



Iowa Department of Transportation

MINUTES OF IOWA D.O.T. SPECIFICATION COMMITTEE MEETING

September 13, 2012

Members Present:	Jim Berger Darwin Bishop Donna Buchwald Eric Johnsen, Secretary Ed Kasper Doug McDonald Gary Novey Dan Redmond Tom Reis, Chair Brian Smith John Smythe	Office of Materials District 3 - Construction Office of Local Systems Specifications Section Office of Contracts District 1 - Marshalltown RCE Office of Bridges & Structures District 4 - Materials Specifications Section Office of Design Office of Construction
Members Not Present:	Sandra Larson Willy Sorensen	Systems Operations Bureau Office of Traffic & Safety
Advisory Members Present:	Lisa Rold Paul Wiegand	FHWA SUDAS
Others Present:	Daniel Harness	Office of Design

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the revised agenda dated September 10, 2012:

1. Article 2432.02, B, 1, a, 1, Mechanically Stabilized Earth (MSE) Retaining Wall.

The Office of Materials requested to allow all types of cement for MSE walls.

**2. Article 2435.03, A, General Requirements for Installation of Manholes and Intakes.
Section 2552, Trench Excavation and Backfill.**

The Office of Design requested to place bedding and backfill requirements from Standard Note 263-1, Tab. 104-5A, and Tab. 104-5B in the Standard Specifications.

3. Article 2505.02, B, 1, High Tension Cable Guardrail.

The Office of Design requested to allow substitution of Class M mix for high tension cable guardrail line post and end anchor foundations.

4. Article 4186.03, Retro Reflective Sheeting.

The Office of Materials requested changes to make the specifications reflect current practice for yellow and yellow-green retro-reflective sheeting.

5. DS-12010, Global Positioning System Machine Control Grading.

The Office of Design requested revisions to the Developmental Specifications for Global Positioning System Machine Control Grading.

6. Article 2214.03, D, 6, Construction (Pavement Scarification).

Article 2528.03, L, Limitations (Traffic Control).

The Office of Traffic and Safety requested to move the ROUGH ROAD sign requirement to Section 2528 and to include a specification requirement for the placement of BUMP signs for milled or scarified surfaces.

7. Article 2528.03, Signs and Devices (Traffic Control).

Article 2550.04, Traffic Control (Night Work Lighting).

The Office of Traffic and Safety requested to move the vehicle warning light requirements from the nighttime lighting section to traffic control so it applies to both day time and night time work.

8. DS-12031, Precast Reinforced Concrete Three-Sided Culvert.

The Specifications Section requested revisions to the Developmental Specifications for Precast Reinforced Concrete Three-Sided Culvert.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials		Item 1	
Submittal Date: 2012.08.28		Proposed Effective Date: April, 2013			
Article No.: 2432.02, B, 1, a, 1		Other:			
Title: Mechanically Stabilized Earth (MSE) Retaining Wall					
Specification Committee Action: Approved as recommended.					
Deferred:	Not Approved:	Approved Date: 9/13/2012	Effective Date: 4/16/2013		
Specification Committee Approved Text: See Specification Section Recommended Text.					
Comments: None.					
Specification Section Recommended Text:					
2432.02, B, 1, a, 1.					
Replace the Article:					
Type I Cement meeting requirements of Section 4101.					
Comments:					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .)					
Type I cement Cement meeting requirements of Section 4101.					
Reason for Revision: To allow all types of cement for MSE wall					
County or City Input Needed (X one)		Yes		No x	
Comments:					
Industry Input Needed (X one)		Yes		No X	
Industry Notified:	Yes	No X	Industry Concurrence:	Yes	No X
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield / Brian Smith		Office: Design	Item 2
Submittal Date: 8/30/2012		Proposed Effective Date: 04/2013	
Article No.: 2435.03, A Title: General Requirements for Installation of Manholes and Intakes. Article No.: 2552 Title: Trench Excavation and Backfill		Other:	
Specification Committee Action: Deferred for more discussion.			
Deferred: X	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
<p>Comments: The Office of Construction expressed some confusion over the articles referring to each other and Class 1 material, which should be Class I. Also, Class I is a bedding material only, so the backfill should probably be according to Class II. The materials specifications should probably be placed in Division 41 with other materials. There are still some conflicting opinions on whether gravel needs to be crushed, especially for the bedding material. A meeting will be set up to discuss how these revisions can be made more clearly and to make sure everyone is on the same page.</p> <p>SUDAS does not think that this material should be used for backfill as it causes an inconsistent base for the pavement. As written, it only applies to Interstate and Primary roads.</p>			
Specification Section Recommended Text:			
2435.03, A, General Requirements for Installation of Manholes and Intakes.			
Add the Article:			
13. Bedding and Backfill under Interstate and Primary Roads.			
Place and compact the material according to Article 2435.03, A, and Article 2552.03, E (Class 1 material).			
2552.02, Materials.			
Add the Article:			
G. Bedding and Backfill under Interstate and Primary Roads.			
Use crushed stone or crushed gravel complying with Article 4120.04 for bedding and backfill. Use gravel that is 100% crushed and produced by crushing material retained on a 1.5 inch (37.5 mm) or larger screen.			
2552.03, E, Pipe Bedding and Backfill Material.			
Add the Article:			
6. Bedding and Backfill under Interstate and Primary Roads.			
Place and compact the material according to Article 2435.03, A, and Article 2552.03, E (Class 1 material).			
<p>Comments: The Article titles were changed to include "Interstate" per discussion at the July Specification Committee meeting.</p> <p>What do the proposed Articles 13 and 6 add to their respective sections, as one of the references in each is to itself? Does Article 13 contradict Articles such as 2435.03, A, 12, Placing and Compacting Backfill Material?</p> <p>The material specified in Article G is not Class 1 material. What does "Class 1 material" in Article 6 in reference to?</p> <p>The following issues were brought up at the July Specification Committee meeting:</p> <p>The District 4 Office asked if we should be referencing the new Section 4118, Pipe Bedding</p>			

