MINUTES
OF
IOWA DOT SPECIFICATION COMMITTEE MEETING

May 14, 2020

Members Present:	Darwin Bishop	District 3 – Construction
	Roger Boulet	District 6 - Materials
	Donna Buchwald	Local Systems Bureau
	Mark Dunn	Contracts & Specifications Bureau
	Daniel Harness	Design Bureau
	Eric Johnsen, Secretary	Contracts & Specifications Bureau
	Wes Musgrove	Construction & Materials Bureau
	Scott Nixon	District 4 - Creston RCE
	Mike Nop	Bridges & Structures Bureau
	Tom Reis, Chair	Contracts & Specifications Bureau
	Willy Sorensen	Traffic & Safety Bureau
Members Not Present:	Charlie Purcell	Project Delivery Division
Advisory Members Present:	Lisa McDaniel	FHWA
	Paul LaFleur	FHWA
	Clayton Burke	Construction & Materials Bureau
	Kyle Frame	Construction & Materials Bureau
	John Hart	Construction & Materials Bureau
	Melissa Serio	Construction & Materials Bureau
	Jeff Schmitt	Construction & Materials Bureau
	Jeff DeVries	Construction & Materials Bureau
	Ken Brink	Location and Environment Bureau
	Paul Wiegand	SUDAS
	Rob Fangmann	Cedar County
	Paul Geilenfeldt	Marshall County

The Specification Committee met on Thursday, May 14, 2020, at 9:00 a.m. Tom Reis, Specifications Engineer, opened the meeting. The items were discussed in accordance with the revised agenda dated May 6, 2020:

The minutes are as follows:

1. **Article 1105.03, E, c, Working Drawings (Control of Work).**
The Bridges and Structures Bureau requested to add a working drawing category to the review list.

2. **Section 1107, Legal Relations and Responsibility to the Public.**
Section 2518, Safety Closure.
Section 2528, Traffic Control.
The Construction and Materials Bureau requested to update and consolidate the language in traffic control related specifications.

3. **Article 2301.05, K, 1, Basis of Payment (Portland Cement Concrete).**
The Construction and Materials Bureau requested to increase the payment for protection of PCC.

4. **Article 2303.03 D, 6, a, 1, b, 8, Lab Voids (Flexible Pavement).**
The Construction and Materials Bureau requested to correct an issue with multiple projects on a contract causing an administration issue.

5. **Article 2304.02, B, Hot Mix Asphalt Option (Detour Pavement).**
The Construction and Materials Bureau requested to allow a more readily available binder to be used for detour pavement.

6. **Article 2412.03, C, 4, Concrete Bridge Decks.**
The Construction and Materials Bureau requested to make this article consistent with the language in the Developmental Specifications for High Performance Concrete for Structures.

7. **Article 2416.05, H, 1, Trenchless (Rigid Pipe Culverts).**
Article 2553.02, Casing Pipe (Trenchless Construction).
The Construction and Materials Bureau requested to include steel pipe substitutions for casing pipe in the Standard Specifications.

8. **Article 2528.03, G, Lighting Devices.**
Section 4188, Traffic Control Devices.
The Traffic and Safety Bureau requested to add specifications for arrow boards to the Standard Specifications.

9. **Article 2556.02, D, Grout (Dowel Bar Retrofit).**
Article 2556.03, D, 1, Grouting Dowel Bars (Dowel Bar Retrofit).
Article 4109.02 (Appendix), Aggregate Gradation Table.
The Construction and Materials Bureau requested to address issues with grout for dowel bar retrofit construction, including adding a new standard gradation.

10. **Section 4127, Aggregate for Flexible Paving Mixtures.**
The Construction and Materials Bureau requested to correct a testing inconsistency with aggregate for flexible paving mixtures.

11. **Article 4183.03, B, 1, b, Fast Dry Waterborne Traffic Paints.**
The Construction and Materials Bureau requested to correct obsolete product names.

12. **Article 4187.01, C, 2, a, 3, Materials for Sign Support Structures.**
The Construction and Materials Bureau requested to correct an obsolete ASTM reference and require ro-cap testing for certain high strength bolts.

13. **DS-15078, High Performance Thin Lift Overlay.**
The Construction and Materials Bureau requested approval of revisions to the Developmental Specifications for High Performance Thin Lift Overlay.

14. **Article 1102.01, H, Competency and Qualification of Bidders.**
The Contracts and Specifications Bureau requested to add two work classes not requiring prequalification.

15. **SS-15XXX, Cold Weather Flexible Paving.**
The Contracts and Specifications Bureau and Construction and Materials Bureau requested approval of Supplemental Specifications for Cold Weather Flexible Paving.

Form 510130 (08-15)

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Michael Nop	**Office:** Bridges and Structures	**Item 1**
Submittal Date:	**Proposed Effective Date:**	
Article No.: 1105.03, E, c **Title:** Working Drawings (Control of Work)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:
1105.03, E, 2, c

Replace Table 1105.03-1:

Table 1105.03-1: Review Bureaus for Working Drawings

ESCRIPTION	REVIEW BUREAU	REVIEW TIME (calendar days)
Falsework for slab bridges	Bridges and Structures	30
Cofferdam design (when required)	Bridges and Structures	30
Reconstruction of substructure (detailed plans for supporting the superstructure)	Bridges and Structures	30
Steel Structures	Bridges and Structures	30
Detail plans for falsework or centering support of steel structures (i.e. erection plans)	Bridges and Structures	30
Steel and aluminum pedestrian hand rails and aesthetic fences	Bridges and Structures	30
Standard support structures for overhead highway signs (i.e. bridge-type trusses, cantilever-type trusses, and bridge mounted supports)	Traffic and Safety[(c)]	30
Precast concrete (i.e. deck panels, RCB culverts, noise wall panels, arch sections, etc.)	Bridges and Structures	30
Tower lighting	Traffic and Safety	30
Highway lighting	Traffic and Safety	30

Bridge mounted light pole base plates and anchor bolts	Bridges and Structures	30
Highway signing steel breakaway posts	Traffic and Safety	30
Traffic signalization[(b)]	Traffic and Safety	30
Highway signing - Type A and B signs	Traffic and Safety	30
Reference Location Signs	Traffic and Safety	30
Bridge components	Bridges and Structures	30
Pre-engineered steel truss recreational trail bridge	Bridges and Structures	30
MSE, segmental, and modular block retaining walls (Preliminary and final submittals shall include design calculations, shop drawings, and field construction drawings)	Design (Soils Design Section)	30 (preliminary) 14 (final)
Soil nail and tie-back retaining walls (Submittal includes final design plans)	Design (Soils Design Section)	60
Intermediate foundation improvement (IFI) (i.e. stone columns, geopiers, etc.) (Submittal shall include design calculations and field construction drawings)	Design (Soils Design Section)	30
Removal of box girder bridges	Bridges and Structures	30
Structural erection manual	Bridges and Structures	30
Temporary shoring	Bridges and Structures	30
Temporary sheet pile retaining wall	Bridges and Structures	30
Architectural mock-ups[(a)]	Bridges and Structures	30
Architectural paving[(a)]	Bridges and Structures	30
Architectural paint color samples and manufacturer data[(a)]	Bridges and Structures	30
Architectural concrete texture form liner samples and drawings[(a)]	Bridges and Structures	30
Architectural concrete sealer samples and manufacturer data[(a)]	Bridges and Structures	30
Architectural ornamental brick[(a)]	Bridges and Structures	30
(a) Submittals of physical samples shall be through the Engineer. **(b)** Submittal time shall be within 45 calendar days from the date of award of contract.		

(c) Working drawings for nonstandard support structures of overhead highway signs shall be reviewed through the Bridges and Structures Bureau.

Comments:

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

1105.03, E, c

Add the following entry to Table 1105.03-1 Review Bureaus for Working Drawings

DESCRIPTION	REVIEW BUREAU	REVIEW TIME (calendar days)
Bridge mounted light pole base plates and anchor bolts	Bridges and Structures	30

Reason for Revision: The BSB has generally been receiving shop drawings for these components, but there has been some confusion as to whether they need to be reviewed since they are not listed in the Specification. Specifically listing them in the Specifications meets BSB desire that they be submitted and reviewed.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X

Comments:

County or City Comments:

Industry Comments: None

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove	**Office:** Construction & Materials	**Item 2**
Submittal Date: March 2020	**Proposed Effective Date:** October 2020	
Section No.: 1107 **Title:** Legal Relations and Responsibility to the Public **Section No.:** 2518 **Title:** Safety Closure **Section No.:** 2528 **Title:** Traffic Control	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text:

1107.08, Public Convenience and Safety.

Replace the Article:

A. The schedule for removal of existing guardrail~~, warning devices,~~ and ~~other~~ traffic control devices requires Engineer's approval. The Contractor may be required to place temporary warning devices at locations where replacement features are not installed the same day as removal takes place.

B. The Contractor shall conduct the work to assure the least possible obstruction to access by the residents along the project. The Contractor shall schedule and conduct the work in such a way as to provide for their safety and convenience. The Contractor shall submit a construction staging plan to the Engineer for local access required to remain open. Relocated accesses shall be completed prior to removal of existing accesses. If a permanent access cannot be completed prior to removal of an existing access, the Contractor shall provide and maintain an alternate access. Work and materials required by the Engineer for public convenience and safety in excess of that provided for in the contract documents will be paid for per Article 1109.03, B.

C. Whenever it is practical to do so, the Contracting Authority will close the portion of the road under construction, provide a detour, and cause suitable detour signs to be erected to mark such detour.

D. When it is not practical for the Contracting Authority to close the road for construction, the Contractor will be expected to perform the work under traffic. The contract documents will ~~indicate this fact and~~ provide instructions for handling traffic through the work area. Unless otherwise stated in the contract documents, all work shall be performed by the Contractor between the hours of 30 minutes after sunrise to 30 minutes before sunset.

E. Except when the contract documents indicate the road is to be closed, ~~during all pavement widening, base widening, and HMA resurfacing work,~~ traffic will be permitted to use the ~~routes~~ roads involved at all times and shall not be delayed unnecessarily. ~~Where a pavement or base is being widened, the machine depositing material shall operate within the designated work area.~~ Construction equipment and materials may be stored within the right-of-way, ~~as far from the traveled way as is practical, but~~ at least 15 feet from the edge of the traveled way, and the roadbed shall be free of Contractor's equipment during non-working hours. The work shall be planned and conducted to cause a minimum delay or interference with traffic.

F. When work on a traveled way necessitates diverting traffic from a work lane to another lane, material, personnel, ~~mobile~~ equipment, and vehicles shall occupy the work lane to the minimum extent and for the minimum time necessary, and non-mobile equipment shall be removed from the work lane promptly after its operation is completed in that lane.

G. On two-lane roadways, a work area shall be established only on one side of the roadway and there shall be no parking of vehicles or equipment on the opposite shoulder within 500 feet of the work area.

~~**H.**~~ The location for storage of materials and equipment by the Contractor during nonworking hours shall be ~~as reviewed~~ at least 15 feet from the edge of the traveled way and approved by the Engineer prior to use.

~~**I**~~ **H.** ~~Parking of private vehicles on Interstate right-of-way will not be allowed.~~ On divided highways, ~~P~~parking of unattended equipment within the median or storage of equipment within 50 feet of the edge of ~~pavement~~ the traveled way will not be allowed.

~~**J**~~ **I.** Materials stored within the highway right-of-way shall be placed to cause a minimum obstruction to traffic. Sidewalks, gutters, sewer inlets, and portions of highway adjoining the roadway under construction shall not be obstructed more than is necessary.

~~**K**~~ **J.** When the shoulder work is a part of the contract for work on a project open to public traffic during construction, the Contractor shall coordinate the operations so that the length and degree of pavement edge drop-off caused or partly caused by the operations are minimized.

~~**L**~~ **K.** Shoulder construction in conjunction with PCC overlay or HMA resurfacing shall meet the following:

1. **Paved Shoulders (Partial or Full Width).**
   Construction shall be staged so no drop-offs exist at the pavement or shoulder edge when the adjacent lane is to be opened to traffic. The pavement edge drop-off requirement shall be satisfied with an HMA shoulder fillet. This fillet shall extend into the shoulder area a minimum of six times the thickness of the drop-off and shall be placed prior to the adjacent lane being opened to traffic. Compaction of the HMA fillet shall be a minimum of one coverage with a pneumatic tired roller per 1 inch of thickness. The fillet shall be removed prior to start of shoulder paving. The shoulder edge drop-off requirement shall be satisfied with a granular fillet, meeting the requirements of the following paragraph.

2. **Granular Shoulders.**
   Construction shall be staged so no drop-offs exist at the pavement edge when the adjacent lane is to be opened to traffic. The drop-off requirements shall be satisfied with a shoulder fillet or full shoulder width of granular material according to Article 2121.03. The fillet shall extend into the shoulder area a minimum of six times the thickness of the drop-off and shall be placed prior to the adjacent lane being opened to traffic. Compaction of the fillet shall be a minimum of one coverage with a pneumatic tired roller per 1 inch of thickness.

~~**M**~~ **L.** Paved shoulder construction adjacent to existing travel lanes shall meet the following:

1. **HMA Shoulder.**
   - Drop-offs greater than 2 inches will not be allowed when the adjacent lane is open to traffic,
   - Place the final lift of HMA shoulder material within 48 hours of the previous lift.

2. **PCC Shoulder.**
   Do not open adjacent lane until PCC shoulder is cured enough to support traffic control devices.

~~**N**~~ **M.** When the Contractor works on a bridge spanning a roadway or passageway, the Contractor shall take all necessary steps to protect the public using the facility below the bridge from falling debris, material, or construction equipment. The Contractor shall submit a safety procedure written plan to the Engineer prior to starting work. The plan shall include the following:

- Design of the means and methods used to provide protection.
- All assumptions used in the design.

Evaluation of the plan and design may require its preparation by a Professional Engineer licensed in the State of Iowa. If so, the costs will be paid for in accordance with Article 1109.03, B.

1107.09, Barricades and Warning Signs.

Replace the Title of the Article:

~~**Barricades and Warning Signs**~~ **Contracting Authority and Contractor Traffic Control Responsibilities.**

1107.09, A.

Replace the first paragraph:

Barricades, channelizing devices, warning signs, and other aspects of traffic control shall be in accordance with the contract documents. In providing adequate and proper traffic control, both the Contracting Authority and the Contractor have certain responsibilities.

1107.09, A, 1, d, Availability.

Delete the last sentence:

~~Replacement materials will also be furnished as necessary.~~

1107.09, A, 2, a, 1.

Replace the third sentence:

When traffic is to be maintained through the construction, the Contractor shall erect and maintain all signs; furnish, erect, and maintain all other traffic control devices and ~~other safeguards~~ pilot cars; and provide all flaggers necessary to protect the traveling public.

1107.09, A, 2, c, Entrance from Local Public Roads.

Delete the second and third sentences:

~~When scarification is part of the contract, ROUGH ROAD signs shall also be erected on the shoulder of the road under construction at local public road intersections. These signs shall be erected, moved when appropriate, and maintained by the Contractor until the scarified areas are covered with the new surface material.~~

1107.09, A, 2, j, Cleaning.

Replace the Article:

The reflective surfaces of signs and traffic control devices shall be washed, as described in ~~Article 2528.03, L~~ Article 2528.03, O, 6, and shall be clean at the time of initial installation on a project.

2518, Safety Closure.

Delete the Section:

~~**2518.01 DESCRIPTION.**~~

~~This section concerns Safety Closures erected as specified in the contract documents. Two types of safety Closures will be specified: Road Closures and Hazard Closures.~~

~~**2518.02 MATERIALS.**~~

~~Use orange mesh safety fence meeting the requirements of Article 4188.03.~~

~~**2518.03 CONSTRUCTION.**~~

~~**A. Erection.**~~

~~**1. Road Closures.**~~

~~**a.** Place a fence meeting the requirements of Article 2518.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.~~

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline. Mount a ROAD CLOSED (RII-2) sign on the Type III barricade.

c. In lieu of Articles 2518.03, A, 1, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches. Mount a ROAD CLOSED (R11-2) sign over the top two rails of on the Type 3 barricade located closest to the approximate roadway centerline.

d. Erect road closures as specified in the contract documents. Erect them on the mainline of the roadway where public traffic is diverted onto an on-site detour and where public traffic is prohibited from entering the work area.

e. Erect road closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

2. Hazard Closure.

a. Place a fence meeting the requirements of Article 2518.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline.

c. In lieu of Articles 2518.03, A, 2, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches.

d. Erect hazard closures as specified in the contract documents. Erect them at locations within a work area when construction involves major hazards on existing or relocated roadways. Such hazards may be located at streams, gullies, railroads, bridge approaches, and driveway locations. Through public traffic should not normally encounter a hazard closure.

e. Erect hazard closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

B. Responsibility.

1. Maintain the location and condition of the safety closures. Any Contractor who temporarily moves the safety closure for equipment or delivery of materials, shall replace it in its original position and is responsible for the restriction of public traffic into the closed area.

2. If a safety closure placed by the Contractor is required for an area after the Engineer's approval of completed work for that specific area, maintenance of that safety closure will become the responsibility of the Contracting Authority. The Engineer will document in writing the transfer of authority.

3. The Engineer will notify the Contractor of the date of removal of safety closures. The safety closure remains the property of the installing Contractor. If the safety closure is not removed by the date specified in the notification, it will become the property of the Contracting Authority and the Contractor will be charged for any removal costs.

2518.04 METHOD OF MEASUREMENT.

The Engineer will count each Safety Closure (either road closure or hazard closure) erected.

2518.05 BASIS OF PAYMENT.

A. Payment will be the contract unit price for each Safety Closure counted.

B. Payment is full compensation for furnishing all material, labor, and equipment necessary to erect, maintain, and remove the Safety Closure, unless indicated otherwise in the contract documents.

2528, Traffic Control.

Replace the Section:

2528.01 DESCRIPTION.

A. General.

1. This section describes various materials, equipment, and procedures involved in traffic control during construction. The Contractor and the Contracting Authority have certain responsibilities, whether public traffic is allowed or is prohibited during construction. Apply Article 1107.09.

2. The contract may include an item for traffic control. In this case furnish, erect, operate, maintain, move, and remove all traffic control devices required by the contract documents.

3. The contract may indicate that traffic control is incidental. In this case the Contracting Authority will furnish all signs and traffic control devices, except pilot car and flaggers' signs, and all Type III barricades, and associated mounting devices. Furnish all other traffic control devices required. Erect, operate, maintain, move, and remove all traffic control devices. Signs and barricades to be furnished by the Contracting Authority will be made available at a nearby maintenance site. Return the signs and barricades when no longer needed. Contracting Authority signs and barricades damaged during construction activities by Contractor's activities shall be replaced at no charge to the Contracting Authority.

4. The contract documents may specify orange mesh safety fence be used in conjunction with other traffic control devices as part of the project traffic control requirements. Use orange mesh safety fence meeting the requirements of Article 4188.03. Securely support the fence so it is in a vertical position without any sagging. Locate and place the safety fence supports so they are not a safety hazard.

5. Ensure all traffic control complies with the current edition of the MUTCD, Part 6 as adopted by the Department, unless modified by the contract documents.

6. On Interstate and Primary Road projects, use crashworthy Category I and Category II traffic control signs and devices that meet NCHRP Report 350; or MASH 2016 (Manual for Assessing Safety Hardware).

7. Upon request provide the following to the Engineer for the purpose of documenting the crashworthiness of Category I and Category II signs and traffic control devices:
- **a.** The vendor's self-certification for Category I traffic control devices.
- **b.** FHWA NCHRP Report 350 or MASH approval memos for Category II signs and traffic control devices.

8. A list of approved Category II traffic control devices is found on the World Wide Web at the following URL: https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/.

~~**9.** Gender specific signs, such as FLAGMAN and MEN WORKING, will not be allowed. Use neutral gender signs, for example FLAGGER, or equivalent symbol signs.~~

~~**10**~~ **9.** Provide 10 calendar days advance notification of a pedestrian path closure to the following:
- National Federation of the Blind of Iowa: Affiliate President, https://nfb.org/resources-iowa.
- Engineer

B. Monitoring with Incident Response.

1. Provide 24 hour per day continuous monitoring of traffic control devices and incident response for emergency situations on projects during complex traffic situations as defined in the contract documents. ~~The contract documents will identify projects requiring monitoring with incident response.~~ Ensure a vehicle and operator traverses the project throughout the entire traffic control zone at all times, except for refueling and short rest breaks no greater than 15 minutes in duration.

2. Furnish this work according to the contract documents any time that signs, barriers, barricades, or other traffic control devices are in place during complex traffic situations.

3. Provide a vehicle and operator for this work as follows:
- **a. Equipment.**
  - **1)** Meet the following requirements:
    - **a)** 3/4 ton pickup truck or another similar vehicle.

b) Contractor's insignia on the doors of the vehicle.
c) Adequate weight and power and suitably equipped to move stalled automobiles, sport utility vehicles, or pickup trucks.
d) Equipped with an amber ~~revolving light or amber strobe~~ or yellow high intensity rotating, flashing, or oscillating warning light visible in all directions and a cellular telephone or similar type of mobile phone.
e) Capable of carrying traffic signs, tools, traffic control devices, and other necessary equipment.

2) When used on projects where more than one lane in one direction is maintained at all times, ensure this vehicle is also be equipped with a Type C arrow panel as described in ~~Article 2528.03, G~~ Article 2528.03, F, mounted to be visible to traffic approaching from behind.

b. Operation.

1) Furnish an operator for the vehicle. Ensure the operator re-erects, repairs, or replaces defective devices immediately upon discovery.

2) Have the operator:
a) Be available to assist persons with vehicle problems and move automobiles, sport utility vehicles, pickup trucks and other obstructions ~~so as~~ to keep travel lanes and shoulders available for public traffic.
b) Continue assistance to motorists and involvement with obstructions until they are no longer an impediment to traffic and further assistance can be provided safely by others.
c) Assist motorists or remove obstructions promptly and safely when a vehicle or anything else is obstructing a travel lane or shoulder intended to be clear.
d) Summon further assistance if needed.
e) Keep a report of any events that restrict the normal traffic flow during complex operations, including responses to emergency situations, on forms provided by the Engineer. Provide the Engineer with a copy of this report daily.

3) During anticipated peak traffic times, the Engineer may direct the Contractor to provide additional monitoring personnel. Payment will be made as extra work according to Article 1109.03, B.

C. Traffic Quality Control.

1. Maintain a Traffic Control Technician on staff, even though the traffic control portion of the contract may be subcontracted. The Traffic Control Technician is required to have attended and passed the exam in an ATSSA Traffic Control Technician, IMSA Work Zone Traffic Control, Iowa AGC Traffic Control Technician class, Minnesota DOT Traffic Control Supervisor training class, or Texas Engineering Extension Service Work Zone Traffic Control training class. This Traffic Control Technician is responsible for overall management of the Contractor's quality control program for traffic control. Starting April 2018, the Traffic Control Technician shall retake and pass the exam in one of the approved classes every 5 years.

2. Daily as the project is constructed, perform the following quality control work associated with monitoring and documenting traffic control conditions:
a. Review all traffic control operations for compliance with contract documents and maintain a project traffic control daily diary in a format provided by the Contracting Authority. Submit this diary to the Engineer. It will become a part of the Contracting Authority's permanent project records. The Engineer may require submission of completed portions of the daily diary at routine intervals during construction of the project. In the diary include:
- Listing and station location of traffic control used each day referenced to the appropriate Standard Road Plan, project plan sheet, etc.,
- All reviews of traffic control devices and operations, whether satisfactory or unsatisfactory, and corrections made,
- Approved changes to the contract document's traffic control,
- Incidentals affecting the efficiency and safety of traffic, and
- A daily list of trained flaggers used, including hours worked.

b. Monitor traffic operations and submit proposed Traffic Control Plan changes to the Engineer for approval.
c. Coordinate all changes to the Traffic Control Plan.
d. Coordinate all traffic control operations, including those of subcontractors and suppliers.

3. Employees who install and remove temporary traffic control signs and devices shall be supervised by a trained Traffic Control Technician per Article 2528.01, C, 1. When traffic control is installed or

removed, the Traffic Control Technician who supervised the installation or removal of temporary traffic control devices and signs shall document in the daily traffic control diary what was installed or removed.

2528.02 MATERIALS.
Use materials meeting the requirements of Part 6 of the MUTCD and Division 41 for the respective traffic control signs and devices.

2528.03 ~~SIGNS AND DEVICES~~ CONSTRUCTION.

A. Signs.

1. Furnish signs that are of the size and type shown in the contract documents and use retroreflective sheeting meeting the requirements of Article 4186.03.

2. For Interstate and Primary projects, furnish diamond shaped warning signs that are 48 inches by 48 inches unless specified otherwise in the contract documents.

