INDIANA DEPARTMENT OF TRANSPORTATION
Driving Indiana's Economic Growth

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Room N925
Indianapolis, Indiana 46204

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Mitchell E. Daniels, Jr., Governor
Michael B. Cline, Commissioner

APPROVED MINUTES

October 18, 2012 Standards Committee Meeting

APPROVED MINUTES

MEMORANDUM

November 28, 2012

TO: Standards Committee

FROM: Scott Trammell, Secretary

RE: Minutes from the October 18, 2012 Standards Committee Meeting

A Standards Committee meeting was called to order by Mr. Miller at 09:00 a.m. on October 18, 2012 in the N955 Bay Window Conference Room.

The meeting was adjourned at 10:51 a.m.

The following committee members were in attendance:

Mark Miller, Chairman
Bob Cales, Contr. Admin.
Dave Boruff, Traffic Admin.
Elizabeth Phillips, Str. Services
Jim Keefer, Fort Wayne Distr.
Ron Walker, Materials Mgmt.
Greg Pankow, State Eng.
Richard Vancleave, Rdway Srv.
Kumar Dave*, Pavement Eng.
Tom Caplinger, Crawf. Distr.

** Proxy for Mike Buening*

Also in attendance were the following:

Bren George, FHWA
Scott Trammell, Secretary
Wendy Chiles, INDOT (item 01)
Jim Reilman, INDOT
Tim McNelis, Indiana Sign & Barricade
Kirt Schleter, Gridlock Traffic Systems, Inc.
Steve Fisher, INDOT
Paul Berebitsky, ICA
Joe Bruno, INDOT
Lana Podorvanova, INDOT

The following items were listed for consideration:

A. GENERAL BUSINESS ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

1. Approval of the Minutes from the September 20, 2012 meeting.

Motion: Mr. Cales
Second: Mr. Boruff
Ayes: 9
Nays: 0

ACTION: APPROVED AS SUBMITTED

B. CONCEPTUAL PROPOSAL ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

(No items were listed)

C. STANDARD SPECIFICATIONS, SPECIAL PROVISIONS AND STANDARD DRAWINGS PROPOSED ITEMS

OLD BUSINESS

(No items were listed)

NEW BUSINESS

Item No. 01 10/18/12 (2012 SS) Mr. Boruff page 04

Standard Specifications:

604.03	PORTLAND CEMENT CONCRETE SIDEWALKS AND CURB RAMPS
605.06	CONCRETE CENTER CURBING
605.09	METHOD OF MEASUREMENT
605.10	BASIS OF PAYMENT

Standard Drawings:

605-CNCC-02	CONCRETE CENTER CURB TYPE B
605-CNCC-03	CONCRETE CENTER CURBS TYPE C & D
605-CNCB-01	HMA CENTER CURB TYPE A

ACTION: WITHDRAWN

Item No. 02 10/18/12 (2012 SS) Mr. Boruff page 16

Standard Specifications:

808.07	PAVEMENT MARKING MATERIAL APPLICATION, EQUIPMENT, AND PERFORMANCE REQUIREMENTS

ACTION: WITHDRAWN

Item No. 03 10/18/12 (2012 SS) Mr. Boruff page 20

Special Provision:

APPROVED MINUTES

412-R-549 FOG SEAL

ACTION: PASSED AS SUBMITTED

Item No. 04 10/18/12 (2012 SS) MS. Phillips page 24

Special Provision:

732-R-310 MODULAR CONCRETE BLOCK RETAINING WALL

ACTION: PASSED AS REVISED

APPROVED MINUTES

cc: Committee Members (11)
FHWA (2)
ICA (1)

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS

REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The nose of a concrete center curb may need markings for night-time visibility (see §3B.23 of the 2011 IMUTCD). Currently the noses will be painted by district traffic or raised pavement markers will be installed by the local jurisdiction. However, standardization of the practice is needed.

Also, there is contractor confusion on when curb ramps should be painted yellow. Normally only the part of the curb ramp that is a trip hazard should be painted.

PROPOSED SOLUTION: Revise 604.03 so that yellow paint is only applied if required (i.e. if the side slopes will have pedestrian cross traffic and they will be steeper than 12:1).

