Iowa Department of Transportation

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

July 9, 2009

Members Present:	John Adam	Statewide Operations Bureau
	Jim Berger	Office of Materials
	Roger Bierbaum	Office of Contracts
	Donna Buchwald	Office of Local Systems
	Eric Johnsen, Secretary	Specifications Section
	Gary Novey	Office of Bridges & Structures
	Dan Redmond	District 4 - Materials
	Tom Reis, Chair	Specifications Section
Members Not Present:	Bruce Kuehl	District 6 - Construction
	John Smythe	Office of Construction
	Troy Jerman	Office of Traffic & Safety
	Mike Kennerly	Office of Design
Advisory Members Present:	Larry Stevens	SUDAS
Others Present:	Max Grogg	FHWA
	Dan Harness	Office of Design
	Tom Jacobson	Office of Construction
	Deanna Maifield	Office of Design

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the revised agenda dated July 2, 2009:

1. 2107.04, B, 1, Compaction with Moisture and Density Control.
2107.04, B, 2, a, Compaction with Moisture Control.

The Office of Design requested changes to eliminate the shrinkage quantity with special compaction earthwork items.

2. Article 2301.31, Time for Opening Pavement for Use.

The Office of Materials requested a change to eliminate PCC certification requirements from the specifications as it is covered in the Material I.M.s.

3. Article 2303.02, E, 2, Anti-strip Agent.
DS-01122.02, E, 2, Anti-strip Agent.

The Office of Materials requested changes to the anti-strip agent specifications.

4. **Article 2310.03, A, Equipment.**
Article 2310.03, B, Preparation of Surface.
Article 2310.03, C, 1, c, Joints.
Article 2310.03, C, 2, a, Hot Mix Asphalt Stress Relief Course.
Article 2310.04, D, Pavement Scarification.
Article 2310.05, D, Pavement Scarification.

The Office of Construction requested changes to revise the preparation of surface language, sawing requirements for bonded overlays, and compaction requirements for HMA stress relief course.

5. **Article 2403.19, B, Time for Opening Pavement for Use.**

The Office of Materials requested a change to eliminate PCC certification requirements from the specifications as it is covered in the Material I.M.s.

6. **Section 2505, Removal and Construction of Guardrail.**
Section 4155, Guardrail.

The Office of Design requested changes to guardrail specifications.

7. **Article 2511.04, D, Detectable Warnings for Curb Ramps.**
Article 2511.05, D, Detectable Warnings for Curb Ramps.

The Office of Contracts requested changes to method of measurement and basis of payment for Detectable Warnings for Curb Ramps.

8. **DS-090XX, Pedestrian Path Closure.**

The Office of Design requested the creation of a new DS for closing a pedestrian path.

9. **DS-090XX, Contractor Stockpiled Shoulder Material.**

The Specifications Section requested the creation of a new DS for stockpiling RAP or contractor furnished shoulder stone to be stockpiled at the contracting authority's site.

10. **SS-01045, Recycled Asphalt Pavement (RAP).**

The Office of Materials requested a change to stockpiling requirements for RAP.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Mike Kennerly	**Office:** Design	**Item 1**
Submittal Date:	**Proposed Effective Date:** April 2010	
Article No.: 2107.04, B, 1 **Title:** Compaction with Moisture and Density Control **Article No.:** 2107.04, B, 2, a **Title:** Compaction with Moisture Control	**Other:**	

Specification Committee Action: Approved as is. Change will also be included in DS-09003, Compaction with Moisture Control, effective with the October 2009 letting.

Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** April 2010

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None

Specification Section Recommended Text:

2107.04, B, 1, Compaction with Moisture and Density Control.

Replace the article:

Cubic yards (cubic meters) shown on the contract documents as determined by the template fill volume. Shrinkage will not be included in moisture and density control quantity.

2107.04, B, 2, a, Compaction with Moisture Control.

Replace the article:

Cubic yards (cubic meters) shown on the contract documents as determined by the template fill volume. Shrinkage will not be included in moisture control quantity.

Comments:

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

2107.04, B, 1, Compaction with Moisture and Density Control.

Replace the first sentence and **add** as the second sentence:

Cubic yards (cubic meters) shown on the contract documents as determined by the template fill volume. Shrinkage will not be included in moisture and density control quantity.

2107.04, B, 2, a, Compaction with Moisture Control.

Replace the first sentence and **add** as the second sentence:

Cubic yards (cubic meters) shown on the contract documents as determined by the template fill volume. Shrinkage will not be included in moisture control quantity.

Reason for Revision: Often, embankments include a combination of material that requires moisture control and material that does not require moisture control. The question was raised whether or not to include shrinkage with the quantity for compaction with moisture control. The Office of Design concluded it should not be included when bidding compaction with moisture control as in-place. The Office of Construction suggested the above change to the Standard Specifications. The Office of Design will include this change on the plans until the Standard Specifications have been revised.

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 2**
Submittal Date: June 1, 2009	**Proposed Effective Date:** April 2010	
Article No.: 2301.31 **Title:** TIME FOR OPENING PAVEMENT FOR USE.	**Other:**	

Specification Committee Action: Approved as is.

Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** April 2010

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None

Specification Section Recommended Text:

2301.31, Time for Opening Pavement for Use

Delete the fifth paragraph:

~~Personnel performing maturity testing shall be Level I PCC certified technician with training for maturity testing.~~

Comments:

Member's Requested Change (Redline/Strikeout):

~~Personnel performing maturity testing shall be Level I PCC certified technician with training for maturity testing~~.

Reason for Revision:

County or City Input Needed (X one)	**Yes**	**No**
Comments:		

Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes**	**No**

Comments: IM 213 already describes Level I PCC certification requirements for maturity testing and is not needed in the specifications. There is a conflict between paving and structures.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 3**
Submittal Date: June 8, 2009	**Proposed Effective Date:** April 2010	
Article No.: 2303.02, E, 2 and DS-01122.02, E, 2 **Title:** Hot Mix Asphalt Mixtures	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** April 2010

Specification Committee Approved Text:

2303.02, E, 2, Anti-strip Agent and DS-01122.02, E, 2, Anti-strip Agent.

Replace the article:

On Interstate and Primary highways designed for 30,000,000 ESALs and higher ~~over 10,000,000 ESALs and all Interstate highways~~, the Contractor shall perform an AASHTO T 283 moisture sensitivity evaluation of the proposed HMA mixture design.

On all other Interstate and Primary highways, if 25% or more of the plus No. 4 (4.75 mm) (virgin and RAP) aggregates or more than 40% of the total (virgin and RAP) aggregates is quartzite, granite, or other siliceous aggregates (not limestone or dolomite) which is obtained by crushing from ledge rock, the Contractor shall perform an AASHTO T 283 moisture sensitivity evaluation of the proposed HMA mixture design.

The minimum required tensile strength ratio (TSR) shall be 80%.

Anti-strip agent will not be required for base repair, patching, or temporary pavement.

When an AASHTO T 283 analysis is required for the mix design, refer to the following table to determine if an anti-strip agent is required:

~~**a.** If the Contractor's results equal or exceed 90% tensile strength ratio (TSR), a mix design verification sample shall be submitted by the Contractor to the Central Materials Laboratory for testing. If Central Laboratory results verify the Contractor's results, no anti-strip agent will be required and no further testing will be required unless substantial mix proportion changes from the original design are made.~~

~~**b.** If the Contractor's results equal or exceed 80% but are less than 90% or the Central Laboratory TSR results do not verify the Contractor's results, the Contractor will be required to obtain an additional sample for AASHTO T 283 testing during the initial placement of the plant produced mix. The additional sample shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall be from an area without anti-strip and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. Production taking place after this initial 500 tons (500 Mg) shall be made with an anti-strip added to the mixture until results are obtained from Central Laboratory. Payment for the anti-strip will be made according to Article 2303.06, D. If Central Laboratory results on mixture without anti-strip confirm acceptability, anti-strip will no longer be required from the time of notification.~~

~~**c.** If the Contractor's results fall below 80% TSR, anti-strip will be required.~~

≥ 90.0%	Not Required [1,2]	Not Required [1,2]
80.0% to 89.9%	Required [2]	See Note [2]
< 80.0%	Required [3]	Required

[1] The Contractor shall provide additional material to the Iowa DOT Central Laboratory for validation testing in accordance with Materials I.M. 510 Appendix C. If the Central Laboratory produces a TSR greater than or equal to 90.0%, the mixture will be considered acceptable without anti-strip and no testing of the initial plant-produced mix will be required.

[2] If the Central Laboratory does not validate the Contractor's results by producing a TSR greater than or equal to 90.0% or the Contractor's mix design TSR results fall between 80.0% and 89.9%, AASHTO T 283 will be required for initial plant produced mix. An additional sample from the plant produced mix shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall be from an area without anti-strip and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. Production taking place after this initial 500 tons (500 Mg) shall be made with an anti-strip added to the mixture until results are obtained from Central Laboratory. Payment for the anti-strip will be made according to Article 2303.06, D. If Central Laboratory results on mixture without anti-strip confirm acceptability, anti-strip will no longer be required from the time of notification.

[3] An additional sample from the plant produced mix shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall include the added anti-strip agent and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. See Article 2303.02, E, 2, a, for additional information.

When anti-strip is utilized, the anti-strip agent shall be one of the following: ~~One of the following anti-strip agents shall be used.~~

a. Hydrated Lime.
Hydrated lime shall meet the requirements of AASHTO M 303, Type I. Section 4193 of the Standard Specifications shall not apply. Hydrated lime will not be considered part of the aggregate when determining the job mix formula and the filler/bitumen ratio. If the Contractor elects to incorporate hydrated lime into the total combined aggregate at the rates specified, AASHTO T283 testing on the initial plant produced mixture will not be required.

b. Liquid Anti-strip Additives.
Liquid anti-strip additives blended into the asphalt binder shall be approved for each JMF. The approval will be based on the following conditions:

1) Asphalt binder supplier shall provide test results that the additive does not negatively impact the asphalt binder properties, including short term and long term aged properties.
2) The design shall establish the optimum additive rate when comparing the dry strength of specimens prepared with asphalt binder not containing the anti-strip additive to conditioned specimens prepared with asphalt binder containing the anti-strip additive. See Materials I.M. 510 for additional information.
3) A change in the source of asphalt binder, liquid anti-strip, or aggregates will require a re-evaluation of the AASHTO T 283 test. When there is a significant change in the aggregate proportions, the Engineer may require a re-evaluation of the AASHTO T 283 test.

c. Polymer-based Liquid Aggregate Treatments.
Polymer-based liquid aggregate treatments shall be approved for each JMF. The approval will be based on the following conditions~~.~~:

1) ~~The design shall establish the optimum additive rate.~~ The design shall establish the optimum additive rate when comparing the dry strength of specimens prepared without the anti-strip additive to conditioned specimens prepared with the anti-strip additive. See Materials I.M. 510 for additional information.

2) A change in the source of asphalt binder, liquid aggregate treatment, or aggregates will require a re-evaluation of the AASHTO T 283 test. When there is a significant change in the aggregate proportions, the Engineer may require a re-evaluation of the AASHTO T 283 test.

Comments: The Office of Construction noted the last sentence of the second paragraph should be its own paragraph since it is not specific to "other Interstate and Primary highways". The Office of Construction also noted the table should be revised so that "Contractor's Mix Design TSR" is above the first column, not to the left of the first column.

Specification Section Recommended Text:

2303.02, E, 2, Anti-strip Agent and DS-01122.02, E, 2, Anti-strip Agent.

Replace the article:

On Interstate and Primary highways designed for 30,000,000 ESALs and higher ~~over 10,000,000 ESALs and all Interstate highways~~, the Contractor shall perform an AASHTO T 283 moisture sensitivity evaluation of the proposed HMA mixture design.

On all other Interstate and Primary highways, if 25% or more of the plus No. 4 (4.75 mm) (virgin and RAP) aggregates or more than 40% of the total (virgin and RAP) aggregates is quartzite, granite, or other siliceous aggregates (not limestone or dolomite) which is obtained by crushing from ledge rock, the Contractor shall perform an AASHTO T 283 moisture sensitivity evaluation of the proposed HMA mixture design. The minimum required tensile strength ratio (TSR) shall be 80%.

Anti-strip agent will not be required for base repair, patching, or temporary pavement.