3. For traffic control zones in duration for 4 calendar days or more, mount signs on fixed posts.

4. Signs for traffic control zones in duration for less than 4 calendar days may be mounted on moveable skids or fixed posts.

5. Meet the following requirements for fixed post mounted signs:
- **a.** Sign sheeting applied to rigid wood or metal.
- **b.** Mounted at a height of at least 7 feet, measured from the bottom of the sign to the near edge of the pavement. A secondary sign on the same post may be mounted 1 foot lower than specified above.
- **c.** A clear distance 2 feet behind a curb or beyond the edge of the shoulder.

6. Meet the following requirements for moveable skid mounted signs:
- **a.** Flexible roll-up sheeting or other skid mounted sign systems that meet NCHRP 350 or MASH requirements.
- **b.** Mounted at a height of at least 1 foot above the roadway.

7. Ensure mounting devices are not so substantial as to be a hazard to vehicles. Meet the following requirements for posts mounted in existing soil:
- **a.** Wood sign supports meeting the materials requirements of Article 4164.04.
- **b.** 3.0 pounds per foot U-shaped rail steel posts.
- **c.** 2 1/4 or 2 1/2 inch square 12 gage perforated steel tubing.

8. Dual-post and triple-post configurations using these sign supports are acceptable provided that no more than two posts occupy any 8 foot wide path. Bracing of these posts will not be permitted. Posts exceeding these requirements shall have breakaway features approved by the Engineer.

9. Ensure signs are in a condition so they are effective for the intended purposes when viewed from a vehicle. For nighttime installations, ensure the reflectance is adequate so that the message is clearly readable. Ensure signs are maintained in a near vertical position.

10. When indicated in the contract documents, use supplemental sign flags in conjunction with work zone signing. Use sign flags 16 inches square and sheeted with red Type ~~IV~~ XI retroreflective sheeting meeting requirements of Article 4186.03.

11. On projects where two new lanes are being constructed adjacent to an existing two lane highway, place TWO WAY TRAFFIC (W6-3) signs. Place them off the right shoulder of mainline: 1) after each public side road for each direction of travel for traffic that may enter from all intersecting side roads; or 2) at 1/2 mile intervals, whichever is less. Install these signs when grading activities start and leave in place until the entire four lane divided highway is opened to traffic. If the pavement is constructed under a separate contract, leave these signs in place after the grading contract is completed. They become the property of the Contracting Authority. The paving contractor then takes over these signs and removes them when the four lane divided highway is opened to traffic. Payment will be according to Article 2528.05, A.

12. When directed by the Engineer, cover or remove permanent signing that conveys a message contrary to the message of the temporary signing and not applicable to the working conditions. When the work is completed uncover or replace permanent signing. Permanent signs damaged by the Contractor's activities shall be replaced at no charge to the Contracting Authority.

13. The END ROAD WORK (G20-2) sign may be eliminated for mobile or short duration (less than 1 hour) temporary traffic control zones.

14. When milled or scarified surfaces exist, sign approaches to scarified areas using ROUGH ROAD (W8-8) signs. Place signs at least 250 feet in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At locations where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet in advance of each location. Erect, move, and maintain these signs until milled or scarified areas have been covered with new HMA or PCC pavement.

B. **Portable Dynamic Message Signs**

Furnish, place, operate (when specified), and maintain Portable Dynamic Message Sign (PDMS) meeting requirements of Article 4188.07 at locations shown on the plans. The Contractor maintains possession of PDMS upon completion of the project.

1. Testing and Configuration.

- **a.** Physical and electronic access to PDMS shall be granted to the Engineer.
- **b.** On Interstate and Primary projects:
  - **1)** At least 1 week before PDMS is deployed to a project, a testing and configuration meeting with the Engineer shall be held.
  - **2)** The Contractor shall perform necessary configuration adjustments to the PDMS and cellular modem to allow remote control by the Contracting Authority's NTCIP software.

2. Remote Operation.

- **a.** On Interstate and Primary projects, the Department will remotely operate signs through use of a modem and NTCIP software.
- **b.** Contracting Authority will use their own NTCIP compliant software to activate messages, check sign's status, and perform diagnostic tests.
- **c.** Anytime during the project, the Engineer may remotely activate a message on the PDMS. Any message placed on the PDMS shall not be removed or replaced by the Contractor unless requested by the Engineer.

3. Direct Operation.

- **a.** On Secondary road projects, PDMS will be operated directly by either the Contractor or the Engineer.
- **b.** Engineer may request the Contractor to operate PDMS for advance traffic notification and warning. Authority to operate PDMS will be under the direction of the Engineer. The Contractor may only operate the PDMS to display messages authorized by the Engineer.
- **c.** Promptly program and/or reprogram the computer to provide the messages as directed by the Engineer.

4. Maintenance.

- **a.** Provide preventive maintenance necessary to achieve uninterrupted service. Provide monitoring of health of each PDMS to accomplish proactive preventive maintenance and provide uninterrupted service. This includes, but is not limited to, performing remote diagnostic tests of equipment's operational status, monitoring status of system performance such as communication, battery status, etc.
- **b.** Engineer may perform remote diagnostic tests of sign's operational status and notify Contractor when a problem is detected.
- **c.** Respond to service phone calls immediately and to the service request emails within 2 hours. Conduct remote or on-site troubleshooting and respond back to the Engineer with notification of action (i.e. device repaired remotely, sending field technician, etc.) within 2 hours of responding.
- **d.** Provide unscheduled maintenance or total replacement of sign when sign is unable to display a message adequately within 24 hours of notification. Action shall be taken to resolve the following problems if they have been visually observed or confirmed by self

diagnostics by the PDMS for three continuous days or seven intermittent days over a 2 week period.

1) An entire pixel board is showing failure.

2) Five or more pixel failures over entire message panel anytime while sign is deployed for use (blank or displaying a message).

3) Two or more pixel failures in any character when displaying a message.

e. Repairs shall be completed within 12 hours of initial notification or the Engineer may cause such work to be performed as may be necessary to provide this service. The cost for this restoration shall be borne by the Contractor.

C. Channelizing Devices.

1. Use Channelizing Devices that are of the type shown in the contract documents. Ensure all channelizing devices meet the current requirements of the MUTCD and Section 4188. Use reflective sheeting meeting the requirements of Article 4186.03.

a. Barricades.

~~**1)** A 2 foot minimum length barricade may be used when Type I or Type II Barricades are furnished as one of the options for channelizing devices in lieu of vertical panels, 42 inch channelizers, cones, or drums.~~

~~**2** **1)** Ensure Type III barricades have a minimum length of rail of 6 feet. When traffic is permitted in each direction around a Type III Barricade, ensure the Type III Barricade used has fully reflectorized faces on both sides of the rails.

~~**3** **2)** Erect barricades in essentially a ~~horizontal~~ vertical position perpendicular to the direction of approaching traffic. Ballast them so as not to cover any striped rail.

b. Cones, ~~Vertical Panels,~~ 42 Inch Channelizers, Drums, and Tubular Markers.

1) Ensure cones, ~~vertical panels,~~ 42 inch channelizers, drums, ~~and~~ tubular markers, and other traffic control devices meet the current requirements of the MUTCD, and Section 4188.

~~**2)** When used to separate two way traffic, separate temporary no passing lines approximately 16 inches, with the marker to be installed between these lines.~~

~~**3** **2)** Ensure tubular markers meet the following:

a) A nominal 36 inch height.

b) Diameter facing traffic at least 2 inches in width.

c) Completely faced with reflectorized white and orange sheeting that is in two bands 4 inches wide with 6 inches between bands, with the top band no more than 2 inches from the top of the tubular marker.

~~**4** **3)** Cones may be used as channelizing devices in tapers and along lane lines during daylight hours only.

~~**5** **4)** 42 inch channelizers may be used in place of drums in work areas remaining in place for up to three days. Spacing of channelizers shall be half the spacing required for drums or double the number of drums required.

c. Temporary Lane Separator System.

1) Installation.

Install according to the manufacturer's recommendations.

2) Maintenance.

Repair or replace all damaged curb units or posts no later than 24 hours after the damage is reported to the Contractor.

3) Removal.

a) Upon completion of the project, the temporary lane separator system will remain the property of the Contractor for systems used in temporary traffic control zones. When placed as part of a permanent installation, the system will become the property of the Contracting Authority.

b) Repair all holes left in the pavement or bridge deck when the temporary lane separator system is removed. Holes shall be filled with a non shrink grout meeting the requirements of Materials I.M. 491.13.

2. Channelizing devices may be placed up to 2 feet beyond centerline or lane line at specific locations where actual work activity is taking place. Return channelizing devices to the original position when the work activity has passed.

3. Individual channelizing devices may be omitted during working hours in areas where placement interferes with the work. Channelizing devices on tapers are required at all times.

4. Do not intermix channelizing devices of different types.

5. For pedestrian path closures, use Type III Barricades to block the full width of the pedestrian path. Mount a SIDEWALK CLOSED (R9-9) sign to at least one of the Type III barricades at each closure.

~~**D. Pilot Cars.**~~

~~**1.** Pickup trucks or automobiles displaying the Contractor's company insignia, equipped with G20-4 signs reading: PILOT CAR - FOLLOW ME. Ensure two signs are mounted on the vehicle so as to be clearly visible from both directions of traffic. Mount the signs so the bottoms are at least 1 foot above the top of the vehicle's roof.~~

~~**2.** Operate pilot cars such that they maintain a uniform speed through the work area, no greater than 40 miles per hour.~~

~~**E**~~ **D. Temporary Barrier Rail.**

Use temporary barrier rail as shown in the contract documents. Unless shown otherwise, use precast concrete units. Tie the units together as specified or as approved by the Engineer.

~~**F**~~ **E. Modular Glare Screens.**

1. When specified in the contract documents furnish, install, and maintain a modular glare screen system on the top of concrete barrier rail according to the contract documents and the modular glare screen system manufacturer's instructions. Furnish a system consisting of modular base rails attached to the top of concrete barrier rail with blades evenly spaced and securely mounted to the base rails. Ensure the following:

- Modular base rails and glare screen blades are compatible so the base unit and blades can be securely attached to each other.
- Base rails and blades supplied are manufactured by the same manufacturer.
- The length of individual modular base rails is no longer than the nominal length of individual temporary concrete barrier rail sections.
- The width of the modular base rails is no wider than the top width of the concrete barrier rail.
- Glare screen blades are FHWA highway green in color and made of impact resistant non-metallic high density plastic material.
- Blade height is from 24 inches to 30 inches and width is from 6 inches to 9 inches.
- The same uniform sized blades are used throughout the work.
- The modular glare screen system is manufactured by a company on the approved manufacturer's list in Materials I.M. 486.06, Appendix A.

2. Install the modular glare screen system according to the manufacturer's instructions and the approval of the Engineer. Install the system so that:

- It is centered along the longitudinal axis length of the top of the concrete barrier rail.
- The overhang of the base rails, blades, and associated assembly over the edges of the top of the concrete barrier rail is kept to a minimum.
- The modular base rails are flush with the top of the concrete barrier rail and they do not extend over the joints between concrete barrier rail sections. A maximum gap between base rails across barrier rail gaps shall be 12 inches.

3. Install glare screen blades so the combination of blade width and spacing provide for a minimum 22 degree sight cut-off angle.

4. Glare screen blades shall be free from reflective sheeting or other modifications and shall be consistent in appearance.

5. Maintain the modular glare screen throughout the work. Replace or repair damaged parts of the modular glare screen system, as soon as practical, at no additional cost to the Contracting Authority.

6. When moving temporary barrier rail with a modular glare screen system, the Contractor may temporarily remove base rails and glare screen blades, if necessary, to assist in the moving. Reinstall the removed base units and glare screen blades as soon as the temporary concrete barrier rail has been moved to its new location.

7. Perform final removal of the modular glare screens from the concrete barrier rail when directed by the Engineer. Upon removal, ensure there are no protrusions on the top of the concrete barrier rail.

8. Upon completion of the work, the Contractor retains ownership of the modular glare screen system.

G F.Lighting Devices.

1. Furnish lighting devices as required by the contract documents. Type A barricade warning lights will normally be required for nighttime installations. Type B warning lights will normally be required for 24 hour operation.

2. Use barricade warning lights that comply with the ITE Standard for Flashing and Steady Burn Barricade Warning Lights and are identified as such. In addition, use Type A barricade warning lights that:

- Operate on a 12 volt battery system, unless the ITE identification specifically indicates that the rating is based on a different system, and
- Are visible to both directions of traffic.

3. When arrow displays are used, furnish Type C arrow displays described in the current edition of the MUTCD, Part 6, and operate them in a sequential chevron mode when indicating a lane change.

H G.Temporary Traffic Signals.

1. General.

a. Set up and operate temporary traffic signals as shown in the contract documents. Ensure the temporary traffic signal system meets the physical display and operational requirements of conventional traffic signals as specified in Part 4 of the MUTCD. Unless stated otherwise in the contract documents, either a span wire or trailer mounted temporary traffic signal system may be provided.

b. In the event any part of the temporary traffic signal system malfunctions or a continuous red flash mode is encountered, furnish flaggers on a 24 hour/7 day a week basis until repairs are made and the signals are fully functional. For temporary traffic signals at intersections, install stop signs on all approaches until the signals are fully operational, at no additional cost to the Contracting Authority.

c. Notify the Engineer at least 48 hours prior to the use of the signals for timing approval and verification.

2. Equipment.

a. Trailer, or Span Wire Mounted, or Flagger Station Systems.

1) Furnish actuated signal controllers complying with NEMA and ITE standards. Ensure the temporary traffic signal system complies with the following:

a) Includes a solid state digital traffic signal controller capable of operating the signals according to MUTCD requirements and NEMA Standard TS1 TS-5. A copy of the manufacturer's certificate of compliance is to be posted in the control cabinet (in a weatherproof folder) and made available to the Engineer upon request.

b) Has conflict monitoring complying with NEMA Standard TS1 and the following:

- Detects the presence of conflicting signal indications, absence of proper voltages, and proper operation of the controller.
- Upon detection of a conflict or loss of communication, all signals enter into flashing red mode.

2) Apply Article 2525.03, E, 4, with the following exceptions for one lane two way traffic control:

a) Green Revert.
If during an All Red clearance interval a call occurs on the phase losing the right-of-way prior to a call on any other traffic phase, the right-of-way reverts to the previous traffic phase, initiating the initial green interval. The transfer is to be immediate without completing the All Red clearance interval.

b) Rest in Absence of Actuation.
In the absence of detector actuation of assertion or recall switch(es), the right-of-way indication dwells in All Red.

3) Comply with the following:

a) Clearance for overhead wiring is a minimum of 18 feet.

b) A detection area is located near the stop line with the downstream edge positioned 6 feet from the stop line. A second detection area is located 100 to 150 feet in advance of the stop line. The size of detection areas is 6 feet by 10 feet. A single above-ground detector may be used to provide detection for both areas.

c) Signal heads have 12 inch lenses and comply with ITE Specification "Vehicle Traffic Control Signal Heads". All signal heads are equipped with visors and back plates. The backplate provides a minimum of 5 inches black field around the signal assembly and has a dull black finish.

d) A minimum of two traffic signal heads per approach. All signal heads mounted over the road surface are mounted a minimum of 15 feet from the bottom of the signal head to the top of the road surface. One signal head mounted over the center of the travel lane. All far right signal heads mounted a minimum of 8 feet from the bottom of the signal head to the top of the ground surface. Required signal heads for through traffic on any one approach located no less than 8 feet apart measured horizontally perpendicular to the approach between the centers of the signal faces.

b. Trailer Mounted Systems.

Provide a system consisting of two or more self-contained trailer mounted units each containing two signal heads.

c. Span-Wire Mounted Systems.

Ensure posts meet the requirements of Article 2528.03, A.

d. Flagger Station Systems.

Provide a traffic signal system, for one-lane/two-way operation in conjunction with a flagger and/or pilot car operation in order to provide greater advance visibility to the flagging operations.

- Two or more self-contained trailer mounted units each consisting of one or two signal heads.
- Single-signal head systems shall have a signal head mounted on each side of the roadway
- Two-signal head systems shall have one signal head mounted on a mast arm capable of extending over the center of the travel lane and the other signal head mounted on the same trailer.

3. Operational Requirements.

a. Locate signals, stop bars, and signs exactly as identified in the contract documents. Secure and level temporary traffic signal installations in a manner approved by the Engineer.

b. Program all temporary traffic signals for red flash upon startup, conflict, or power failure. Program the temporary traffic signal system to dwell in All Red.

c. For one lane two way traffic control operations, when an additional phase is used for a side road movement, only one long all red interval is to be used between active phases on each side of the work area.

d. Set signal timing as identified in the contract documents.

4. Equipment Crossings.

a. For equipment crossings, use a signal operator to control the signal system. Position this operator with good sight distance for both the mainline and haul road.

b. Program the signal system with fixed yellow and all red time periods so the operator can only activate the beginning of the yellow interval for mainline traffic.

c. When the equipment crossing is not in use, set the signal to yellow flash mode. If hauling operations are suspended for more than one week, cover the signal heads, or if portable trailer units are used, remove the trailers.

~~I~~ H. Temporary Floodlighting.

1. General.

a. Set up and operate either pole mounted or portable~~, mobile~~ self contained LED temporary floodlights at locations shown in contract documents.

b. Ensure floodlighting is installed and in service before commencing work requiring nighttime traffic control according to the traffic control plan.

c. Exercise reasonable care to avoid interruptions during hours of darkness, promptly repair damage to system, and replace burned out lamps promptly.

2. Equipment.

a. Pole Mounted Floodlights.

1) Pole-mounted luminaire.

2) Mounting height of luminaires is no less than 35 feet above the roadway and as shown in the contract documents. Pole length determined by field measurement to obtain specified mounting height.

3) Place poles outside normal shoulder line at approximate locations shown on the contract documents.

4) Meet the following requirements for floodlighting luminaires:
- Standard roadway types with totally enclosed refractors.
- IES glare control rating of "cut off".
- Lamps with initial output rating at least 19,000 lumens.
- Photoelectric controlled for dusk to dawn operation.
- Approval of the Engineer.

5) Ensure clearance for overhead wiring at least 18 feet. Auxiliary poles used to furnish power to floodlighting offset 30 feet from traveled way unless there are right-of-way restrictions.

6) Above ground lighting circuits are aluminum or A.C.S.R. triplex.

7) Underground lighting circuits are type U.S.E. or U.F.

b. Portable~~, Mobile~~ Self Contained LED Floodlights.

1) Mounted on portable trailers containing solar cell array and storage battery system to power LED luminaire. Ensure system meets NCHRP 350 or MASH Category IV crash testing.

2) Ensure mounting height of LED luminaires is no less than 17 feet above roadway, or as shown in the contract documents.

3) Locate portable trailers so LED luminaire is centered over outside edge of pavement and trailer is on shoulder offset as far as possible from traveled way

4) Meet materials requirements of Article 4188.05 for LED Floodlighting Luminaires.

~~J~~ I. Temporary Crash Cushions.

Apply Section 2551.

~~K~~ J. Flaggers.

1. Prior to flagging operations, ensure flaggers are trained in safe flagging operations that comply with Iowa DOT Flagger's Handbook, Part 6 of the MUTCD, and the Standard Specifications. Ensure training of flaggers includes the following:

a. Issuing and reviewing the current Iowa DOT Flagger's Handbook,

b. Presentation of the current Iowa Professional Flagging Video,

c. Issuing flagger training cards including the information below. ~~Ensure the flaggers carry their flagger training card at all times and show it upon request.~~

1) Employee name,

2) Date of training,

3) Name of Instructor, and

4) Expiration date of December 31 of the year following the training date.

2. Maintain a list of the flaggers trained and the date of the training.

3. Training is not required for short time, emergency, or relief assignment of employees to flagging operations. Payment will not be made in accordance with Article 2528.05, I.

4. Ensure flagger operations, equipment, and apparel comply with the current Iowa DOT Flagger's Handbook.

5. When nighttime flagging is required, provide auxiliary lighting to illuminate the flagging stations according to the MUTCD, Part 6 and current Iowa DOT Flagger's Handbook. Set up this lighting in such a manner to minimize glare to motorists. The cost of furnishing nighttime flagging station~~s~~ lighting is included in the lump sum price bid for Traffic Control.

6. Ensure flaggers always carry their flagger training card and show it upon request.

K. Pilot Cars.

1. Pickup trucks or automobiles displaying Contractor's company insignia on doors of the vehicle, equipped with G20-4 signs reading: PILOT CAR - FOLLOW ME. Ensure two signs are mounted on vehicle ~~so as~~ to be clearly visible from both directions of traffic. Mount signs so bottoms are at least 1 foot above top of vehicle's roof.

2. Operate pilot cars so they maintain a uniform speed through work area, no greater than 40 miles per hour.

L. Temporary Portable Rumble Strips

Use temporary portable rumble strips of the type shown in the contract documents and meeting requirements of Article 4188.08.

1. Placement.

a. A temporary portable rumble strip panel consists of three individual temporary portable rumble strips placed on roadway surface.

b. Place centerline end of temporary portable rumble strip 6 inches from centerline of roadway perpendicularly extending its full length transversely across pavement surface.

c. Place each individual temporary portable rumble strip 15 to 20 feet apart within the temporary portable rumble strip panel.

2. Maintenance.

Ensure temporary portable rumble strips maintain alignment within 6 inches perpendicular to centerline of roadway when measured from one end to the other end of the individual temporary portable rumble strip.

3. Removal.

When temporary traffic control requiring temporary portable rumble strips is no longer in operation, remove temporary portable rumble strips from roadway.

M. Speed Feedback Signs.

Furnish, place, operate, and maintain speed feedback signs at locations shown on the contract documents. Ensure all speed feedback signs meet the current requirements of the MUTCD and Section 4188.

1. Definitions.

a. Speed Feedback Trailer.

Speed feedback trailers are mobile devices using speed feedback signs to capture vehicle speed for oncoming traffic.

b. Display.

The display is a device connecting to the speed feedback trailer capable of broadcasting the speed of oncoming traffic captured by the speed feedback sign. This device allows for vehicle speed feedback to the vehicle operator, allowing for speed adjustment throughout the remainder of the work zone.

2. Testing and Configuration.

a. At least 1 week before speed feedback trailer is deployed to a project, a testing and configuration meeting with the Engineer shall be held.

b. The Contractor, in conjunction with the Engineer, will perform necessary configuration adjustments to the speed feedback trailer.

3. Maintenance.

a. Provide preventive maintenance necessary to achieve uninterrupted service.

b. Verify operational status each day as part of the daily diary and notify Engineer when a problem is detected.

c. Provide unscheduled maintenance or total replacement of sign when sign is unable to display a message adequately within 24 hours of notification. Action shall be taken to resolve the following problems if they have been visually observed or confirmed by self diagnostics by the speed feedback trailer for 3 continuous days or 7 intermittent days over a 2 week period.

1) An entire pixel board is showing failure.

2) Five or more pixel failures over entire message panel anytime while sign is deployed for use (blank or displaying a message).

3) Two or more pixel failures in any character when displaying the speed.

d. If service is not restored within 24 hours, Engineer will cause such work to be performed as may be necessary to provide this service. The cost for this restoration shall be borne by the Contractor.

~~**4.** Remove speed feedback trailers when no longer needed.~~

N. Safety Closure.

Two types of safety closures will be specified: road closures and hazard closures.

1. Road Closures.

a. Place fence meeting requirements of Article 2528.02 across roadway from outside edge of shoulder to outside edge of shoulder. Securely support fence so it is in a vertical position without sagging.

b. Place Type III barricade, described in Part 6 of the MUTCD, immediately in front of fence at the approximate roadway centerline. Mount ROAD CLOSED (RII-2) sign on the Type III barricade.

c. In lieu of Articles 2528.03, N, 1, a and b above, place a series of Type 3 barricades across roadway from outside edge of shoulder to outside edge of shoulder. Ensure gaps between Type 3 barricades are no greater than 6 inches. Mount ROAD CLOSED (R11-2) sign over the top two rails of on the Type 3 barricade located closest to the approximate roadway centerline.

d. Erect road closures as specified in the contract documents. Erect them on the mainline of roadway where public traffic is diverted onto an on-site detour and where public traffic is prohibited from entering work area.

e. Erect road closures beginning with the start of the contract period as specified in the contract documents, or when work commences.

2. Hazard Closure.

a. Place fence meeting requirements of Article 2528.02 across roadway from outside edge of shoulder to outside edge of shoulder. Securely support fence so it is in a vertical position without sagging.

b. Place Type III barricade, described in Part 6 of the MUTCD, immediately in front of fence at the approximate roadway centerline.

c. In lieu of Articles 2518.03, N, 2, a and b above, place a series of Type 3 barricades across roadway from outside edge of shoulder to outside edge of shoulder. Ensure gaps between Type 3 barricades are no greater than 6 inches.

d. Erect hazard closures as specified in the contract documents. Erect them at locations within work area when construction involves major hazards on existing or relocated roadways. Such hazards may be located at streams, gullies, railroads, bridge approaches, and driveway locations. Through public traffic should not normally encounter a hazard closure.

e. Erect hazard closures beginning with the start of the contract period as specified in the contract documents, or when work commences.