Material. Section 4118 would only be for the bedding and not the backfill.

The District 4 Office pointed out that Article 4120.04 is for Class A crushed stone. Article 4120.03 should be applied for gravels.

The District 4 Office questioned requiring 100% crushed gravel. Uncrushed gravel is a better bedding material. This language will be removed from the specification.

Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use **Strikeout and **Highlight**.)**

2435.03, A, 13, Bedding and Backfill under Interstate and Primary Roads.

Add as a new article:

6. Bedding and Backfill under Primary Roads.

Place and compact the material according to Article 2435.03, A and Article 2552.03, E (Class 1 materials).

2552.02, G, Bedding and Backfill under Interstate and Primary Roads.

Add as a new article:

Use crushed stone or crushed gravel complying with Article 4120.04 for all bedding and backfill. Use gravel that is 100% crushed produced by crushing material retained on a 1.5 inch (37.5 mm) or larger screen.

2552.03, E, 6, Bedding and Backfill under Primary Roads.

Add as a new article:

6. Bedding and Backfill under Primary Roads.

Place and compact the material according to Article 2435.03, A and Article 2552.03, E (Class 1 materials).

Reason for Revision: Currently, this language appears in Standard Note 263-1 (used with sanitary sewer, watermain, and appurtenances) Tab 104-5A (list of intakes and utility accesses), and in Tab 104-5B (list of intakes, utility accesses, and storm sewer pipe). Since this is the standard procedure, the Office of Design would like to add this to the Standard Specifications and remove it from Tabs 104-5A and 104-5B, as well as void Standard Note 263-1. **The Office of Construction has asked that material requirements in Section 2435 be left as they are.**

County or City Input Needed (X one)			Yes	No		
Comments:						
Industry Input Needed (X one)			Yes	No		
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No	
Comments:						

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield / Brian Smith		Office: Design		Item 3	
Submittal Date: 8/30/12		Proposed Effective Date: 4/16/2013			
Article No.: 2505.02, B, 1		Other:			
Title: High Tension Cable Guardrail					
Specification Committee Action: This item was not approved.					
Deferred:	Not Approved: X	Approved Date:	Effective Date:		
Specification Committee Approved Text:					
Comments: The Specification Committee felt that Article 2403.02, B, 1, c, covers this issue and that if the specifications start to clarify for the cable guardrail foundations, they would also need to clarify for all structural concrete uses.					
Specification Section Recommended Text:					
2505.02, B, 1.					
Add as the second sentence:					
Class M mix may be substituted for Class C mix at no additional cost to the Contracting Authority.					
Comments: Article 2403.02, B, 1, c, allows substitution of Class D or Class M mixtures for Class C mixtures except for bridge floors. Since we refer to Class C mixture per Section 2403 in the first sentence of the Article, wouldn't that be adequate?					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)					
2505.02, B, 1, High Tension Cable Guardrail.					
Add as a second sentence:					
Class M mix may be substituted for Class C mix at no additional cost to the Contracting Authority.					
Reason for Revision: The question came up as to whether Class M mix can be used in place of Class C. The Office of Construction stated it can be allowed. Do we also want to allow Class D (also at no extra cost)?					
County or City Input Needed (X one)		Yes		No X	
Comments:					
Industry Input Needed (X one)		Yes		No X	
Industry Notified:	Yes	No X	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger		Office: Materials	Item 4
Submittal Date: 07-18-12		Proposed Effective Date: April, 2013	
Article No.: 4186.03 Title: Retro Reflective Sheeting		Other:	
Specification Committee Action: Approved as recommended.			
Deferred:	Not Approved:	Approved Date: 9/13/2012	Effective Date: 4/16/2013
Specification Committee Approved Text: See Specification Section Recommended Text.			
Comments: None.			
Specification Section Recommended Text:			
4186.03, A, 3.			
Add the following line to the end of Table 4186.03-1, Retro Reflective Sheeting Classification:			
Type XI	A prismatic very high intensity retro reflective sheeting having highest retro reflective characteristics at wide range of distances.		
4186.03, B, 1, a.			
Replace the Article:			
Meet the following requirements:			
1) Type III or IV sheeting is used for all signs with yellow, green, red, blue, or brown background, unless otherwise specified.			
2) Type XI Fluorescent sheeting is used for signs with yellow or yellow-green background.			
3) The legend on white and yellow signs is fabricated using black nonreflective sheeting that is applied directly, or by silk screening with black opaque ink.			
4) The legend on green signs is fabricated using white Type III or IV sheeting that is applied directly.			
5) The legend on red signs is fabricated using transparent red ink that is reverse silk screened on white Type III or IV sheeting, or is fabricated using white Type III or IV sheeting that is applied directly on a red Type III or IV sheeting background.			
6) The legend on blue and brown signs is fabricated using transparent ink that is reverse silk screened on white Type III or IV sheeting, or white Type III or IV sheeting that is applied directly.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight			
4186.03 RETRO REFLECTIVE SHEETING.			
A. General.			