When an AASHTO T 283 analysis is required for the mix design, refer to the following table to determine if an anti-strip agent is required:

~~**a.** If the Contractor's results equal or exceed 90% tensile strength ratio (TSR), a mix design verification sample shall be submitted by the Contractor to the Central Materials Laboratory for testing. If Central Laboratory results verify the Contractor's results, no anti-strip agent will be required and no further testing will be required unless substantial mix proportion changes from the original design are made.~~

~~**b.** If the Contractor's results equal or exceed 80% but are less than 90% or the Central Laboratory TSR results do not verify the Contractor's results, the Contractor will be required to obtain an additional sample for AASHTO T 283 testing during the initial placement of the plant produced mix. The additional sample shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall be from an area without anti-strip and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. Production taking place after this initial 500 tons (500 Mg) shall be made with an anti-strip added to the mixture until results are obtained from Central Laboratory. Payment for the anti-strip will be made according to Article 2303.06, D. If Central Laboratory results on mixture without anti-strip confirm acceptability, anti-strip will no longer be required from the time of notification.~~

~~**c.** If the Contractor's results fall below 80% TSR, anti-strip will be required.~~

AASHTO T283 Testing for Initial Plant-Produced Mix	Anti-Strip Agent

	80.0% to 89.9%	Required [2]	See Note [2]
	< 80.0%	Required [3]	Required

[4] The contractor shall provide additional material to the Central Laboratory for validation testing in accordance with Materials IM 510 Appendix C. If the Central Laboratory produces a TSR greater than or equal to 90.0%, the mixture shall be considered acceptable without anti-strip and no testing of the initial plant-produced mix shall be required.

[5] If the Central Laboratory does not validate the Contractor's results by producing a TSR greater than or equal to 90.0% or the Contractor's mix design TSR results fall between 80.0% and 89.9%, AASHTO T283 shall be required for initial plant produced mix. An additional sample from the plant produced mix shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall be from an area without anti-strip and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. Production taking place after this initial 500 tons (500 Mg) shall be made with an anti-strip added to the mixture until results are obtained from Central Laboratory. Payment for the anti-strip will be made according to Article 2303.06, D. If Central Laboratory results on mixture without anti-strip confirm acceptability, anti-strip will no longer be required from the time of notification.

[6] An additional sample from the plant produced mix shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall include the added anti-strip agent and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. See Article 2303.02, E, 2, a, for additional information.

When anti-strip is utilized, the anti-strip agent shall be one of the following: ~~One of the following anti-strip agents shall be used.~~

a. Hydrated Lime.
Hydrated lime shall meet the requirements of AASHTO M 303, Type I. Section 4193 of the Standard Specifications shall not apply. Hydrated lime will not be considered part of the aggregate when determining the job mix formula and the filler/bitumen ratio. If the Contractor elects to incorporate hydrated lime into the total combined aggregate at the rates specified, AASHTO T283 testing on the initial plant produced mixture will not be required.

b. Liquid Anti-strip Additives.
Liquid anti-strip additives blended into the asphalt binder shall be approved for each JMF. The approval will be based on the following conditions:

4) Asphalt binder supplier shall provide test results that the additive does not negatively impact the asphalt binder properties, including short term and long term aged properties.
5) The design shall establish the optimum additive rate when comparing the dry strength of specimens prepared with asphalt binder not containing the anti-strip additive to conditioned specimens prepared with asphalt binder containing the anti-strip additive. See Materials I.M. 510 for additional information.
6) A change in the source of asphalt binder, liquid anti-strip, or aggregates will require a re-evaluation of the AASHTO T 283 test. When there is a significant change in the aggregate proportions, the Engineer may require a re-evaluation of the AASHTO T 283 test.

c. Polymer-based Liquid Aggregate Treatments.
Polymer-based liquid aggregate treatments shall be approved for each JMF. The approval will be based on the following conditions~~.~~:

3) ~~The design shall establish the optimum additive rate.~~ The design shall establish the optimum additive rate when comparing the dry strength of specimens prepared without the anti-strip additive to conditioned specimens prepared with the anti-strip additive. See Materials I.M. 510 for additional information.
4) A change in the source of asphalt binder, liquid aggregate treatment, or aggregates will require a re-evaluation of the AASHTO T 283 test. When there is a significant change in the aggregate proportions, the Engineer may require a re-evaluation of the AASHTO T 283 test.

Comments:

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

Request changes as noted…

2. Anti-strip Agent.

On Primary and Interstate highways designed for 30,000,000 ESALs and higher ~~over 10,000,000 ESALs and all Interstate highways~~, the Contractor shall perform an AASHTO T 283 moisture sensitivity evaluation of the proposed HMA mixture design.

On all other Primary and Interstate highways, if 25% or more of the plus No. 4 (4.75 mm) (virgin and RAP) aggregates or more than 40% of the total (virgin and RAP) aggregates is quartzite, granite, or other siliceous aggregates (not limestone or dolomite) which is obtained by crushing from ledge rock, the Contractor shall perform an AASHTO T 283 moisture sensitivity evaluation of the proposed HMA mixture design. The minimum required tensile strength ratio (TSR) shall be 80%.

Anti-strip agent will not be required for base repair, patching, or temporary pavement.

When an AASHTO T 283 analysis is required for the mix design, refer to the following table to determine if an anti-strip agent is required:

~~**a.** If the Contractor's results equal or exceed 90% tensile strength ratio (TSR), a mix design verification sample shall be submitted by the Contractor to the Central Materials Laboratory for testing. If Central Laboratory results verify the Contractor's results, no anti-strip agent will be required and no further testing will be required unless substantial mix proportion changes from the original design are made.~~

~~**b.** If the Contractor's results equal or exceed 80% but are less than 90% or the Central Laboratory TSR results do not verify the Contractor's results, the Contractor will be required to obtain an additional sample for AASHTO T 283 testing during the initial placement of the plant produced mix. The additional sample shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall be from an area without anti-strip and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. Production taking place after this initial 500 tons (500 Mg) shall be made with an anti-strip added to the mixture until results are obtained from Central Laboratory. Payment for the anti-strip will be made according to Article 2303.06, D. If Central Laboratory results on mixture without anti-strip confirm acceptability, anti-strip will no longer be required from the time of notification.~~

~~**c.** If the Contractor's results fall below 80% TSR, anti-strip will be required.~~

		AASHTO T283 Testing for Initial Plant-Produced Mix	Anti-Strip Agent
Contractor's Mix Design TSR	≥ 90.0%	Not Required [1,2]	Not Required [1,2]
	80.0% to 89.9%	Required [2]	See Note [2]
	< 80.0%	Required [3]	Required

[7] The contractor shall provide additional material to the Central Laboratory for validation testing in accordance with Materials IM 510 Appendix C. If the Central Laboratory

produces a TSR greater than or equal to 90.0%, the mixture shall be considered acceptable without anti-strip and no testing of the initial plant-produced mix shall be required.

[8] If the Central Laboratory does not validate the Contractor's results by producing a TSR greater than or equal to 90.0% or the Contractor's mix design TSR results fall between 80.0% and 89.9%, AASHTO T283 shall be required for initial plant produced mix. An additional sample from the plant produced mix shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall be from an area without anti-strip and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. Production taking place after this initial 500 tons (500 Mg) shall be made with an anti-strip added to the mixture until results are obtained from Central Laboratory. Payment for the anti-strip will be made according to Article 2303.06, D. If Central Laboratory results on mixture without anti-strip confirm acceptability, anti-strip will no longer be required from the time of notification.

[9] An additional sample from the plant produced mix shall be obtained either from a test strip, if available, or during the initial, approximately, 500 tons (500 Mg) of mix. This sample shall include the added anti-strip agent and will be used to determine acceptability of the plant produced mixture for moisture sensitivity. See Article 2303.02, E, 2, a. for additional information.

When anti-strip is utilized, the anti-strip agent shall be one of the following: ~~One of the following anti-strip agents shall be used.~~

a. Hydrated Lime.
Hydrated lime shall meet the requirements of AASHTO M 303, Type I. Section 4193 of the Standard Specifications shall not apply. Hydrated lime will not be considered part of the aggregate when determining the job mix formula and the filler/bitumen ratio. If the Contractor elects to incorporate hydrated lime into the total combined aggregate at the rates specified, AASHTO T283 testing on the initial plant produced mixture will not be required.

b. Liquid Anti-strip Additives.
Liquid anti-strip additives blended into the asphalt binder shall be approved for each JMF. The approval will be based on the following conditions:

7) Asphalt binder supplier shall provide test results that the additive does not negatively impact the asphalt binder properties, including short term and long term aged properties.
8) The design shall establish the optimum additive rate when comparing the dry strength of specimens prepared with asphalt binder not containing the anti-strip additive to conditioned specimens prepared with asphalt binder containing the anti-strip additive. See Materials I.M. 510 for additional information.
9) A change in the source of asphalt binder, liquid anti-strip, or aggregates will require a re-evaluation of the AASHTO T 283 test. When there is a significant change in the aggregate proportions, the Engineer may require a re-evaluation of the AASHTO T 283 test.

c. Polymer-based Liquid Aggregate Treatments.
Polymer-based liquid aggregate treatments shall be approved for each JMF. The approval will be based on the following conditions~~.~~:

5) ~~The design shall establish the optimum additive rate.~~ The design shall establish the optimum additive rate when comparing the dry strength of specimens prepared without the anti-strip additive to conditioned specimens prepared with the anti-strip additive. See Materials I.M. 510 for additional information.

6) A change in the source of asphalt binder, liquid aggregate treatment, or aggregates will require a re-evaluation of the AASHTO T 283 test. When there is a significant change in the aggregate proportions, the Engineer may require a re-evaluation of the AASHTO T 283 test.					
Reason for Revision: Industry requested this section be clarified. AASHTO T283 is not intended for lower level ESAL mixes on interstate ramps. The revision also removes "verify" from the language and clarifies when re-evaluation of T283 is necessary.					
County or City Input Needed (X one)			**Yes**	**No** X	
Comments:					
Industry Input Needed (X one)			**Yes**	**No** X	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes** X	**No**
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Kevin Merryman	**Office:** Construction	**Item 4**
Submittal Date: June 29, 2009	**Proposed Effective Date:** April 2010	
Article No.: 2310 **Title:** Portland Cement Concrete Overlay	**Other:**	

Specification Committee Action: Deferred to August Specification Committee meeting.

Deferred: X	**Not Approved:**	**Approved Date:**	**Effective Date:**

Specification Committee Approved Text:

Comments: The Office of Bridges & Structures noted that the article heading "Preparation of Surface" is confusing when you have a sub-heading "Surface Preparation". Both items under Preparation of Surface refer to scarification, even though one item is called Pavement Scarification and one is called Surface Preparation. The Office of Contracts stated that the equipment used for surface preparation should not be subject to approval of the Engineer since we do give specifications for this equipment. The Specifications Section will revise this specification for the August Specification Committee meeting.

Specification Section Recommended Text:

2310.03, A, Equipment.

Replace the paragraph:

~~Surface preparation equipment used~~ Equipment used to prepare the existing pavement surface shall be subject to approval of the Engineer and shall comply with the following:

2310.03, B, Preparation of Surface.

Replace the article:

If full depth base repair is included in the project, it shall be completed prior to ~~surface preparation~~ preparation of the existing pavement surface.

~~Surface preparation~~ When required, preparation of the existing pavement shall include the entire ~~surface~~ area to be resurfaced. Materials removed in the preparation operation may be placed in the shoulder area unless otherwise specified in the contract documents.

1. ~~Bonded Overlays~~ Surface Preparation.

For Bonded Overlays, ~~T~~the surface shall be prepared by shot blasting~~,~~ or ~~shall be scarified and followed by either shot blasting or sand blasting~~ scarification. Scarification shall be to a nominal depth of 1/4 inch (5 mm). In either case, the preparation shall be of an extent to remove all dirt, oil, and other foreign materials, as well as any laitance or loose material from the surface and edges against which new concrete is to be placed.

2. ~~Unbonded Overlays~~ Pavement Scarification.

For unbonded overlays and whitetopping, pavement scarification shall meet the requirements of Section 2214.

When placement of a new HMA stress relief layer is included as part of the contract for unbonded overlays, pavement scarification will not be required.

~~When jointing is specified in which panels are smaller than a normal lane width, the entire surface shall be scarified to create a roughened surface. This will not apply when a new HMA~~

~~stress relief layer is constructed as a part of this contract.~~

Any high spots found in the existing HMA pavement shall be trimmed at the direction of the Engineer. This work would be accomplished during the scarification operation, only at isolated locations, and would be considered incidental to the ~~surface preparation~~ pavement scarification.

~~**3. Whitetopping.**~~
~~When jointing is specified in which panels are smaller than a normal lane width, the entire surface shall be scarified using a cold milling operation to create a roughened surface. Any high spots found in the existing HMA pavement shall be trimmed at the direction of the Engineer. This work would be accomplished during the scarification operation, only at isolated locations, and would be considered incidental to the surface preparation.~~

2310.03, C, 1, c, Joints.