3. Responsibility.

a. Maintain location and condition of safety closures. Any Contractor who temporarily moves the safety closure for equipment or delivery of materials, shall replace it in its original position and is responsible for the restriction of public traffic into the closed area.

b. If a safety closure placed by the Contractor is required for an area after the Engineer's approval of completed work for that specific area, maintenance of that safety closure will become the responsibility of the Contracting Authority. The Engineer will document in writing the transfer of authority.

c. The Engineer will notify Contractor of the date of removal of safety closures. Safety closure remains property of the installing Contractor. If safety closure is not removed by the date specified in the notification, it will become property of the Contracting Authority and the Contractor will be charged for removal costs.

~~N~~ O.Limitations.

1. Use sandbags or other crashworthy methods to anchor all traffic control devices subject to movement by wind.

~~**2.** When a two way road is open to public traffic during contract work, do not control one way traffic through the work area by means of a carry through flag or other token, except during equipment failure or emergency. Use other means when voice or signal communication between flaggers at control points is difficult or not effective because of distance, sight, or noise. Other means may be two way radio, pilot cars, or traffic signals.~~

~~**3.** Use pilot cars when the normal work area exceeds 1/4 mile on Primary projects. Where necessary for short durations, the distance may be extended to 1/2 mile for better sight distance or to clear intersections or other safety considerations with approval of the Engineer, provided a two-way radio is used for communication between flaggers.~~

~~**4**~~ **2.** During non-working hours, remove, cover, or turn down traffic control devices intended for working hours only, unless a drop-off or physical obstruction remains within 15 feet of a lane open to traffic. Signs or barricades are not required for work beyond 15 feet of a lane open to traffic. Remove traffic control devices when no longer needed.

~~**5**~~ **3.** Personnel in the highway right-of-way shall wear only orange or strong yellow green ANSI 107 Type R Class 2 apparel when exposed to traffic or construction equipment. Orange or strong yellow green colored or a combination of these colors, ANSI 107 Class E pants or shin reflectors/gaiters are also required to be worn at night. Shin reflectors/gaiters shall have a minimum of two 2 inch bands of retroreflective material spaced at least 6 inches apart. Background material shall extend at least 2 inches above and below retroreflective bands and continue through the length of shin reflector/gaiter. Shin reflector/gaiter shall completely encircle the leg and be worn on lower leg between knee and ankle.

~~**6**~~ **4.** The Engineer may require signs and traffic control devices to be recleaned by washing. Use a brush and water, and detergent or solvent as necessary. Include the entire target area or sign face, supplemental or auxiliary signs, if any, all reflectors, and faces of warning lights which are part of that device.

~~**7**~~ **5.** Ensure entry to and exit from work areas is in the direction of public traffic and does not cross open traffic lanes at other than designated locations.

~~**8**~~ **6.** During hours of darkness, operate equipment in the traffic control zone facing in the direction of traffic flow unless specified otherwise in the Traffic Control Plan. Darkness will include the period from sunset to sunrise and other times when conditions such as fog, snow, sleet or rain provide insufficient lighting to clearly identify persons and vehicles on the highway at a distance of 500 feet ahead.

~~**9**~~ **7.** Unless stated otherwise in the ~~traffic control plan~~ Traffic Control Plan, provide for a minimum of 2 miles between traffic control zones on rural roadways. The Engineer will determine minimum distances between traffic control zones on urban roadways.

~~**10**~~ **8.**Submit Traffic Control Plan modifications to the Engineer for review and approval prior to any changes being made. The Engineer may modify sign spacing to meet existing field conditions or to prevent obstruction of the motorist's view of permanent signing.

~~**11**~~ **9.**Ensure vehicles (except ready mix trucks) hauling soil, aggregate, ~~and~~ paving material, and other construction material to or from work area display a minimum 16 inch by 48 inch sign with the legend "DO NOT FOLLOW - INTO WORK AREA", as shown in the contract documents. Comply with the following requirements for the sign:

- Orange with black lettering using Type VII (Iowa) sheeting.
- Keep clean to maintain its visibility.

~~**12**~~ **10.**For lanes closed to traffic, place two drums meeting the requirements of Article 2528.03, C, every 1000 feet. For full depth excavations in a closed lane, place two drums in front of each location. Additional drums need not be placed for full depth excavations spaced closer than 150 feet.

~~**13.** When milled or scarified surfaces exist, sign approaches to scarified areas using ROUGH ROAD (W8-8) signs. Place signs at least 250 feet in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At locations where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet in advance of each location. Erect, move, and maintain these signs until milled or scarified areas have been covered with new HMA or PCC pavement.~~

~~**14**~~ **11.**~~Active~~ ~~c~~Contractor vehicles and self-propelled equipment (except hand operated equipment) operating or parked within 15 feet of an open traffic lane (unless shielded by temporary or permanent barrier) and contractor, delivery, ~~and~~ service and private vehicles entering or exiting work area shall display cab roof mounted amber or yellow high intensity rotating, flashing, or oscillating warning

lights. Repair or replace vehicle warning lights not functional or missing within 24 hours.

12. Parking of private vehicles on Interstate right-of-way will be allowed if private vehicles are parked at least 15 feet away from an open traffic lane when Contractor is working. Parking of private vehicles on Interstate right-of-way is not permitted during non-working hours. Request approval from Engineer of location for parking of private vehicles.

13. Conduct operations within the same lane from the start of work area to end of work area and do not shift traffic from one lane to another lane unless allowed in the contract documents. If the contract includes work in adjacent lanes, space individual lane closures for each lane per requirements in Article 2528.03, O, 9.

2528.04 METHOD OF MEASUREMENT.

Measurement will be as follows:

A. Traffic Control.
Lump sum.

B. Portable Dynamic Message Signs.
The Engineer will count the number of days each Portable Dynamic Message Sign is required to be in place along a road and capable of displaying messages to the traveling public. Days when PDMS is blank and is in good working condition, will be measured. Days when PDMS is unable to display a message due to cellular ~~(when specified)~~ or mechanical problems will not be measured. Days when PDMS is on the roadway and not approved by the Engineer will not be measured.

C. Temporary Barrier Rail.
The Engineer will ~~calculate~~ measure the length of temporary barrier rail used ~~based on count and the nominal length of each unit~~ in linear feet. The length of temporary barrier rail measured will be the length required per setup. Measurement will also be made for temporary barrier rail moved within, or added to, an existing setup when required by the contract documents. Measurement of temporary barrier rail, after its initial placement, will not be made unless it is required by the contract documents to be moved.

D. Temporary Lane Separator System.
The Engineer will measure the length of the Temporary Lane Separator System installed in linear feet.

E. Modular Glare Screen.
Measurement for Modular Glare Screen System will be in linear feet.

F. Temporary Crash Cushions.
Article 2551.04 applies.

G. Temporary Traffic Signals.
By count for each group installation of temporary traffic signals operated by a common control unit. A group installation is normally four signal heads at the same traffic conflict area.

H. Temporary Floodlighting Luminaire.
By count.

I. Pilot Cars.

1. By count for the number of pilot cars used during each work shift. A shift is a scheduled period of work for the Contractor's operations.

2. For a pilot car to be counted:
- **a.** Use of the pilot car is necessary and it is used as part of preplanned work that is started that shift and is intended to proceed for a major part of the shift. If used less than 4 hours during a shift, one half pilot car will be counted.
- **b.** Use of other pilot cars is necessary and they are used for at least 1 hour during the shift, perhaps intermittently, and this shall be the primary duty of the employee. If used less than 4 hours in a shift, one-half pilot car will be counted. If used at least 4 hours, but less than 12 hours, a total of one pilot car will be counted. If used 12 hours or more, an additional one-half pilot car will be counted for a total of 1.5 pilot cars for the shift.

J. Flaggers.

1. By count for the number of flaggers used during each work shift. A shift is a scheduled period of work for the Contractor's operations.

2. For flaggers to be counted:
- **a.** Use of the flaggers is necessary and they are used as part of preplanned work that is started that shift and is intended to proceed for a major part of the shift. If used less than 4 hours during a shift, one-half flagger will be counted. If used at least 4 hours, but less than 12 hours, a total of one flagger will be counted. If used 12 hours or more, an additional one-half flagger will be counted for a total of 1.5 flaggers for the shift.
- **b.** Use of other flaggers is necessary and they are used for at least 1 hour during the shift, perhaps intermittently, and this shall be the primary duty of the employee. If used less than 4 hours in a shift, one-half flagger will be counted.

K. Monitoring with Incident Response.
Calendar days based on the contract quantity. Additional personnel required by the Engineer to provide additional traffic monitoring of ~~CMS~~ PDMS operation will be measured in calendar days per person needed.

L. Safety Closures.
By count for number of Safety Closures placed.

2528.05 BASIS OF PAYMENT.
Payment will be at the contract unit price as described below. When the Engineer requires recleaning of reflectorized surfaces of signs and traffic control devices, payment will be made as extra work according to Article 1109.03, B. All signs and traffic control devices furnished by the Contractor remain the Contractor's property at the completion of the work and are to be removed from the site when no longer needed.

A. Traffic Control.

1. Lump sum when there is a contract item for Traffic Control.

2. Payment is full compensation for:
- Erecting, maintaining, moving, and removing all traffic control devices required by the contract documents, including warning lights,
- Furnishing all materials, labor, and equipment, and
- Traffic quality control.

B. Portable Dynamic Message Signs.

1. Payment will be at the contract unit price per calendar day for each Portable Dynamic Message Sign measured as provided in Article 2528.04, B.

2. Payment is full compensation for furnishing, placing, operation (when specified), and maintenance of PDMS. Payment includes the cost of preventative and unscheduled maintenance, cellular communication ~~(when specified)~~, on-board software, hardware, and power supply.

C. Temporary Barrier Rail.

1. Linear feet of Temporary Barrier Rail measured.

2. Maintenance of temporary barrier rail is incidental to Temporary Barrier Rail.

3. Payment for repair or replacement of temporary barrier rail damaged by public traffic will be paid according to Article 1109.03, B.

D. Temporary Lane Separator System.

1. Linear feet of Temporary Lane Separator System measured

2. Payment includes installation, maintenance, repair, removal of the temporary lane separator system (if installed in a temporary traffic control zone), and all required pavement or bridge deck repair.

E. Modular Glare Screen.

1. ~~Per foot~~ Linear feet of Modular Glare Screen System measured.

2. Payment is full compensation for:
- Material,equipment, and labor to furnish and install the system on top of temporary concrete barrier rail,
- ~~Furnishing and applying retroreflective strips,~~
- Maintenance of the system,
- Repairing or replacing damaged parts of the system,
- Removing and reinstalling the system if necessary when moving the concrete barrier rail, and
- Final removal of the system from the top of the concrete barrier rail.

F. Temporary Crash Cushions.
Article 2551.05, A, applies.

G. Temporary Traffic Signals.

1. Each, for individual group installations operated by a common control unit, normally four signal heads at the same traffic control area.

2. Payment is full compensation for furnishing, installing, maintaining and servicing the controller, signal heads, traffic detection system, signal operator, costs for electrical energy, and the cost of removing temporary traffic signal materials from the construction site. The Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary traffic signals.

H. Temporary Floodlighting Luminaire.

1. Each.

2. Payment is full compensation for~~:~~ furnishing, installing, maintaining and servicing temporary floodlighting units, costs for electrical energy, cost of removing lighting materials from construction site, and Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary floodlighting.
- ~~Furnishing, installing, maintaining and servicing the temporary floodlighting units,~~
- ~~All costs for electrical energy,~~
- ~~The cost of removing all lighting materials from the construction site, and~~
- ~~The Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary floodlighting.~~

I. Pilot Cars.
Predetermined contract unit price per each for number of shifts each pilot car was operated.

J. Flaggers.

1. Predetermined contract unit price per each for number of shifts each flagger was used.

2. Payment is full compensation for providing trained flaggers according to ~~Article 2528.03, K~~ Article 2528.03, K.

K. Monitoring with Incident Response.

1. Per calendar day for number of calendar days used.

2. This payment is full compensation for:
- Furnishing the necessary vehicle (including operation, maintenance, and supplies),
- Furnishing the operator,

- Documentation of events that restrict normal flow of traffic including responses to an emergency situation,
- Re-erecting, repairing, or replacing traffic control devices,
- Providing assistance to persons with vehicle problems,
- Moving stalled vehicles, and
- Summoning further assistance when needed.

3. Payment for number of calendar days that additional personnel, such as for ~~CMS~~ PDMS operation required by the Engineer, will be the contract unit price per calendar day. Payment is full compensation for furnishing required personnel and necessary support vehicles.

L. Safety Closures.

Payment is full compensation for furnishing material, labor, and equipment necessary to erect, maintain, and remove Safety Closure, unless indicated otherwise in the contract documents.

Comments: FHWA had some concerns with the language in Article 1107.08 and whether some of the clear distances contradicted each other. Since some of the language refers to "at least 15 feet" and the language for multilane highways refers to 50 feet, they are not contradictory, just a higher level of clear zone for multilane highways.

The committee discussed usage of multilane vs. divided. Both can have issues, but divided is more specific than multilane, which can apply to a larger percentage of roadways.

The Work Zone Traffic Committee will continue to review these changes and see if any of the approved language needs to be tweaked in the future.

Local Systems asked about the flagger station systems and if these had been approved for use by the FHWA. These are approved for use because there is still a flagger at each station, but there is going to be further research into the use of pilot car controlled signals to reduce the number of workers needed for traffic control.

Local Systems questioned if 50 feet is enough advance notice of a bump caused by milling or scarification. This specification is currently in the specifications, it is just being moved to another area of Article 2528. The committee wondered if this information should even be in the Standard Specifications or included as part of a road standard. The committee decided to leave the language for now but review its inclusion for future revisions.

Local Systems asked if Type 3 apparel should be specified for workers during nighttime work. The current language is taken from the Flagger's Handbook and is consistent with that. The committee did not want to reference the Flagger's Handbook, as the apparel section covers more than just flaggers. The use of Type 3 apparel for nighttime work will be reviewed for both the Standard Specifications and Flagger's Handbook.

In Article 2528.03, A,12 there was a typo in the first added sentence, where it says replace *and* remove. This was corrected.

Specification Section Recommended Text:

1107.08, Public Convenience and Safety.

Replace the Article:

A. The schedule for removal of existing guardrail~~, warning devices,~~ and ~~other~~ traffic control devices requires Engineer's approval. The Contractor may be required to place temporary warning devices at locations where replacement features are not installed the same day as removal takes place.

B. The Contractor shall conduct the work to assure the least possible obstruction to access by the residents along the project. The Contractor shall schedule and conduct the work in such a way as to provide for their safety and convenience. The Contractor shall submit a construction staging plan to the Engineer for local access required to remain open. Relocated accesses shall be completed prior to removal of existing accesses. If a permanent access cannot be completed prior to removal of an existing access, the Contractor shall provide and maintain an alternate access. Work and materials required by the Engineer for public convenience and safety in excess of that provided for in the contract documents will be paid for per Article 1109.03, B.

C. Whenever it is practical to do so, the Contracting Authority will close the portion of the road under construction, provide a detour, and cause suitable detour signs to be erected to mark such detour.

D. When it is not practical for the Contracting Authority to close the road for construction, the Contractor will be expected to perform the work under traffic. The contract documents will ~~indicate this fact and~~ provide instructions for handling traffic through the work area. Unless otherwise stated in the contract documents, all work shall be performed by the Contractor between the hours of 30 minutes after sunrise to 30 minutes before sunset.

E. Except when the contract documents indicate the road is to be closed, ~~during all pavement widening, base widening, and HMA resurfacing work,~~ traffic will be permitted to use the ~~routes~~ roads involved at all times and shall not be delayed unnecessarily. ~~Where a pavement or base is being widened, the machine depositing material shall operate within the designated work area.~~ Construction equipment may be stored within the right-of-way, ~~as far from the traveled way as is practical, but~~ at least 15 feet from the edge of the traveled way, and the roadbed shall be free of Contractor's equipment during non-working hours. The work shall be planned and conducted to cause a minimum delay or interference with traffic.

F. When work on a traveled way necessitates diverting traffic from a work lane to another lane, material, personnel, ~~mobile~~ equipment, and vehicles shall occupy the work lane to the minimum extent and for the minimum time necessary, and non-mobile equipment shall be removed from the work lane promptly after its operation is completed in that lane.

G. On two-lane roadways, a work area shall be established only on one side of the roadway and there shall be no parking of vehicles or equipment on the opposite shoulder within 500 feet of the work area.

H. The location for storage of materials and equipment by the Contractor during nonworking hours shall be ~~as reviewed~~ at least 15 feet from the edge of the traveled way and approved by the Engineer prior to use.

I. ~~Parking of private vehicles on Interstate right-of-way will not be allowed.~~ On multilane highways, ~~P~~parking of unattended equipment within the median or storage of equipment within 50 feet of the edge of ~~pavement~~ the traveled way will not be allowed.

J. Materials stored within the highway right-of-way shall be placed to cause a minimum obstruction to traffic. Sidewalks, gutters, sewer inlets, and portions of highway adjoining the roadway under construction shall not be obstructed more than is necessary.

K. When the shoulder work is a part of the contract for work on a project open to public traffic during construction, the Contractor shall coordinate the operations so that the length and degree of pavement edge drop-off caused or partly caused by the operations are minimized.

L. Shoulder construction in conjunction with PCC overlay or HMA resurfacing shall meet the following:

1. **Paved Shoulders (Partial or Full Width).**
   Construction shall be staged so no drop-offs exist at the pavement or shoulder edge when the adjacent lane is to be opened to traffic. The pavement edge drop-off requirement shall be satisfied with an HMA shoulder fillet. This fillet shall extend into the shoulder area a minimum of six times the thickness of the drop-off and shall be placed prior to the adjacent lane being opened to traffic. Compaction of the HMA fillet shall be a minimum of one coverage with a pneumatic tired roller per 1 inch of thickness. The fillet shall be removed prior to start of shoulder paving. The shoulder edge drop-off requirement shall be satisfied with a granular fillet, meeting the requirements of the following paragraph.

2. **Granular Shoulders.**
   Construction shall be staged so no drop-offs exist at the pavement edge when the adjacent lane is to be opened to traffic. The drop-off requirements shall be satisfied with a shoulder fillet or full shoulder width of granular material according to Article 2121.03. The fillet shall extend into the shoulder area a minimum of six times the thickness of the drop-off and shall be placed prior to

the adjacent lane being opened to traffic. Compaction of the fillet shall be a minimum of one coverage with a pneumatic tired roller per 1 inch of thickness.

M. Paved shoulder construction adjacent to existing travel lanes shall meet the following:

1. HMA Shoulder.
- Drop-offs greater than 2 inches will not be allowed when the adjacent lane is open to traffic,
- Place the final lift of HMA shoulder material within 48 hours of the previous lift.

2. PCC Shoulder.
Do not open adjacent lane until PCC shoulder is cured enough to support traffic control devices.

N. When the Contractor works on a bridge spanning a roadway or passageway, the Contractor shall take all necessary steps to protect the public using the facility below the bridge from falling debris, material, or construction equipment. The Contractor shall submit a safety procedure written plan to the Engineer prior to starting work. The plan shall include the following:
- Design of the means and methods used to provide protection.
- All assumptions used in the design.

Evaluation of the plan and design may require its preparation by a Professional Engineer licensed in the State of Iowa. If so, the costs will be paid for in accordance with Article 1109.03, B.

1107.09, Barricades and Warning Signs.

Replace the Title of the Article:
~~Barricades and Warning Signs~~ Contracting Authority and Contractor Traffic Control Responsibilities.

1107.09, A.

Replace the first paragraph:
Barricades, channelizing devices, warning signs, and other aspects of traffic control shall be in accordance with the contract documents. In providing adequate and proper traffic control, both the Contracting Authority and the Contractor have certain responsibilities.

1107.09, A, 1, d, Availability.

Delete the last sentence:
~~Replacement materials will also be furnished as necessary.~~

1107.09, A, 2, a, 1.

Replace the third sentence:
When traffic is to be maintained through the construction, the Contractor shall erect and maintain all signs; furnish, erect, and maintain all other traffic control devices and ~~other safeguards~~ pilot cars; and provide all flaggers necessary to protect the traveling public.

1107.09, A, 2, c, Entrance from Local Public Roads.

Delete the second and third sentences:
~~When scarification is part of the contract, ROUGH ROAD signs shall also be erected on the shoulder of the road under construction at local public road intersections. These signs shall be erected, moved when appropriate, and maintained by the Contractor until the scarified areas are covered with the new surface material.~~

1107.09, A, 2, j, Cleaning.

Replace the Article:
The reflective surfaces of signs and traffic control devices shall be washed, as described in ~~Article 2528.03, L~~ Article 2528.03, O, 6, and shall be clean at the time of initial installation on a project.

2518, Safety Closure.

Delete the Section:

~~**2518.01 DESCRIPTION.**~~

~~This section concerns Safety Closures erected as specified in the contract documents. Two types of safety Closures will be specified: Road Closures and Hazard Closures.~~

~~**2518.02 MATERIALS.**~~

~~Use orange mesh safety fence meeting the requirements of Article 4188.03.~~

~~**2518.03 CONSTRUCTION.**~~

~~**A. Erection.**~~

~~**1. Road Closures.**~~

~~**a.** Place a fence meeting the requirements of Article 2518.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.~~

~~**b.** Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline. Mount a ROAD CLOSED (RII-2) sign on the Type III barricade.~~

~~**c.** In lieu of Articles 2518.03, A, 1, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches. Mount a ROAD CLOSED (R11-2) sign over the top two rails of on the Type 3 barricade located closest to the approximate roadway centerline.~~

~~**d.** Erect road closures as specified in the contract documents. Erect them on the mainline of the roadway where public traffic is diverted onto an on-site detour and where public traffic is prohibited from entering the work area.~~

~~**e.** Erect road closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.~~

~~**2. Hazard Closure.**~~

~~**a.** Place a fence meeting the requirements of Article 2518.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.~~

~~**b.** Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline.~~

~~**c.** In lieu of Articles 2518.03, A, 2, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches.~~

~~**d.** Erect hazard closures as specified in the contract documents. Erect them at locations within a work area when construction involves major hazards on existing or relocated roadways. Such hazards may be located at streams, gullies, railroads, bridge approaches, and driveway locations. Through public traffic should not normally encounter a hazard closure.~~

~~**e.** Erect hazard closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.~~

~~**B. Responsibility.**~~

~~**1.** Maintain the location and condition of the safety closures. Any Contractor who temporarily moves the safety closure for equipment or delivery of materials, shall replace it in its original position and is responsible for the restriction of public traffic into the closed area.~~

~~**2.** If a safety closure placed by the Contractor is required for an area after the Engineer's approval of completed work for that specific area, maintenance of that safety closure will become the responsibility of the Contracting Authority. The Engineer will document in writing the transfer of authority.~~

~~**3.** The Engineer will notify the Contractor of the date of removal of safety closures. The safety closure remains the property of the installing Contractor. If the safety closure is not removed by the date~~

~~specified in the notification, it will become the property of the Contracting Authority and the Contractor will be charged for any removal costs.~~

~~**2518.04 METHOD OF MEASUREMENT.**~~
~~The Engineer will count each Safety Closure (either road closure or hazard closure) erected.~~

~~**2518.05 BASIS OF PAYMENT.**~~

~~**A.** Payment will be the contract unit price for each Safety Closure counted.~~

~~**B.** Payment is full compensation for furnishing all material, labor, and equipment necessary to erect, maintain, and remove the Safety Closure, unless indicated otherwise in the contract documents.~~

2528, Traffic Control.

Replace the Section:

2528.01 DESCRIPTION.

A. **General.**

1. This section describes various materials, equipment, and procedures involved in traffic control during construction. The Contractor and the Contracting Authority have certain responsibilities, whether public traffic is allowed or is prohibited during construction. Apply Article 1107.09.

2. The contract may include an item for traffic control. In this case furnish, erect, operate, maintain, move, and remove all traffic control devices required by the contract documents.

3. The contract may indicate that traffic control is incidental. In this case the Contracting Authority will furnish all signs and traffic control devices, except pilot car and flaggers' signs, and all Type III barricades, and associated mounting devices. Furnish all other traffic control devices required. Erect, operate, maintain, move, and remove all traffic control devices. Signs and barricades to be furnished by the Contracting Authority will be made available at a nearby maintenance site. Return the signs and barricades when no longer needed. Any Contracting Authority signs and barricades damaged during construction activities by the Contractor's activities shall be replaced at no charge to the Contracting Authority.