3. Retroreflective Sheeting is classified as shown in Table 4186.03-1

Table 4186 .03-1: Retro Reflective Sheeting Classification

Type IV	
Type VI	
(Iowa)	
Type VII	
(Iowa)	
ASTM Type XI	A prismatic very high intensity retro reflective sheeting having highest retro reflective characteristics at wide range of distances.

B.

1. Permanent Signs and Devices

a. Meet the following requirements:

- 1) Type III or IV sheeting is used for all signs with yellow, green, red, blue or brown background, unless otherwise specified.
- 2) ASTM Type XI Fluorescent sheeting is used for all signs with yellow or yellow-green background.
- 2) 3)-----
- 3) 4)-----
- 4) 5)-----
- 5) 6)-----

Reason for Revision: To make the specification reflect the current practice.

County or City Input Needed (X one)		Yes	No X		
Comments:					
Industry Input Needed (X one)		Yes	No X		
Industry Notified:	Yes	No X	Industry Concurrence:	Yes	No x
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield / Brian Smith		Office: Design		Item 5	
Submittal Date: 8/30/12		Proposed Effective Date: 4/16/2013			
Article No.: Title:		Other: DS-12010, Global Positioning System Machine Control Grading			
Specification Committee Action: Deferred for further discussion.					
Deferred: X	Not Approved:	Approved Date:	Effective Date:		
Specification Committee Approved Text:					
<p>Comments: The Office of Design would like to incorporate the machine control specifications (both grading and paving) into the Standard Specifications so that the Contractor has the option on all projects. Some issues need to be resolved, such as where the specifications will go in the spec. book, i.e. Construction Survey section, grading section, paving section, or a new section.</p> <p>The Office of Construction supports placing the machine control grading specifications into the Standard Specifications as this is a pretty standard practice. The machine control paving is less widespread and may need to remain a DS longer.</p> <p>The Office of Design will set up a meeting to discuss how to incorporate the machine control specifications into the Standard Specifications. The Offices of Construction and Contracts as well as the Specifications Section will be invited.</p> <p>One issue that will need to be addressed is how to specify when the RCE Office plans on doing some of the survey on a machine control grading project.</p> <p>The Office of Construction would like to present any changes to the industry for input prior to implementation.</p> <p>The Office of Design would like to include something in the specifications defining support files (i.e. tabulations, machine control files, etc.) and that they should fall lower on the hierarchy to the plans, regardless of whether the plans are printed or electronic. This issue will be discussed with the group that the Office of Design puts together.</p> <p>When this item becomes optional on all projects, there will no longer be a bid item, but the cost of any work will be included in Construction Survey.</p> <p>The Offices of Construction and Contracts are in the process of making the posting of support files to a website standard practice so that the contractors will have access to these before the letting.</p>					
Specification Section Recommended Text: See attached Draft Developmental Specifications for Global Positioning System Machine Control Grading.					
Comments:					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .) See attached.					
Reason for Revision:					
County or City Input Needed (X one)		Yes	No X		
Comments:					
Industry Input Needed (X one)		Yes	No X		
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

DRAFT DS-120XX
(Replaces DS-12010)



**DEVELOPMENTAL SPECIFICATIONS
FOR
GLOBAL POSITIONING SYSTEM MACHINE CONTROL GRADING**

Effective Date
April 16, 2013

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

120XX.01 GENERAL.

- A. This specification contains requirements for grading construction using Global Positioning System (GPS) machine control grading techniques. Use this developmental specification in conjunction with Section 2526 of the Standard Specifications.
- B. The Contractor has the option of using grading equipment controlled with a GPS machine control system in the construction of the roadway embankment.
- C. The plans indicate the areas of the project where the Contracting Authority is providing electronic surface models of the roadway embankment construction. The Contractor may construct remaining areas with conventional construction survey techniques. The Contractor may, at no additional cost to the Contracting Authority, build the required surface models to facilitate GPS machine control grading for those areas.
- D. The Contractor may use any type of GPS machine control equipment and systems that results in achieving the existing grading requirements. Convert the electronic data provided by the Contracting Authority into the format required by the machine control grading system.

120XX.02 EQUIPMENT.

Provide all equipment required to accomplish GPS machine control grading. Use equipment that generates end results meeting the Standard Specifications.

120XX.03 CONSTRUCTION.

A. Contracting Authority Responsibilities.

- 1. The Engineer will set the initial horizontal and vertical control points in the field for the project as indicated in the contract documents.
- 2. The Engineer will provide the project specific localized coordinate system. The control information utilized in establishing the localized coordinate system, specifically the rotation, scaling, and translation can be obtained from the Engineer upon request.