Replace the second paragraph:

Joints shall be sawed in the resurfacing directly over existing ~~transverse~~ joints. ~~Transverse~~ jJoints shall be sawed to the full depth of new resurfacing concrete, including depressions created in the existing surface, and as specified in the widening areas. ~~Transverse~~ jJoints shall be sawed as soon as possible without causing excessive raveling. ~~Joints shall be sawed directly over existing longitudinal joints to a depth of one-half the overlay thickness, with a maximum depth of 3 inches (75 mm).~~

2310.03, C, 2, a, Hot Mix Asphalt Stress Relief Course.

Replace the paragraph:

Construct in accordance with Article 2303.03. Compaction shall be ~~in accordance with Article 2303.03, E,~~ Class ~~1C~~ II Compaction, except only static steel wheeled rollers shall be used. Article 2303.04 shall also apply.

2310.04, D, Pavement Scarification.

Add a new article:

1. Measurement by Weight (Mass).
The quantity of Pavement Scarification will be determined in accordance with Article 2214.06, A, 1.

2. Measurement by Area.
The quantity of Pavement Scarification will be determined in accordance with Article 2214.06, A, 2.

2310.04, D, Hot Mix Asphalt Stress Relief Course.

Renumber article:

~~**D**~~ **E, Hot Mix Asphalt Stress Relief Course.**

2310.05, D, Pavement Scarification.

Add a new article:

1. Measurement by Weight (Mass).
The Contractor will be paid the contract unit price for Pavement Scarification in accordance with Article 2214.07, A, 1.

2. Measurement by Area.
The Contractor will be paid the contract unit price for Pavement Scarification in accordance with Article 2214.07, A, 2.

2310.05, D, Hot Mix Asphalt Stress Relief Course.

Renumber article:

~~**D** **E**~~**, Hot Mix Asphalt Stress Relief Course.**

Comments: Deferred from June 11th Specifications Committee meeting. A reference to Article 2303.03 was added to Article 2310.03, C, 2, a, Hot Mix Asphalt Stress Relief Course.

Member's Requested Change (Redline/Strikeout):

2310.03 CONSTRUCTION.

A. Equipment.
~~Surface preparation equipment used~~ Equipment used to prepare the existing pavement surface shall be subject to approval of the Engineer and shall comply with the following:

1. Scarifying or Shotblasting Equipment.
Equipment shall be a power operated, capable of uniformly scarifying or removing the existing surface to depths required in a satisfactory manner. Other types of removal devices may be used if their operation is suitable and if they can be demonstrated to the satisfaction of the Engineer. The contract documents will include a pay item for such work.

2. Sand Blasting Equipment.
Sand blasting equipment shall be capable of removing rust, oil, and concrete laitance from the existing surface of the pavement.

B. Preparation of Surface.
If full depth base repair is included in the project, it shall be completed prior to ~~surface preparation~~ preparation of the existing pavement surface.

~~Surface preparation~~ When required, preparation of the existing pavement shall include the entire ~~surface~~ area to be resurfaced. Materials removed in the preparation operation may be placed in the shoulder area unless otherwise specified in the contract documents.

1. ~~Bonded Overlays~~ Surface Preparation.
For Bonded Overlays, ~~T~~the surface shall be prepared by shot blasting~~,~~ or ~~shall be scarified and followed by either shot blasting or sand blasting~~ scarification. Scarification shall be to a nominal depth of 1/4 inch (5 mm). In either case, the preparation shall be of an extent to remove all dirt, oil, and other foreign materials, as well as any laitance or loose material from the surface and edges against which new concrete is to be placed.

2. ~~Unbonded Overlays~~ Pavement Scarification.
For unbonded overlays and whitetopping, pavement scarification shall meet the requirements of Section 2214.

When placement of a new HMA stress relief layer is included as part of the contract for unbonded overlays, pavement scarification will not be required.

~~When jointing is specified in which panels are smaller than a normal lane width, the entire surface shall be scarified to create a roughened surface. This will not apply when a new HMA stress relief layer is constructed as a part of this contract.~~

Any high spots found in the existing HMA pavement shall be trimmed at the direction of the Engineer. This work would be accomplished during the scarification operation, only at isolated locations, and would be considered incidental to the ~~surface preparation~~ pavement scarification.

~~**3. Whitetopping.**~~
~~When jointing is specified in which panels are smaller than a normal lane width, the entire surface shall be scarified using a cold milling operation to create a roughened surface.~~

~~Any high spots found in the existing HMA pavement shall be trimmed at the direction of the Engineer. This work would be accomplished during the scarification operation, only at isolated locations, and would be considered incidental to the surface preparation.~~

C. Placing and Finishing Overlay.
Section 2317 shall apply to all PCC Pavement bid items of a Primary project if any individual PCC Pavement bid item for that project is 5000 square yards (4200 m^2) or greater. Section 2316 shall apply to all other Primary projects and when specifically required for other projects.

The placing equipment shall be controlled to the proper elevation by string line. Cross sections shall be taken and a grade line established. The Engineer will review and approve the new grade lines. Information detailing the pavement design thicknesses at the various survey points and material quantities will also be provided. During construction, these grades shall not be altered solely to account for concrete overruns. Some overrun is normal and only with approval of the Engineer will they be adjusted.

1. Bonded Overlays.

a. Surface Cleaning.
Prior to placing concrete onto the surface, the entire surface shall be cleaned with an air blast. After cleaning, no traffic will be permitted on the cleaned surface except that necessary for overlay construction.

b. Surface Condition.
The prepared surface shall be dry to allow some absorption of the concrete mortar.

c. Joints.
The exact location of each contraction and expansion joint in the existing pavement and the joint to be sawed at each full depth patch shall be identified on both sides by a reliable method.

Joints shall be sawed in the resurfacing directly over existing ~~transverse~~ joints. ~~Transverse~~ jJoints shall be sawed to the full depth of new resurfacing concrete, including depressions created in the existing surface, and as specified in the widening areas. ~~Transverse j~~Joints shall be sawed as soon as possible without causing excessive raveling. ~~Joints shall be sawed directly over existing longitudinal joints to a depth of one-half the overlay thickness, with a maximum depth of 3 inches (75 mm).~~

2. Unbonded Overlays.

a. Hot Mix Asphalt Stress Relief Course.
Compaction shall be in accordance with Article 2303.03, E, 2, Class ~~1C~~ II Compaction except only static steel wheeled rollers shall be used.

b. Surface Cleaning.

The Contractor shall clean the existing surface of all loose or adhering foreign material prior to placement of the PCC over HMA pavement. Normally this will be accomplished with a power broom and shall be available during paving operations to clean loose material that may be tracked onto the surface by the construction equipment.

c. Surface Condition.
The prepared surface shall be dry when concrete is placed on the surface of the HMA pavement to allow some absorption of the concrete mortar. If the surface of the HMA is above 110ºF (40ºC), the Contractor may apply water to the surface of the HMA ahead of the paving operation in order to cool the surface. The water shall be applied far enough in advance of the paving operation that the surface will dry from evaporation before concrete is placed. No water shall be applied to the surface of the pavement when the HMA surface temperature is below 100ºF (38ºC).

d. Joints.
When jointing is specified in which panels are smaller than a normal lane width, the joints shall be 1/8 inch (3 mm) wide with no cleaning or sealing required.

3. Whitetopping.

a. Surface Cleaning.
The Contractor shall clean the existing surface of all loose or adhering foreign material prior to placement of the PCC over HMA pavement. Normally this will be accomplished with a power broom and shall be available during paving operations to clean loose material that may be tracked onto the surface by the construction equipment.

b. Surface Condition.
The prepared surface shall be dry when concrete is placed on the surface of the HMA pavement to allow some absorption of the concrete mortar. If the surface of the HMA is above 110ºF (40ºC), the Contractor may apply water to the surface of the HMA ahead of the paving operation in order to cool the surface. The water shall be applied far enough in advance of the paving operation that the surface will dry from evaporation before concrete is place. No water shall be applied to the surface of the pavement when the HMA surface temperature is below 100ºF (38ºC).

c. Joints.
When jointing is specified in which panels are smaller than a normal lane width, the joints shall be 1/8 inch (3 mm) wide with no cleaning or sealing required.

D. Limitation of Operations.
At forecasted air temperatures below 55°F (13°C) the opening time shall be determined using the maturity method. Resurfacing concrete shall not be placed when the air or pavement temperature is below 40°F (4°C).

The Contractor will be permitted to use the shoulders for construction activities. It will be the Contractor's responsibility to repair the shoulders at no additional cost as deemed necessary by the Engineer, to restore the shoulders to a condition acceptable for shoulder work. The Contractor may elect to limit the use and vehicle loadings to minimize this work and its cost.

Bonded concrete overlays shall be placed between June 1 and September 30.

Unbonded overlay and whitetopping materials shall not be placed on any HMA when the pavement surface temperature exceeds 120° F (50°C).

2310.04 METHOD OF MEASUREMENT.

The quantity of the various items of work involved in the construction of PCC overlay will be measured by the Engineer in accordance with the following provisions:

A. Portland Cement Concrete Overlay, Furnish Only.
The quantity of resurfacing concrete furnished will be measured in cubic yards (cubic meters), using a count of batches incorporated. This quantity will include concrete placed in widening sections and partial depth patches.

B. Portland Cement Concrete Overlay, Placement Only.
The quantity of Portland Cement Concrete Overlay, Placement Only, in square yards (square meters), will be the quantity shown in the contract documents. The area of PCC overlay placement will be determined from the longitudinal surface and the nominal pavement width, including widening sections.

C. Surface Preparation.
The quantity of Surface Preparation, in square yards (square meters), will be the quantity shown in the contract documents. The area of surface preparation will be determined from the longitudinal surface and the nominal width of existing pavement.

D. Pavement Scarification

1. Measurement by Weight (Mass).
The quantity of Pavement Scarification will be determined in accordance with Section 2214.06, A, 1.

2. Measurement by Area.
The quantity of Pavement Scarification will be determined in accordance with Section 2214.06, A, 2.

~~D~~E. Hot Mix Asphalt Stress Relief Course.

1. Measurement by Weight (Mass).
When measurement is by weight (mass), the quantity of Hot Mix Asphalt Stress Relief Course will be expressed in tons (megagrams) and determined from the weight (mass) of individual loads, including fillets, measured to the nearest 0.01 tons (0.01 Mg). Loads may be weighed in trucks, weigh hoppers, or from the weight (mass) from batch plants computed by count of batches in each truck and batch weight (mass). Article 2001.07 shall apply.

The asphalt binder will be measured in accordance with Article 2303.05, B.

2. Measurement by Area.
When payment is based on square yards (square meters), the quantity of Hot Mix Asphalt Stress Relief Course, in square yards (square meters), will be the quantity shown in the contract documents.

The quantity of asphalt binder used will not be measured separately for payment.

2310.05 BASIS OF PAYMENT.
For the performance of acceptable work, measured as provided above, the Contractor will be paid the contract unit price in accordance with the following provisions:

A. Portland Cement Concrete Overlay, Furnish Only.
The Contractor will be paid the contract unit price per cubic yards (cubic meters) for Portland Cement Concrete, Furnish Only, as measured above. This payment shall be full compensation for furnishing all

raw materials, and for proportioning, mixing, and delivery of concrete to the paving machine.

B. Portland Cement Concrete Overlay, Placement Only.
The Contractor will be paid the contract unit price per square yard (square meter) for Portland Cement Concrete Overlay, Placement Only. This payment shall be full compensation for furnishing all materials, labor, and equipment necessary to place, finish, texture, and cure the concrete, including the placement of tie bars for widening, if required; sawing, cleaning, and sealing the joints, if required; and surface cleaning.

C. Surface Preparation.
The Contractor will be paid the contract unit price per square yard (square meter) for Surface Preparation. This payment shall be full compensation for preparation of the existing pavement, sandblasting or shot blasting, and for removal of the existing pavement surface material in accordance with Article 1104.08.

D. Pavement Scarification

1. Measurement by Weight (Mass).
The contractor will be paid the contract unit price for Pavement Scarification in accordance with Section 2214.07, A, 1.

2. Measurement by Area.
The contractor will be paid the contract unit price for Pavement Scarification in accordance with Section 2214.07, A, 2.

~~D~~E. Hot Mix Asphalt Stress Relief Course.
The Contractor will be paid for the asphalt binder in accordance with Article 2303.06, B.