4. The contract documents may specify orange mesh safety fence be used in conjunction with other traffic control devices as part of the project traffic control requirements. Use orange mesh safety fence meeting the requirements of Article 4188.03. Securely support the fence so it is in a vertical position without any sagging. Locate and place the safety fence supports so they are not a safety hazard.

5. Ensure all traffic control complies with the current edition of the MUTCD, Part 6 as adopted by the Department, unless modified by the contract documents.

6. On Interstate and Primary Road projects, use crashworthy Category I and Category II traffic control signs and devices that meet NCHRP Report 350 or MASH 2016 (Manual for Assessing Safety Hardware).

7. Upon request provide the following to the Engineer for the purpose of documenting the crashworthiness of Category I and Category II signs and traffic control devices:
- **a.** The vendor's self-certification for Category I traffic control devices.
- **b.** FHWA NCHRP Report 350 or MASH approval memos for Category II signs and traffic control devices.

8. A list of approved Category II traffic control devices is found on the World Wide Web at the following URL: https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/.

~~**9.** Gender specific signs, such as FLAGMAN and MEN WORKING, will not be allowed. Use neutral gender signs, for example FLAGGER, or equivalent symbol signs.~~

~~10~~ **9.** Provide 10 calendar days advance notification of a pedestrian path closure to the following:

- National Federation of the Blind of Iowa: Affiliate President, https://nfb.org/resources-iowa.
- Engineer

B. Monitoring with Incident Response.

1. Provide 24 hour per day continuous monitoring of traffic control devices and incident response for emergency situations on projects during complex traffic situations as defined in the contract documents. ~~The contract documents will identify projects requiring monitoring with incident response.~~ Ensure a vehicle and operator traverses the project throughout the entire traffic control zone at all times, except for refueling and short rest breaks no greater than 15 minutes in duration.

2. Furnish this work according to the contract documents any time that signs, barriers, barricades, or other traffic control devices are in place during complex traffic situations.

3. Provide a vehicle and operator for this work as follows:

a. Equipment.

1) Meet the following requirements:

a) 3/4 ton pickup truck or another similar vehicle.

b) Contractor's insignia on the doors of the vehicle.

c) Adequate weight and power and suitably equipped to move stalled automobiles, sport utility vehicles, or pickup trucks.

d) Equipped with an amber ~~revolving light or amber strobe~~ or yellow high intensity rotating, flashing, or oscillating warning light visible in all directions and a cellular telephone or similar type of mobile phone.

e) Capable of carrying traffic signs, tools, traffic control devices, and other necessary equipment.

2) When used on projects where more than one lane in one direction is maintained at all times, ensure this vehicle is also be equipped with a Type C arrow panel as described in ~~Article 2528.03, C~~ Article 2528.03, F, mounted to be visible to traffic approaching from behind.

b. Operation.

1) Furnish an operator for the vehicle. Ensure the operator re-erects, repairs, or replaces defective devices immediately upon discovery.

2) Have the operator:

a) Be available to assist persons with vehicle problems and move automobiles, sport utility vehicles, pickup trucks and other obstructions ~~so as~~ to keep all travel lanes and shoulders available for public traffic.

b) Continue assistance to motorists and involvement with obstructions until they are no longer an impediment to traffic and further assistance can be provided safely by others.

c) Assist motorists or remove obstructions promptly and safely when a vehicle or anything else is obstructing a travel lane or shoulder intended to be clear.

d) Summon further assistance if needed.

e) Keep a report of any events that restrict the normal traffic flow during complex operations, including responses to emergency situations, on forms provided by the Engineer. Provide the Engineer with a copy of this report daily.

3) During anticipated peak traffic times, the Engineer may direct the Contractor to provide additional monitoring personnel. Payment will be made as extra work according to Article 1109.03, B.

C. Traffic Quality Control.

1. Maintain a Traffic Control Technician on staff, even though the traffic control portion of the contract may be subcontracted. The Traffic Control Technician is required to have attended and passed the exam in an ATSSA Traffic Control Technician, IMSA Work Zone Traffic Control, Iowa AGC Traffic Control Technician class, Minnesota DOT Traffic Control Supervisor training class, or Texas Engineering Extension Service Work Zone Traffic Control training class. This Traffic Control Technician is responsible for overall management of the Contractor's quality control program for traffic control. Starting April 2018, the Traffic Control Technician shall retake and pass the exam in one of the approved classes every 5 years.

2. On a daily basis as the project is constructed, perform the following quality control work associated with monitoring and documenting traffic control conditions:

a. Review all traffic control operations for compliance with contract documents and maintain a project traffic control daily diary in a format provided by the Contracting Authority. Submit this diary to the Engineer. It will become a part of the Contracting Authority's permanent project records. The Engineer may require submission of completed portions of the daily diary at routine intervals during construction of the project. In the diary include:
- Listing and station location of traffic control used each day referenced to the appropriate Standard Road Plan, project plan sheet, etc.,
- All reviews of traffic control devices and operations, whether satisfactory or unsatisfactory, and corrections made,
- Approved changes to the contract document's traffic control,
- Incidentals affecting the efficiency and safety of traffic, and
- A daily list of trained flaggers used, including hours worked.

b. Monitor traffic operations and submit proposed Traffic Control Plan changes to the Engineer for approval.

c. Coordinate all changes to the Traffic Control Plan.

d. Coordinate all traffic control operations, including those of subcontractors and suppliers.

3. Employees who install and remove temporary traffic control signs and devices shall be supervised by a trained Traffic Control Technician per Article 2528.01, C, 1. When traffic control is installed or removed, the Traffic Control Technician who supervised the installation or removal of temporary traffic control devices and signs shall document in the daily traffic control diary what was installed or removed.

2528.02 MATERIALS.

Use materials meeting the requirements of Part 6 of the MUTCD and Division 41 for the respective traffic control signs and devices.

2528.03 ~~SIGNS AND DEVICES~~ CONSTRUCTION.

A. Signs.

1. Furnish signs that are of the size and type shown in the contract documents and use retroreflective sheeting meeting the requirements of Article 4186.03.

2. For Interstate and Primary projects, furnish diamond shaped warning signs that are 48 inches by 48 inches unless specified otherwise in the contract documents.

3. For traffic control zones in duration for 4 calendar days or more, mount signs on fixed posts.

4. Signs for traffic control zones in duration for less than 4 calendar days may be mounted on moveable skids or fixed posts.

5. Meet the following requirements for fixed post mounted signs:
a. Sign sheeting applied to rigid wood or metal.
b. Mounted at a height of at least 7 feet, measured from the bottom of the sign to the near edge of the pavement. A secondary sign on the same post may be mounted 1 foot lower than specified above.
c. A clear distance 2 feet behind a curb or beyond the edge of the shoulder.

6. Meet the following requirements for moveable skid mounted signs:
a. Flexible roll-up sheeting or other skid mounted sign systems that meet NCHRP 350 or MASH requirements.
b. Mounted at a height of at least 1 foot above the roadway.

7. Ensure mounting devices are not so substantial as to be a hazard to vehicles. Meet the following requirements for posts mounted in existing soil:
a. Wood sign supports meeting the materials requirements of Article 4164.04.
b. 3.0 pounds per foot U-shaped rail steel posts.
c. 2 1/4 or 2 1/2 inch square 12 gage perforated steel tubing.

8. Dual-post and triple-post configurations using these sign supports are acceptable provided that no more than two posts occupy any 8 foot wide path. Bracing of these posts will not be permitted. Posts exceeding these requirements shall have breakaway features approved by the Engineer.

9. Ensure signs are in a condition so they are effective for the intended purposes when viewed from a vehicle. For nighttime installations, ensure the reflectance is adequate so that the message is clearly readable. Ensure signs are maintained in a near vertical position.

10. When indicated in the contract documents, use supplemental sign flags in conjunction with work zone signing. Use sign flags 16 inches square and sheeted with red Type ~~IV~~ XI retroreflective sheeting meeting requirements of Article 4186.03.

11. On projects where two new lanes are being constructed adjacent to an existing two lane highway, place TWO WAY TRAFFIC (W6-3) signs. Place them off the right shoulder of mainline: 1) after each public side road for each direction of travel for traffic that may enter from all intersecting side roads; or 2) at 1/2 mile intervals, whichever is less. Install these signs when grading activities start and leave in place until the entire four lane divided highway is opened to traffic. If the pavement is constructed under a separate contract, leave these signs in place after the grading contract is completed. They become the property of the Contracting Authority. The paving contractor then takes over these signs and removes them when the four lane divided highway is opened to traffic. Payment will be according to Article 2528.05, A.

12. When directed by the Engineer, cover or remove permanent signing that conveys a message contrary to the message of the temporary signing and not applicable to the working conditions. When the work is completed uncover or replace and removed permanent signing. Permanent signs damaged by the Contractor's activities shall be replaced at no charge to the Contracting Authority.

13. The END ROAD WORK (G20-2) sign may be eliminated for mobile or short duration (less than 1 hour) temporary traffic control zones.

14. When milled or scarified surfaces exist, sign approaches to scarified areas using ROUGH ROAD (W8-8) signs. Place signs at least 250 feet in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At locations where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet in advance of each location. Erect, move, and maintain these signs until milled or scarified areas have been covered with new HMA or PCC pavement.

B. **Portable Dynamic Message Signs**

Furnish, place, operate (when specified), and maintain Portable Dynamic Message Sign (PDMS) meeting requirements of Article 4188.07 at locations shown on the plans. The Contractor maintains possession of PDMS upon completion of the project.

1. Testing and Configuration.

c. Physical and electronic access to PDMS shall be granted to the Engineer.

d. On Interstate and Primary projects:

3) At least 1 week before PDMS is deployed to a project, a testing and configuration meeting with the Engineer shall be held.

4) The Contractor, shall perform necessary configuration adjustments to the PDMS and cellular modem to allow remote control by the Contracting Authority's NTCIP software.

2. Remote Operation.

d. On Interstate and Primary projects, the Department will remotely operate signs through use of a modem and NTCIP software.

e. Contracting Authority will use their own NTCIP compliant software to activate messages, check sign's status, and perform diagnostic tests.

f. Anytime during the project, the Engineer may remotely activate a message on the PDMS. Any message placed on the PDMS shall not be removed or replaced by the Contractor unless requested by the Engineer.

3. Direct Operation.

a. On Secondary road projects, PDMS will be operated directly by either the Contractor or the Engineer.

b. The Engineer may request the Contractor to operate PDMS for advance traffic notification and warning. Authority to operate PDMS will be under the direction of the Engineer. The Contractor may only operate the PDMS to display messages authorized by the Engineer.

c. Promptly program and/or reprogram the computer to provide the messages as directed by the Engineer.

4. Maintenance.

e. Provide preventive maintenance necessary to achieve uninterrupted service. Provide monitoring of health of each PDMS to accomplish proactive preventive maintenance and provide uninterrupted service. This includes, but is not limited to, performing remote diagnostic tests of equipment's operational status, monitoring status of system performance such as communication, battery status, etc.

f. Engineer may perform remote diagnostic tests of sign's operational status and notify Contractor when a problem is detected.

g. Respond to service phone calls immediately and to the service request emails within 2 hours. Conduct remote or on-site troubleshooting and respond back to the Engineer with notification of action (i.e. device repaired remotely, sending field technician, etc.) within 2 hours of responding.

h. Provide unscheduled maintenance or total replacement of sign when sign is unable to display a message adequately within 24 hours of notification. Action shall be taken to resolve the following problems if they have been visually observed or confirmed by self diagnostics by the PDMS for three continuous days or seven intermittent days over a 2 week period.

4) An entire pixel board is showing failure.

5) Five or more pixel failures over entire message panel anytime while sign is deployed for use (blank or displaying a message).

6) Two or more pixel failures in any character when displaying a message.

e. Repairs shall be completed within 12 hours of initial notification or the Engineer may cause such work to be performed as may be necessary to provide this service. The cost for this restoration shall be borne by the Contractor.

C. Channelizing Devices.

1. Use Channelizing Devices that are of the type shown in the contract documents. Ensure all channelizing devices meet the current requirements of the MUTCD and Section 4188. Use reflective sheeting meeting the requirements of Article 4186.03.

a. Barricades.

~~**1)** A 2 foot minimum length barricade may be used when Type I or Type II Barricades are furnished as one of the options for channelizing devices in lieu of vertical panels, 42 inch channelizers, cones, or drums.~~

~~**2**~~ **1)** Ensure Type III barricades have a minimum length of rail of 6 feet. When traffic is permitted in each direction around a Type III Barricade, ensure the Type III Barricade used has fully reflectorized faces on both sides of the rails.

~~**3**~~ **2)** Erect barricades in essentially a ~~horizontal~~ vertical position perpendicular to the direction of approaching traffic. Ballast them so as not to cover any striped rail.

b. Cones, ~~Vertical Panels,~~ 42 Inch Channelizers, Drums, and Tubular Markers.

1) Ensure cones, ~~vertical panels,~~ 42 inch channelizers, drums, ~~and~~ tubular markers, and other traffic control devices meet the current requirements of the MUTCD, and Section 4188.

~~**2)** When used to separate two way traffic, separate temporary no passing lines approximately 16 inches, with the marker to be installed between these lines.~~

~~**3**~~ **2)** Ensure tubular markers meet the following:

a) A nominal 36 inch height.

b) Diameter facing traffic at least 2 inches in width.

c) Completely faced with reflectorized white and orange sheeting that is in two bands 4 inches wide with 6 inches between bands, with the top band no more than 2 inches from the top of the tubular marker.

~~**4**~~ **3)** Cones may be used as channelizing devices in tapers and along lane lines during daylight hours only.

~~**5**~~ **4)** 42 inch channelizers may be used in place of drums in work areas remaining in place for up to three days. Spacing of channelizers shall be half the spacing required for drums or double the number of drums required.

c. Temporary Lane Separator System.

1) Installation.
Install according to the manufacturer's recommendations.

2) Maintenance.
Repair or replace all damaged curb units or posts no later than 24 hours after the damage is reported to the Contractor.

3) Removal.

a) Upon completion of the project, the temporary lane separator system will remain the property of the Contractor for systems used in temporary traffic control zones. When placed as part of a permanent installation, the system will become the property of the Contracting Authority.

b) Repair all holes left in the pavement or bridge deck when the temporary lane separator system is removed. Holes shall be filled with a non shrink grout meeting the requirements of Materials I.M. 491.13.

2. Channelizing devices may be placed up to 2 feet beyond centerline or lane line at specific locations where actual work activity is taking place. Return channelizing devices to the original position when the work activity has passed.

3. Individual channelizing devices may be omitted during working hours in areas where placement interferes with the work. Channelizing devices on tapers are required at all times.

4. Do not intermix channelizing devices of different types.

5. For pedestrian path closures, use Type III Barricades to block the full width of the pedestrian path. Mount a SIDEWALK CLOSED (R9-9) sign to at least one of the Type III barricades at each closure.

~~**D. Pilot Cars.**~~

~~**1.** Pickup trucks or automobiles displaying the Contractor's company insignia, equipped with G20-4 signs reading: PILOT CAR - FOLLOW ME. Ensure two signs are mounted on the vehicle so as to be clearly visible from both directions of traffic. Mount the signs so the bottoms are at least 1 foot above the top of the vehicle's roof.~~

~~**2.** Operate pilot cars such that they maintain a uniform speed through the work area, no greater than 40 miles per hour.~~

~~**E**~~ **D. Temporary Barrier Rail.**

Use temporary barrier rail as shown in the contract documents. Unless shown otherwise, use precast concrete units. Tie the units together as specified or as approved by the Engineer.

~~**F**~~ **E. Modular Glare Screens.**

1. When specified in the contract documents furnish, install, and maintain a modular glare screen system on the top of concrete barrier rail according to the contract documents and the modular glare screen system manufacturer's instructions. Furnish a system consisting of modular base rails attached to the top of concrete barrier rail with blades evenly spaced and securely mounted to the base rails. Ensure the following:

- Modular base rails and glare screen blades are compatible so the base unit and blades can be securely attached to each other.
- Base rails and blades supplied are manufactured by the same manufacturer.
- The length of individual modular base rails is no longer than the nominal length of individual temporary concrete barrier rail sections.
- The width of the modular base rails is no wider than the top width of the concrete barrier rail.
- Glare screen blades are FHWA highway green in color and made of impact resistant non-metallic high density plastic material.
- Blade height is from 24 inches to 30 inches and width is from 6 inches to 9 inches.
- The same uniform sized blades are used throughout the work.
- The modular glare screen system is manufactured by a company on the approved manufacturer's list in Materials I.M. 486.06, Appendix A.

2. Install the modular glare screen system according to the manufacturer's instructions and the approval of the Engineer. Install the system so that:
- It is centered along the longitudinal axis length of the top of the concrete barrier rail.
- The overhang of the base rails, blades, and associated assembly over the edges of the top of the concrete barrier rail is kept to a minimum.
- The modular base rails are flush with the top of the concrete barrier rail and they do not extend over the joints between concrete barrier rail sections. A maximum gap between base rails across barrier rail gaps shall be 12 inches.

3. Install glare screen blades so the combination of blade width and spacing provide for a minimum 22 degree sight cut-off angle.

4. Glare screen blades shall be free from reflective sheeting or other modifications and shall be consistent in appearance.

5. Maintain the modular glare screen throughout the work. Replace or repair damaged parts of the modular glare screen system, as soon as practical, at no additional cost to the Contracting Authority.

6. When moving temporary barrier rail with a modular glare screen system, the Contractor may temporarily remove base rails and glare screen blades, if necessary, to assist in the moving. Reinstall the removed base units and glare screen blades as soon as the temporary concrete barrier rail has been moved to its new location.

7. Perform final removal of the modular glare screens from the concrete barrier rail when directed by the Engineer. Upon removal, ensure there are no protrusions on the top of the concrete barrier rail.

~~**8.** Upon completion of the work, the Contractor retains ownership of the modular glare screen system.~~

~~G~~ F. Lighting Devices.

1. Furnish lighting devices as required by the contract documents. ~~Type A barricade warning lights will normally be required for nighttime installations.~~ Type B warning lights will normally be required for 24 hour operation.

2. Use barricade warning lights that comply with the ITE Standard for Flashing and Steady Burn Barricade Warning Lights and are identified as such. ~~In addition, use Type A barricade warning lights that:~~
- ~~Operate on a 12 volt battery system, unless the ITE identification specifically indicates that the rating is based on a different system, and~~
- ~~Are visible to both directions of traffic.~~

3. When arrow displays are used, furnish Type C arrow displays described in the current edition of the MUTCD, Part 6, and operate them in a sequential chevron mode when indicating a lane change.

~~H~~ G. Temporary Traffic Signals.

1. General.

a. Set up and operate temporary traffic signals as shown in the contract documents. Ensure the temporary traffic signal system meets the physical display and operational requirements of conventional traffic signals as specified in Part 4 of the MUTCD. Unless stated otherwise in the contract documents, either a span wire or trailer mounted temporary traffic signal system may be provided.

b. In the event any part of the temporary traffic signal system malfunctions or a continuous red flash mode is encountered, furnish flaggers on a 24 hour/7 day a week basis until repairs are made and the signals are fully functional. For temporary traffic signals at intersections, install stop signs on all approaches until the signals are fully operational, at no additional cost to the Contracting Authority.

c. Notify the Engineer at least 48 hours prior to the use of the signals for timing approval and verification.

2. Equipment.

a. Trailer, ~~or~~ Span Wire Mounted, or Flagger Station Systems.

1) Furnish actuated signal controllers complying with NEMA and ITE standards. Ensure the temporary traffic signal system complies with the following:

a) Includes a solid state digital traffic signal controller capable of operating the signals according to MUTCD requirements and NEMA Standard ~~TS1~~ TS-5. A copy of the manufacturer's certificate of compliance is to be posted in the control cabinet (in a weatherproof folder) and made available to the Engineer upon request.

b) Has conflict monitoring complying with NEMA Standard TS1 and the following:

- Detects the presence of conflicting signal indications, absence of proper voltages, and proper operation of the controller.
- Upon detection of a conflict or loss of communication, all signals enter into flashing red mode.

2) Apply Article 2525.03, E, 4, with the following exceptions for one lane two way traffic control:

a) Green Revert.
If during an All Red clearance interval a call occurs on the phase losing the right-of-way prior to a call on any other traffic phase, the right-of-way reverts to the previous traffic phase, initiating the initial green interval. The transfer is to be immediate without completing the All Red clearance interval.

b) Rest in Absence of Actuation.
In the absence of detector actuation of assertion or recall switch(es), the right-of-way indication dwells in All Red.

3) Comply with the following:

a) Clearance for overhead wiring is a minimum of 18 feet.

b) A detection area is located near the stop line with the downstream edge positioned 6 feet from the stop line. A second detection area is located 100 to 150 feet in advance of the stop line. The size of detection areas is 6 feet by 10 feet. A single above-ground detector may be used to provide detection for both areas.

c) Signal heads have 12 inch lenses and comply with ITE Specification "Vehicle Traffic Control Signal Heads". All signal heads are equipped with visors and back plates. The backplate provides a minimum of 5 inches black field around the signal assembly and has a dull black finish.

d) A minimum of two traffic signal heads per approach. All signal heads mounted over the road surface are mounted a minimum of 15 feet from the bottom of the signal head to the top of the road surface. One signal head mounted over the center of the travel lane. All far right signal heads mounted a minimum of 8 feet from the bottom of the signal head to the top of the ground surface. Required signal heads for through traffic on any one approach located no less than 8 feet apart measured horizontally perpendicular to the approach between the centers of the signal faces.

b. Trailer Mounted Systems.
Provide a system consisting of two or more self-contained trailer mounted units each containing two signal heads.

c. Span-Wire Mounted Systems.
Ensure posts meet the requirements of Article 2528.03, A.

d. Flagger Station Systems.
Provide a traffic signal system, for one-lane/two-way operation in conjunction with a flagger and/or pilot car operation in order to provide greater advance visibility to the flagging operations.

- Two or more self-contained trailer mounted units each consisting of one or two signal heads.
- Single-signal head systems shall have a signal head mounted on each side of the roadway
- Two-signal head systems shall have one signal head mounted on a mast arm capable of extending over the center of the travel lane and the other signal head mounted on the same trailer.

3. Operational Requirements.

a. Locate signals, stop bars, and signs exactly as identified in the contract documents. Secure and level temporary traffic signal installations in a manner approved by the Engineer.

b. Program all temporary traffic signals for red flash upon startup, conflict, or power failure. Program the temporary traffic signal system to dwell in All Red.

c. For one lane two way traffic control operations, when an additional phase is used for a side road movement, only one long all red interval is to be used between active phases on each side of the work area.

d. Set signal timing as identified in the contract documents.

4. Equipment Crossings.

a. For equipment crossings, use a signal operator to control the signal system. Position this operator with good sight distance for both the mainline and haul road.

b. Program the signal system with fixed yellow and all red time periods so the operator can only activate the beginning of the yellow interval for mainline traffic.

c. When the equipment crossing is not in use, set the signal to yellow flash mode. If hauling operations are suspended for more than one week, cover the signal heads, or if portable trailer units are used, remove the trailers.

~~I~~ H. Temporary Floodlighting.

1. General.

a. Set up and operate either pole mounted or portable~~, mobile~~ self contained LED temporary floodlights at locations shown in contract documents.

b. Ensure floodlighting is installed and in service before commencing work requiring nighttime traffic control according to the traffic control plan.

c. Exercise reasonable care to avoid interruptions during hours of darkness, promptly repair damage to system, and replace burned out lamps promptly.

2. Equipment.

a. Pole Mounted Floodlights.

1) Pole-mounted luminaire.

2) Mounting height of luminaires is no less than 35 feet above the roadway and as shown in the contract documents. Pole length determined by field measurement to obtain specified mounting height.

3) Place poles outside normal shoulder line at approximate locations shown on the contract documents.

4) Meet the following requirements for floodlighting luminaires:

- Standard roadway types with totally enclosed refractors.
- IES glare control rating of "cut off".
- Lamps with initial output rating at least 19,000 lumens.
- Photoelectric controlled for dusk to dawn operation.
- Approval of the Engineer.

5) Ensure clearance for overhead wiring at least 18 feet. Auxiliary poles used to furnish power to floodlighting offset 30 feet from traveled way unless there are right-of-way restrictions.

6) Above ground lighting circuits are aluminum or A.C.S.R. triplex.

7) Underground lighting circuits are type U.S.E. or U.F.

b. Portable~~, Mobile~~ Self Contained LED Floodlights.

1) Mounted on portable trailers containing solar cell array and storage battery system to power LED luminaire. Ensure system meets NCHRP 350 or MASH Category IV crash testing.