3. The Contracting Authority will make available the following electronic data files with the proposal form. This information is available for a fee at: <http://www.ia.bidx.com/main/index.html> (verify procedure). The Contractor will be required to purchase an online account to obtain the electronic data. The files that are made available were originally created with the computer software applications MicroStation (CADD software) and GEOPAK (civil engineering software). The data files will be in the native formats and other software formats as described below. Perform necessary conversion of the files for the selected grade control equipment.
- a. CAD Files:
 - ~~GEOPAK TIN files~~ Digital Terrain model files in various formats representing the design surfaces and the existing surfaces.
 - ~~GEOPAK GPK files~~ Files containing all horizontal and vertical alignment information.
 - ~~GEOPAK d~~ Documentation file describing all of the ~~chains and profiles~~ horizontal and vertical alignments as well as a description of other files included.
 - MicroStation primary design file.
 - MicroStation design file with 3D break lines of design elements.
 - MicroStation cross section files.
 - MicroStation ROW data file.
 - MicroStation photogrammetry and text files.
 - b. Machine Control Surface Model Files:
 - ~~ASCII format.~~
 - LandXML format.
 - ~~Trimble Terramodel format.~~

Note: ~~TIN files and s~~ Surface model files of the proposed finish grade include the topsoil placement where required in the plans.
 - c. Alignment Data Files:
 - ~~ASCII format.~~
 - LandXML format.
 - ~~Trimble Terramodel format.~~

No guarantee is made that the data systems used by the Engineer will be directly compatible with the systems the Contractor uses.

Apply Article 1105.04 of the Standard Specifications with the additional clarification that information shown on the plans governs over the provided electronic data.

The electronic information is not to be considered a representation of actual conditions to be encountered during construction. Providing the Contractor this information does not relieve the Contractor from the responsibility of making an investigation of conditions to be encountered, including but not limited to site visits, and basing the bid on information obtained from these investigations and the their professional interpretations and judgment. The Contractor assumes the risk of error if the information is used for any purposes for which the information was not intended.

Any assumptions the Contractor makes from this electronic information is at their risk.

The Contracting Authority will develop and make available electronic data to the Contractor for review as part of the contract documents. Ensure the electronic data will function in the machine control grading system.

4. The Engineer may perform spot checks of the machine control grading results, surveying calculations, records, field procedures, and actual staking. If the Engineer determines the work is not being performed in a manner that will assure accurate results, the Engineer may order such work to be redone, to the requirements of the contract documents, at no additional

cost to the Contracting Authority.

B. Contractor's Responsibilities.

1. Provide the Engineer with a GPS rover (with the same capabilities as units used by the Contractor) for use during the duration of the contract. At the end of the contract, the GPS rover unit will be returned. Provide the Engineer 8 hours of formal training on the Contractor's GPS machine control systems.
2. Review and apply the data the Contracting Authority has provided to perform GPS machine control grading.
3. The Contractor bears all costs, including but not limited to the cost of actual reconstruction of work, that may be incurred due to errors in application of GPS machine control grading techniques. Grade elevation errors and associated quantity adjustments resulting from the Contractor's activities are at no cost to the Contracting Authority.
4. Convert the Contracting Authority's electronic data into a format compatible with the machine control system.
5. Manipulation of the Contracting Authority's electronic data is taken at the Contractor's own risk.
6. Check and recalibrate, if necessary, the GPS machine control system at the beginning of each work day.
7. Meet the same accuracy requirements as conventional grading construction as detailed in the Standard Specifications.
8. Establish secondary control points at appropriate intervals and at locations along the length of the project and outside the project limits and/or where work is performed beyond the project limits as required at intervals not to exceed 1000 feet (300 m). Determine the horizontal position of these points using static GPS sessions or by traverse connection from the original baseline control points. Establish the elevation of these control points using differential leveling from the project benchmarks, forming closed loops. Provide a copy of all new control point information to the Engineer prior to construction activities. The Contractor is responsible for all errors resulting from their efforts. Correct all deficiencies to the satisfaction of the Engineer at no additional cost to the Contracting Authority.
9. Preserve all reference points and monuments that are established by the Engineer within the project limits. Reestablish reference points that have not been preserved at no additional cost to the Contracting Authority.
10. Set hubs at the top of the finished subgrade at all hinge points on the cross section at 1000 foot (300 m) intervals on mainline and at least two cross sections on the side roads and ramps. Establish these hubs, using conventional survey methods, for use by the Engineer to check the accuracy of the construction.
11. Provide controls points and conventional grade stakes at critical points such as, but not limited to, PC's, PT's, super elevation points, and other critical points required for the construction of drainage and roadway structures.
12. At least one week prior to the preconstruction conference, submit to the Engineer for review a written machine control grading work plan which includes the equipment type, control software manufacture and version, and the proposed location of the local GPS base station used for broadcasting differential correction data to rover units.

120XX.04 METHOD OF MEASUREMENT.

None.

120XX.05 BASIS OF PAYMENT.