1. Measurement by Weight (Mass).
The Contractor will be paid the contract unit price per ton (megagram) for Hot Mix Asphalt Stress Relief Course as measured above. This payment shall be full compensation for furnishing and placing the HMA stress relief course. The Contractor will be paid separately for the asphalt binder in accordance with Article 2303.06, B.

2. Measurement by Area.
The Contractor will be paid the contract unit price per square yard (square meter) for Hot Mix Asphalt Stress Relief Course constructed. This payment shall be full compensation for furnishing and placing the HMA stress relief course, including the cost of the asphalt binder.

Reason for Revision: Revises preparation of surface language to require the Surface Preparation item only for Bonded Overlays and Pavement Scarification for Unbonded Overlays and Whitetopping. Also, revises joint sawing requirements for bonded overlays and compaction requirements for HMA stress relief course.

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

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 5**
Submittal Date: June 1, 2009	**Proposed Effective Date:** April 2010	
Article No.: 2403.19, B **Title:** Time For Opening Pavement For Use	**Other:**	

Specification Committee Action: Approved as is.

Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** April 2010

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The title of the article was corrected.

Specification Section Recommended Text:

2403.19, B, Loads Producing Flexural Stresses.

Delete the last paragraph:

~~Personnel performing maturity testing shall be Level 1 PCC certified technicians, with training for maturity testing. This certified technician may supervise other persons who may then perform the temperature testing of the constructed structure.~~

Comments:

Member's Requested Change (Redline/Strikeout):

~~Personnel performing maturity testing shall be Level 1 PCC certified technicians, with training for maturity testing. This certified technician may supervise other persons who may then perform the temperature testing of the constructed structure.~~

Reason for Revision:

County or City Input Needed (X one)	**Yes**	**No**
Comments:		

Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes**	**No**

Comments: IM 213 already describes Level I PCC certification requirements for maturity testing and is not needed in the specifications. There is a conflict between paving and structures.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Mike Kennerly	**Office:** Design	**Item 6**
Submittal Date: 06-29-2009	**Proposed Effective Date:** 10/20/09	
Article No.: SS-090XX **Title:** Guardrail Construction and Removal	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** 10/20/2009

Specification Committee Approved Text: See attached draft SS-090XX.

Comments: The Methods section presented the changes to these specifications. A new guardrail system will be used (Midwest Guardrail System) which allows more competition and better performance. New bid items will be associated with this new system. Also, High Tension Cable Guardrail system requirements were moved to the Materials I.M. 455.01 with an approved list in Appendix A.

Method of Measurement was clarified and changed to a linear foot plan quantity per comments from the Office of Construction and Office of Contracts. M mix option was deleted per comments from Construction and Materials. Removal of Guardrail will be paid for to the nearest 0.5 foot for steel beam (since sections are 12.5 feet long) and 1 foot for cable (since there are no set increments). Steel beam guardrail installations requiring end anchors will require a Type E Terminal Section, a Type II Barricade, and a Type A Warning Light until the end anchor is installed. Incomplete high tension cable guardrail end anchors will not require a temporary traffic drum because it does not present a traffic hazard.

Draft SS-090XX will be replaced by a GS revision in April 2010. Counties and cities will have until then to transition to the new specifications and bid items.

Specification Section Recommended Text:

2505. Guardrail Construction and Removal.

Replace the section:

2505.01 DESCRIPTION.
Construct guardrail. Remove existing guardrail.

2505.02 MATERIALS.

A. ~~Formed~~ Steel Beam Guardrail ~~and Low Tension Three Strand Cable Guardrail~~.
Apply Section 4155.

B. Low Tension Cable Guardrail.
Apply Section 4155.

~~B~~C. High Tension Cable Guardrail.

1. Meet the manufacturer's materials requirements. For ~~concrete foundations for~~ line post~~s~~ and end anchor~~s~~ foundations, use Class C mix according to Section 2403.

2. Supply spare parts kits for high tension cable guardrail consisting of:
- An extra supply of TL-4 line posts (socketed-type), including post hardware and accessories (caps, reflective sheeting, straps, spacers, and socket covers). This supply is to include enough materials to complete a 300 foot (90 m) installation.
- An extra supply of anchor posts (socketed-type), including post hardware and accessories (caps, reflective sheeting, straps, fittings, spacers, and socket

covers). This supply is to include enough materials to complete one end anchor installation.
- Specialized tools necessary to maintain the guardrail, such as a spreader tool.

3. Spare parts kits do not include a tension meter. Deliver the spare parts kit to the Contracting Authority's nearest maintenance office.

2505.03 CONSTRUCTION AND REMOVAL OF GUARDRAIL.

Furnish and install posts, beams or cables, end anchors, and special connections and fittings required in the contract documents. Erect to the specified line and mounting height. Changes in the installed length require the Engineer's approval.

A. ~~Formed~~ Steel Beam Guardrail and Low Tension ~~Three Strand~~ Cable Guardrail. ~~Furnish and install posts, beams or cables, end anchors, and special connections and fittings required in the contract documents. Erect to the specified line and mounting height. Construct guardrail as follows:~~

1. ~~Installation of Formed~~ Steel Beam Guardrail.

a. Install w-beam or thrie beam as designated in the contract documents. When not designated, install w-beam.

b. Use ~~w-beam or thrie~~ steel beam guardrail ~~that is~~ ready for assembly when delivered to the project. Do not punch, drill, cut, or weld ~~w-beam or thrie~~ beam in the field.

c. Steel beam guardrail elements may be furnished in either 25 foot (7.62 m) or 12.5 foot (3.81 m) nominal length sections.

d. Straight rail sections may be used to construct radii of 150 feet (45 m) or greater. Shop-curve rail sections for radii less than 150 feet (45 m).

e. Install posts for steel beam guardrail at spacing identified in the contract documents. If not defined, use 6.25 foot (1.91 m) spacing.

f. Fully connect beam to all posts as shown in the contract documents. For W-beam guardrail installations with wood blockouts, nail the blockout to the post to prevent blockout rotation. Other methods of preventing rotation may be approved by the Engineer.

2. ~~Installation of~~ Low Tension ~~Three Strand~~ Cable Guardrail.

a. Attach the ~~three~~ cables to the posts and end anchors according to the contract documents. ~~Attach the cables to the posts using approved hooks, or by other means if specified in the contract documents.~~ Attach compensation devices and turnbuckles ~~so as not~~ to not interfere with the function of ~~any part of~~ the installation.

b. Individual cables may be spliced by use of an approved device installed where no interference with any other function will occur. One splice per cable is allowed. Cable may not be spliced within 250 feet (75 m) of another splice in one of the other cables.

c. Tighten individual cables using mechanical means. Stretch cables tight so that no sags occur between posts and so that, in the opinion of the Engineer, the finished installation presents a satisfactory appearance.

3. Posts.

a. Drive posts in a manner that does not damage the post. Place backfill material (consisting of material removed or other suitable soil) around posts required to be set in prebored holes. Place the backfill material in lifts not exceeding 4 inches (100 mm). Thoroughly compact each lift before the next lift is placed.

b. Install the posts to be firm, plumb, and at the location, spacing, and elevation designated.

4. End Anchors and Terminals.

a. Install end anchors and terminals of the type shown in the contract documents. Cast end anchors in place using Class C concrete according to Section 2403, except air content may vary from 4% to 7%. Finish exposed concrete as directed by the Engineer. ~~When anchor bolt holes in concrete bridge end posts do not align correctly for the formed steel beam guardrail terminal connection, drill new anchor bolt holes in the locations required for the terminal connection. Use a core bit to ensure correct anchor bolt hole location and alignment.~~

b. When bolt holes in concrete bridge end posts or concrete barrier do not align correctly for the steel beam guardrail terminal connection, drill new bolt holes in the locations required for the terminal connection. Use a core bit to ensure correct bolt hole location and alignment. ~~Cast anchors in place. Use Class C concrete according to Section 2403, except air content may very from 4% to 7%. Finish exposed concrete as directed by the Engineer. Class C concrete may be subjected to loading of the rail in 3 calendar days. Concrete with high early strength may be necessary to meet the requirements of Article 2505.03, D. Class M concrete may be substituted at no additional cost to the Contracting Authority. Concrete with these proportions can also be subjected to loading in 3 calendar days.~~

5. Guardrail Markers ~~and Barrier Markers~~.

When indicated in the contract documents, install guardrail markers ~~and barrier markers~~ of the required type meeting the requirements of Article 4186.12.

6. Delineators and Object Markers.

When indicated in the contract documents, install delineators and object markers of the required type meeting the requirements of Articles 4186.11 and 4186.12.

B. High Tension Cable Guardrail.

1. General.

~~**a.** Construct high tension cable guardrail by furnishing and installing posts, cables, end anchors, and all special connections and fittings which may be required in the contract documents.~~

~~**b.**~~ Furnish high tension cable guardrail ~~that:~~

~~**1.** Meets the requirements of NCHRP Report 350, Test Level 4 criteria.~~

~~**2.** Is accepted as a crashworthy device by the FHWA.~~

~~**3.** Exhibits a dynamic deflection for NCHRP Report 350 Test 3-11 of 8 feet (2.4 m) or less.~~

~~**c.**~~ from the ~~A~~approved products ~~are~~ listed in Materials I.M. 455.01.

2. Installation of High Tension Cable Guardrail.

a. Install high tension cable guardrail according to the manufacturer's recommendations. Prior to construction, provide the Engineer with three copies of the manufacturer's most current product manuals covering installation and maintenance of the installation. Include signed certification statements ~~for~~ that all materials to be incorporated into the installation ~~according to~~ comply with Materials I.M. 455.01.

b. Tension the cables according to the manufacturer's recommendations at the time of installation, then check and adjust the tension approximately three weeks after installation.

3. Posts.

a. Ensure posts are plumb and at the manufacturer's recommended location, spacing, and elevation. Spacing shall not exceed 20 feet (6 m).

b. Furnish "socketed" type posts and install in reinforced concrete foundations.

Cast the foundations in place according to Article 2505.03, A, 4. Use the dimensions and reinforcement recommended by the manufacturer, except with a foundation depth of at least 42 inches (1.1 m).

4. End Anchors.

a. Incorporate one of the approved end anchors listed in Materials I.M. 455.01. Furnish end anchors produced by the same manufacturer of the high tension cable guardrail.

b. Construct end anchors according to the manufacturer's recommendations for the site specific soil conditions. Soils testing required is incidental to the cable installation.

5. Delineating High Tension Cable Guardrail.

a. Delineate high tension cable guardrail installations using retroreflective sheeting. Apply the sheeting to the last five posts at each end of an installation and throughout the remainder of the installation at a maximum spacing of 50 feet (15 m). Apply Type III or IV retroreflective sheeting that:

- Meets the requirements of Article 4186.03,
- Provides at least 7 square inches (4500 mm^2) of surface area when viewed from a line parallel to the roadway centerline, and
- Is yellow or white and of the same color as the adjacent edge line.

b. Attach sheeting near the top of the post: 1) in a manner recommended by the manufacturer; and 2) to that side of the post from which vehicle impacts are most likely. For installations where impacts are likely to occur from either side, apply the sheeting to both sides of the post.

C. Guardrail Removal.

1. Remove guardrail, delineators, and object markers as shown in the contract documents. Salvage the materials the Engineer considers suitable for future use. Deliver the salvaged materials to the location stated in the contract documents. Salvaged materials become the property of the Contracting Authority. Materials not suitable for future use become the property of the Contactor. Remove non-salvaged materials off the project site.

2. ~~Without damaging any parts, carefully r~~Remove, disassemble, and clean ~~the~~ salvaged guardrail without damaging parts. ~~If~~ Replace material ~~is~~ damaged during removal, disassembly, or cleaning~~, replace~~ with new material of the same kind~~. Replace damaged materials with new materials~~ (at no cost to the Contracting Authority). Stockpile salvaged materials as indicated in the contract documents. Restore areas disturbed by the removal operation to an acceptable condition.

3. ~~Remove, without damaging, the posts the Engineer designates as salvable. Pull the posts having no salvage value.~~ Place backfill material consisting of suitable soil in ~~the~~ post holes. Sand or other granular materials ~~are~~ is not acceptable for use as backfill material. Place backfill material in lifts not exceeding 4 inches (100 mm). Thoroughly compact each lift before the next lift is placed. Fill and tamp holes within the same working day.