2) Ensure mounting height of LED luminaires is no less than 17 feet above roadway, or as shown in the contract documents.

3) Locate portable trailers so LED luminaire is centered over outside edge of pavement and trailer is on shoulder offset as far as possible from traveled way

4) Meet materials requirements of Article 4188.05 for LED Floodlighting Luminaires.

~~J~~ I. Temporary Crash Cushions.

Apply Section 2551.

~~K~~ J. Flaggers.

1. Prior to flagging operations, ensure the flaggers are trained in safe flagging operations that comply with Iowa DOT Flagger's Handbook, Part 6 of the MUTCD, and the Standard Specifications. Ensure training of flaggers includes the following:

a. Issuing and reviewing the current Iowa DOT Flagger's Handbook,

b. Presentation of the current Iowa Professional Flagging Video,

c. Issuing flagger training cards including the information below. ~~Ensure the flaggers carry their flagger training card at all times and show it upon request.~~

1) Employee name,

2) Date of training,

3) Name of Instructor, and
4) Expiration date of December 31 of the year following the training date.

2. Maintain a list of the flaggers trained and the date of the training.

3. Training is not required for short time, emergency, or relief assignment of employees to flagging operations. Payment will not be made in accordance with Article 2528.05, I.

4. Ensure flagger operations, equipment, and apparel comply with the current Iowa DOT Flagger's Handbook.

5. When nighttime flagging is required, provide auxiliary lighting to illuminate the flagging stations according to the MUTCD, Part 6 and current Iowa DOT Flagger's Handbook. Set up this lighting in such a manner to minimize glare to motorists. The cost of furnishing nighttime flagging station~~s~~ lighting is included in the lump sum price bid for Traffic Control.

6. Ensure the flaggers carry their flagger training card at all times and show it upon request.

K. Pilot Cars.

1. Pickup trucks or automobiles displaying the Contractor's company insignia on the doors of the vehicle, equipped with G20-4 signs reading: PILOT CAR - FOLLOW ME. Ensure two signs are mounted on the vehicle ~~so as~~ to be clearly visible from both directions of traffic. Mount the signs so the bottoms are at least 1 foot above the top of the vehicle's roof.

2. Operate pilot cars such that they maintain a uniform speed through the work area, no greater than 40 miles per hour.

L. Temporary Portable Rumble Strips

Use temporary portable rumble strips of the type shown in the contract documents and meeting requirements of Article 4188.08.

1. Placement.
a. A temporary portable rumble strip panel consists of three individual temporary portable rumble strips placed on roadway surface.
b. Place centerline end of temporary portable rumble strip 6 inches from centerline of roadway perpendicularly extending its full length transversely across pavement surface.
c. Place each individual temporary portable rumble strip 15 to 20 feet apart within the temporary portable rumble strip panel.

2. Maintenance.
Ensure temporary portable rumble strips maintain alignment within 6 inches perpendicular to centerline of roadway when measured from one end to the other end of the individual temporary portable rumble strip.

3. Removal.
When temporary traffic control requiring temporary portable rumble strips is no longer in operation, remove temporary portable rumble strips from roadway.

M. Speed Feedback Signs.

Furnish, place, operate, and maintain speed feedback signs at locations shown on the contract documents. Ensure all speed feedback signs meet the current requirements of the MUTCD and Section 4188.

5. Definitions.
c. Speed Feedback Trailer.
Speed feedback trailers are mobile devices using speed feedback signs to capture vehicle speed for oncoming traffic.
d. Display.
The display is a device connecting to the speed feedback trailer capable of broadcasting the speed of oncoming traffic captured by the speed feedback sign. This device allows for vehicle speed feedback to the vehicle operator, allowing for speed adjustment throughout the

remainder of the work zone.

6. Testing and Configuration.

c. At least 1 week before speed feedback trailer is deployed to a project, a testing and configuration meeting with the Engineer shall be held.

d. The Contractor, in conjunction with the Engineer, will perform necessary configuration adjustments to the speed feedback trailer.

7. Maintenance.

e. Provide preventive maintenance necessary to achieve uninterrupted service.

f. Verify operational status each day as part of the daily diary and notify Engineer when a problem is detected.

g. Provide unscheduled maintenance or total replacement of sign when sign is unable to display a message adequately within 24 hours of notification. Action shall be taken to resolve the following problems if they have been visually observed or confirmed by self diagnostics by the speed feedback trailer for 3 continuous days or 7 intermittent days over a 2 week period.

4) An entire pixel board is showing failure.

5) Five or more pixel failures over entire message panel anytime while sign is deployed for use (blank or displaying a message).

6) Two or more pixel failures in any character when displaying the speed.

h. If service is not restored within 24 hours, Engineer will cause such work to be performed as may be necessary to provide this service. The cost for this restoration shall be borne by the Contractor.

~~**8. Remove speed feedback trailers when no longer needed.**~~

N. Safety Closure.

Two types of safety closures will be specified: road closures and hazard closures.

1. Road Closures.

a. Place a fence meeting the requirements of Article 2528.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline. Mount a ROAD CLOSED (RII-2) sign on the Type III barricade.

c. In lieu of Articles 2528.03, N, 1, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches. Mount a ROAD CLOSED (R11-2) sign over the top two rails of on the Type 3 barricade located closest to the approximate roadway centerline.

d. Erect road closures as specified in the contract documents. Erect them on the mainline of the roadway where public traffic is diverted onto an on-site detour and where public traffic is prohibited from entering the work area.

e. Erect road closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

2. Hazard Closure.

a. Place a fence meeting the requirements of Article 2528.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline.

c. In lieu of Articles 2518.03, N, 2, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches.

d. Erect hazard closures as specified in the contract documents. Erect them at locations within a work area when construction involves major hazards on existing or relocated roadways. Such hazards may be located at streams, gullies, railroads, bridge approaches, and driveway locations. Through public traffic should not normally encounter a hazard closure.

e. Erect hazard closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

3. Responsibility.

a. Maintain the location and condition of the safety closures. Any Contractor who temporarily moves the safety closure for equipment or delivery of materials, shall replace it in its original position and is responsible for the restriction of public traffic into the closed area.

b. If a safety closure placed by the Contractor is required for an area after the Engineer's approval of completed work for that specific area, maintenance of that safety closure will become the responsibility of the Contracting Authority. The Engineer will document in writing the transfer of authority.

c. The Engineer will notify the Contractor of the date of removal of safety closures. The safety closure remains the property of the installing Contractor. If the safety closure is not removed by the date specified in the notification, it will become the property of the Contracting Authority and the Contractor will be charged for any removal costs.

~~N~~ O.Limitations.

1. Use sandbags or other crashworthy methods to anchor all traffic control devices subject to movement by wind.

~~**2.** When a two way road is open to public traffic during contract work, do not control one way traffic through the work area by means of a carry through flag or other token, except during equipment failure or emergency. Use other means when voice or signal communication between flaggers at control points is difficult or not effective because of distance, sight, or noise. Other means may be two way radio, pilot cars, or traffic signals.~~

~~**3.** Use pilot cars when the normal work area exceeds 1/4 mile on Primary projects. Where necessary for short durations, the distance may be extended to 1/2 mile for better sight distance or to clear intersections or other safety considerations with approval of the Engineer, provided a two way radio is used for communication between flaggers.~~

~~4~~ 2. During non-working hours, remove, cover, or turn down traffic control devices intended for working hours only, unless a drop-off or physical obstruction remains within 15 feet of a lane open to traffic. Signs or barricades are not required for work beyond 15 feet of a lane open to traffic. When traffic control devices are no longer needed, remove them.

~~5~~ 3. Personnel in the highway right-of-way shall wear only orange or strong yellow green ANSI 107 Type R Class 2 apparel when exposed to traffic or construction equipment. Orange or strong yellow green colored or a combination of these colors, ANSI 107 Class E pants or shin reflectors/gaiters are also required to be worn at night. Shin reflectors/gaiters shall have a minimum of two 2 inch bands of retroreflective material spaced at least 6 inches apart. Background material shall extend at least 2 inches above and below retroreflective bands and continue through the length of shin reflector/gaiter. Shin reflector/gaiter shall completely encircle the leg and be worn on lower leg between knee and ankle.

~~6~~ 4. The Engineer may require signs and traffic control devices to be recleaned by washing. Use a brush and water, and detergent or solvent as necessary. Include the entire target area or sign face, supplemental or auxiliary signs, if any, all reflectors, and faces of warning lights which are part of that device.

~~7~~ 5. Ensure entry to and exit from work areas is in the direction of public traffic and does not cross open traffic lanes at other than designated locations.

~~8~~ 6. During hours of darkness, operate equipment in the traffic control zone facing in the direction of traffic flow unless specified otherwise in the Traffic Control Plan. Darkness will include the period from sunset to sunrise and other times when conditions such as fog, snow, sleet or rain provide insufficient lighting to clearly identify persons and vehicles on the highway at a distance of 500 feet ahead.

~~9~~ 7. Unless stated otherwise in the ~~traffic control plan~~ Traffic Control Plan, provide for a minimum of 2 miles between traffic control zones on rural roadways. The Engineer will determine minimum distances between traffic control zones on urban roadways.

~~10~~ 8. Submit Traffic Control Plan modifications to the Engineer for review and approval prior to any changes being made. The Engineer may modify sign spacing to meet existing field conditions or to prevent obstruction of the motorist's view of permanent signing.

~~11~~ 9. Ensure vehicles (except ready mix trucks) hauling soil, aggregate, ~~and~~ paving material, and other construction material to or from work area display a minimum 16 inch by 48 inch sign with the legend "DO NOT FOLLOW - INTO WORK AREA", as shown in the contract documents. Comply with the following requirements for the sign:

- Orange with black lettering using Type VII (Iowa) sheeting.
- Keep clean to maintain its visibility.

~~12~~ 10. For lanes closed to traffic, place two drums meeting the requirements of Article 2528.03, C, every 1000 feet. For full depth excavations in a closed lane, place two drums in front of each location. Additional drums need not be placed for full depth excavations spaced closer than 150 feet.

~~**13.** When milled or scarified surfaces exist, sign approaches to scarified areas using ROUGH ROAD (W8-8) signs. Place signs at least 250 feet in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At locations where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet in advance of each location. Erect, move, and maintain these signs until milled or scarified areas have been covered with new HMA or PCC pavement.~~

~~14~~ 11. ~~Active c~~Contractor vehicles and self-propelled equipment (except hand operated equipment) operating or parked within 15 feet of an open traffic lane (unless shielded by temporary or permanent barrier) and contractor, delivery, ~~and~~ service and private vehicles entering or exiting work area shall display cab roof mounted amber or yellow high intensity rotating, flashing, or oscillating warning lights. Repair or replace vehicle warning lights not functional or missing within 24 hours.

12. Parking of private vehicles on Interstate right-of-way will be allowed if private vehicles are parked at least 15 feet away from an open traffic lane when the contractor is working. Parking of private vehicles on Interstate right-of-way is not permitted during non-working hours. Engineer will approve location for parking of private vehicles.

13. Conduct all operations within the same lane from the start of the work area to the end of the work area and do not shift traffic from one lane to another lane unless allowed in the contract documents. If the contract includes work in adjacent lanes, space the individual lane closures for each lane per the requirements in Article 2528.03, O, 9.

2528.04 METHOD OF MEASUREMENT.

Measurement will be as follows:

A. Traffic Control.
Lump sum.

B. Portable Dynamic Message Signs.
The Engineer will count the number of days each Portable Dynamic Message Sign is required to be in place along a road and capable of displaying messages to the traveling public. Days when PDMS is blank and is in good working condition, will be measured. Days when PDMS is unable to display a message due to cellular ~~(when specified)~~ or mechanical problems will not be measured. Days when PDMS is on the roadway and not approved by the Engineer will not be measured.

C. Temporary Barrier Rail.
The Engineer will ~~calculate~~ measure the length of temporary barrier rail used ~~based on count and the nominal length of each unit~~ in linear feet. The length of temporary barrier rail measured will be the length required per setup. Measurement will also be made for temporary barrier rail moved within, or added to, an existing setup when required by the contract documents. Measurement of temporary barrier rail, after its initial placement, will not be made unless it is required by the contract documents to be moved.

D. Temporary Lane Separator System.
The Engineer will measure the length of the Temporary Lane Separator System installed in linear feet.

E. Modular Glare Screen.
Measurement for Modular Glare Screen System will be in linear feet.

F. Temporary Crash Cushions.
Article 2551.04 applies.

G. Temporary Traffic Signals.
By count for each group installation of temporary traffic signals operated by a common control unit. A group installation is normally four signal heads at the same traffic conflict area.

H. Temporary Floodlighting Luminaire.
By count.

I. Pilot Cars.

1. By count for the number of pilot cars used during each work shift. A shift is a scheduled period of work for the Contractor's operations.

2. For a pilot car to be counted:
- **a.** Use of the pilot car is necessary and it is used as part of preplanned work that is started that shift and is intended to proceed for a major part of the shift. If used less than 4 hours during a shift, one half pilot car will be counted.
- **b.** Use of other pilot cars is necessary and they are used for at least 1 hour during the shift, perhaps intermittently, and this shall be the primary duty of the employee. If used less than 4 hours in a shift, one-half pilot car will be counted. If used at least 4 hours, but less than 12 hours, a total of one pilot car will be counted. If used 12 hours or more, an additional one-half pilot car will be counted for a total of 1.5 pilot cars for the shift.

J. Flaggers.

1. By count for the number of flaggers used during each work shift. A shift is a scheduled period of work for the Contractor's operations.

2. For flaggers to be counted:
- **a.** Use of the flaggers is necessary and they are used as part of preplanned work that is started that shift and is intended to proceed for a major part of the shift. If used less than 4 hours during a shift, one-half flagger will be counted. If used at least 4 hours, but less than 12 hours, a total of one flagger will be counted. If used 12 hours or more, an additional one-half flagger will be counted for a total of 1.5 flaggers for the shift.
- **b.** Use of other flaggers is necessary and they are used for at least 1 hour during the shift, perhaps intermittently, and this shall be the primary duty of the employee. If used less than 4 hours in a shift, one-half flagger will be counted.

K. Monitoring with Incident Response.
Calendar days based on the contract quantity. Additional personnel required by the Engineer to provide additional traffic monitoring of ~~CMS~~ PDMS operation will be measured in calendar days per person needed.

L. Safety Closures.
By count for the number of Safety Closures placed.

2528.05 BASIS OF PAYMENT.
Payment will be at the contract unit price as described below. When the Engineer requires recleaning of reflectorized surfaces of signs and traffic control devices, payment will be made as extra work according to Article 1109.03, B. All signs and traffic control devices furnished by the Contractor remain the Contractor's property at the completion of the work and are to be removed from the site when no longer needed.

A. Traffic Control.

1. Lump sum when there is a contract item for Traffic Control.

2. Payment is full compensation for:
- Erecting, maintaining, moving, and removing all traffic control devices required by the contract documents, including warning lights,
- Furnishing all materials, labor, and equipment, and
- Traffic quality control.

B. Portable Dynamic Message Signs.

1. Payment will be at the contract unit price per calendar day for each Portable Dynamic Message Sign measured as provided in Article 2528.04, B.

2. Payment is full compensation for furnishing, placing, operation (when specified), and maintenance of PDMS. Payment includes the cost of preventative and unscheduled maintenance, cellular communication ~~(when specified)~~, on-board software, hardware, and power supply.

C. Temporary Barrier Rail.

1. Linear feet of Temporary Barrier Rail measured.

2. Maintenance of temporary barrier rail is incidental to Temporary Barrier Rail.

3. Payment for repair or replacement of temporary barrier rail damaged by public traffic will be paid according to Article 1109.03, B.

D. Temporary Lane Separator System.

3. Linear feet of Temporary Lane Separator System measured

4. Payment includes installation, maintenance, repair, removal of the temporary lane separator system (if installed in a temporary traffic control zone), and all required pavement or bridge deck repair.

E. Modular Glare Screen.

1. ~~Per foot~~ Linear feet of Modular Glare Screen System measured.

2. Payment is full compensation for:
- Material,equipment, and labor to furnish and install the system on the top of the temporary concrete barrier rail,
- ~~Furnishing and applying retroreflective strips,~~
- Maintenance of the system,
- Repairing or replacing damaged parts of the system,
- Removing and reinstalling the system if necessary when moving the concrete barrier rail, and
- Final removal of the system from the top of the concrete barrier rail.

F. Temporary Crash Cushions.
Article 2551.05, A, applies.

G. Temporary Traffic Signals.

1. Each, for individual group installations operated by a common control unit, normally four signal heads at the same traffic control area.

2. Payment is full compensation for furnishing, installing, maintaining and servicing the controller, signal heads, traffic detection system, signal operator, costs for electrical energy, and the cost of removing temporary traffic signal materials from the construction site. The Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary traffic signals.

H. Temporary Floodlighting Luminaire.

1. Each.

2. Payment is full compensation for~~:~~ furnishing, installing, maintaining and servicing the temporary floodlighting units, all costs for electrical energy, the cost of removing all lighting materials from the construction site, and the Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary floodlighting.

- ~~Furnishing, installing, maintaining and servicing the temporary floodlighting units,~~
- ~~All costs for electrical energy,~~
- ~~The cost of removing all lighting materials from the construction site, and~~
- ~~The Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary floodlighting.~~

I. Pilot Cars.
Predetermined contract unit price per each for the number of shifts each pilot car was operated.

J. Flaggers.

1. Predetermined contract unit price per each for the number of shifts each flagger was used.

2. Payment is full compensation for providing trained flaggers according to ~~Article 2528.03, K~~ Article 2528.03, K.

K. Monitoring with Incident Response.

1. Per calendar day for the number of calendar days used.

2. This payment is full compensation for:

- Furnishing the necessary vehicle (including operation, maintenance, and supplies),
- Furnishing the operator,
- Documentation of any events that restrict the normal flow of traffic including responses to an emergency situation,
- Re-erecting, repairing, or replacing traffic control devices,
- Providing assistance to persons with vehicle problems,
- Moving stalled vehicles, and
- Summoning further assistance when needed.

3. Payment for the number of calendar days that additional personnel, such as for ~~CMS~~ PDMS operation required by the Engineer, will be the contract unit price per calendar day. Payment is full compensation for furnishing the required personnel and necessary support vehicles.

L. Safety Closures.
Payment is full compensation for furnishing all material, labor, and equipment necessary to erect, maintain, and remove the Safety Closure, unless indicated otherwise in the contract documents.

Comments:

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

1107.08 PUBLIC CONVENIENCE AND SAFETY.

A. The schedule for removal of existing guardrail, ~~warning devices,~~ and ~~other~~ traffic control devices requires Engineer's approval. The Contractor may be required to place temporary warning devices at locations where replacement features are not installed the same day as removal takes place.

D. When it is not practical for the Contracting Authority to close the road for construction, the Contractor will be expected to perform the work under traffic. The contract documents will ~~indicate this fact and~~ provide instructions for handling traffic through the work area. Unless otherwise stated in the contract documents, all work shall be performed by the Contractor between the hours of 30 minutes after sunrise to 30 minutes before sunset.

E. Except when the contract documents indicate the road is to be closed, ~~during all pavement widening, base widening, and HMA resurfacing work,~~ traffic will be permitted to use the ~~routes~~ roads involved at all times and shall not be delayed unnecessarily. ~~Where a pavement or base is being widened, the machine depositing material shall operate within the designated work area~~. Construction equipment may be stored within the right-of-way, at least 15 feet from the edge of the traveled way, and ~~as far from the traveled way Aas is practical, but~~ the roadbed shall be free of Contractor's equipment during non-working hours. The work shall be planned and conducted to cause a minimum delay or interference with traffic.

F. When work on a traveled way necessitates diverting traffic from a work lane to another lane, material, personnel, ~~mobile~~ equipment, and vehicles shall occupy the work lane to the minimum extent and for the minimum time necessary, and non-mobile equipment shall be removed from the work lane promptly after its operation is completed in that lane.

H. The location for storage of materials and equipment by the Contractor during nonworking hours shall be at least 15 feet from the edge of the traveled way ~~as reviewed~~ and approved by the Engineer prior to use.

I. ~~Parking of private vehicles on Interstate right-of-way will not be allowed.~~ On multilane highways parking ~~Parking~~ of unattended equipment within the median or storage of equipment within 50 feet of the edge of the traveled way ~~pavement~~ will not be allowed.

1107.09 ~~BARRICADES AND WARNING SIGNS~~. CONTRACTING AUTHORITY AND CONTRACTOR TRAFFIC CONTROL RESPONSIBILITIES.

A. Barricades, channelizing devices, warning signs, and other aspects of traffic control shall be in accordance with the contract documents. In providing adequate and proper traffic control, both the Contracting Authority and the Contractor have certain responsibilities.

d. Availability.

Except when there is an item for traffic control, all signs and traffic control devices (except pilot car signs and flagger signs) will be made available to the Contractor at a nearby site designated by the Engineer. They will be furnished by the Contracting Authority. ~~Replacement materials will also be furnished as necessary.~~

2. Responsibilities of the Contractor.

a. General.

1) The Contractor shall be responsible for placing and maintaining proper barricades, warning signs, and other traffic control devices on the project, and the Contractor shall take every reasonable precaution to prevent traffic from interfering with the work and to prevent the work from interfering with the traffic; and shall take every reasonable precaution to provide for safety of the general public traveling to, through, within, along, and across the project. Where the road is closed for construction, the Contractor shall take every reasonable precaution to protect the work and equipment and to provide for safety of the public. When traffic is to be maintained through the construction, the Contractor shall erect and maintain all signs; furnish, erect, and maintain all other traffic control devices, pilot cars and ~~other safeguards;~~ provide all flaggers necessary to protect the traveling public. Payment for this work will be in accordance with Article 2528.05.

c. Entrance from Local Public Roads.

On local public roads open to traffic during construction, the Contractor shall erect and maintain signs in accordance with the contract documents. ~~When scarification is part of the contract, ROUGH ROAD signs shall also be erected on the shoulder of the road under construction at local public road intersections. These signs shall be erected, moved when appropriate, and maintained by the Contractor until the scarified areas are covered with the new surface material~~. Payment for this work will be in accordance with Article 2528.05.

i. Cleaning.

The reflective surfaces of signs and traffic control devices shall be washed, as described in ~~Article 2528.03, L,~~ Artilce 2528.03.O.6 and shall be clean at the time of initial installation on a project.

~~**Section 2518. Safety Closure**~~

~~**2518.01 DESCRIPTION.**~~

This section concerns Safety Closures erected as specified in the contract documents. Two types of safety Closures will be specified: Road Closures and Hazard Closures.

2518.02 MATERIALS.

Use orange mesh safety fence meeting the requirements of Article 4188.03.

2518.03 CONSTRUCTION.

A. Erection.

1. Road Closures.

a. Place a fence meeting the requirements of Article 2518.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline. Mount a ROAD CLOSED (RII-2) sign on the Type III barricade.

c. In lieu of Articles 2518.03, A, 1, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches. Mount a ROAD CLOSED (R11-2) sign over the top two rails of on the Type 3 barricade located closest to the approximate roadway centerline.

d. Erect road closures as specified in the contract documents. Erect them on the mainline of the roadway where public traffic is diverted onto an on-site detour and where public traffic is prohibited from entering the work area.

e. Erect road closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

2. Hazard Closure.

a. Place a fence meeting the requirements of Article 2518.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline.

c. In lieu of Articles 2518.03, A, 2, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches.

d. Erect hazard closures as specified in the contract documents. Erect them at locations within a work area when construction involves major hazards on existing or relocated roadways. Such hazards may be located at streams, gullies, railroads, bridge approaches, and driveway locations. Through public traffic should not normally encounter a hazard closure.

e. Erect hazard closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

B. Responsibility.

1. Maintain the location and condition of the safety closures. Any Contractor who temporarily moves the safety closure for equipment or delivery of materials, shall replace it in its original position and is responsible for the restriction of public traffic into the closed area.

2. If a safety closure placed by the Contractor is required for an area after the Engineer's approval of completed work for that specific area, maintenance of that safety closure will become the responsibility of the Contracting Authority. The Engineer will document in writing the transfer of authority.

3. The Engineer will notify the Contractor of the date of removal of safety closures. The safety closure remains the property of the installing Contractor. If the safety closure is not removed by the date specified in the notification, it will become the property of the Contracting Authority and the Contractor will be charged for any removal costs.

2518.04 METHOD OF MEASUREMENT.

The Engineer will count each Safety Closure (either road closure or hazard closure) erected.