- A. Payment for GPS Machine Control Grading will be the lump sum contract unit price.
- B. Payment is full compensation for all work associated with preparing the electronic data files for use in the Contractor's machine control system, the required system check and needed recalibration, training for the Engineer, and all other items described in Article DS-120XX.03, B.
- C. Delays due to satellite reception of signals to operate the GPS machine control system will not result in adjustment to the contract unit price for any construction items or be justification for granting contract extensions.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Work Zone Traffic Safety Committee		Office: Traffic and Safety	Item 6
Submittal Date: 2012.09.07		Proposed Effective Date: April 2013	
Article No.: 2214.03, D, 6 Title: Construction (Pavement Scarification) Article No.: 2528.03, L Title: Signs and Devices (Traffic Control)		Other:	
Specification Committee Action: Approved as recommended.			
Deferred:	Not Approved:	Approved Date: 9/13/2012	Effective Date: 4/16/2013
Specification Committee Approved Text: See Specification Section Recommended Text.			
Comments: None.			
Specification Section Recommended Text:			
2214.0.3, D, 6.			
Delete the Article:			
6. When resurfacing is part of the contract, sign the approaches to scarified areas on Primary Roads with ROUGH ROAD signs. Repeat the signs for traffic that may enter within the scarified area from intersecting public roads. Erect, move (if appropriate), and maintain these signs until the scarified areas are covered with new mixture.			
2528.03, L, Limitations.			
Add the Article:			
13. When milled or scarified surfaces exist, sign approaches to scarified areas using ROUGH ROAD (W8-8) signs. Place signs at least 250 feet (75 m) in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At locations where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet (15 m) in advance of each location. Erect, move, and maintain these signs until milled or scarified areas have been covered with new HMA or PCC pavement.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)			
2214.03 CONSTRUCTION.			
D. Limitations.			
6. When resurfacing is part of the contract, sign the approaches to scarified areas on Primary Roads with ROUGH ROAD signs. Repeat the signs for traffic that may enter within the scarified area from intersecting public roads. Erect, move (if appropriate), and maintain these signs until the scarified areas are covered with new mixture.			
2528.03 SIGNS AND DEVICES.			
L. Limitations.			
13. When milled or scarified surfaces exist, sign approaches to scarified areas with ROUGH ROAD (W8-8) signs. Signs shall be placed a minimum of 250 feet (75 m) in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At each location where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet (15 m) in advance of each location. Erect, move, and maintain these signs until milled or scarified areas have been covered with new HMA or PCC pavement.			

Reason for Revision: To move the ROUGH ROAD sign requirement to the traffic control portion of the specifications and to include a specification requirement for the placement of BUMP signs for milled or scarified surfaces. Currently BUMP signs are added by change order to effected projects.					
County or City Input Needed (X one)			Yes	No X	
Comments:					
Industry Input Needed (X one)			Yes	No X	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Work Zone Traffic Safety Committee		Office: Traffic and Safety	Item 7
Submittal Date: 2012.09.07		Proposed Effective Date: April 2013	
Article No.: 2528.03 Title: Signs and Devices (Traffic Control) Article No.: 2550.04 Title: Traffic Control (Night Work Lighting)		Other:	
Specification Committee Action: Deferred for further discussion.			
Deferred: X	Not Approved:	Approved Date:	Effective Date:
Specification Committee Approved Text:			
<p>Comments: The Office of Construction had concerns that this could be a burden on contractors to comply with and that at the very least, it should be discussed with them prior to implementation.</p> <p>The District 3 Construction Office felt that the number of vehicles and equipment with warning lights could become a distraction to the public on projects such as HMA paving, when you will have delivery trucks, a paver, rollers, etc. all in one location.</p> <p>The Work Zone Traffic Safety Committed will further review this revision and discuss it with the industry.</p>			
Specification Section Recommended Text:			
2528.03, Signs and Devices.			
Add the Article:			
M. Vehicle Warning Lights.			
Ensure vehicles and equipment (except hand operated equipment) operating or parked within 15 feet (4.6 m) of an open lane of traffic and vehicles and equipment entering or exiting work area display amber or yellow high intensity rotating, flashing, oscillating, or strobe warning lights. Warning lights shall be maintained in good operating condition and shall be mounted on equipment to provide for 360 degree visibility, day or night, for a minimum distance of 1000 feet (300 m). The use of magnetically mounted beacons will be permissible if they meet the requirements for visibility and mounting.			
2550.04, Traffic Control.			
Delete the Article:			
A. Ensure all vehicles and equipment (except for hand operated equipment) operating or parked within 15 feet (4.6 m) of an open lane of traffic and all vehicles and equipment entering or exiting the work area display amber high intensity rotating, flashing, or oscillating lights.			
Comments:			
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight.)			
2528.03 SIGNS AND DEVICES.			
M. Vehicle Warning Lights			
Ensure vehicles and equipment (except hand operated equipment) operating or parked within 15 feet (4.6 m) of an open lane of traffic and vehicles and equipment entering or exiting work area display amber or yellow high intensity rotating, flashing, oscillating, or strobe warning lights. Warning lights shall be maintained in good operating condition and shall be mounted on equipment to provide for 360 degree visibility, day or night, for a minimum distance of 1000 feet (300 m). The use of magnetically mounted beacons will be permissible if they meet the requirements for visibility and mounting.			
2550.04 TRAFFIC CONTROL.			
A. Ensure all vehicles and equipment (except for hand operated equipment) operating or parked within 15			