~~**4.** Remove delineators and object markers as shown in the contract documents or as designated by the Engineer. Salvage the materials the Engineer considers suitable for future use. Salvaged materials become the property of the Contracting Authority. Materials not suitable for future use become the property of the Contractor. Remove non-salvaged materials off the project site.~~

D. Limitations.

1. **General.**
   - **a.** Do not stress attachments to new concrete or to ~~anchor~~ bolts set in epoxy resin until the new concrete or epoxy resin has attained an age of 3 calendar days. Concrete foundations for posts and end anchors may be subjected to cable tensioning after 3 calendar days. These time requirements may be lengthened by the Engineer during cool weather. Class M concrete may be substituted for Class C concrete at no additional cost to the Contracting Authority.
   - **b.** Complete grading work, if required, prior to removal of existing guardrail or installation of new guardrail.
   - **c.** When a roadway is open to traffic during construction, complete guardrail installations within 5 working days from the day the structure, barrier rail, pavement, or shoulder (whichever is the controlling item of work) is sufficiently completed to allow guardrail installation. Each installation exceeding the 5 working day completion requirement will be subject to a price adjustment of $100 per working day. For high tension cable guardrail, this price adjustment will be waived when the installation serves as crossover protection only and no guardrail or concrete barrier has been removed.
   - **d.** When a roadway is closed to public traffic for construction, complete all guardrail installations before opening the road to traffic.
   - ~~**e.** On a roadway that is open for traffic during guardrail construction, each installation exceeding the 5 working day completion requirement will be subject to a contract price adjustment of $100 per working day. For high tension cable guardrail, this price adjustment will be waived when the installation is designated as crossover protection only and no guardrail or concrete barrier has been removed.~~

2. **~~Formed~~ Steel Beam Guardrail and Low Tension ~~Three Strand~~ Cable Guardrail.**
   In areas where guardrail construction is not restricted by other construction, remove existing guardrail (if any) and construct new guardrail, except for end anchors requiring concrete, on the same working day. ~~Fully connect beam rail to all posts.~~ Place concrete for the final end anchor no later than the next working day. ~~Until the final anchor is finished, use a Type E Terminal Section, a Type II Barricade, and a Type A Warning Light to end a guardrail installation that requires end anchors.~~

3. **High Tension Cable Guardrail.**
   - **a.** In case of a discrepancy between these Specifications and the manufacturer's recommendations, these Specifications will govern.
   - **b.** At locations where the proposed guardrail installation does not interfere with the functioning of the existing guardrail, do not remove the existing guardrail until the high tension cable guardrail system is fully functional. Once the installation is fully functional, remove existing guardrail within 5 working days.
   - ~~**c.** Delineate guardrail end anchors with a temporary traffic drum until the final end anchor is completed and the cables properly tensioned.~~

2505.04 METHOD OF MEASUREMENT.
Measurement will be as follows:

A. ~~Formed~~ Steel Beam Guardrail ~~and Low Tension Three Strand Cable Guardrail~~.

1. **Installation of Steel Beam Guardrail (MGS).**
   - **a.** ~~Steel beam and cable guardrail quantities will be s~~Shown in the contract documents.

b. ~~The cable~~ Steel beam guardrail ~~quantity~~ will be calculated by counting the number of 12.5 foot (3.81 m) sections. ~~using one of the cables of cable guardrail, with no deductions for turnbuckles or compensating devices. Any changes in the installed length shall be approved by the Engineer. This will also include the length of installations continued across a bridge.~~

2. Barrier Transition Section (MGS).
By count.

~~2~~3. Steel Beam Guardrail End Anchors ~~and Terminal Devices~~.
By count for each type of steel beam guardrail end anchor~~s~~ and terminal device~~s~~ constructed. Installations continued across a bridge will not be counted as end anchors.

~~3~~4. Standard End Terminal (MGS) ~~Low Tension Three Strand Cable Guardrail End Anchor.~~
By count for each type of end terminal constructed.

B. Low Tension Cable Guardrail.

1. Installation of Low Tension Cable Guardrail.
a. Shown in the contract documents.
b. Length will be calculated using one of the cables of cable guardrail, with no deductions for turnbuckles or compensating devices.

2. Low Tension Cable Guardrail End Anchor.
By count.

~~B~~C. High Tension Cable Guardrail.

1. High Tension Cable Guardrail.
a. Linear feet (meters) shown in the contract documents.
b. ~~The l~~Length will be calculated as the protection length, not including lengths of high tension cable guardrail end anchors.

2. High Tension Cable Guardrail, End Anchor.
By count.

3. High Tension Cable Guardrail, Spare Parts Kit.
By count for the number of spare parts kits delivered.

~~C~~D. Removal of Guardrail.

1. Steel beam guardrail: linear feet (meters) to the nearest 0.1 foot (0.1 m) by measuring along the front of the rail from bolt hole to bolt hole.

2. Cable guardrail: in linear feet (meters) to the nearest 0.1 foot (0.1 m) by measuring along the front of one of the cables with no deductions for turnbuckles or compensating devices.

2505.05 BASIS OF PAYMENT.
Payment for guardrail items will be the contract unit price as described below. Payment includes furnishing all materials, equipment, tools, and labor necessary to complete the removal and installation of the guardrail, including excavation and placing backfill. However, excavation in unexpected rock will be paid for as extra work according to Article 1109.03. Unexpected rock will be considered as rock encountered during excavation that was not visible

from the roadway and was not indicated in the contract documents. ~~The Engineer may adjust the payment for guardrail according to Article 2505.03, D.~~

A. ~~Formed~~ Steel Beam Guardrail ~~and Three Strand Guardrail Cable~~.

1. Installation of Steel Beam Guardrail (MGS).
- **a.** ~~Per~~ Each 12.5 foot (3.18 m) section ~~linear foot (meter) for Formed Steel Beam, Thrie-Beam, and Cable Guardrail~~.
- **b.** Payment for nested ~~formed~~ steel beam guardrail ~~and thrie-beam~~ will be included in the contract unit price. ~~Posts, spacer blocks, object markers, delineators, guardrail markers, barrier markers, offset brackets, and remaining hardware are incidental to formed steel beam, thrie-beam, and cable guardrail.~~
- **c.** Posts, spacer blocks, object markers, delineators, guardrail markers, barrier markers, offset brackets, and remaining hardware are incidental. ~~For cable guardrail, the following additional items are incidental: hook bolts, turnbuckles, compensating devices, concrete, and remaining hardware.~~

2. Barrier Transition Section (MGS).
- **a.** Each.
- **b.** Payment for nested steel beam guardrail will be included in the contract unit price.
- **c.** Posts, spacer blocks, object markers, delineators, guardrail markers, barrier markers, offset brackets, and remaining hardware are incidental.

~~2~~3. Steel Beam Guardrail End Anchors ~~and Terminal Devices~~.
- **a.** Each for the type of steel beam guardrail end anchor constructed.
- **b.** Drilling new ~~anchor~~ bolt holes for guardrail connection is incidental.

~~3~~4. Standard End Terminal (MGS) ~~Low Tension Three Strand Cable Guardrail End Anchors~~.
- **a.** Each for the type of standard end terminal constructed.
- **b.** Payment for nested steel beam guardrail will be included in the contract unit price.
- **c.** Posts, spacer blocks, object markers, delineators, guardrail markers, offset brackets, and remaining hardware are incidental.

B. Low Tension Cable Guardrail.

1. Installation of Low Tension Cable Guardrail.
- **a.** Per linear foot (meter).
- **b.** Posts, spacer blocks, object markers, delineators, guardrail markers, barrier markers, offset brackets, hook bolts, turnbuckles, compensating devices, concrete, and remaining hardware are incidental.

2. Low Tension Three Strand Cable Guardrail End Anchor.
Each.

~~B~~C. High Tension Cable Guardrail.

1. High Tension Cable Guardrail.
- **a.** Per linear foot (meter).
- **b.** ~~All p~~Posts and accessories required by the manufacturer, ~~as well as~~ additional hardware and concrete, and grading required to meet cable height tolerance are incidental ~~to the item~~.

2. High Tension Cable Guardrail, End Anchor.

Each. Grading required to meet the manufacturer's recommendations is incidental ~~to the high tension cable guardrail anchor~~.

3. **High Tension Cable Guardrail, Spare Parts Kit.**
Each. Payment is full compensation for delivering spare parts kit to the location identified in the contract documents.

~~C~~D. **Guardrail Removal.**

1. Per linear foot (meter) for removal of guardrail, including ~~formed~~ steel beam guardrail, ~~thrie-beam,~~ cable guardrail, end anchors, and terminal devices.

2. Payment includes hauling salvaged material to the stockpile site. Placing backfill material around posts and in end anchor footing holes ~~are~~ is incidental.

3. Payment for nested ~~formed~~ steel beam guardrail ~~and thrie-beam~~ will be included in the contract unit price.

4. Posts, spacer blocks, object markers, delineators, guardrail markers, ~~barrier markers,~~ offset brackets, end anchors, terminal devices, and remaining hardware are incidental ~~to formed steel beam and thrie beam guardrail~~.

45. For low tension cable guardrail the following additional items are incidental: ~~Posts,~~ hook bolts, turnbuckles, compensating devices, ~~end anchors,~~ and remaining hardware ~~are incidental to cable guardrail~~.

4155. Guardrail

Replace the section:

4155.01 GENERAL REQUIREMENTS.
Ensure guardrail materials meet the requirements for the type of guardrail specified. Use guardrail posts of wood or steel as specified in the contract documents.

4155.02 ~~FORMED~~ STEEL BEAM GUARDRAIL.
Comply with the following:

A. **Rail elements~~,~~ and terminal sections:** meet the requirements of AASHTO M 180, Class A, 12 gauge (2.67 mm thickness), Type I, unless a greater thickness is required.

~~**B. Thrie-beam rail:** furnish when required.~~

~~**C. Rail elements and terminal sections:** Class A, 12 gauge (2.67 mm thickness), Type I, unless a greater thickness is required.~~

~~D~~B. **~~Anchor b~~Bolts used to attach steel beam guardrail to concrete barrier or bridge ~~barrier~~ rail:** full-length galvanized and meet the requirements of ASTM A 449, Type 1 ~~F 1554, Grade 105~~.

~~E~~C. **All other bolts:** meet the requirements of ASTM A 307, Grade A.

~~F~~D. **Washers used to attach steel beam guardrail to concrete barrier or bridge ~~barrier~~ rail:** meet the requirements of ASTM F 436.

~~G~~E. **All other washers:** meet the requirements of ASTM F 844.

~~H~~F. **Nuts used to attach steel beam guardrail to concrete barrier or bridge ~~barrier~~**

rail: heavy hex, Class 2B meeting the requirements of ASTM A 563, DH.

~~I~~**G. All other nuts:** meet the requirements for ASTM A 563, Grade A, hex.

~~J~~**H. Galvanizing:** meet the requirements of ASTM A 153, Class C.

4155.03 CABLES.

A. Cable GuardRrail.

1. Meet the requirements of AASHTO M 30, Type I, Class A.

2. For high tension cable guardrail, meet the manufacturer's requirements.

B. Anchor Cable.
Meet the requirements of AASHTO M 30, Type II, Class A.

4155.04 ~~WOOD~~ POSTS.

A. Wood Posts.
Use posts sawed to the dimensions shown in the contract documents and meeting the requirements of Section 4164.

~~4155.05~~B. Steel Posts.

~~A~~1. Use steel posts ~~and blocks~~ of the dimensions shown in the contract documents and ~~that~~ meet the requirements of ASTM A 36/A 36M structural steel. ~~Ensure steel posts and blocks are galvanized according to the requirements of ASTM A 123.~~

~~B~~2. Ensure bolt holes comply with Article 2408.03, S, 2.

~~C~~3. Ensure steel posts and blocks are galvanized according to the requirements of ASTM A 123. Ensure galvanizing is done after fabrication and after all bolt holes have been drilled.

4155.0~~6~~5 ~~SPACER~~ BLOCKOUTS.

A. For wood ~~spacer~~ blockouts, meet the requirements for wood posts.

~~**B.** For steel spacers, meet the requirements for steel posts.~~

~~C~~B. ~~Spacer b~~Blockouts manufactured from alternate materials that have received FHWA ~~approval~~ acceptance for use on the National Highway System may be substituted for wood ~~or steel spacer~~ blockouts. ~~A list of approved spacer blocks is found on the World Wide Web at the following URL: http://safety.fhwa.dot.gov/fourthlevel/pro_res_road_nchrp350.htm.~~

4155.0~~7~~6 MISCELLANEOUS ITEMS.

A. Ensure the following:

1. All miscellaneous items and materials are of the type, size, and dimension shown in the contract documents.

2. All metal parts are galvanized. However, any items or parts of items to be covered with 2 inches (50 mm) or more of concrete need not be galvanized.

3. All cable fittings required for cable guardrail installation are designed and fabricated so as to develop the full strength of a single cable or the multiple cable assembly, as applicable.

