beneath the leveling pad will be verified by dynamic cone penetrometer, DCP, testing in accordance with ITM 509. Areas not meeting ITM 509 shall be removed, replaced, and compacted in accordance with 203 and 211, as directed. DCP verification of the level of compaction beneath the leveling pad will not be required if the foundation is in an embankment section that is constructed in accordance with 203.*

An unreinforced concrete leveling pad shall be provided at each foundation level as shown on the plans. The leveling pad shall be cured in accordance with 702.22 for a minimum of 12 h before placement of concrete face panels.

SECTION 731, BEGIN LINE 348, INSERT AS FOLLOWS:

REVISION TO SPECIFICATIONS (REVISED AGENDA ITEM)  
PROPOSED NEW RSP 731-B-XXX MSE RETAINING WALL REQUIREMENTS

The work shall also include B borrow backfilling above a theoretical 1:1 slope behind the ground reinforcement as shown on the plans.

*When structure backfill type 3 nominal size aggregates 1 in. or 1/2 in., or coarse aggregate No. 5, No. 8, No. 9, No. 11, or No. 12 are used in the reinforced backfill zone, geotextiles shall be installed vertically between the interface of the reinforced backfill zone and the backfill behind the reinforced portion of the MSE volume or the retained soil. Geotextiles shall also be installed horizontally across the top of the reinforced backfill zone.*

SECTION 731, BEGIN LINE 389, DELETE AND INSERT AS FOLLOWS:

Concrete leveling pad will be measured by the linear foot. Common excavation will be measured by the cubic yard in accordance with 203.27(a) to the neat lines shown on the plans. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09. Geotextile shall be measured in accordance with 616.12, except as otherwise specified herein. Underdrains for MSE walls and components of the internal drainage system will be measured in accordance with 718.09. ~~Geotextile materials used as joint covering will not be measured.~~ *If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the removal, replacement, and compaction of the new material will be measured in accordance with 203 and 211.*

*Geotextile materials used as joint covering will not be measured.* Precast or cast-in-place concrete coping will not be measured.

SECTION 731, AFTER LINE 432, INSERT AS FOLLOWS:

*If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the cost of removal, replacement, and compaction of new material will be paid for in accordance with 203 and 211.*

*If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad that is constructed on an embankment section that is constructed under the same contract, the cost of removal, replacement, and compaction of new material shall be included in the cost of the leveling pad.*

SECTION 735, BEGIN LINE 44, DELETE AND INSERT AS FOLLOWS:

**735.04 Submittals**

The Contractor shall submit working drawings ~~and design calculations~~ in accordance with 105.02. *The Contractor shall submit design calculations in accordance with 105.02 and the following additional requirements. In case of discrepancy, the requirements listed below supersede those listed in 105.02. Design calculations shall show the complete design of the temporary wire-faced wall. Calculations may be in either longhand or computer-printout format and must follow a systematic and logical*

REVISION TO SPECIFICATIONS (REVISED AGENDA ITEM)  
PROPOSED NEW RSP 731-B-XXX MSE RETAINING WALL REQUIREMENTS

*methodology. A summary sheet that shows design assumptions and their source, controlling parameters and load cases, and other pertinent input and output information shall be attached to the calculations package. Wall construction operations shall not begin until the Contractor receives written notice that the working drawings are approved.*

SECTION 735, BEGIN LINE 121, DELETE AND INSERT AS FOLLOWS:

Common excavation will be measured in accordance with 203.27. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09. ~~Geotextile materials will not be measured.~~ *If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the removal, replacement, and compaction of the new material will be measured in accordance with 203 and 211.*

*Geotextile materials will not be measured.* Drainage of the backfill including piping, aggregates, and incidentals will not be measured.

SECTION 735, BEGIN LINE 143, INSERT AS FOLLOWS:

The cost of all MSE retaining wall components including wire-facing elements, concrete face panels, ground reinforcing, tie strips, fasteners, soil retention materials, repair or replacement of wire-facing elements damaged or removed due to backfill placement, and incidentals shall be included in the cost of temporary wire-facing.

*If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad in a section constructed on original ground or in a cut section, the cost of removal, replacement, and compaction of new material will be paid for in accordance with 203 and 211.*

*If unsuitable foundation material is encountered in the portion of the foundation beneath the leveling pad that is constructed on an embankment section that is constructed under the same contract, the cost of removal, replacement, and compaction of new material shall be included in the cost of the leveling pad.*

**7.5 Granular Materials.** For granular materials, the strength of the material is measured after completion of compaction for each 18 in. of the material. Prior to measuring the blow count for 12 in., the DCP is penetrated into the material a depth of 6 in. The number of blows of the DCP is measured for a penetration from 6 in. to 18 in. into the granular material.

**7.6 Foundation Material Beneath MSE Leveling Pad.** *For the foundation material beneath the leveling pad of an MSE retaining wall, the strength of the material is measured after the MSE foundation has been compacted and proofrolled. The number of blows is measured for each 6 in. increment of penetration into the material for a total penetration of 30 in.*

**7.6.1** *The minimum number of blows of the DCP for each 6 in. increment is 5 blows per each 6 in. increment in order for the foundation material beneath the MSE leveling pad to be considered acceptable. A DCP measurement is defined as the number of blows per 6 in. increment for a total penetration of 30 in. (There will be 5 sets of DCP readings at each measurement location).*

**7.6.2** *The frequency of DCP measurements is one DCP measurement for every 50 ft of linear MSE wall or five DCP measurements per end bent. If, on an end bent, an MSE wingwall is more than 1.5 times the length of the MSE abutment wall, that MSE wingwall is considered a linear MSE wall for DCP measurement purposes.*

**8.0 REPORT.** Report the number of blows to obtain the required penetration of the DCP.

COMMENTS AND ACTION

(REVISED AGENDA ITEM)

731-B-XXX MSE RETAINING WALL REQUIREMENTS

<p>Motion:          Second:          Ayes:          Nays:</p>	<p>Action:  <input type="checkbox"/> Passed as Submitted  <input type="checkbox"/> Passed as Revised  <input type="checkbox"/> Withdrawn</p>
<p>Standard Specifications Sections affected:</p>	<p><input type="checkbox"/> 2016 Standard Specifications Book  <input type="checkbox"/> Revise Pay Items List</p>
<p>211.03.1 pg 203; 731 pg 6993 thru 702; 735 pg 711 thru 712.</p>	<p><input type="checkbox"/> Create RSP (No. _____)          Effective _____ Letting          RSP Sunset Date: _____</p>
<p>Recurring Special Provision affected:           NONE</p>	<p><input type="checkbox"/> Revise RSP (No. _____)          Effective _____ Letting          RSP Sunset Date: _____</p>
<p>Standard Sheets affected:           NONE</p>	<p>Standard Drawing Effective _____</p>
<p>Design Manual Sections affected:           SECTION 410-5.0</p>	<p><input type="checkbox"/> Create RPD (No. _____)          Effective _____ Letting  <input type="checkbox"/> Technical Advisory</p>
<p>GIFE Sections cross-references:           NONE</p>	<p>GIFE Update Req'd.? Y ___ N ___          By _____ Addition or _____ Revision</p>
	<p>Frequency Manual Update Req'd? Y ___ N ___          By _____ Addition or _____ Revision</p>
	<p>Received FHWA Approval? _____</p>