Revise 605.06 to require that yellow paint be applied on concrete center curb noses when shown on the Standard Drawings and revise the drawings to show yellow paint on curb types B through D.

APPLICABLE STANDARD SPECIFICATIONS: 604.03(i) and 605.06

APPLICABLE STANDARD DRAWINGS: 604-SWCR-03, 604-SWCR-04, 605-CNCB-01, 605-CNCC-02, and 605-CNCC-03

APPLICABLE DESIGN MANUAL SECTION: Section 45-2.02(02)

APPLICABLE SECTION OF GIFE: Section 17 and 22

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: David Boruff, P.E.

Title: Traffic Administration Section Supervisor

Organization: INDOT

Phone Number: (317) 234-7975

Date: 09/13/12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Ad-hoc review by district traffic and Highway Design & Tech Support

APPROVED MINUTES

REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

SECTION 604 – SIDEWALKS, CURB RAMPS, STEPS, AND HANDRAILS
604.03 PORTLAND CEMENT CONCRETE SIDEWALKS AND CURB RAMPS

The Standard Specifications are revised as follows:

SECTION 604, BEGIN LINE 144, DELETE AND INSERT AS FOLLOWS:

(i) Painting

~~The exposed surfaces of the curb throughout the width of curb ramps~~ *If the curb ramp side slopes will have pedestrian cross traffic and the side slopes will be steeper than 12:1, the side slopes* shall be painted yellow in accordance with 808.06. Silica sand shall be applied to the wet paint along the top of the curb at the rate of 6.0 lb/gal. ~~(0.7 kg/L)~~.

If the truncated domes for the curb ramp are located near brick pavement, the truncated domes shall be painted yellow in accordance with 808.06.

APPROVED MINUTES

REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

SECTION 605 - CURBING
605.06 CONCRETE CENTER CURBING
605.09 METHOD OF MEASUREMENT
605.10 BASIS OF PAYMENT

The Standard Specifications are revised as follows:

SECTION 605, BEGIN LINE 142, DELETE AND INSERT AS FOLLOWS:

605.06 Concrete Center Curbing

(a) Preparation

The subgrade shall be prepared the same as for the adjoining pavement. If subbase is provided for the adjoining pavement, it shall be carried through for the full width of the curb and at the same thickness as that for the pavement.

(b) Installation

The temperature limitations of 502.11 shall apply to placing the concrete. The surface shall be troweled smooth with a metal trowel. Curing shall be in accordance with 504.04.

Forms shall be removed within 24 h after the concrete has been placed. Plane surfaces and exposed sides of the curb shall be checked with a 10 ft ~~(3 m)~~ straightedge. Portions showing irregularities of 1/4 in. ~~(6 mm)~~ or more shall be removed and replaced in compliance with these specifications.

Joints in center curbs adjacent to PCCP shall be aligned with joints in adjoining PCCP. Joints in center curbs adjacent to asphalt shall be spaced at 18 ft ~~(15.5 m)~~ maximum. The joints shall be saw cut or formed with 1/4 in. ~~(6 mm)~~ thick preformed joint material. Joint sealant is not required for joints in center curbs.

Where an expansion joint is constructed in PCCP adjacent to concrete center curb, the expansion joint shall be carried through the center curb in accordance with applicable requirements of 503.03(f).

(c) Painting

When required, the noses of concrete center curb shall be painted yellow in accordance with 808.06.

SECTION 605, BEGIN LINE 249, DELETE AND INSERT AS FOLLOWS:

605.09 Method of Measurement

Curbing, both new and reset, and curb removal will be measured by the linear foot ~~(meter)~~ along the front face of the section at the finished grade elevation. Combined curb and gutter will be measured along the face of the curb. Curb turnout will be measured longitudinally by the linear foot ~~(meter)~~ as curb of the type specified, from the ends of the radii which touch the front face of the longitudinal curb portion. Combined curb and gutter turnout will be measured longitudinally by the linear foot ~~(meter)~~ as curb and

APPROVED MINUTES

gutter of the type specified, from the ends of the radii which touch the front face of the longitudinal curb portion. No deduction in length will be made for drainage structures installed in the curbing such as catch basins or drop inlets. Concrete center curb will be measured by the linear foot ~~(meter)~~, unless it is of variable width, in which case measurement will be by the square yard ~~(square meter)~~.