B. Internal threads of fasteners may be oversize, tapped after galvanizing.

C. When specific requirements are not stated in the contract documents, obtain the Engineer's approval for anchor angles, anchor cable, turnbuckles, hooked bolts, ~~and~~ compensating devices, ~~as well as~~ and any other fittings or special hardware which may be required.

Comments:

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**
See attached Draft SS-090XX.

Reason for Revision: Several changes have been made to the guardrail standards which have resulted in the need to update Sections 2505 and 4155 of the Standard Specifications. For this SS, Sections 2505 and 4155 have been combined.

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:					

Draft SS-090XX
(New)

Iowa Department of Transportation

SUPPLEMENTAL SPECIFICATIONS
FOR
GUARDRAIL CONSTRUCTION AND REMOVAL

Effective Date
October 20, 2009

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Sections 2505 and 4155 with the following:

Section 2505. Guardrail Construction and Removal

2505.01 DESCRIPTION.
Construct guardrail. Remove existing guardrail.

2505.02 MATERIALS.
Provide guardrail materials meeting the requirements for the type of guardrail specified. Provide guardrail posts of wood or steel as specified in the contract documents.

A. Steel Beam Guardrail and Low Tension Cable Guardrail.
Apply Section 4155.

B. High Tension Cable Guardrail.

1. Meet the manufacturer's materials requirements. For line post and end anchor foundations, use Class C mix according to Section 2403.

2. Supply spare parts kits for high tension cable guardrail. Deliver them to the Contracting Authority's nearest maintenance office. Spare parts kits consist of the following items, but do not include a tension meter:

- An extra supply of TL-4 line posts (socketed-type), including post hardware and accessories (caps, reflective sheeting, straps, spacers, and socket covers). This supply is to include enough materials to complete a 300 foot installation.
- An extra supply of anchor posts (socketed-type), including post hardware and accessories (caps, reflective sheeting, straps, fittings, spacers, and socket covers). This supply is to include enough materials to complete one end anchor installation.
- Specialized tools necessary to maintain the guardrail, such as a spreader tool.

2505.03 CONSTRUCTION AND REMOVAL OF GUARDRAIL.
Furnish and install posts, beams or cables, end anchors, and special connections and fittings required in the contract documents. Install to the specified line and mounting height. Changes in the installed length require the Engineer's approval.

A. Steel Beam Guardrail and Low Tension Cable Guardrail.

1. Steel Beam Guardrail.

a. Install w-beam or thrie beam as designated in the contract documents. When not designated, install w-beam.

b. Use steel beam guardrail ready for assembly when delivered to the project. Do not punch, drill, cut, or weld beam in the field.

c. Steel beam guardrail elements may be furnished in either 25 foot (7.62 m) or 12.5 foot (3.81 m) nominal length sections.

d. Straight rail sections may be used to construct radii of 150 feet (45 m) or greater. Shop curve rail sections for radii less than 150 feet (45 m).

e. Install posts for steel beam guardrail at spacing identified in the contract documents. If not defined, use 6.25 foot (1.91 m) spacing.

f. Where necessary, adjust horizontal and vertical alignment of the guardrail to account for road curvature. Use minor adjustments with no abrupt changes.

g. Fully connect beam to all posts as shown in the contract documents. For W-beam guardrail installations with wood blockouts, nail the blockout to the post to prevent blockout rotation. Other methods of preventing rotation may be approved by the Engineer.

2. Low Tension Cable Guardrail.

a. Attach the cables to the posts and end anchors according to the contract documents. Attach compensation devices and turnbuckles so as not to interfere with the function of any part of the installation.

b. Individual cables may be spliced by use of an approved device installed where no interference with any other function will occur. One splice per cable is allowed. Cable may not be spliced within 250 feet (75 m) of another splice in one of the other cables.

c. Tighten individual cables using mechanical means. Stretch cables tight so that no sags occur between posts and so that, in the opinion of the Engineer, the finished installation presents a satisfactory appearance.

3. Posts.

a. Drive posts in a manner that does not damage the post. Place backfill material (consisting of material removed or other suitable soil) around posts required to be set in prebored holes. Place the backfill material in lifts not exceeding 4 inches (100 mm). Thoroughly compact each lift before the next lift is placed.

b. Install the posts to be firm, plumb, and at the location, spacing, and elevation designated.

4. End Anchors and Terminals.

a. Install end anchors and terminals of the type shown in the contract documents. Cast end anchors in place using Class C concrete according to Section 2403, except air content may vary from 4% to 7%. Finish exposed concrete as directed by the Engineer.

b. When bolt holes in concrete bridge end posts or concrete barrier do not align correctly for the steel beam guardrail terminal connection, drill new bolt holes in the locations required for the terminal connection. Use a core bit to ensure correct bolt hole location and alignment.

5. Guardrail Markers.

When indicated in the contract documents, install guardrail markers of the required type meeting the requirements of Article 4186.12.

6. Delineators and Object Markers.

When indicated in the contract documents, install delineators and object markers of the required type meeting the requirements of Articles 4186.11 and 4186.12.

B. High Tension Cable Guardrail.

Furnish high tension cable guardrail from the approved products listed in Materials I.M. 455.01.

1. Installation of High Tension Cable Guardrail.

a. Install high tension cable guardrail according to the manufacturer's recommendations. Prior to construction, provide the Engineer with three copies of the manufacturer's most current product manuals covering installation and maintenance of the installation. Include signed certification statements that all materials to be incorporated into the installation comply with Materials I.M. 455.01.

b. Tension the cables according to the manufacturer's recommendations at the time of installation, then check and adjust the tension approximately three weeks after installation.

2. Posts.

a. Ensure posts are plumb and at the manufacturer's recommended location, spacing, and elevation. Spacing is not to exceed 20 feet (6 m).

b. Furnish "socketed" type posts and install in reinforced concrete foundations. Cast the foundations in place according to Article 2505.03, A, 4. Use the dimensions and reinforcement recommended by the manufacturer, except with a foundation depth of at least 42 inches (1.1 m).

3. End Anchors.

a. Incorporate one of the approved end anchors listed in Materials I.M. 455.01. Furnish end anchors produced by the same manufacturer of the high tension cable guardrail.

b. Construct end anchors according to the manufacturer's recommendations for the site specific soil conditions. Soils testing required is incidental to the cable installation.

4. Delineating High Tension Cable Guardrail.

a. Delineate high tension cable guardrail installations using retroreflective sheeting. Apply the sheeting to the last five posts at each end of an installation and throughout the remainder of the installation at a maximum spacing of 50 feet (15 m). Apply Type III or IV retroreflective sheeting that:

- Meets the requirements of Article 4186.03,
- Provides at least 7 square inches (4500 mm^2) of surface area when viewed from a line parallel to the roadway centerline, and
- Is yellow or white and of the same color as the adjacent edge line.

b. Attach sheeting near the top of the post: 1) in a manner recommended by the manufacturer; and 2) to that side of the post from which vehicle impacts are most likely. For installations where impacts are likely to occur from either side, apply the sheeting to both sides of the post.

C. Guardrail Removal.

1. Remove guardrail, delineators, and object markers as shown in the contract documents. Salvage the materials the Engineer considers suitable for future use. Deliver the salvaged materials to the location stated in the contract documents. Salvaged materials become the property of the Contracting Authority. Materials not suitable for future use become the property of the Contactor. Remove non-salvaged materials off the project site.

2. Carefully remove, disassemble, and clean the salvaged guardrail without damaging the parts. Replace material damaged during removal, disassembly, or cleaning with new material of the same kind (at no cost to the Contracting Authority). Stockpile salvaged materials as indicated in the contract documents. Restore areas disturbed by the removal operation to an acceptable condition.

3. Place backfill material consisting of suitable soil in post holes. Sand or other granular materials are not acceptable for use as backfill material. Place backfill material in lifts not exceeding 4 inches (100 mm). Thoroughly compact each lift before the next lift is placed. Fill and tamp holes within the same working day.

D. Limitations.

1. General.
- **a.** Do not stress attachments to new concrete or to bolts set in epoxy resin until the new concrete or epoxy resin has attained an age of 3 calendar days. Concrete foundations for posts and end anchors may be subjected to cable tensioning after 3 calendar days. These time requirements may be lengthened by the Engineer during cool weather.
- **b.** Complete grading work, if required, prior to removal of existing guardrail or installation of new guardrail.
- **c.** When a roadway is open to traffic during construction, complete guardrail installations within 5 working days from the day the structure, barrier rail, pavement, or shoulder (whichever is the controlling item of work) is sufficiently completed to allow guardrail installation. Each installation exceeding the 5 working day completion requirement will be subject to a contract price adjustment of $100 per working day. For high tension cable guardrail, this price adjustment will be waived when the installation serves as crossover protection only and no guardrail or concrete barrier has been removed.
- **d.** When a roadway is closed to public traffic for construction, complete all guardrail installations before opening the road to traffic.

2. Steel Beam Guardrail and Low Tension Cable Guardrail.
- **a.** In areas where guardrail construction is not restricted by other construction, remove existing guardrail (if any) and construct new guardrail, except for end anchors requiring concrete, on the same working day. Place concrete for the final end anchor no later than the next working day.
- **b.** For steel beam guardrail installations requiring end anchors, use a Type E Terminal Section, a Type II Barricade, and a Type A Warning Light to end the installations until the final anchor is finished.

3. High Tension Cable Guardrail.
- **a.** In case of a discrepancy between these Specifications and the manufacturer's recommendations, these Specifications will govern.
- **b.** At locations where the proposed guardrail installation does not interfere with the functioning of the existing guardrail, do not remove the existing guardrail until the high tension cable guardrail system is fully functional. Once the installation is fully functional, remove existing guardrail within 5 working days.

2505.04 METHOD OF MEASUREMENT.

Measurement will be as follows:

A. Steel Beam Guardrail Installation.

1. Steel Beam Guardrail.
- **a.** Linear feet (meters) shown in the contract documents.
- **b.** Length will be calculated from the number of 12.5 foot (3.81 m) sections.

2. Steel Beam Guardrail Barrier Transition Section.

By count.

3. Steel Beam Guardrail End Anchors.

By count for each type of end anchor constructed. Installations continued across a bridge will not be counted as end anchors.

4. **End Terminals.**
   By count for each type of end terminal constructed.

B. Low Tension Cable Guardrail Installation.

1. **Low Tension Cable Guardrail.**
   a. Linear feet (meters) shown in the contract documents.
   b. Length will be calculated using one of the cables of cable guardrail, with no deductions for turnbuckles or compensating devices.

2. **Low Tension Cable Guardrail, End Anchor.**
   By count.

C. High Tension Cable Guardrail Installation.

1. **High Tension Cable Guardrail.**
   a. Linear feet (meters) shown in the contract documents.
   b. Length will be calculated as the protection length, not including lengths of end anchors.

2. **High Tension Cable Guardrail, End Anchor.**
   By count.

3. **High Tension Cable Guardrail, Spare Parts Kit.**
   By count for the number of spare parts kits delivered.

D. Removal of Guardrail.

1. **Steel beam guardrail**: linear feet (meters) to the nearest 0.5 foot (0.1 m) by measuring along the front of the rail from bolt hole to bolt hole.

2. **Cable guardrail**: in linear feet (meters) to the nearest 1 foot (0.1 m) by measuring along the front of one of the cables with no deductions for turnbuckles or compensating devices.

2505.05 BASIS OF PAYMENT.
Payment for guardrail items will be the contract unit price as described below. Payment includes furnishing all materials, equipment, tools, and labor necessary to complete the removal and installation of the guardrail, including excavation and placing backfill. However, excavation in unexpected rock will be paid for as extra work according to Article 1109.03. Unexpected rock will be considered as rock encountered during excavation that was not visible from the roadway and was not indicated in the contract documents.

A. Steel Beam Guardrail Installation.

1. **Steel Beam Guardrail.**
   a. Per linear foot (meter).
   b. Payment for nested steel beam guardrail will be included in the contract unit price.
   c. Posts, spacer blocks, object markers, delineators, guardrail markers, barrier markers, offset brackets, and remaining hardware are incidental.

2. **Steel Beam Guardrail Barrier Transition Section.**
   a. Each.
   b. Payment for nested steel beam guardrail will be included in the contract unit price.
   c. Posts, spacer blocks, object markers, delineators, guardrail markers, barrier markers, offset brackets, and remaining hardware are incidental.

3. **Steel Beam Guardrail End Anchors.**
   a. Each for the type of end anchor constructed.
   b. Payment for nested steel beam guardrail will be included in the contract unit price.
   c. Drilling new bolt holes for guardrail connection is incidental.