feet (4.6 m) of an open lane of traffic and all vehicles and equipment entering or exiting the work area display amber high intensity rotating, flashing, or oscillating lights.					
Reason for Revision: To move the vehicle warning light requirements from the nighttime lighting section to traffic control so it applies to both day time and night time work. Also to add additional information regarding the visibility of these lights.					
County or City Input Needed (X one)			Yes	No X	
Comments:					
Industry Input Needed (X one)			Yes	No X	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Tom Reis		Office: Specifications		Item 8	
Submittal Date: 2012.09.10		Proposed Effective Date: December 2012			
Article No.: Title:		Other: DS-12031, Precast Reinforced Concrete Three-Sided Culvert			
Specification Committee Action: Deferred for further discussion.					
Deferred: X	Not Approved:	Approved Date:	Effective Date:		
Specification Committee Approved Text:					
<p>Comments: The Office of Bridges and Structures has concerns with the precast footings. The precast footings typically used would not meet the design of our cast-in-place footings. At the very least, this needs to be made clear in the specifications. Also, the Iowa DOT would need to approve shop drawings of the proposed footings.</p> <p>Bidding will need to be made clear in the DS or plans so that the Contractor knows how to bid precast footings. Language will be added to the DS to clarify this.</p> <p>The Office of Bridges and Structures will review the DS for changes to reference Section 2419.</p>					
Specification Section Recommended Text: See attached draft DS for Precast Reinforced Concrete Three-Sided Culvert.					
<p>Comments: How are the footings paid for? I don't see any mention in the specification, so I assume they are bid as structural concrete and reinforcing steel. Will there be an issue with bidding precast vs. cast-in-place? Are there any different specifications for the precast footings vs. cast-in-place?</p> <p>If we are making changes to the DS, should we reference Section 2419, Precast Concrete Units, since this new section governs other precast concrete units?</p>					
Member's Requested Change: (Do not use 'Track Changes', or 'Mark-Up'. Use Strikeout and Highlight .)					
See attached DS.					
Reason for Revision: To allow precast footings to be used in conjunction with precast 3 sided culvert.					
County or City Input Needed (X one)		Yes		No X	
Comments:					
Industry Input Needed (X one)		Yes		No X	
Industry Notified:	Yes	No	Industry Concurrence:	Yes	No
Comments:					

DRAFT DS-120XX
(Replaces DS-12031)



**DEVELOPMENTAL SPECIFICATIONS
FOR
PRECAST REINFORCED CONCRETE THREE-SIDED CULVERT**

Effective Date
November 16, 2012

THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

120XX.01 DESCRIPTION.

This specification is for precast concrete three-sided culverts constructed on site-cast or precast concrete footings or a full width site-cast or precast concrete floor. Precast reinforced concrete three sided culvert shall be fabricated in accordance with Materials I.M. 445 by an approved source in accordance with Materials I.M. 445.02, Appendix A.

A. Designation.

Precast reinforced concrete three-sided culvert units manufactured in accordance with this specification shall be designated by span and rise. Precast reinforced concrete culvert wingwalls and headwalls manufactured in accordance with this specification shall be designated by length, height, and deflection angle.

B. Shop Drawings.

1. Contractor shall submit design computations and shop drawings for review. These documents shall be signed and sealed by a Professional Engineer licensed in the State of Iowa and shall include the following:
 - Reactions at base of arch legs, and base of wingwalls,
 - Quantity and weight of anchor blocks at wingwalls,
 - Dimensions of arch, wingwalls, and anchor blocks at wingwalls,
 - Connection details at base of arch to footing and base of wingwall to footing,
 - Connection details of wingwall to arch, headwall to arch, and
 - Connection details between arch sections.
2. Fabrication shall not begin until review by Engineer is completed.

120XX.02 MATERIALS AND DESIGN.

A. Materials.

Refer to Section 2407 of the Standard Specifications.

1. Steel Reinforcement.

Reinforcing steel shall be in accordance with Section 2404 of the Standard Specifications. Reinforcing steel for precast elements shall be fabricated and placed according to detailed shop drawings submitted by manufacturer.

2. Hardware.

Bolts and threaded rods for wingwall connections shall conform to ASTM A 307. Nuts shall conform to AASHTO M 292 (ASTM A 194) Grade 2H. Bolts, threaded rods, and nuts used in wingwall connections shall be mechanically zinc coated in accordance with ASTM B 695 Class 50. Structural Steel for wingwall connection plates and plate washers shall conform to AASHTO M 270 (ASTM A 709) Grade 36 and shall be hot dip galvanized as per AASHTO M 111 (ASTM A 123). Wingwalls shall be connected with bolted steel plates meeting the above specifications. Hook Bolts used in attached headwall connections shall be ASTM A 307. Mechanical splices for reinforcing bars shall be in accordance with Materials I.M. 451 Appendix E.