Bed course material will be measured by the ton ~~(megagram)~~.

Center curb markings will be measured per each.

605.10 Basis of Payment

The accepted quantities of curb work will be paid for at the contract unit price per linear foot ~~(meter)~~ for curb; curb and gutter; curb, reset; or center curb, of the type specified. Variable width center curb will be paid for at the contract unit price per square yard ~~(square meter)~~ for center curb, of the width specified. Bed course material will be paid for at the contract unit price per ton ~~(megagram)~~, complete in place.

Curb turnout will be paid for at the contract unit price per linear foot ~~(meter)~~ of the type of curb specified. Combined curb and gutter will be paid for at the contract unit price per linear foot ~~(meter)~~ for curb and gutter of the type specified.

Center curb markings will be paid for at the contract unit price per each.

Payment will be made under:

Pay Item	**Pay Unit Symbol**
Bed Course Material	TON ~~(Mg)~~
Center Curb Markings	*EACH*
Center Curb, _____ type	LFT ~~(m)~~
Center Curb, _____ type	SYS ~~(m2)~~
Curb and Gutter, _____ type	LFT ~~(m)~~
Curb, _____ type	LFT ~~(m)~~
Curb, Remove	LFT ~~(m)~~
Curb, Reset, _____ type	LFT ~~(m)~~

The cost of tack coat, reinforcing bars or welded wire reinforcement for curb, curb and gutter, or center curb shall be included in the cost of the pay items. The cost

APPROVED MINUTES

REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

SECTION 605 - CURBING
605.06 CONCRETE CENTER CURBING
605.09 METHOD OF MEASUREMENT
605.10 BASIS OF PAYMENT

of replacement curb portions for those which show irregularities or 1/4 in. ~~(6 mm)~~ or more shall be included in the cost of curb.

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REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

EXISTING STANDARD DRAWINGS 605-CNCC-02 CONCRETE CENTER CURB TYPE B (WITH MARKUPS)

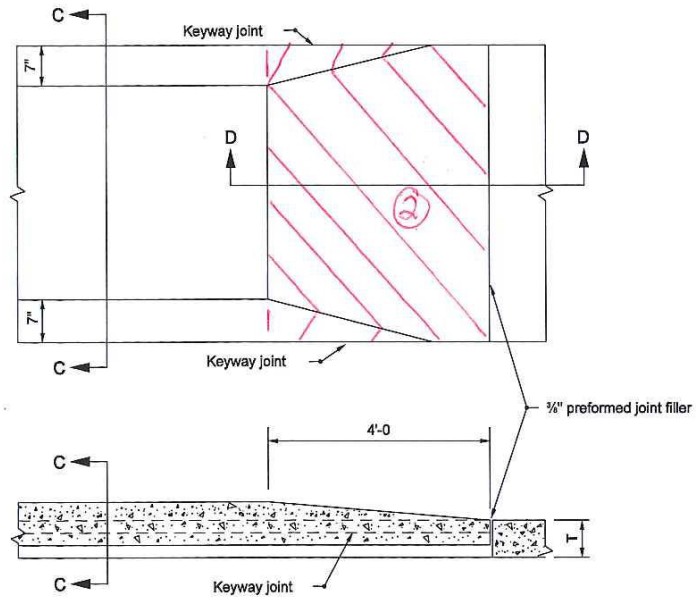
NOTES :

(1) Curb radii and batter to conform to Type B curb, as shown on Standard Drawing E 605-CCSJ-01.

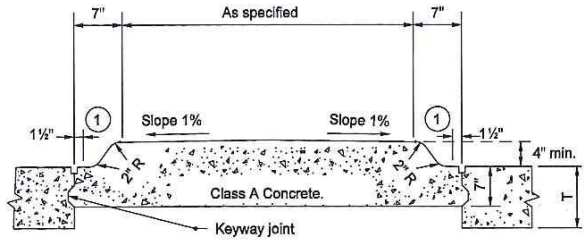
(2) Apply yellow paint to nose of center curb.