4. **End Terminals.**
   a. Each for the type of end terminal constructed.
   b. Payment for nested steel beam guardrail will be included in the contract unit price.
   c. Posts, spacer blocks, object markers, delineators, guardrail markers, offset brackets, and remaining hardware are incidental.

B. Low Tension Cable Guardrail Installation.

1. **Low Tension Cable Guardrail.**
   a. Per linear foot (meter).
   b. Posts, spacer blocks, object markers, delineators, guardrail markers, barrier markers, offset brackets, hook bolts, turnbuckles, compensating devices, concrete, and remaining hardware are incidental.

2. **Low Tension Cable Guardrail, End Anchor.**
   Each.

C. High Tension Cable Guardrail Installation.

1. **High Tension Cable Guardrail.**
   a. Per linear foot (meter).
   b. Posts and accessories required by the manufacturer, additional hardware and concrete, and grading required to meet cable height tolerance are incidental.

2. **High Tension Cable Guardrail, End Anchor.**
   Each. Grading required to meet the manufacturer's recommendations is incidental.

3. **High Tension Cable Guardrail, Spare Parts Kit.**
   Each. Payment is full compensation for delivering spare parts kit to the location identified in the contract documents.

D. Removal of Guardrail.

1. Per linear foot (meter) for removal of guardrail, including steel beam guardrail, cable guardrail, end anchors, and terminal devices.

2. Payment includes hauling salvaged material to the stockpile site. Placing backfill material around posts and in end anchor footing holes is incidental.

3. Payment for nested steel beam guardrail will be included in the contract unit price.

4. Posts, spacer blocks, object markers, delineators, guardrail markers, offset brackets, end anchors, terminal devices, and remaining hardware are incidental.

5. For low tension cable guardrail, the following additional items are incidental: hook bolts, turnbuckles, compensating devices, and remaining hardware.

Section 4155. Guardrail

4155.01 GENERAL REQUIREMENTS.
Provide guardrail materials meeting the requirements for the type of guardrail specified. Provide guardrail posts of wood or steel as specified in the contract documents.

4155.02 STEEL BEAM GUARDRAIL.
Comply with the following:

A. Rail elements and terminal sections: meet the requirements of AASHTO M 180, Class A, 12 gauge (2.67 mm thickness), Type I, unless a greater thickness is required.

B. Bolts used to attach steel beam guardrail to concrete barrier or bridge rail: full-length galvanized and meet the requirements of ASTM A 449, Type 1.

C. All other bolts: meet the requirements of ASTM A 307, Grade A.

D. Washers used to attach steel beam guardrail to concrete barrier or bridge rail: meet the requirements of ASTM F 436.

E. All other washers: meet the requirements of ASTM F 844.

F. Nuts used to attach steel beam guardrail to concrete barrier or bridge rail: heavy hex, Class 2B meeting the requirements of ASTM A 563, DH.

G. All other nuts: meet the requirements for ASTM A 563, Grade A, hex.

H. Galvanizing: meet the requirements of ASTM A 153, Class C.

4155.03 CABLES.

A. Cable Guardrail.

1. Meet the requirements of AASHTO M 30, Type I, Class A.

2. For high tension cable guardrail, meet the manufacturer's requirements.

B. Anchor Cable.
Meet the requirements of AASHTO M 30, Type II, Class A.

4155.04 POSTS.

A. Wood Posts.
Use posts sawed to the dimensions shown in the contract documents and meeting the requirements of Section 4164.

B. Steel Posts.

1. Use steel posts of the dimensions shown in the contract documents and that meet the requirements of ASTM A 36/A 36M structural steel.

2. Ensure bolt holes comply with Article 2408.03, S, 2.

3. Ensure steel posts and blocks are galvanized according to the requirements of ASTM A 123. Ensure galvanizing is done after fabrication and after all bolt holes have been drilled.

4155.05 BLOCKOUTS.

A. For wood blockouts, meet the requirements for wood posts.

B. Blockouts manufactured from alternate materials that have received FHWA acceptance for use on the National Highway System may be substituted for wood blockouts.

4155.06 MISCELLANEOUS ITEMS.

A. Ensure the following:

1. All miscellaneous items and materials are of the type, size, and dimension shown in the contract documents.

2. All metal parts are galvanized. However, any items or parts of items to be covered with 2 inches (50 mm) or more of concrete need not be galvanized.

3. All cable fittings required for cable guardrail installation are designed and fabricated so as to develop the full strength of a single cable or the multiple cable assembly, as applicable.

B. Internal threads of fasteners may be oversize, tapped after galvanizing.

C. When specific requirements are not stated in the contract documents, obtain the Engineer's approval for anchor angles, anchor cable, turnbuckles, hook bolts, compensating devices, and any other fittings or special hardware which may be required.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Roger Bierbaum	**Office:** Contracts	**Item 7**
Submittal Date: May 21, 2009	**Proposed Effective Date:** April 2010	
Article No.: 2511.04 **Title:** Method of Measurement (Removal and Construction of PCC Sidewalks) **Article No.:** 2511.05 **Title:** Basis of Payment (Removal and Construction of PCC Sidewalks)	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** April 2010

Specification Committee Approved Text:

2511.04, D, Detectable Warnings for Curb Ramps.

Replace the article:

The Engineer will measure in square feet to the nearest square foot (square meters to the nearest 0.1 square meter) the surface area of Detectable Warnings for Curb Ramps.

Comments: Both SUDAS and the Office of Local Systems would prefer this to be a square foot bid item. If the unit of measurement is area, the Office of Contracts would like the Method of Measurement changed to a measured quantity, so the Contractor is paid for what is actually placed.

Specification Section Recommended Text:

2511.04, D, Detectable Warnings for Curb Ramps.

Replace the entire article:

The quantity of Detectable Warnings for Curb Ramps will be the number of nominal 2 feet by 2 feet (0.6 m by 0.6 m) standard panels used for a curb ramp. No deductions will be made for portions of the panels trimmed and not used.

2511.05, D, Detectable Warnings for Curb Ramps.

Replace the entire article:

The Contractor will be paid the contract unit price for each Detectable Warning for Curb Ramps panel or partial panel used. This payment shall be full compensation for furnishing all equipment, labor, and materials to construct the detectable warnings for curb ramps in accordance with the contract documents.

Comments: Deferred from the June 11th Specifications Committee meeting. The unit of measure has been changed to each full or partial panel used.

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

1. Replace 2511.04 D. Detectable Warnings for Curb Ramps with the following:

The quantity of detectable warnings for curb ramps will computed based on nominal size of the quantity of standard panels used for a curb ramp. No deductions will be made for the portions of the panels trimmed and not used. A minimum of 8.0 square feet of Detectable Warning for Curb Ramps will be paid for each curb ramp installation.

2. Replace 2511.05 D. Detectable Warnings for Curb Ramps with the following:

The Contractor will be paid the contract unit price for the square feet of Detectable Warning for Curb Ramps panels or partial panels used. This payment shall be full compensation for furnishing all materials, equipment and labor to construct the detectable warnings for curb ramps in accordance with the contract documents.

Reason for Revision: Detectable Warnings for Curb Ramps are normally installed in 2 foot by 2 foot or 2 foot by 4 foot standard panels. The cost of cutting and installing a partial panel is more costly than

installing a full panel. The current specification bases payment on the quantity shown in the contract documents, which is a computed quantity, often based on partial panels. This revision will pay for the number of full or partial panels consumed, not the based on the size of the panels installed. Secondly the actual site conditions often require a different quantity of Detectable Warnings for Curb Ramps panels than what is computed by the designer. Therefore the quantity paid should be based on actual field information to ensure the acceptable number of panels is installed.					
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: Mike Kennerly	**Office:** Design	**Item 8**
Submittal Date: 5/29/09	**Proposed Effective Date:** 10/20/09	
Article No.: DS-090XX **Title:** Pedestrian Path Closure	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** 10/20/2009

Specification Committee Approved Text: See attached Draft DS-090XX.

Comments: The Office of Contracts would like this specification to be incorporated into the Standard Specifications when possible. That way it is a part of all contracts and does not need to be added to specific projects. This specification will be incorporated into the Standard Specifications in April 2010.

Specification Section Recommended Text: See attached Draft DS-090XX.

Comments:

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**
See attached Draft DS-090XX

Reason for Revision: Occasionally the need arises to close a pedestrian path (i.e. a sidewalk). The barricade used for the closure must meet NCHRP Report 350, as well as ADA, requirements. This DS provides contractors with guidance for meeting those requirements.

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:					

Draft DS-090XX
(New)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
PEDESTRIAN PATH CLOSURES

Effective Date
October 20, 2009

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090XX.01 Description
This specification describes pedestrian path closure requirements.

Provide 10 calendar day advance notification of a pedestrian path closure to the following:
- Iowa Department of the Blind: Curtis.chong@blind.state.ia.us.
- National Federation of the Blind of Iowa: m.barber@mchsi.com.
- Project Engineer

090XX.02 Materials
Provide Type II Barricades meeting NCHRP Report 350. A list of approved Type II Barricades is found on the internet at the following URL:
http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/wzd/

Use barricades meeting the following requirements:
- The top of the top rail of the barricade is 36 to 42 inches (900 to 1050 mm) above the adjacent surface. The top rail of the barricade is parallel to the bottom rail and situated to allow pedestrians to use the rail as a guide for their hands for way-finding purposes.
- The bottom of the bottom rail of the barricade is no higher than 1.5 inches (38 mm) above the adjacent surface. The top of the bottom rail is no lower than 6 inches (150 mm) above the adjacent surface.
- The barricade is continuous, stable, and non-flexible.

090XX.03 Construction
Install the barricade across the full width of the closed pedestrian path. Locate the barricade to minimize sight distance restrictions for road users.

090XX.04 Method of Measurement and Basis of Payment.
Pedestrian Path Closure is incidental to Traffic Control.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Tom Reis	**Office:** Specifications	**Item 9**
Submittal Date: 2009.06.27	**Proposed Effective Date:** 10/20/09	
Article No.: DS-090XX **Title:** Contractor Stockpiled Shoulder Material	**Other:**	

Specification Committee Action: Deferred to a future Specification Committee meeting.

Deferred: X	**Not Approved:**	**Approved Date:**	**Effective Date:**

Specification Committee Approved Text:

Comments: Transportation and stockpiling details will be included in the plan by the Designer. Per discussion, one bid item will be used. The Office of Construction would like the stockpile site availability changed to Monday through Thursday, since some garages aren't open on Friday. This specification will be revised and submitted to HDMT for review before being brought back to a future Specification Committee meeting for approval.

Specification Section Recommended Text: See attached Draft DS-090XX.

Comments:

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.)**
See attached Draft DS-090XX

Reason for Revision: In the past, contractors have been required to stockpile RAP for the contracting authority's maintenance use. This DS will give specifications for this practice as well as allow the contractor to provide virgin shoulder stone in lieu of the RAP.

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:					

Draft DS-090XX
(New)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
CONTRACTOR STOCKPILED SHOULDER MATERIAL

Effective Date
October 20, 2009

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090XX.01 DESCRIPTION.
Furnish granular shoulder material for the contracting authority's use. The granular shoulder material may be Class A Crushed Stone or RAP, at the Contractor's option. Stockpile material at location(s) identified in the contract documents.

090XX.02 MATERIALS AND EQUIPMENT.

A. For Class A Crushed Stone, furnish material meeting the requirements of Article 4120.04.

B. For RAP, meet the following:

1. RAP shall be generated from pavement scarification on the contract.

2. Process RAP so that 100% of the material passes the 1.5 inch (37.5 mm) sieve. RAP shall not be further processed.

C. Use weighing equipment meeting the requirements of Article 2001.07.

090XX.03 CONSTRUCTION.

A. Transporting.

1. Location(s) for delivery of shoulder material will be identified in the contract documents.

2. No more than 2 locations will be identified per contract.

3. Locations will be no further than 30 miles from the project limits.

B. Stockpiling.

1. The Engineer will determine stockpile location. Contact the Engineer at least 48 hours prior to stockpiling.

2. No more than 2500 tons (2250 Mg) will be stockpiled at each location.

3. Stockpiles shall be constructed utilizing generally accepted methods of stockpiling.

4. Stockpile locations will be available from 8:00 a.m. to 4:30 p.m., Monday through Friday, or other times with permission of the Engineer.

090XX.04 METHOD OF MEASUREMENT.
Measurement for Class A Crushed Stone and RAP satisfactorily stockpiled will be computed from the weights (mass) of individual truckloads, including the moisture in the aggregate at time of delivery.