~~**2518.05 BASIS OF PAYMENT.**~~

~~**A.** Payment will be the contract unit price for each Safety Closure counted.~~

~~**B.** Payment is full compensation for furnishing all material, labor, and equipment necessary to erect, maintain, and remove the Safety Closure, unless indicated otherwise in the contract documents.~~

Section 2528. Traffic Control

2528.01 DESCRIPTION.

A. General.

3. The contract may indicate that traffic control is incidental. In this case the Contracting Authority will furnish all signs and traffic control devices, except pilot car and flaggers' signs, and all Type III barricades, and associated mounting devices. Furnish all other traffic control devices required. Erect, operate, maintain, move, and remove all traffic control devices. Signs and barricades to be furnished by the Contracting Authority will be made available at a nearby maintenance site. Return the signs and barricades when no longer needed. Any Contracting Authority signs and barricades damaged during construction activities by the Contractor's activities shall be replaced at no charge to the Contracting Authority.

5. Ensure all traffic control complies with the current edition of the MUTCD, Part 6 as adopted by the Department, unless modified by the Contract Documents.

6. On Interstate and Primary Road projects, use crashworthy Category I and Category II traffic control signs and devices that meet NCHRP Report 350 or MASH 2016 (Manual for Assessing Safety Hardware).

7. Upon request provide the following to the Engineer for the purpose of documenting the crashworthiness of Category I and Category II signs and traffic control devices:
- **a.** The vendor's self-certification for Category I traffic control devices.
- **b.** FHWA NCHRP Report 350 or MASH approval memos for Category II signs and traffic control devices.

~~**9.** Gender specific signs, such as FLAGMAN and MEN WORKING, will not be allowed. Use neutral gender signs, for example FLAGGER, or equivalent symbol signs.~~

~~**10** **9.** Provide 10 calendar days advance notification of a pedestrian path closure to the following:
- National Federation of the Blind of Iowa: Affiliate President, https://nfb.org/resources-iowa.
- Engineer

B. Monitoring With Incident Response.

1. Provide 24 hour per day continuous monitoring of traffic control devices and incident response for emergency situations on projects during complex traffic situations as defined in the contract documents. ~~The contract documents will identify projects requiring monitoring with incident response~~. Ensure a vehicle and operator traverses the project throughout the entire traffic control zone at all times, except for refueling and short rest breaks no greater than 15 minutes in duration.

3. Provide a vehicle and operator for this work as follows:

a. Equipment.

1) Meet the following requirements:
- **a)** 3/4 ton pickup truck or another similar vehicle.
- **b)** Contractor's insignia on the doors of the vehicle.
- **c)** Adequate weight and power and suitably equipped to move stalled automobiles, sport utility vehicles, or pickup trucks.
- **d)** Equipped with an amber or yellow high intensity rotating, flashing, or oscillating warning light ~~amber revolving light or amber strobe light~~ visible in all directions and a cellular telephone or similar type of mobile phone.

2) When used on projects where more than one lane in one direction is maintained at all times, ensure this vehicle is also be equipped with a Type C arrow panel as described in Article 2528.03, ~~F~~C, mounted to be visible to traffic approaching from behind.

b. Operation.

1) Furnish an operator for the vehicle. Ensure the operator re-erects, repairs, or replaces defective devices immediately upon discovery.

2) Have the operator:

a) Be available to assist persons with vehicle problems and move automobiles, sport utility vehicles, pickup trucks and other obstructions ~~so as~~ to keep all travel lanes and shoulders available for public traffic.

3) During anticipated peak traffic times, the Engineer may direct the Contractor to provide additional monitoring personnel. Payment will be made as extra work according to Article 1109.03, B

2528.03 ~~SIGNS AND DEVICES~~ CONSTRUCTION.

A. Signs.

6. Meet the following requirements for moveable skid mounted signs:

a. Flexible roll-up sheeting or other skid mounted sign systems that meet NCHRP 350 or MASH requirements.

b. Mounted at a height of at least 1 foot above the roadway.

10. When indicated in the contract documents, use supplemental sign flags in conjunction with work zone signing. Use sign flags 16 inches square and sheeted with red Type XI ~~IV~~ retroreflective sheeting meeting requirements of Article 4186.03.

12. When directed by the Engineer, cover or remove permanent signing that conveys a message contrary to the message of the temporary signing and not applicable to the working conditions. When the work is completed uncover or replace and removed permanent signing. Permanent signs damaged by the Contractor's activities shall be replaced at no charge to the Contracting Authority.

14. When milled or scarified surfaces exist, sign approaches to scarified areas using ROUGH ROAD (W8- 8) signs. Place signs at least 250 feet in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At locations where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet in advance of each location. Erect, move, and maintain these signs until milled or scarified areas have been covered with new HMA or PCC pavement.

C. Channelizing Devices.

1. Use Channelizing Devices that are of the type shown in the contract documents. Ensure all channelizing devices meet the current requirements of the MUTCD and Section 4188. Use reflective sheeting meeting the requirements of Article 4186.03.

a. Barricades.

~~**1)** A 2 foot minimum length barricade may be used when Type I or Type II Barricades are furnished as one of the options for channelizing devices in lieu of vertical panels, 42 inch channelizers, cones, or drums.~~

1~~2~~) Ensure Type III barricades have a minimum length of rail of 6 feet. When traffic is permitted in each direction around a Type III Barricade, ensure the Type III Barricade used has fully reflectorized faces on both sides of the rails.

2~~3~~) Erect barricades in essentially a ~~horizontal~~ vertical position perpendicular to the direction of approaching traffic. Ballast them so as not to cover any striped rail.

b. Cones, ~~Vertical Panels~~, 42 Inch Channelizers, Drums, and Tubular Markers.

1) Ensure cones, ~~vertical panels~~, 42 inch channelizers, drums, ~~, and~~ tubular markers, and other traffic control devices meet the current requirements of the MUTCD, and Section 4188.

~~**2)** When used to separate two way traffic, separate temporary no passing lines approximately 16 inches, with the marker to be installed between these lines.~~

2~~3~~) Ensure tubular markers meet the following:

a) A nominal 36 inch height.

b) Diameter facing traffic at least 2 inches in width.

c) Completely faced with reflectorized white and orange sheeting that is in two bands 4 inches wide with 6 inches between bands, with the top band no more than 2 inches from the top of the tubular marker.

34) Cones may be used as channelizing devices in tapers and along lane lines during daylight hours only.

45) 42 inch channelizers may be used in place of drums in work areas remaining in place for up to three days. Spacing of channelizers shall be half the spacing required for drums or double the number of drums required.

~~**D. Pilot Cars.**~~

~~**1.** Pickup trucks or automobiles displaying the Contractor's company insignia, equipped with G20-4 signs reading: PILOT CAR - FOLLOW ME. Ensure two signs are mounted on the vehicle so as to be clearly visible from both directions of traffic. Mount the signs so the bottoms are at least 1 foot above the top of the vehicle's roof.~~

~~**2.** Operate pilot cars such that they maintain a uniform speed through the work area, no greater than 40 miles per hour.~~

DE. Temporary Barrier Rail.

Use temporary barrier rail as shown in the contract documents. Unless shown otherwise, use precast concrete units. Tie the units together as specified or as approved by the Engineer.

EF. Modular Glare Screens.

~~**8.** Upon completion of the work, the Contractor retains ownership of the modular glare screen system.~~

FG. Lighting Devices.

1. Furnish lighting devices as required by the contract documents. ~~Type A barricade warning lights will normally be required for nighttime installations.~~ Type B warning lights will normally be required for 24-hour operation.

2. Use barricade warning lights that comply with the ITE Standard for Flashing and Steady Burn Barricade Warning Lights and are identified as such. ~~In addition, use Type A barricade warning lights that:~~

- ~~Operate on a 12 volt battery system, unless the ITE identification specifically indicates that the rating is based on a different system, and~~
- ~~Are visible to both directions of traffic.~~

GH. Temporary Traffic Signals.

1. General.

c. Notify the Engineer at least 48 hours prior to the use of the signals for timing approval and verification.

2. Equipment.

a. Trailer ~~or~~ Span Wire Mounted, or Flagger Station Systems.

1) Furnish actuated signal controllers complying with NEMA and ITE standards. Ensure the temporary traffic signal system complies with the following:

a) Includes a solid state digital traffic signal controller capable of operating the signals according to MUTCD requirements and NEMA Standard ~~TS1~~ TS-5. A copy of the manufacturer's certificate of compliance is to be posted in the control cabinet (in a weatherproof folder) and made available to the Engineer upon request.

b. Flagger Station Systems.

Provide a traffic signal system, for one-lane/two-way operation in conjunction with a flagger and/or pilot car operation in order to provide greater advance visibility to the flagging operations.

- Two or more self-contained trailer mounted units each consisting of one or two signal heads.

- Single-signal head systems shall have a signal head mounted on each side of the roadway
- Two-signal head systems shall have one signal head mounted on a mast arm capable of extending over the center of the travel lane and the other signal head mounted on the same trailer.

~~H~~I. Temporary Floodlighting.

1. General.

a. Set up and operate either pole mounted or portable, ~~mobile~~ self contained LED temporary floodlights at locations shown in contract documents.

b. Ensure floodlighting is installed and in service before commencing work requiring nighttime traffic control according to the traffic control plan.

c. Exercise reasonable care to avoid interruptions during hours of darkness, promptly repair damage to system, and replace burned out lamps promptly.

b. Portable~~, Mobile~~ Self Contained LED Floodlights.

1) Mounted on portable trailers containing solar cell array and storage battery system to power LED luminaire. Ensure system meets NCHRP 350 or MASH Category IV crash testing.

2) Ensure mounting height of LED luminaires is no less than 17 feet above roadway, or as shown in the contract documents.

3) Locate portable trailers so LED luminaire is centered over outside edge of pavement and trailer is on shoulder offset as far as possible from traveled way

4) Meet materials requirements of Article 4188.05 for LED Floodlighting Luminaires.

~~I~~J. Temporary Crash Cushions.

Apply Section 2551.

~~J~~K. Flaggers.

1. Prior to flagging operations, ensure the flaggers are trained in safe flagging operations that comply with Iowa DOT Flagger's Handbook, Part 6 of the MUTCD, and the Standard Specifications. Ensure training of flaggers includes the following:

a. Issuing and reviewing the current Iowa DOT Flagger's Handbook,

b. Presentation of the current Iowa Professional Flagging Video,

c. Issuing flagger training cards including the information below. ~~Ensure the flaggers carry their flagger training card at all times and show it upon request.~~

1) Employee name,

2) Date of training,

3) Name of Instructor, and

4) Expiration date of December 31 of the year following the training date.

5. When nighttime flagging is required, provide auxiliary lighting to illuminate the flagging stations according to the MUTCD, Part 6 and current Iowa DOT Flagger's Handbook. Set up this lighting in such a manner to minimize glare to motorists. The cost of furnishing nighttime flagging station~~s~~ lighting is included in the lump sum price bid for Traffic Control.

6. Ensure the flaggers carry their flagger training card at all times and show it upon request.

K. Pilot Cars.

1. Pickup trucks or automobiles displaying the Contractor's company insignia on the doors of the vehicle, equipped with G20-4 signs reading: PILOT CAR - FOLLOW ME. Ensure two signs are mounted on the vehicle ~~so as~~ to be clearly visible from both directions of traffic. Mount the signs so the bottoms are at least 1 foot above the top of the vehicle's roof.

2. Operate pilot cars such that they maintain a uniform speed through the work area, no greater than 40 miles per hour.

M. Speed Feedback Signs.

Furnish, place, operate, and maintain speed feedback signs at locations shown on the contract documents. Ensure all speed feedback signs meet the current requirements of the MUTCD and Section 4188.

~~**4.** Remove speed feedback trailers when no longer needed.~~

N. Safety Closure.

Two types of safety closures will be specified: road closures and hazard closures.

1. Road Closures.

a. Place a fence meeting the requirements of Article 2528.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline. Mount a ROAD CLOSED (RII-2) sign on the Type III barricade.

c. In lieu of Articles 2528.03, N, 1, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches. Mount a ROAD CLOSED (R11-2) sign over the top two rails of on the Type 3 barricade located closest to the approximate roadway centerline.

d. Erect road closures as specified in the contract documents. Erect them on the mainline of the roadway where public traffic is diverted onto an on-site detour and where public traffic is prohibited from entering the work area.

e. Erect road closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

2. Hazard Closure.

a. Place a fence meeting the requirements of Article 2528.02 across the roadway from outside edge of shoulder to outside edge of shoulder. Securely support the fence so it is in a vertical position without sagging.

b. Place a Type III barricade, described in Part 6 of the MUTCD, immediately in front of the fence at the approximate roadway centerline.

c. In lieu of Articles 2518.03, N, 2, a and b above, place a series of Type 3 barricades across the roadway from outside edge of shoulder to outside edge of shoulder. Ensure that gaps between Type 3 barricades are no greater than 6 inches.

d. Erect hazard closures as specified in the contract documents. Erect them at locations within a work area when construction involves major hazards on existing or relocated roadways. Such hazards may be located at streams, gullies, railroads, bridge approaches, and driveway locations. Through public traffic should not normally encounter a hazard closure.

e. Erect hazard closures beginning with the start of the contract period as specified in the contract documents, or when the work commences.

3. Responsibility.

a. Maintain the location and condition of the safety closures. Any Contractor who temporarily moves the safety closure for equipment or delivery of materials, shall replace it in its original position and is responsible for the restriction of public traffic into the closed area.

b. If a safety closure placed by the Contractor is required for an area after the Engineer's approval of completed work for that specific area, maintenance of that safety closure will become the responsibility of the Contracting Authority. The Engineer will document in writing the transfer of authority.

c. The Engineer will notify the Contractor of the date of removal of safety closures. The safety closure remains the property of the installing Contractor. If the safety closure is not removed by the date specified in the notification, it will become the property of the Contracting Authority and the Contractor will be charged for any removal costs.

O~~N~~. Limitations.

1. Use sandbags or other crashworthy methods to anchor all traffic control devices subject to movement by wind.

~~**2.** When a two way road is open to public traffic during contract work, do not control one way traffic~~

~~through the work area by means of a carry through flag or other token, except during equipment failure or emergency. Use other means when voice or signal communication between flaggers at control points is difficult or not effective because of distance, sight, or noise. Other means may be two way radio, pilot cars, or traffic~~ signals.

~~**3.** Use pilot cars when the normal work area exceeds 1/4 mile on Primary projects. Where necessary for short durations, the distance may be extended to 1/2 mile for better sight distance or to clear intersections or other safety considerations with approval of the Engineer, provided a two way radio is used for communication between flaggers~~.

24. During non-working hours, remove, cover, or turn down traffic control devices intended for working hours only, unless a drop-off or physical obstruction remains within 15 feet of a lane open to traffic. Signs or barricades are not required for work beyond 15 feet of a lane open to traffic. When traffic control devices are no longer needed, remove them.

35. Personnel in the highway right-of-way shall wear only orange or strong yellow green colored or a combination of these colors, ANSI 107 Type R Class 2 apparel when exposed to traffic or construction equipment. Orange or strong yellow green ANSI 107 Class E pants or shin reflectors/gaiters are also required to be worn at night. Shin reflectors/gaiters shall have a minimum of two 2 inch bands of retroreflective material spaced at least 6 inches apart. Background material shall extend at least 2 inches above and below retroreflective bands and continue through the length of shin reflector/gaiter. Shin reflector/gaiter shall completely encircle the leg and be worn on lower leg between knee and ankle.

46. The Engineer may require signs and traffic control devices to be recleaned by washing. Use a brush and water, and detergent or solvent as necessary. Include the entire target area or sign face, supplemental or auxiliary signs, if any, all reflectors, and faces of warning lights which are part of that device.

57. Ensure entry to and exit from work areas is in the direction of public traffic and does not cross open traffic lanes at other than designated locations.

68. During hours of darkness, operate equipment in the traffic control zone facing in the direction of traffic flow unless specified otherwise in the Traffic Control Plan. Darkness will include the period from sunset to sunrise and other times when conditions such as fog, snow, sleet or rain provide insufficient lighting to clearly identify persons and vehicles on the highway at a distance of 500 feet ahead.

79. Unless stated otherwise in the ~~traffic control plan~~ Traffic Control Plan, provide for a minimum of 2 miles between traffic control zones on rural roadways. The Engineer will determine minimum distances between traffic control zones on urban roadways.

810. Submit Traffic Control Plan modifications to the Engineer for review and approval prior to any changes being made. The Engineer may modify sign spacing to meet existing field conditions or to prevent obstruction of the motorist's view of permanent signing.

911. Ensure vehicles (except ready mix trucks) hauling soil, aggregate, ~~and~~ paving material, and other construction materials to or from work area display a minimum 16 inch by 48 inch sign with the legend "DO NOT FOLLOW - INTO WORK AREA", as shown in the contract documents. Comply with the following requirements for the sign:

- Orange with black lettering using Type VII (Iowa) sheeting.
- Keep clean to maintain its visibility.

1012. For lanes closed to traffic, place two drums meeting the requirements of Article 2528.03, C, every 1000 feet. For full depth excavations in a closed lane, place two drums in front of each location. Additional drums need not be placed for full depth excavations spaced closer than 150 feet.

~~**13.** When milled or scarified surfaces exist, sign approaches to scarified areas using ROUGH ROAD (W8-8) signs. Place signs at least 250 feet in advance of milled or scarified areas. Repeat signs for traffic that may enter within the scarified area from intersecting public roads. At locations where milled or scarified areas end at project limits, bridges, or end of day's work; place BUMP (W8-1) signs within 50 feet in advance of each location. Erect, move, and maintain these signs until milled or~~

~~scarified areas have been covered with new HMA or PCC pavement.~~

~~11~~14. ~~Active~~ Ce~~o~~ntractor vehicles and self-propelled equipment (except hand operated equipment) operating or parked within 15 feet of an open traffic lane (unless shielded by temporary or permanent barrier) and contractor, delivery, ~~and~~ service and private vehicles entering or exiting work area shall display cab roof mounted amber or yellow high intensity rotating, flashing, or oscillating warning lights. Repair or replace vehicle warning lights not functional or missing within 24 hours.

12. Parking of private vehicles on Interstate right-of-way will be allowed if private vehicles are parked at least 15 feet away from an open traffic lane when the contractor is working. Parking of private vehicles on Interstate right-of-way is not permitted during non-working hours. Engineer will approve location for parking of private vehicles.

13. The Contractor shall conduct all operations within the same lane from the start of the work area to the end of the work area and shall not shift traffic from one lane to another lane unless allowed in the Contract Documents. If the contract includes work in adjacent lanes, the Contractor shall space the individual lane closures for each lane per the requirements in article 2528.03.O.9.

2528.04 METHOD OF MEASUREMENT.

Measurement will be as follows:

B. Portable Dynamic Message Signs.

The Engineer will count the number of days each Portable Dynamic Message Sign is required to be in place along a road and capable of displaying messages to the traveling public. Days when PDMS is blank and is in good working condition, will be measured. Days when PDMS is unable to display a message due to cellular ~~(when specified)~~ or mechanical problems will not be measured. Days when PDMS is on the roadway and not approved by the Engineer will not be measured.

C. Temporary Barrier Rail.

The Engineer will ~~calculate~~ measure the length of temporary barrier rail used in linear feet ~~based on count and the nominal length of each unit~~. The length of temporary barrier rail measured will be the length required per setup. Measurement will also be made for temporary barrier rail moved within, or added to, an existing setup when required by the contract documents. Measurement of temporary barrier rail, after its initial placement, will not be made unless it is required by the contract documents to be moved.

D. Temporary Lane Separator System.

The Engineer will measure the length of the Temporary Lane Separator System installed in linear feet.

E. Modular Glare Screen.

Measurement for Modular Glare Screen System will be in ~~liner~~ linear feet.

J. Flaggers.

2. For flaggers to be counted:

a. Use of the flaggers is necessary and they are used as part of preplanned work that is started that shift and is intended to proceed for a major part of the shift. If used less than 4 hours during a shift, one-half flagger will be counted. If used at least 4 hours, but less than 12 hours, a total of one flagger will be counted. If used ~~more than~~ 12 hours or more, an additional one-half flagger will be counted for a total of 1.5 flaggers for the shift.

K. Monitoring with Incident Response.

Calendar days based on the contract quantity. Additional personnel required by the Engineer to provide additional traffic monitoring of ~~CMS~~ PDMS operation will be measured in calendar days per person needed.

L. Safety Closures

By count for the number of Safety Closures placed.

2528.05 BASIS OF PAYMENT.

Payment will be at the contract unit price as described below. When the Engineer requires recleaning of reflectorized surfaces of signs and traffic control devices, payment will be made as extra work according to Article

1109.03, B. All traffic control signs and devices furnished by the Contractor remain the Contractor's property at the completion of the work and are to be removed from the site when no longer needed.

B. Portable Dynamic Message Signs.

2. Payment is full compensation for furnishing, placing, operation (when specified), and maintenance of PDMS. Payment includes the cost of preventative and unscheduled maintenance, cellular communication ~~(when specified),~~ on-board software, hardware, and power supply.

E. Modular Glare Screen.

1. ~~Per foot~~ Linear feet of Modular Glare Screen System measured.

2. Payment is full compensation for:

- Material,equipment, and labor to furnish and install the system on the top of the temporary concrete barrier rail,
- ~~Furnishing and applying retroreflective strips,~~
- Maintenance of the system,
- Repairing or replacing damaged parts of the system,
- Removing and reinstalling the system if necessary when moving the concrete barrier rail, and
- Final removal of the system from the top of the concrete barrier rail.

H. Temporary Floodlighting Luminaire.

1. Each.

2. ~~Payment is full compensation for:~~

- ~~Furnishing, installing, maintaining and servicing the temporary floodlighting units,~~
- ~~All costs for electrical energy,~~
- ~~The cost of removing all lighting materials from the construction site, and~~
- ~~The Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary floodlighting.~~

Payment is full compensation for furnishing, installing, maintaining and servicing the temporary floodlighting units, all costs for electrical energy, the cost of removing all lighting materials from the construction site, and the Contractor shall supply their own breaker box and power meter and shall not connect to existing Contracting Authority owned circuits to supply power for temporary floodlighting.

J. Flaggers.

1. Predetermined contract unit price per each for the number of shifts each flagger was used.

2. Payment is full compensation for providing trained flaggers according to Article 2528.03, ~~JK~~.

K. Monitoring with Incident Response.

3. Payment for the number of calendar days that additional personnel, such as for ~~CMS~~ PDMS operation required by the Engineer, will be the contract unit price per calendar day. Payment is full compensation for furnishing the required personnel and necessary support vehicles.

L. Safety Closures

Payment is full compensation for furnishing all material, labor, and equipment necessary to erect, maintain, and remove the Safety Closure, unless indicated otherwise in the contract documents.

Reason for Revision: Several changes are proposed to update and consolidate the language in traffic control related specifications.

New Bid Item Required (X one)	**Yes**	**No** x
Bid Item Modification Required (X one)	**Yes** x	**No**

Bid Item Obsoletion Required (X one)	**Yes**	**No** x
Comments:		
County or City Comments:		
Industry Comments:		

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IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / John Hart	**Office:** Construction & Materials	**Item 3**
Submittal Date:	**Proposed Effective Date:**	
Article No.: 2301.05, K, 1 **Title:** Basis of Payment (Portland Cement Concrete)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: Cedar County asked if the Engineer had any leeway in not paying for protection if the Contractor could have waited a day for better weather when protection would not be needed. The Construction and Materials Bureau stated that they try not to get into the Contractor's production schedule and would not want to be subject to claims if they told a Contactor they couldn't pave on a particular day if it is allowed by specification with protection. The Construction and Materials Bureau did point out that there are weather restrictions in Article 2301.03, S of the Standard Specifications that would give the Engineer some control of cold weather paving. The counties will consider whether any additional language will be requested.

Specification Section Recommended Text:

2301.05, K, 1

Replace the first sentence:

When any of the types of additional protection described in Article 2301.03, K, 3, is necessary, additional payment will be made as extra work at the rate of ~~$1~~ 2.00 per square yard of surface protected.

Comments:

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

1. When any of the types of additional protection described in Article 2301.03, K, 3, is necessary, additional payment will be made as extra work at the rate of $~~1~~2.00 per square yard of surface protected. Payment will be limited to protection necessary within the contract period. Protection necessary after November 15 will be paid for only when the Engineer authorizes the work.

Reason for Revision: It has been 15 years since the basis of payment for protection has been updated. Based on Contracts construction cost index since 2005, recommending an increase to $2.00 per square yard from $1.00 per square yard. Will continue to monitor and adjust as needed in the future.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X

Comments:

County or City Comments:

Industry Comments: Reviewed with ICPA and members – in agreement. This has been shared with the ICPA/members. No negative comments have been received.

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SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Jeff Schmitt	**Office:** Construction & Materials	**Item 4**
Submittal Date: 04-24-2020	**Proposed Effective Date:** Oct 2020 GSS	
Article No.: 2303.03 D, 6, a, 1, b, 8 **Title:** Lab Voids (Flexible Pavement)		

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2303.03 D, 6, a, 1, b, 8.