B. Design.

1. Minimum Stresses.

Precast element dimensions and reinforcement details shall be as prescribed in plans and shop drawings provided by manufacturer, subject to provisions of Article DS-120XX.02, C. Minimum concrete compressive strength shall be 4000 psi (27.5 MPa). Minimum steel yield strength shall be 60,000 psi (450 MPa).

2. AASHTO Specification.

Precast elements shall be designed in accordance with "AASHTO LRFD Bridge Design Specifications", 5th Edition, adopted by AASHTO, 2010. Minimum of 1 foot (0.3 m) cover above crown of culvert units is required in the installed condition (unless noted otherwise on the shop drawings and designed accordingly). Design live load shall be HL-93.

3. Placement of Reinforcement in Precast Culvert Units.

Cover of concrete over outside circumferential reinforcement shall be 2 inches (50 mm) minimum. Cover of concrete over inside circumferential reinforcement shall be 1.5 inches (38 mm) minimum, unless otherwise noted on shop drawings. Clear distance of end circumferential wires shall not be less than 1 inch (25 mm) or more than 2 inches (50 mm) from ends of each section. Reinforcement shall be assembled utilizing single or multiple layers of welded wire reinforcing (not to exceed three layers) supplemented with a single layer of deformed billet-steel bars, when necessary. Welded wire reinforcing shall be composed of circumferential and longitudinal wires meeting spacing requirements of Article DS-120XX.02, B, 6, and shall contain sufficient longitudinal wires extending through culvert unit to maintain shape and position of reinforcement. Longitudinal distribution reinforcement may be welded wire reinforcing or deformed billet-steel bars and shall meet spacing requirements of Article DS-120XX.02, B, 6. Ends of longitudinal distribution reinforcement shall not be more than 3 inches (75 mm) or less than 1.5 inches (38 mm) from ends of culvert unit.

4. Placement of Reinforcement for Precast Wingwalls and Headwalls.

Cover of concrete over longitudinal and transverse reinforcement shall be 2 inches (50 mm) minimum. Clear distance from end of each precast element to end transverse reinforcing steel shall not be less than 1 inch (25 mm) or more than 2 inches (50 mm). Reinforcement shall be assembled using a single layer of welded wire reinforcing or single layer of deformed billet-steel bars. Welded wire reinforcing shall be composed of transverse and longitudinal wires meeting the spacing requirements of Article DS-120XX.02, B, 6, and shall contain sufficient longitudinal wires extending through the element to maintain shape and position of reinforcement. Longitudinal reinforcement may be welded wire reinforcing or deformed billet-steel bars and shall meet spacing requirements of Article DS-120XX.02, B, 6. Ends of

longitudinal reinforcement shall be not more than 3 inches (75 mm) or less than 1.5 inches (38 mm) from the ends of the walls.

5. Laps, Welds, and Spacing for Precast Culvert Units.

Tension splices in circumferential reinforcement shall be made by lapping. Overlap shall meet requirements of AASHTO 5.11.2. Overlap for welded wire reinforcing shall be measured between outermost longitudinal wires of each fabric sheet. For splices other than tension splices, Overlap shall be a minimum of 12 inches (300 mm) for welded wire reinforcing or deformed billet-steel bars. Spacing center-to-center of circumferential wires in a wire reinforcing sheet shall be not less than 2 inches (50 mm) or more than 4 inches (100 mm). Spacing center-to-center of longitudinal wires shall not be more than 8 inches (200 mm). Spacing center-to-center of longitudinal distribution steel for either line of reinforcing in top slab shall be not more than 16 inches (400 mm).

6. Laps, Welds, and Spacing for Precast Wingwalls and Headwalls.

Splices in reinforcement shall be made by lapping. Overlap shall meet requirements of AASHTO 5.11.2. Spacing center-to-center of wires in a wire reinforcing sheet shall be not less than 2 inches (50 mm) or more than 8 inches (200 mm).

7. Structural Design.

Structural design shall consider the following assumptions:

- Foundation design shall consider lateral forces caused by arching action.
- Culvert leg to footing connection shall not transfer design moments. Vertical and horizontal force components shall be resisted by the footing.
- Wingwall to footing connection shall not transfer design moments. Anchor block system shall resist soil overturning forces. Wingwall footings shall not be designed to resist soil overturning forces.
- Headwall connections and wingwalls shall be designed for sliding and overturning.
- Continuity shall exist between main structure footing and wingwall footing.

C. Tolerances.

1. Culvert Units.

a. Internal Dimensions.

Internal dimensions shall vary not more than 1% from design dimensions or more than 1.5 inches (38 mm), whichever is less. Haunch dimensions shall vary not more than 0.75 inches (19 mm) from design dimension.

b. Slab and Wall Thickness.

Slab and wall thicknesses shall not be less than that shown in the design by more than 0.25 inch (6 mm). A thickness more than that required in the design will not be cause for rejection.

c. Length of Opposite Surfaces.

Variations in laying lengths of two opposite surfaces of culvert unit shall not be more than 0.50 inch (12.5 mm) in any section, except where beveled ends for laying of curves are specified on the contract documents.

d. Length of Section.

Underrun in laying length of a section shall not be more than 0.50 inches (12.5 mm) in any culvert unit.

e. Position of Reinforcement.