The quantity to be bid shall not be more than the quantity of RAP generated on the contract. If the quantity of RAP underruns, but is greater than the bid quantities for Class A Crushed Stone and RAP, the contractor will be required to provide the bid quantity. If the quantity of RAP underruns and is less than the bid quantities for Class A Crushed Stone and RAP, the quantity will be adjusted to the quantity of RAP generated, regardless of the type of material bid.

090XX.05 BASIS OF PAYMENT.
Payment will be the contract unit price as follows:

A. Class A Crushed Stone

1. Per ton (megagram) for the tons (megagrams) stockpiled.

2. Payment is full compensation for:
   - Furnishing, transporting, and stockpiling the material in accordance with the contract documents,
   - Furnishing all equipment, labor, and materials, and
   - Performance of all work necessary to complete the work.

B. RAP

1. Per ton (megagram) for the tons (megagrams) stockpiled.

2. Payment is full compensation for:
   - Processing, hauling, and stockpiling the material in accordance with the contract documents,
   - Furnishing all equipment and labor, and
   - Performance of all work necessary to complete the work.

3. Pavement scarification will be paid for separately.

4. No separate payment will be made for the asphalt binder in the RAP.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 10**
Submittal Date: June 8, 2009	**Proposed Effective Date:** October 2009	
Article No.: SS-01045 Appendix A **Title:** Instructions for RAP for HMA Mixtures	**Other:**	

Specification Committee Action: Approved as is.			
Deferred:	**Not Approved:**	**Approved Date:** 07/09/2009	**Effective Date:** 10/20/2009
Specification Committee Approved Text: See attached Draft SS-09XXX.			
Comments: None.			
Specification Section Recommended Text:			
Comments:			

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

Add the following noted sentence to the second paragraph under the STORAGE section:

STORAGE

Stockpiles shall be placed on a base with adequate drainage, constructed in layers to minimize RAP segregation and ensure a workable face.

To meet Classified RAP criteria, separate stockpiles shall be constructed for each source of RAP based on the quality of aggregate, type and quantity of asphalt binder, and size of processed material. The Contractor shall notify the Engineer and District Materials Engineer 48 hours prior to blending Classified RAP materials of the same source, type and quantity of asphalt binder, and size of processed material to retain Classified status.

Reason for Revision: The District Materials Engineers requested they be notified prior to adding/blending allowable material to a Classified RAP stockpile. Notification is required for other RAPprocessing, but not specifically mentioned for this case.

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

Draft SS-090XX
(New)

Iowa Department of Transportation

SUPPLEMENTAL SPECIFICATIONS
FOR
RECYCLED ASPHALT PAVEMENT

Effective Date
October 20, 2009

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

This specification applies to projects on the Primary Road System only. It may apply to other projects when specifically identified in the contract documents.

Replace Article 2303.02, C with the following:

C. Recycled Asphalt Pavement.
RAP is salvaged asphalt pavement. RAP shall be from a source designated in the contract documents, a Classified RAP stockpile, or Unclassified RAP furnished by the Contractor. The designations Classified and Unclassified are exclusively for the use of RAP in HMA.

The Contractor shall identify each RAP stockpile and document Classified RAP stockpiles as directed in Appendix A. Information required for documentation of Classified RAP material in a stockpile for future use in HMA shall include identification of the project from which the material was removed; mix data from the original project including mixture type, aggregate classification, location and depth in the pavement structure; extracted gradation information, if available; and description of stockpile location and quantity. Additional material shall not be added to a Classified RAP stockpile without the approval of the District Materials Engineer.

The Engineer may reject a RAP stockpile for non-uniformity based on visual inspection. Stockpiles shall be worked in such a manner that the materials removed are representative of a cross section of the pile.

Stockpiles of RAP shall be placed on a base sufficient to prevent contamination as directed in Appendix A. RAP stockpiles containing concrete chunks, grass, dirt, wood, metal, coal tar, or other foreign or environmentally restricted materials shall not be used. RAP stockpiles may include PCC (not to exceed 10% of the stockpile) from patches or composite pavement that was milled as part of the asphalt pavement.

When RAP is taken from a project, or is furnished by the Contracting Authority, the contract documents will indicate quantity of RAP expected to be available and test information, if known. The Contractor is responsible for salvaging this material. Unless otherwise specified in the contract

documents, RAP not used in HMA shall become the property of the Contractor.

For HMA mix design purposes, the Contracting Authority will test samples of the RAP. The aggregate gradation and amount of asphalt binder in the RAP will be based on the Contract Authority's extraction tests. When the amount of RAP binder exceeds 20% of the total asphalt binder, the asphalt binder grade shall be changed as directed in Materials I.M. 510.

1. Classified RAP.
Classified RAP is from a documented source with the aggregate meeting the appropriate quality requirements in Materials I.M. 510, and properly stockpiled.

Classified RAP may be used in the base, intermediate, and surface mixtures for which the RAP aggregate qualifies. The surface course may use up to 15% of Classified RAP. The Contractor may use more than 15% of Classified RAP for the surface course when there is quality control sampling and testing of the RAP meeting the requirements in Appendix A. Not more than 30% of the total asphalt binder in the surface mix shall come from the RAP.

2. Unclassified RAP.
Any stockpiled RAP not meeting the requirements of Classified RAP or from an unknown source shall be designated as Unclassified RAP. For Interstate and Primary projects, up to 10% Unclassified RAP may be used in HMA base and shoulder mixtures. For Primary projects, up to 10% Unclassified RAP may be used for equal to or less than 1,000,000 ESAL intermediate mixtures. For all other projects, up to 10% Unclassified RAP may be used in HMA base, intermediate, and shoulder mixtures. There will be no friction aggregate credit or aggregate crushed particles credit for Unclassified RAP.

When an Unclassified RAP stockpile is characterized by sampling and testing for mix design, no material can be added to the stockpile until the project is completed.

Replace Article 2303.05, C with the following:

C. Recycled Asphalt Pavement.
The quantity of asphalt binder in classified or unclassified RAP, which is incorporated into the mix, will be calculated in tons (megagrams) of asphalt binder in the RAP, based on the actual asphalt binder content determined for the mix design from the results of the Engineer's extraction test.

The quantity of asphalt binder in classified or unclassified RAP, which is incorporated into the mix, will be included in the quantity of asphalt binder used.

Replace the second paragraph of Article 2303.06, B with the following:

Payment for asphalt binder will be for all new asphalt binder and the asphalt binder in the RAP which is incorporated in the mixture.

The quantity of asphalt binder in classified or unclassified RAP, which is incorporated into the mix, will be calculated in tons (megagrams) of asphalt binder in the RAP. This will be based on the actual asphalt binder content determined for the mix design from the results of the Engineer's extraction test.

Appendix A – Instructions for RAP for HMA Mixtures (Supersedes Materials I.M. 505)

GENERAL
This Appendix describes requirements for processing, storing, documenting, and sampling & testing of RAP intended for use in HMA mixtures.

All notifications and documentation shall be submitted to the District Materials Engineer based on the District responsible for the location of the initial RAP stockpile.

PROCESSING
RAP suitable for HMA shall be processed by milling and/or crushing to a maximum particle size of 1.5 inches (37.5 mm). The Contractor shall notify the Engineer and District Materials Engineer 48 hours before processing begins.

Additional screening or blending may be done to achieve a more uniform stockpile. This processing may be done as the stockpile is built or as part of the HMA plant production. Additional actions that may improve the consistency of the RAP include further crushing to reduce top size, screening into coarse and fine fractions, or blending by proportioning through a two-bin cold feed.

STORAGE
Stockpiles shall be placed on a base with adequate drainage, constructed in layers to minimize RAP segregation and ensure a workable face.

To meet Classified RAP criteria, separate stockpiles shall be constructed for each source of RAP based on the quality of aggregate, type and quantity of asphalt binder, and size of processed material. The Contractor shall notify the Engineer and District Materials Engineer at least 48 hours prior to blending Classified RAP materials of the same source, type and quantity of asphalt binder, and size of processed material to retain Classified status.

All RAP stockpiles shall be identified by maps of stockpile areas and signs placed in or near each stockpile.

DOCUMENTATION of CLASSIFIED RAP STOCKPILES
Stockpiled RAP material will only be considered Classified RAP when the following documentation requirements are met. No documentation is required when the RAP is used on the project it came from, or a tied project.

- Form 820009r (see Appendix B) is completed by the RAP owner and a copy is forwarded to the District Materials Engineer within 10 calendar days of completing the stockpile.
- Any special handling, treatment or conditions of the RAP or it's use should be described on this form.
- Maps shall provide details that depict the stockpile site, including adjacent stockpiles of RAP or aggregates, permanent plant equipment, and landmarks.
- Maps and signs shall identify the stockpile by RAP Identification Number.

The District Materials Engineer will review Form 820009r for accuracy. Portions of the form including assigning the RAP identification number, aggregate quality type, crushed particle and friction type credit, average values for extracted aggregate gradation, aggregate bulk specific gravity, aggregate absorption and asphalt binder content will be completed by the District Materials Engineer.

Notify the District Materials Engineer at least 48 hours before relocating or reprocessing a classified RAP stockpile for future use (not intended for a specific project). The notification shall include the estimated quantity of RAP being relocated or reprocessed and the new location of the stockpile. Relocation of RAP shall be reported on Form 820009r and submitted to the District Materials Engineer within 10 calendar days of completing the relocation. Reprocessing a Classified RAP stockpile may require additional sampling, testing, and new Form 820009r with reassignment of a RAP Identification Number.

Before January 1st of each year, the Contractor shall update Form 820009r on the status of each Classified RAP stockpile. Report the estimated quantity of RAP removed for the construction season completed and the available RAP in each stockpile for future use.

SAMPLING AND TESTING

Mix Design

A certified Level I Aggregate Technician shall obtain the samples. Samples for mix design testing shall be obtained from at least 3 locations. Significant mixture differences in the pavement to be recycled may require separate stockpiles and samples. A sampling plan shall be developed by the Contractor and approved by the District Materials Engineer prior to sampling.

Samples for mix design obtained from the RAP stockpile are the most representative, but not always possible when the mix designs are performed. When stockpile samples are not available, RAP samples shall be obtained by milling a minimum of 50 feet (15 m) of project length at each sample location. Other methods of sampling for mix design, including coring or air-hammer patch areas, may only be used with the approval of the District Materials Engineer.

Obtain sufficient material for contractor mix design testing and owner agency RAP extraction testing as recommended in Materials I.M. 510. A representative 30 pound (15 kg) sample split from the total sample shall be delivered to the District Materials Laboratory for extraction testing. Results of the extraction test will be provided to the Contractor within 4 weeks of sample delivery.

Quality Control

When RAP quality control is required, the Contractor shall use one of the following quality control sampling programs. A certified Level I Aggregate Technician shall obtain the samples.

- Stockpiles – The Contractor shall obtain a representative sample of RAP from the stockpile for each 1000 tons of RAP placed in the stockpile.
- HMA Plant – The Contractor shall obtain a representative sample of RAP from the HMA plant RAP feed belt for each lot of HMA produced.

The Contractor shall use the ignition oven (Materials I.M. 338) or chemical extraction (AASHTO T 164) to extract the aggregate from the RAP sample. Calibration of the asphalt binder content from the ignition oven extraction is not required for the RAP quality control program. The gradation of the extracted RAP aggregate and the un-calibrated asphalt binder content shall be logged and charted within 24 hours of sampling.

Appendix B – Classified RAP Stockpile Report (Form 820009r)

820009r (December 2005)

Classified RAP Stockpile Report						
Stockpile Owner:				**RAP Stockpile ID #**		
SOURCE OF RAP	Project No.			Dates of Removal		
Route No.	From			To		
Removal Depth	JMF No(s)	Mix Type / Size		Crushed Particle %		

LOCATION OF RAP STOCKPILE:

County	Section	Township	Range
Description of stockpile base:			
Processing remarks:			

STOCKPILE QUANTITY INVENTORY LOG

Date	Quantity	Disposition (Project No. and use)
		Total initial stockpile quantity

Average EXTRACTION TEST RESULTS		**Aggregate Characteristics**	
Gradation	Lab Report nos.		
3 / 4		Aggregate Type	
1 / 2			
3 / 8	Pb =	Crushed Particles	%
No. 4			
No. 8	Gsb =	Aggr Friction Type 2	%
No. 16			
No. 30	Abs% =	Aggr Friction Type 3	%
No. 50			
No. 100	FAA =	Aggr Friction Type 4	%
No. 200			

Shaded boxes to be completed by the District Materials Engineer

Stockpile Owner Representative		Date
District Materials Representative		Date