Replace the Article:

When the same mix type is placed in both PWL and AAD areas in a single day ~~on a single project~~, include all samples for that day in the PWL lot as well as the quantity of the mixture bid item produced and placed in the PWL area.

Comments:

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

Revise the Article:

(8) When the same mix type is placed in both PWL and AAD areas in a single day~~ on a single project~~, include all samples for that day in the PWL lot as well as the quantity of the mixture bid item produced and placed in the PWL area.

Reason for Revision: The existing specification language is based on the mainline and shoulder paving operations being part of a single project. The revision makes the specification valid for (recent) situations when the shoulder and mainline operations are developed as separate projects, based on different funding sources.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X

Comments: Revision was discussed and recommended for approval by DME's on March 25, 2020.

County or City Comments:

Industry Comments:

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SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Jeff Schmitt	**Office:** Construction & Materials	**Item 5**
Submittal Date: 04-27-2020	**Proposed Effective Date:** October 2020 GS	
Article No.: 2304.02, B. **Title:** Hot Mix Asphalt Option (Detour Pavement)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2304.02, B, Hot Mix Asphalt Option.

Replace the Article:

Design a mixture per Materials I.M. 510 for the following:

1. For detour pavements or median crossovers on interstates and multi-lane primary highways, use a High Traffic (HT) surface or intermediate mixture, with PG 64-22 or PG 58-28~~H~~S asphalt binder. PG 58-28S binder use requires a mixture with at least 15% binder replacement from RAM. Surface lift requires L-4 friction aggregate.

2. For detour pavements on all other primary highways, use a High Traffic (HT) surface or intermediate mixture with a PG 64-22 or PG 58-28~~H~~S asphalt binder.

3. For detour pavements on non-primary projects use a Standard Traffic (ST) surface or intermediate mixture with a PG 64-22 or PG 58-28~~H~~S asphalt binder.

Comments:

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

Revise the three items of the article:

B. Hot Mix Asphalt Option.

1. For detour pavements or median crossovers on interstates and multi-lane primary highways, use a High Traffic (HT) surface or intermediate mixture, with PG 64-22 or PG 58-28~~H~~S asphalt binder. PG 58-28S binder use requires a mixture with at least 15% binder replacement from RAM. The surface lift requires L-4 friction aggregate.

2. For detour pavements on all other primary highways, use a High Traffic (HT) surface or intermediate mixture with a PG 64-22 or PG 58-28~~H~~S asphalt binder.

3. For detour pavements on non-primary projects, use a Standard Traffic (ST) surface or intermediate mixture with a PG 64-22 or PG 58-28~~H~~S asphalt binder.

Reason for Revision: PG 64-22S binder is often not readily available. In the above situations, PG 58-28S is considered an acceptable (and much more economical) substitution versus PG 58-28H. The RAM requirement in (1.) provides additional mat stiffness for potential high truck volume situations.		
New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X
Comments:		
County or City Comments:		
Industry Comments: APAI & HMA contractors have expressed support for the change.		

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IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Todd Hanson	**Office:** Construction & Materials	**Item 6**
Submittal Date: March 25, 2020	**Proposed Effective Date:** October 2020	
Article No.: 2412.03, C, 4 **Title:** Concrete Bridge Decks	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2412.03, C, Placing Concrete.

Replace the first sentence of Article 4:

Do not place concrete if the forecast theoretical rate of evaporation for that day exceeds 0.2 ~~lbs.~~ pounds per square foot per hour.

Add the Article and **renumber** the following Article:

5. Calculate theoretical evaporation rate, in accordance with methods described in Materials I.M. 382, at a maximum interval of every 3 hours during placement. If rate exceeds 0.2 pounds per square foot per hour, cease placement at next location acceptable to Engineer.

~~5~~ **6.** Concrete placement equipment proposed to be operated directly on bridge deck reinforcing steel shall be submitted to the Engineer with manufacturer's specifications for review/approval prior to use in concrete placement. Requests may require closer spacing of reinforcing bar supports and tying of all reinforcing bar intersections.

Comments:

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

4. Do not place concrete if the forecast theoretical rate of evaporation for that day exceeds 0.2 lbs. per square foot per hour. Do not place concrete, without permission from the Engineer, when the forecast wind velocity (maximum steady wind or gusts) will be 25 mph or greater. Use the Theoretical Rate of Evaporation Chart located within the appendix to calculate the theoretical rate of evaporation. For this chart, use:

- The National Weather Service's maximum air temperature, relative humidity, and maximum steady wind velocity without gusts for the date and the location of the concrete deck placement, and
- The temperature of plastic concrete at time of placement.

Monitor theoretical evaporation rate, in accordance with IM 382, at a maximum interval of every three hours during placement.

If the rate exceeds 0.2 pounds per square foot per hour cease placement at next location acceptable to Engineer.

Reason for Revision:

Make 2412 consistent with HPC DS language.

New Bid Item Required (X one)	**Yes**	**No** x
Bid Item Modification Required (X one)	**Yes**	**No** x
Bid Item Obsoletion Required (X one)	**Yes**	**No** x
Comments:		
County or City Comments:		
Industry Comments:		

DETERMINING RELATIVE HUMIDITY AND DEW POINT

GENERAL

This method describes equipment and methods used to determine the wind speed, relative humidity, and ambient temperature used to determine the theoretical evaporation rate when placing concrete bridge decks or bridge deck overlays.

The same equipment may be used to determine the dew point. When painting structural steel, specifications may require the dew point to be measured, to ensure that no moisture is condensed on the surface to be painted.

APPARATUS

- Kestrel 3000 Weather Meter (Figure 1.)
- ExTech 45158 Mini Hygro Thermo-Anemometer (Figure 2.)
- Equivalent meter meeting the following:

Measurement	Range	Resolution	Accuracy (±)
Wind Speed (mph)	1.5 to 60 mph	0.2 mph	3%
Relative Humidity, (%)	10 to 95%	1%	5%
Temperature, (°F)	0 to 120 °F	0.1 °F	1.8 °F
Dew Point, ((°F)	0 to 120 °F	0.1 °F	3.6 °F

PROCEDURE – Theoretical Evaporation Rate

1. Determine the wind speed, relative humidity, and ambient temperature at a location within 10 feet of the deck and at approximately shoulder height above the deck.
2. Determine the concrete temperature in accordance with IM 385.
3. Determine the theoretical evaporation rate, using the Theoretical Rate of Evaporation Chart in Article 2412 or Iowa DOT Form E122.

PROCEDURE – Dew Point

Determine the dew point in accordance with the meter instructions.

Figure 1. Kestrel 3000

Figure 2. ExTech 45158

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SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Kyle Frame / Melissa Serio	**Bureau:** Construction and Materials	**Item 7**
Submittal Date: 04/24/2020	**Proposed Effective Date:** October 2020	
Article No.: 2416.05, H, 1 **Title:** Trenchless (Rigid Pipe Culverts **Article No.:** 2553.02 **Title:** Casing Pipe (Trenchless Construction)	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Construction and Materials Bureau indicated that there had previously been some reluctance to allow steel pipe due to Buy America provisions, since much of the pipe is left over from the pipeline industry and would not have good records of its source. Pipe will be required to meet Buy America and will need certification.

The concrete pipe industry had some concerns with allowing this substitution, but it is for limited use (trenchless construction) and will not be specified but will be allowed for substitution.

Specification Section Recommended Text:

2416.05, H, 1.

Add as the second sentence:

When substitutions are made per Article 2553.02, A, 2, e, payment will be made per type and size of pipe as shown in the contract documents.

2553.02, A, 2, e, Roadway Pipe Culvert.

Replace the Article:

1) **Reinforced Concrete Pipe:** Apply Section 4145.
2) Substitution with welded or seamless steel pipe meeting the ASTM and grade requirements of Article 2553.02, B, 1 will be allowed. Concrete transition end sections are required. Meet the requirements of Materials I.M. 440 for material acceptance, minimum steel carrier pipe wall thickness, welding criteria and concrete transition end sections.

2553.02, B, 1, Pipe.

Add to the end of the Article:

Meet the requirements of Materials I.M. 440 for material acceptance.

2553.02, B, 2, a.

Replace the Article:

Comply with AWS Code D1.1 or D1.5. ~~Weld all joints with full penetrating weld.~~ Weld joints the full perimeter of the pipe to withstand pipe installation without joint separation. Welders shall be qualified according to Materials I.M. 560. Welds shall comply with Materials I.M. 558.

Comments:

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

Replace 2416.05, H

H. Trenchless:

1. Payment will be made at the contract unit price per linear foot for each type and size of pipe. When substitutions are made per Article 2553.02, A, 2, e payment will be made per type and size of pipe as shown in the contract documents.

2553.02, A, 2, e

Replace Article:

e. **Roadway Pipe Culvert.**
1) Reinforced Concrete Pipe: Apply Section 4145.
2) Substitution with welded or seamless steel pipe meeting the ASTM and grade requirements of Article 2553.02, B, 1 will be allowed. Concrete transition end sections are required. Meet the requirements of Materials I.M. 440 for material acceptance, minimum steel carrier pipe wall thickness, welding criteria and concrete transition end sections.

2553.02 B

Replace Article:

B. Casing Pipe.

1. Pipe.
Use only new steel pipe meeting the requirements of ASTM A 139/A 139M, Grade B; ASTM A 252, Grade 2; or ASTM A 53/A 53M, Grade B. Pipe may be welded or seamless. Wall thickness will be as specified in the contract documents. Meet the requirements of Materials I.M. 440 for material acceptance.

2. Joints.
a. Comply with American Welding Society Code D1.1 or D1.5. ~~Weld all joints with full penetrating weld.~~ Weld joints the full perimeter of the pipe to withstand pipe installation without joint separation. Welders shall be qualified according to Materials I.M. 560. Welds shall comply with Materials I.M. 558.

Reason for Revision: Describe how steel pipe substitutions will be paid.

The DOT has been accepting VE's for using jacked steel pipe in lieu of RCP for roadway pipe culverts for more than 10 years. This spec revision will incorporate the ability for the contractor to make this substitution without a VE and include in their bid. A new Materials IM will be released October 2020 in conjunction with this specification revision.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X
Comments:		
County or City Comments:		
Industry Comments:		

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SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Willy Sorenson	**Office:** Traffic & Safety	**Item 8**
Submittal Date:	**Proposed Effective Date:**	
Article No.: 2528.03, G **Title:** Lighting Devices **Section No.:** 4188 **Title:** Traffic Control Devices	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text:

2528.03, G, Lighting Devices.

Replace the title and Article:

~~**Lighting Devices**~~ **Arrow Boards.**

Furnish, place, operate, and maintain arrow boards at locations shown on the contract documents. Ensure arrow boards meet current requirements of MUTCD and Article 4188.10.

~~**1.** Furnish lighting devices as required by the contract documents. Type A barricade warning lights will normally be required for nighttime installations. Type B warning lights will normally be required for 24 hour operation.~~

~~**2.** Use barricade warning lights that comply with the ITE Standard for Flashing and Steady Burn Barricade Warning Lights and are identified as such. In addition, use Type A barricade warning lights that:~~

- ~~Operate on a 12 volt battery system, unless the ITE identification specifically indicates that the rating is based on a different system, and~~
- ~~Are visible to both directions of traffic.~~

~~**3.** When arrow displays are used, furnish Type C arrow displays described in the current edition of the MUTCD, Part 6, and operate them in a sequential chevron mode when indicating a lane change.~~

1. Operation.

a. When indicating a right or left lane closure, operate in a sequential chevron mode.
b. When indicating a traffic split, operate in a flashing double arrow mode.
c. When indicating caution, operate in an alternating diamond mode.

2. Remote Communications.

When using an Arrow Board for stationary work zones on the Interstate System, remote communication capabilities meeting requirements of Article 4188.10, F are required.

3. Type and Size.

Type C Arrow Boards as defined in Part 6 of the MUTCD are required for all applications.

4. Testing and Configuration.

On Interstate projects, at least 1 week before Arrow Board is deployed to a project, a testing and configuration process shall be performed with the Engineer.

4188, Traffic Control Devices.

Add the Article:

4188.10 Arrow Boards.

A. General.

Arrow Boards shall be approved per Materials I.M. 486.12.

B. Power System.

1. Solar power system shall charge and maintain batteries automatically without intervention, designed for year round deployment in Iowa assuming minimal solar charging during winter months.

2. No component shall create a shadow on any portion of solar panels.

3. Battery box shall be locked.

C. Display.

1. Minimum display size shall be 96 inches wide by 48 inches tall.

2. Minimum legibility distance is 1 mile.

3. Minimum number of elements (or pixels) is 15.

4. Elements shall be capable of at least 50% dimming from full brightness. Use dimmed mode for nighttime operation.

5. Color presented by elements shall be yellow.

6. Minimum element on-time shall be 50% for flashing mode, with equal intervals of 25% for each sequential phase. Flashing rate shall be not less than 25 or more than 40 flashes per minute.

D. Controls.

Use an LCD display, keyboard, Rotary switches, or other means to set and view operating modes.

E. Operating Modes.

Following 4 modes are the minimum required. Additional modes are allowed, but not required.

- Off. Except for charging system the entire unit is off. Solar panels will continue to charge batteries in this position.
- Sequential Chevron.
- Flashing Double Arrow.
- Alternating Diamond.

F. GPS and Remote Communications (When Required).

1. Arrow board shall have the ability to receive and transmit its GPS coordinates (latitude and longitude) within a 30 foot diameter of its true location.

2. Electronic communications between arrow board or arrow board's central server and the Department shall follow communication protocol defined in Materials I.M. 486.12.

3. Arrow boards shall transmit status and location as follows:
- **a.** Mode change within 2 minutes.
- **b.** Location (if moved more than 500 feet) within 2 minutes.
- **c.** Health check every 30 minutes.

G. Portable Dynamic Message Signs as an Arrow Board.
A portable dynamic message sign may be used to simulate an arrow board if it meets the requirements in this section.

Comments: The Traffic and Safety Bureau indicated that the plan is to expand the remote communications specifications to other projects in October 2021. The Local Systems Bureau has some concerns with this and educating cities and counties before the implementation is made. Cedar County indicated that they didn't see that this would affect most counties, because they only have two lane roadways and don't use arrow boards. Some more populated counties and larger cities would be affected by the change. The Traffic and Safety Bureau offered to provide their presentation for use by APWA, ICEA, or other organizations that may need education on this requirement before further implementation.

Article 4188.10, C, title was revised as it was taken from the speed feedback camera section.

Article 4188.10, F, 3, was revised as the wording on buffer zones and the State of Iowa border was confusing and unnecessary. Any clarification can be covered by the Materials I.M. that gives instruction to the companies providing the arrow board monitoring and submitting that information to the Department.

Specification Section Recommended Text:

2528.03, G, Lighting Devices.

Replace the title and Article:

~~**Lighting Devices**~~ **Arrow Boards.**

Furnish, place, operate, and maintain arrow boards at locations shown on the contract documents. Ensure all arrow boards meet the current requirements of the MUTCD and Article 4188.10.

~~**1.** Furnish lighting devices as required by the contract documents. Type A barricade warning lights will normally be required for nighttime installations. Type B warning lights will normally be required for 24 hour operation.~~

~~**2.** Use barricade warning lights that comply with the ITE Standard for Flashing and Steady Burn Barricade Warning Lights and are identified as such. In addition, use Type A barricade warning lights that:~~
- ~~Operate on a 12 volt battery system, unless the ITE identification specifically indicates that the rating is based on a different system, and~~
- ~~Are visible to both directions of traffic.~~

~~**3.** When arrow displays are used, furnish Type C arrow displays described in the current edition of the MUTCD, Part 6, and operate them in a sequential chevron mode when indicating a lane change.~~

1. Operation.
- **a.** When indicating a right or left lane closure, operate in a sequential chevron mode.
- **b.** When indicating a traffic split, operate in a flashing double arrow mode.
- **c.** When indicating caution, operate in an alternating diamond mode.

2. Remote Communications.
When using an Arrow Board for stationary work zones on the Interstate System, remote communication capabilities meeting the requirements in Article 4188.10, F are required.

3. Type and Size.
Type C Arrow Boards as defined in Part 6 of the MUTCD are required for all applications.

4. Testing and Configuration.
On Interstate Projects, at least 1 week before Arrow Board is deployed to a project, a testing and configuration process must be performed with the Engineer.

4188, Traffic Control Devices.

Add the Article:

4188.10 Arrow Boards.

A. General.
Arrow Boards shall be approved per Materials I.M. 486.12.

B. Power System.

1. Solar power system shall charge and maintain batteries automatically without intervention, designed for year round deployment in Iowa assuming minimal solar charging during winter months.

2. No component shall create a shadow on any portion of the solar panels.

3. Battery box shall be lockable to prevent unauthorized access.

C. Speed Display and Behavior.

1. Minimum display size shall be 96 inches wide by 48 inches tall.

2. Minimum legibility distance is 1 mile.

3. Minimum number of elements (or pixels) is 15.

4. Elements shall be capable of at least 50% dimming from full brightness. The dimmed mode stall be used for nighttime operation.

5. The color presented by the elements shall be yellow.

6. The minimum element on-time shall be 50% for the flashing mode, with equal intervals of 25% for each sequential phase. The flashing rate shall be not less than 25 or more than 40 flashes per minute.

D. Controls.
System shall use an LCD display, keyboard, Rotary switches, or other means to set and view operating modes.

E. Operating Modes.
The following 4 modes are the minimum required. Additional modes are allowed, but not required.

- Off. Except for the charging system the entire unit is off. Solar panels will continue to charge batteries in this position.

- Sequential Chevron.
- Flashing Double Arrow.
- Alternating Diamond.

F. GPS and Remote Communications.

1. The arrow board shall have the ability to receive and transmit its GPS coordinates (latitude and longitude) within a 30 foot diameter of its true location.

2. All electronic communications between the arrow board or the arrow board's central server and the department shall follow the communication protocol defined in Materials I.M. 486.12.

3. All arrow boards within a 1 mile buffer of the State of Iowa border shall transmit status and location as follows:
- **a.** Mode change within 2 minutes.
- **b.** Location (if moved more than 500 feet) within 2 minutes.
- **c.** Health check every 30 minutes.

G. Portable Dynamic Message Signs as an Arrow Board.
A portable dynamic message sign may be used to simulate an arrow board as long as it meets the requirements in this section.

Comments:

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

G. ~~Lighting Devices~~ Arrow Boards.
Furnish, place, operate, and maintain arrow boards at locations shown on the contract documents. Ensure all arrow boards meet the current requirements of the MUTCD and Section 4188.10.

~~**1.** Furnish lighting devices as required by the contract documents. Type A barricade warning lights will normally be required for nighttime installations. Type B warning lights will normally be required for 24 hour operation.~~

1. Operation.
- **d.** When indicating a right or left lane closure, operate in a sequential chevron mode.
- **e.** When indicating a traffic split, operate in a flashing double arrow mode.
- **f.** When indicating caution, operate in an alternating diamond mode.

~~**2.** Use barricade warning lights that comply with the ITE Standard for Flashing and Steady Burn Barricade Warning Lights and are identified as such. In addition, use Type A barricade warning lights that:~~
- ~~Operate on a 12 volt battery system, unless the ITE identification specifically indicates that the rating is based on a different system, and~~
- ~~Are visible to both directions of traffic.~~

2. Remote Communications
- **a.** When using an Arrow Board for stationary work zones on the Interstate System, remote communication capabilities meeting the requirements in 4188.10.F are required.
- **b.** For all other applications, requirements in 4188.10.F are not required at this time.

~~3. When arrow displays are used, furnish Type C arrow displays described in the current edition of the MUTCD, Part 6, and operate them in a sequential chevron mode when indicating a lane change.~~

3 Type and Size
a. Type C Arrow Boards as defined in Part 6 of the MUTCD are required for all applications.

4 Testing and Configuration
a. On Interstate Projects.
1. At least 1 week before Arrow Board is deployed to a project, a testing and configuration process must be performed with the Engineer.

4188.10 Arrow Boards.

A. General.
Arrow Boards shall be approved per Materials I.M. 486.12.

B. Power System.
1. Solar power system shall charge and maintain batteries automatically without intervention, designed for year round deployment in Iowa assuming minimal solar charging during winter months.
2. No component shall create a shadow on any portion of the solar panels.
3. Battery box shall be lockable to prevent unauthorized access.

C. Speed Display and Behavior.
1. Minimum display size shall be 96" wide by 48" tall.
2. Minimum legibility distance is 1 mile.
3. Minimum number of elements (or pixels) is 15.
4. Elements shall be capable of at least 50% dimming from full brightness. The dimmed mode stall be used for nighttime operation.
5. The color presented by the elements shall be yellow.
6. The minimum element on-time shall be 50 percent for the flashing mode, with equal intervals of 25 percent for each sequential phase. The flashing rate shall be not less than 25 or more than 40 flashes per minute.

D. Controls.
1. System shall use an LCD display, keyboard, Rotary switches or other means to set and view operating modes.

E. Operating Modes. The following 4 modes are the minimum required. Additional modes are allowed, but not required.
1. Off. Except for the charging system the entire unit is off. Solar panels will continue to charge batteries in this position.
2. Sequential Chevron
3. Flashing Double Arrow
4. Alternating Diamond

F. GPS and Remote Communications
1. The arrow board shall have the ability to receive and transmit its GPS coordinates (latitude and longitude) within a 30 foot diameter of its true location.
2. All electronic communications between the arrow board or the arrow board's central server and the department shall follow the communication protocol defined in IM 486.12.
3. All arrow boards within a 1 mile buffer of the State of Iowa border shall transmit status and location as follows:
   a. Mode change within 2 minutes.
   b. Location (if moved more than 500') within 2 minutes.
   c. Health check every 30 minutes.

G. Portable Dynamic Message Signs as an Arrow Board
1. A portable dynamic message sign may be used to simulate an arrow board as long as it meets the requirements in this section.

Reason for Revision: In the past, Arrow Boards just needed to meet the specifications in the MUTCD. Starting this October ('20), all arrow boards used on the Interstate system must have the ability to determine their GPS coordinates and transmit its location as well as display status to a central server. These specs do that. Requirements for Type A and B beacons are specified in the MUTCD.

New Bid Item Required (X one)	**Yes**	**No** x
Bid Item Modification Required (X one)	**Yes**	**No** x

Bid Item Obsoletion Required (X one)	**Yes**	**No** x
Comments: DOT has been working with Industry on this change for over 2 years.		
County or City Comments:		
Industry Comments:		

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / John Hart	**Office:** Construction & Materials	**Item 9**
Submittal Date: April 27, 2020	**Proposed Effective Date:** October 2020	
Article No.: 2556.02 D **Title:** Grout (Dowel Bar Retrofit) **Article No.:** 2556.03, D, 1 **Title:** Grouting Dowel Bars (Dowel Bar Retrofit) **Article No.:** 4109.02 (Appendix) **Title:** Aggregate Gradation Table	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: Correct location of the new aggregate gradation in the table will be discussed with the Geology Section.

Specification Section Recommended Text:

2556.02, D, Grout.

Replace the Article:

1. Grout material placed around bars shall be a shrinkage compensated rapid set patch material listed in Materials I.M. 491.20, Appendix B.

2. Grout material may be from packaged bags or proportioned on site from bulk cementitious materials.

a. Packaged bags shall be extended with pea gravel, proportioned, and mixed according to the manufacturer's recommendations. Fine aggregate additions and water in excess of manufacturer's recommendations are not allowed.

b. Bulk cementitious materials shall be equivalent in composition to cementitious materials used in packaged bags and shall be proportioned with fine aggregate and water and extended with pea gravel to produce a mixture equivalent to packaged bag mix meeting manufacturer's recommendations. Water in excess of manufacturer's recommendation will not be allowed.

3. Fine aggregate shall meet the requirements of Section 4110.

~~**2**~~ **4.** ~~Extend grout according to the manufacturer's recommendations. Aggregate for extending grout shall be~~ pea gravel ~~meeting Section 4112, with~~ shall have a minimum durability of Class 2 and ~~the following gradation:~~ meet the requirements of Article 4112.03, B and Gradation No. 9 of the Aggregate Gradation Table, Article 4109.02.