Maximum variation in position of reinforcement shall be ± 0.50 inches (12.5 mm). In no case shall cover over reinforcement be less than 1.50 inches (38 mm) for outside circumferential steel or less than 1 inch (25 mm) for inside circumferential steel as measured to external or internal surface of culvert. These tolerances or cover requirements do not apply to mating surfaces of joints.

- f. Area of Reinforcement.**

Areas of steel reinforcement shall be the design steel areas shown on manufacturer's shop drawings. Steel areas greater than those required will not be cause for rejection. Permissible variation in diameter of reinforcement shall conform to tolerances prescribed in the ASTM specifications for that type of reinforcement.
- 2. Wingwalls and Headwalls.**
 - a. Wall Thickness.**

Wall thickness shall not vary from that shown in the design by more than 0.50 inches (12.5 mm).
 - b. Length / Height of Wall sections.**

Length and height of wall shall not vary from that shown in the design by more than 0.50 inches (12.5 mm).
 - c. Position of Reinforcement.**

Maximum variation in position of reinforcement shall be ± 0.50 inches (12.5 mm). In no case shall cover over reinforcement be less than 1.50 inches (38 mm).
 - d. Size of Reinforcement.**

Permissible variation in diameter of reinforcing shall conform to tolerances prescribed in the ASTM specification for that type of reinforcing. Steel area greater than that required will not be cause for rejection.

120XX.03 CONSTRUCTION.

A. Footings.

Culvert units and wingwalls shall be installed on cast-in-place or precast concrete footings. Design size and elevation of footings shall be as shown on the plans. Keyways shall be compatible with precast arch system. A keyway shall be formed in top surface of footing and 3 inches (75 mm) minimum clear of inside and outside faces of culvert units, unless specified otherwise on the plans. Footings shall be given a smooth float finish and shall reach a compressive strength of at least 2000 psi (13.8 MPa) before placement of culvert and wingwall elements. Completed footing surface shall be constructed in accordance with grades shown on the plans. When tested with a 10 foot (3 m) straight edge, the surface shall not vary more than 0.25 inches in 10 feet (6 mm in 3 m).

B. Placement of the Culvert Units, Wingwalls, and Headwalls.

Culvert units, wingwalls, and headwalls shall be placed as shown on the plans. Special care shall be taken in setting elements to true line and grade. Culvert units and wingwalls shall be set on 6 inch by 6 inch (150 mm by 150 mm) steel shims. A minimum of 0.50 inches (12.5 mm) gap shall be provided between footing and bottom of the culvert's vertical legs or wingwall. This gap shall be filled with non-shrink cement grout with a minimum 28 day compressive strength of 4000 psi (27.5 MPa) and shall comply with Materials I.M. 491.13.

C. External Protection of Joints.

- 1.** Butt joints made by two adjoining culvert units shall be covered with a 7/8 inch by 1 3/8 inch (22 mm by 35 mm) piece of preformed bituminous joint sealant and a minimum of a 24 inch (600 mm) wide joint wrap of engineering fabric. Engineering fabric shall be in accordance with Article 4196.01, B, 3, of the Standard Specifications, and centered on joint. Surface shall be free of dirt before applying joint material. A primer compatible with the joint wrap shall be applied for a minimum width of 12 inches (300 mm) to each side of joint. Joint shall be covered continuously from bottom of one culvert section leg, across top of arch and to opposite culvert section leg. Laps that result in joint wrap shall be a minimum of 6 inches (150 mm) long with overlap running downhill.
- 2.** In addition to joints between culvert units, the joint between end culvert unit and headwall shall be sealed as described above. If precast wingwalls are used, joint between end culvert

unit and wingwall shall be sealed with a 24 inch (600 mm) wide strip of engineering fabric. If lift holes are formed in arch units, they shall be plugged with a concrete or plastic plug and primed and covered with a 12 inch by 12 inch (300 mm by 300 mm) square of engineering fabric.

D. Joints.

Culvert units shall be produced with flat butt ends. Ends of culvert units shall be such that when sections are laid together they make a continuous line with a smooth interior free of appreciable irregularities, all compatible with permissible variations in Article DS-120XX.02, C. Joint width shall not exceed 0.75 inches (19 mm).

120XX.04 METHOD OF MEASUREMENT.

A. Precast Concrete Three-Sided Culvert.

Linear feet (meters) as shown on plans.

B. Precast Concrete Wingwalls.

Number of wingwalls as shown on plans.

120XX.05 BASIS OF PAYMENT.

A. Precast Concrete Three-Sided Culvert.

Payment will be the contract unit price per linear foot (meter) for the number of linear feet (meters) constructed in a satisfactory manner. Bid items will be specified by span and rise. Payment will be full compensation for providing equipment; materials including concrete, reinforcing steel, connecting plates, bolts, non-shrink grout, material testing, tools, and shipping; and incidentals necessary to construct culvert and headwalls.

B. Precast Concrete Wingwalls.

Payment will be the contract unit price for each wingwall constructed in a satisfactory manner. Payment will be full compensation for providing equipment; materials including concrete, reinforcing steel, connecting plates, bolts, non-shrink grout, material testing, tools, shipping, and labor; and incidentals necessary to construct wingwalls.