~~**Sieve Size**~~	~~**Percent Passing**~~
~~1/2 inch~~	~~100~~
~~3/8 inch~~	~~85-100~~

~~No. 8 0-8~~

~~**3.** The rapid set cement used to produce any of the rapid set patch materials in Materials I.M. 491.20, Appendix B may be approved to produce a concrete patch mix utilizing sand meeting Section 4110 and pea gravel meeting Section 4112, at maximum aggregate extension. Concrete patch mix shall meet the following strength requirements:~~

- ~~3 hour minimum compressive strength of 3000 psi, ASTM C 39~~
- ~~24 hour minimum compressive strength of 5000 psi, ASTM C 39~~
- ~~24 hour bond to dry PCC, 1000 psi, ASTM C 882~~

5. Water shall meet the requirements of Section 4102.

4 6. Furnish a list of materials for use in making the grout, and the mix design, to the Engineer at least 30 calendar days prior to installation. District Materials Engineer may waive mix design testing based on previous testing with the patching materials. Grout shall meet the following strength requirements:

- Three hour minimum compressive strength of 3000 psi, ASTM C 39.
- 24 hour minimum compressive strength of 5000 psi, ASTM C 39.

~~5~~ **7.** Testing of the grout by the Engineer may be done anytime during production.

2556.03, D, 1.

Replace the first sentence:

Produce grout with a portable mixer approved by the Engineer or a volumetric mixer meeting the requirements of Article 2001.20, E for miscellaneous pours.

Appendix.

Add the gradation:

Grad. No.	Section No.	Std. Sieve Sz.	1/2"	3/8"	8	200	
		Intended Use		Percent Passing			Notes
9	2556	Grout Agg.	100	85-100	0-10	0-1.5	

Comments:

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

2556.02

D. Grout.

1. Grout material placed around bars shall be a shrinkage compensated rapid set patch material listed in Materials I.M. 491.20, Appendix B.

2. Grout material may be from packaged bags or proportioned on site from bulk cementitious materials.

Packaged bags shall be extended with pea gravel, proportioned, and mixed according to the manufacture's recommendations. Fine aggregate additions and water in excess of the manufacture's recommendation shall not be allowed.

Bulk cementitious materials shall be equivalent in composition to the cementitious materials used in the packaged bags and shall be proportioned with fine aggregate and water and extended with pea gravel to produce a mixture equivalent to the packaged bag mix meeting the manufacture's recommendations. Water in excess of the manufacture's recommendation shall not be allowed.

3. Fine aggregate shall meet the requirements of 4110.

2.4. ~~Extend grout according to the manufacturer's recommendations. Aggregate for extending grout shall be~~ Pea gravel shall have ~~meeting Section 4112, with~~ a minimum durability of Class 2 and meet the requirements of section 4112.03 B and gradation No. ? of the Aggregate Gradation Table, Article 4109.02. ~~the following gradation:~~

~~Sieve Size~~	~~Percent Passing~~
~~1/2 inch~~	~~100~~
~~3/8 inch~~	~~85-100~~
~~No. 8~~	~~0-8~~

5. Water shall meet the requirements of 4102.

~~**3.** The rapid set cement used to produce any of the rapid set patch materials in Materials I.M. 491.20, Appendix B may be approved to produce a concrete patch mix utilizing sand meeting Section 4110 and pea gravel meeting Section 4112, at maximum aggregate extension. Concrete patch mix shall meet the following strength requirements:~~

- ~~3 hour minimum compressive strength of 3000 psi, ASTM C 39~~
- ~~24 hour minimum compressive strength of 5000 psi, ASTM C 39~~
- ~~24 hour bond to dry PCC, 1000 psi, ASTM C 882~~

4. 6. Furnish a list of materials for use in making the grout, and the mix design, to the Engineer at least 30 calendar days prior to installation. The District Materials Engineer may waive mix design testing based on previous testing with the patching materials. Grout shall meet the following strength requirements:

- 3 hour minimum compressive strength of 3000 psi, ASTM C 39
- 24 hour minimum compressive strength of 5000 psi, ASTM C 39

~~5.~~ 7. Testing of the grout by the Engineer may be done anytime during production.

2556.03

D. Grouting Dowel Bars.

1. Produce grout with a portable mixer approved by the Engineer or a volumetric mixer meeting the requirements of 2001.20 E for miscellaneous pours. Place grout immediately after mixing and before grout has attained initial set. Do not re-temper grout with water.

4109.02 Appendix

#?		
	1/2"	100
	3/8"	85-100
	#4	
	#8	0-10
	#16	
	#50	
	#100	
	#200	0-1.5

Reason for Revision: First, we want to specify one gradation in one place (4109.02 Aggregate Gradation Table) for DBR projects and ensure this aggregate was fine enough with 100% passing the ½" and not contaminated with excess minus #200 material. Secondly, we want to ensure that the grout mix being NTPEP tested on packaged product for approval was replicated on DBR projects. Review of recent grout mixes has indicted that cement contents have been dropping over time and are below the tested level in IM491.20B. This has coincided with some early deterioration experienced on two projects.

We want to ensure that the mix being produced does not exceed the maximum w/c ratio and that the proportions remain accurate to throughout the project. Some equipment being currently used does not

provide real-time ticket/proportion feedback to the operator or inspection staff.

Wanted to specify one gradation in one place (4109.02 Aggregate Gradation Table) for DBR projects. In addition, other intermediate gradations on the table did not satisfy the DBR requirements as they were too coarse and/or did not have a limit on the minus #200.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X

Comments:

County or City Comments:

Industry Comments: This has been shared with the ICPA/members and technical representatives from Western Material and Design LLC and CTS Cement Manufacturing Corp..

1. My only concern is a cement product being locked into it's NTPEP cement content might be problematic. Aggregates play a huge role into the required cement content and are adjusted accordingly. The cement content range typically used is between 658-750, just depending on aggregates. I understand your concern and am assuming these problems have occurred when cement content drops below 658.

2. I think it looks good

3. ICPA was OK with language when reviewed but wanted to distribute to members. Still waiting on any comments from members.

4. Some production gradations have been reviewed to ensure material produced currently can meet the proposed gradation.

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove	**Office:** Construction & Materials	**Item 10**
Submittal Date:	**Proposed Effective Date:**	
Section No.: 4127 **Title:** Aggregate for Flexible Paving Mixtures	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

4127.03, A.

Replace Table 4127.03-1:

Table 4127.03-1: Fine Aggregate Quality (Flexible Paving Mixtures)

Fine Aggregate Quality	Type A Maximum %	Type B Maximum %	Test Method
Organic Matter	0.01	0.01	Iowa DOT Materials Laboratory Test Method No. 215
Clay Lumps/Friable Particles	1.5	3.0	Materials I.M. 368[(a)]
Shale	2.0	5.0	Materials I.M. 344

(a) Use Method A for initial test. If Method A fails, Method B may be used.

4127.04, B.

Replace the Article:

~~Maximum shale allowed in the fine portion of the combined materials:~~ Coarse and fine aggregate shall meet quality requirements of Articles 4127.02 and 4127.03 before combining aggregates.

~~**Table 4127.04: Maximum Shale Allowed**~~

~~Aggregate Type~~	~~Maximum Percent Allowed~~	~~Test Method~~
~~Type A~~	~~2.0~~	~~Materials I.M. 344~~
~~Type B~~	~~5.0~~	~~Materials I.M. 344~~

Comments:

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

4127.03 FINE AGGREGATE.

A. Natural sand meeting the requirements of Table 4127.03-1. A gradation for wearing course mixture of no more than 50% retained between two consecutive standard sieves below the No. 4 sieve or gravel aggregate with 100% passing the 3/8-inch sieve meeting these requirements.

Table 4127.03-1: Fine Aggregate Quality (Flexible Paving Mixtures)

Fine Aggregate Quality	Type A Maximum %	Type B Maximum %	Test Method
Organic Matter	0.01	0.01	Iowa DOT Materials Laboratory Test Method No. 215
Clay Lumps/Friable Particles	1.5	3.0	Materials I.M. 368[(a)]
Shale	2.0	5.0	Materials I.M. 344

(b) Use Method A for initial test. If Method A fails, Method B may be used.

B. Crushed gravel or stone processed from coarse aggregate meeting the requirements of Article 4127.02.

4127.04 COMBINED AGGREGATES.

A. Use aggregate, which does not contain adherent films of clay or other matter that will prevent coating of particles with asphalt binder. Meet gradations of Materials I.M. 510.

B. The coarse and fine aggregate must meet the quality requirements of 4127.02 and 4127.03 before combining aggregates.

~~**B.** Maximum shale allowed in the fine portion of the combined materials:~~

~~**Table 4127.04: Maximum Shale Allowed**~~

~~Aggregate Type~~	~~Maximum Percent Allowed~~	~~Test Method~~
~~Type A~~	~~2.0~~	~~Materials I.M. 344~~
~~Type B~~	~~5.0~~	~~Materials I.M. 344~~

Reason for Revision: Quality tests can only be performed before combining aggregates.

New Bid Item Required (X one)	**Yes**	**No** x
Bid Item Modification Required (X one)	**Yes**	**No** x
Bid Item Obsoletion Required (X one)	**Yes**	**No** x
Comments:		
County or City Comments:		
Industry Comments:		

Form 510130 (08-15)

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove	**Office:** Construction & Materials	**Item 11**
Submittal Date: March 2019	**Proposed Effective Date:** October 2020	
Article No.: 4183.03, B, 1, b **Title:** Fast Dry Waterborne Traffic Paints	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 4/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text:

4183.03, B, 1, b, Resin Solids.

Replace the Article:

Composed of 100% acrylic emulsion polymer ~~(Rohm & Haas E 3427, Dow Chemical DT 250,~~ or ~~an~~ approved equal~~)~~ that allow finished paint products to meet all other areas of the specifications. ~~Low Temperature Paint to use Rohm & Haas XSR Resin.~~

Comments: The Construction and Materials Bureau asked if this information could be covered by MAPLE and the Materials I.M.s. Language was conditionally approved if this cannot be done by the October ERL release.

Following the meeting, the Construction and Materials Bureau indicated that the product information could be deleted and we will be good with listing the finished paint products in MAPLE with no need to list the polymer manufacturers.

Specification Section Recommended Text:

4183.03, B, 1, b, Resin Solids.

Replace the Article:

Composed of 100% acrylic emulsion polymer (~~Rohm & Haas~~ Dow FASTRACK E 3427, Dow FASTRACK 5408A, ~~Dow Chemical~~ Arkema ENCOR DT 250, or an approved equal). Low Temperature Paint to use ~~Rohm & Haas~~ Dow FASTRACK 5408A or Dow FASTRACK XSR Resin.

Comments: Should we be putting product names in the Standard Specifications. Seems like this is something that could be in a Materials I.M.

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

B. Specific Requirements.

1. Composition.

The composition of the paint is left to the discretion of the manufacturer as long as the finished product meets the following requirements and applicable Federal, State, or local regulations for products of this type.

a. Pigment Content.

Percent pigment by weight of the finished product to be from 45.0% to 55.0% by weight for white and 55.0% to 58.0% by weight for yellow as tested by ASTM D 3723.

b. Resin Solids.

Composed of 100% acrylic emulsion polymer (~~Rohm & Haas~~ Dow FASTRACK E 3427, Dow FASTRACK 5408A, ~~Dow Chemical~~ Arkema ENCOR DT 250, or an approved equal). Low

Temperature Paint to use ~~Rohm & Haas~~ Dow FASTRACK 5408A or Dow FASTRACK XSR Resin.		
Reason for Revision: Current language is incorrect. DOW & Arkema Products are now named as indicated due to company acquisitions.		
New Bid Item Required (X one)	**Yes**	**No** x
Bid Item Modification Required (X one)	**Yes**	**No** x
Bid Item Obsoletion Required (X one)	**Yes**	**No** x
Comments:		
County or City Comments:		
Industry Comments:		

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove	**Office:** Construction & Materials	**Item 12**
Submittal Date: March 2019	**Proposed Effective Date:** October 2020	
Article No.: 4187.01, C, 2, a, 3 **Title:** Materials for sign support structures	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

4187.01, C, 2, a, 3.

Replace the Article:

Bolts shall be:

- ASTM F 3125 Grade A 325 Type 1 / A 325-T Type 1 or
- ASTM A 449 Type 1 with Ro-cap testing required pursuant to Articles 2408.03, S and 4153.06.

Comments:

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

2. Fasteners for Galvanized Steel Superstructures.

a. Galvanized Steel High Strength Bolts.

1) Use size specified in the contract documents.

2) Galvanize according to requirements of ASTM B 695, Class 55 Type 1 or ASTM F 2329 with zinc bath temperature limited to 850°F.

3) Bolts shall be ASTM F 3125 Grade A 325 Type 1 / A 325-T Type 1 or ASTM A 449 Type 1 with Ro-cap testing required pursuant to Articles 2408.03, S and 4153.06.

4) Threads are to comply with ANSI/ASME B 1.1 for UNC thread series, Class 2A tolerance.

Reason for Revision: Current language is incorrect. Update to New ASTM F 3125 specification. Clarify A 449 bolts will require ro-cap testing.

New Bid Item Required (X one)	**Yes**	**No** x
Bid Item Modification Required (X one)	**Yes**	**No** x
Bid Item Obsoletion Required (X one)	**Yes**	**No** x

Comments:

County or City Comments:

Industry Comments:

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Wes Musgrove / Jeff Schmitt	**Office:** Construction & Materials	**Item 13**
Submittal Date: 04-27-2020	**Proposed Effective Date:** ASAP	
Article No.: **Title:**	**Other:** DS-15078, Developmental Specifications for High Performance Thin Lift Overlay	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 7/21/2020

Specification Committee Approved Text: See attached Developmental Specifications for High Performance Thin Lift Overlay.

Comments:

Specification Section Recommended Text: See attached Draft Developmental Specifications for High Performance Thin Lift Overlay.

Comments:

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

B. Mix Design.

3. Hamburg Testing (AASHTO T324).

Hamburg testing required only for Interstate paving mixes.

Compact to 3.5% air voids. No more than 4 mm rutting in the first 8000 passes.

Reason for Revision:

Iowa DOT has evaluated rutting potential of High Performance Thin Lift Overlay (HIPRO) mixes since 2015 and found the rate of rutting similar to any other mix for a given traffic level. This specification revision is to treat HIPRO mixes the same as other mixes regarding the Hamburg Wheel Tracking requirements. As such, Hamburg testing of HIPRO mixes will only be required on Interstate paving.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X

Comments: Scott Schram discussed previous project results and recommended the specification change at the Strategic Asphalt Committee (SAC) meeting on 04-23-2020.

County or City Comments:

Industry Comments: Industry expressed support for the change at SAC meeting on 04-23-2020.

DS-15083
(Replaces DS-15078)

DEVELOPMENTAL SPECIFICATIONS
FOR
HIGH PERFORMANCE THIN LIFT OVERLAY

Effective Date
July 21, 2020

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

15083.01 DESCRIPTION.
These specifications describe requirements for a highly polymer modified asphalt thin lift surface course. Apply Section 2303 of the Standard Specifications unless otherwise directed in these specifications.

15083.02 MATERIALS.

A. Asphalt Binder.
Use PG 64-34E+ with a minimum percent recovery of 90% when tested at 64°C per AASHTO T 350 at 3.2 kPa.

B. Mix Design.

1.

Design Gyrations	50
Design Voids Target (Based on %Gmm)	≤ 2.0
Film Thickness	8.0 – 15.0
Aggregate Quality	A
Crushed Content (minimum)	50%
FAA (minimum)	40
Sand Equivalency (minimum)	50

2. Friction Aggregate.
Interstates: minimum 30% of Total Aggregate shall be Type 2 or better
Non-Interstates: minimum 50% of Total Aggregate shall be Type 4 or better

3. Hamburg Testing (AASHTO T324).
Required only for Interstate paving mixes. Compact to 3.5% air voids. No more than 4 mm rutting in the first 8000 passes.

4. Do not use more than 15.0% binder replacement. Do not use RAS.

5. Gradation.

Table DS-15083: Thin Lift Overlay Gradation

Sieve Size	Min % Passing	Max % Passing
1½ inch		
1 inch		
3/8 inch	91	100
#4		90
#8	27	63
#16		
#30		
#50		
#100		
#200	2	10

15083.03 CONSTRUCTION.

A. Apply tack coat prior to placement of thin lift overlay according to Section 2303 of the Standard Specifications.

B. Pave when ambient temperatures are at least 60ºF and rising.

C. Compact with static steel wheeled roller.

D. Do not open to traffic until the entire mat has cooled below 150°F.

E. Quality Assurance/Quality Control.

1. Field Voids Acceptance.
Acceptance for field voids shall be Class II compaction defined in Section 2303 of the Standard Specifications.

2. Lab Voids Acceptance.
Sample from windrow or hopper. Apply Article 2303.05, A, 3, a, 2, of the Standard Specifications for AAD acceptance. Air void target is based on approved JMF.

3. Take at least one cold feed for gradation control each day of production.

15083.04 METHOD OF MEASUREMENT.
Hot Mix Asphalt Thin Lift Overlay will be measured according to Article 2303.04 of the Standard Specifications.

15083.05 BASIS OF PAYMENT.
Hot Mix Asphalt Thin Lift Overlay will be paid for according to Article 2303.05 of the Standard Specifications.

Form 510130 (08-15)

IOWA DOT

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Mark Dunn / Tom Reis / Eric Johnsen	**Office:** Contracts & Specifications	**Item 14**
Submittal Date: 4/8/2020	**Proposed Effective Date:** ASAP	
Article No.: 1102.01, H **Title:** Competency and Qualification of Bidders	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 7/21/2020

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: Item will be added to proposal bucket list starting with the July 21, 2020 letting before it goes into the October 20 General Supplemental Specifications.

Specification Section Recommended Text:

1102.01, H.

Replace the first sentence:

For proposals involving only furnishing of materials, granular surfacing, lighting, buildings, asbestos removal, salvage and removal, debris removal, wells, traffic signals, pavement marking, traffic signs, clearing and grubbing, or mowing; the following shall apply in lieu of the above requirements of this article:

Comments:

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

1102.01.H For proposals involving only the furnishing of materials, granular surfacing, lighting, buildings, asbestos removal, salvage and removal, debris removal, wells, traffic signals, pavement marking, traffic signs, clearing and grubbing, or mowing, the following shall apply in lieu of the above requirements of this article:

Bidders submitting proposals must be recognized contractors engaged in the class of work provided for in the contract documents, and must possess all necessary licenses, certificates and resources to complete the work. Before the contract is awarded to a bidder, the bidder may be required to furnish evidence to the satisfaction of the Department of the bidder's ability to perform and complete the contract. Bidders shall complete Bidder Status Form portion of Form 650004.

Reason for Revision: These work types should not require prequalification.

New Bid Item Required (X one)	**Yes**	**No** X
Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X

Comments:

County or City Comments:

Industry Comments:

Form 510130 (08-15)

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Tom Reis / Wes Musgrove / Scott Schram	**Office:** Contracts & Specifications / Construction & Materials	**Item 15**
Submittal Date: 05/04/2020	**Proposed Effective Date:** October 2020	
Article No.: **Title:**	**Other:** Proposed Supplemental Specification or incorporate into Standard Specifications	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 5/14/2020	**Effective Date:** 10/20/2020

Specification Committee Approved Text:

2303.03, C, 4, c, 2.

Replace the first sentence:

When road surface temperature is less than that shown in Tables 2303.03-1 and 2303.03-2, unless allowed per Article 2303.03, F.

2303.03, Construction.

Add the Article:

F. Cold Weather Paving.

1. When road surface temperature is below requirements shown in Tables 2303.03-1 and 2303.03-2, or when air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40°F, cold-weather paving may be considered by the Engineer.

2. Cold Weather Paving Plan.

a. Submit a written cold weather paving plan to the Engineer. Document material, operational, and equipment changes for paving when air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40°F.

b. Include the following:

1) Use an approved mix design that incorporates a warm mix additive. Do not use water injection.

2) Identify warm mix additive and dosage rate.

3) Identify modifications to compaction process and when modifications apply.

c. If the National Weather Service forecast for the construction area predicts ambient air temperature less than 40°F at the projected time of paving within the next 24 hours, confirm or submit revisions to the cold weather paving plan for Engineer validation. Update plan as required to accommodate conditions anticipated for the next day's operations. Upon validation of the plan, the Engineer will allow paving for the next day. Once in effect, pave conforming to the Engineer-accepted cold weather paving plan for balance of that workday or shift regardless of the temperature at time of paving.

d. Engineer's written acceptance will be required for the cold weather paving plan. Engineer's acceptance of the plan does not relieve Contractor of responsibility for the quality of HMA pavement placed in cold weather.

3. Do not place flexible paving mixtures over frozen subgrade or base, or where roadbed is unstable.

4. Engineer may further limit placement if, in the Engineer's judgment, other conditions are detrimental to quality work.

2303.04, Method of Measurement.

Add the Article:

G. Cold Weather Paving.

Will not be measured separately. The quantity will be based on tons of flexible paving mixture placed with warm mix additive.

2303.05, Basis of Payment.

Add the Article:

G. Cold Weather Paving.

1. When cold weather paving is permitted by the Engineer, incorporation of warm mix additive into the asphalt mixture will be considered as extra work ordered by the Engineer. Payment will be made at the rate of $2.00 per ton of flexible paving mixture in which the warm mix additive is incorporated.

2. Contracting Authority will not pay for compaction additive when:

a. Pay factor for Field Voids is less than 1.0 for Class I compaction.
b. Compaction is not thorough and effective for Class II compaction.
c. On days when liquidated damages have been assessed.

3. If because of an excusable compensable delay, the Engineer directs Contractor to pave when temperatures meet cold weather definition, the Contracting Authority will relieve Contractor of responsibility for damage and defects the Engineer attributes to cold weather paving.

Comments: The committee determined that implementation will be much easier if the specifications are incorporated into the Standard Specifications. The Construction and Materials Bureau will advise Project Engineers that the specifications can be added to existing contracts by mutual benefit change order this fall.

Approved additives will eventually need to be incorporated into MAPLE through a Materials I.M.

District 3 indicated that references to submittal of the cold weather paving plan at the preconstruction conference should be removed, as typically it is not planned to pave in these conditions when the project is started.

Specification Section Recommended Text: See attached Draft Supplemental Specifications for Cold Weather Flexible Paving.

Comments:

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

See attached specification language.

Reason for Revision: The desire is to have specifications address the issues that arises annually with the approach of winter shut down. With accelerated construction being required frequently it would be desirable to incorporate some type of cold weather paving language into the specifications.

New Bid Item Required (X one)	**Yes** X	**No**

Bid Item Modification Required (X one)	**Yes**	**No** X
Bid Item Obsoletion Required (X one)	**Yes**	**No** X
Comments:		
County or City Comments:		
Industry Comments: Discussed in general with Strategic Asphalt Committee		

DRAFT SS-15XXX
(New)

SUPPLEMENTAL SPECIFICATIONS
FOR
COLD WEATHER FLEXIBLE PAVING

Effective Date
August 18, 2020

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

15XXX.01 DESCRIPTION.
Conform to these cold weather paving provisions for work specified in Section 2303 of the General Specifications. Contractor is responsible for quality of flexible paving mixtures placed in cold weather.

15XXX.02 DEFINITION.
When road surface temperature is below the requirements shown in Tables 2303.03-1 and 2303.03-2, or when air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40°F, cold-weather paving may be considered by the Engineer.

15XXX.03 COLD WEATHER PAVING PLAN.

e. Submit a written cold weather paving plan to the Engineer at the preconstruction meeting. Document material, operational, and equipment changes for paving when air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40°F.

f. Include the following:

4) Use an approved mix design that incorporates a warm mix additive. Do not use water injection.

5) Identify warm mix additive and dosage rate.

6) Identify modifications to compaction process and when modifications apply.

g. If National Weather Service forecast for construction area predicts ambient air temperature less than 40°F at projected time of paving within next 24 hours, confirm or submit revisions to cold weather paving plan for Engineer validation. Update plan as required to accommodate conditions anticipated for next day's operations. Upon validation of plan, Engineer will allow paving for the next day. Once in effect, pave conforming to Engineer-accepted cold weather paving plan for the balance of that workday or shift regardless of temperature at the time of paving.

h. Engineer's written acceptance is required for the cold weather paving plan. Engineer's acceptance of the plan does not relieve Contractor of responsibility for the quality of HMA pavement placed in cold weather except as specified in SS-15XXX.

15XXX.04 CONSTRUCTION.

A. Do not place flexible paving mixtures over frozen subgrade or base, or where roadbed is unstable.

B. The Engineer may further limit placement if, in the Engineer's judgment, other conditions are detrimental to quality work.

15XXX.05 METHOD OF MEASUREMENT.

Tons placed.

15XXX.06 BASIS OF PAYMENT.

A. $2 per ton of mix placed with a cold weather compaction additive.

B. The Contracting Authority will not pay for the compaction additive when:

d. Pay factor for Field Voids is less than 1.0 for Class I compaction.

e. Compaction is not thorough and effective for Class II compaction.

f. On days when liquidated damages have been assessed.

C. If because of an excusable compensable delay, the Engineer directs Contractor to pave when temperatures meet the cold weather definition, the Contracting Authority will relieve Contractor of responsibility for damage and defects the Engineer attributes to cold weather paving.