LEGEND

T = Normal pavement depth



SECTION D-D



SECTION C-C

INDIANA DEPARTMENT OF TRANSPORTATION

CONCRETE CENTER CURB
TYPE B

MARCH 2004

STANDARD DRAWING NO. E 605-CNCC-02

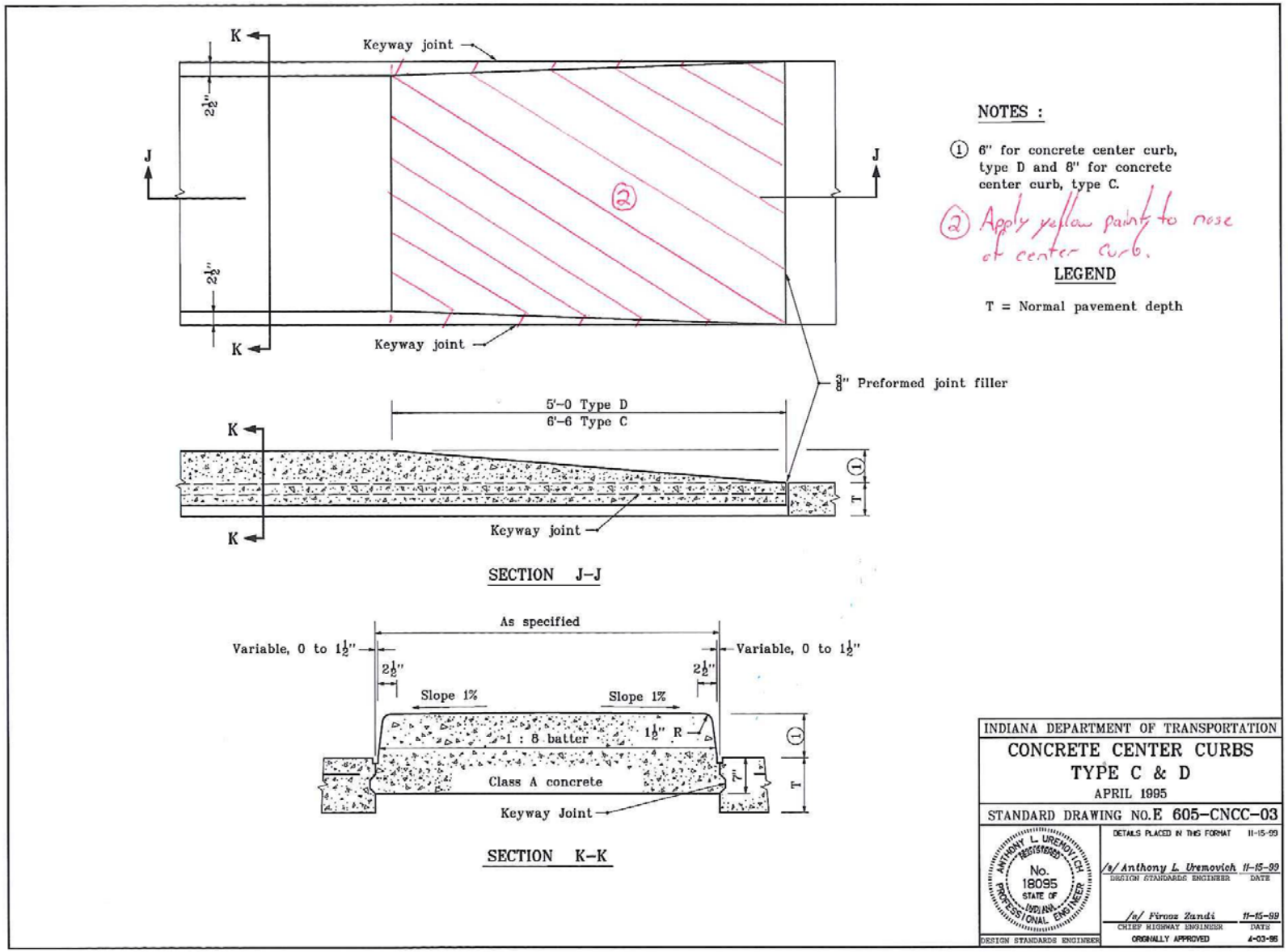
RICHARD L. VanCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 3/01/04
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 3/01/04
CHIEF HIGHWAY ENGINEER DATE

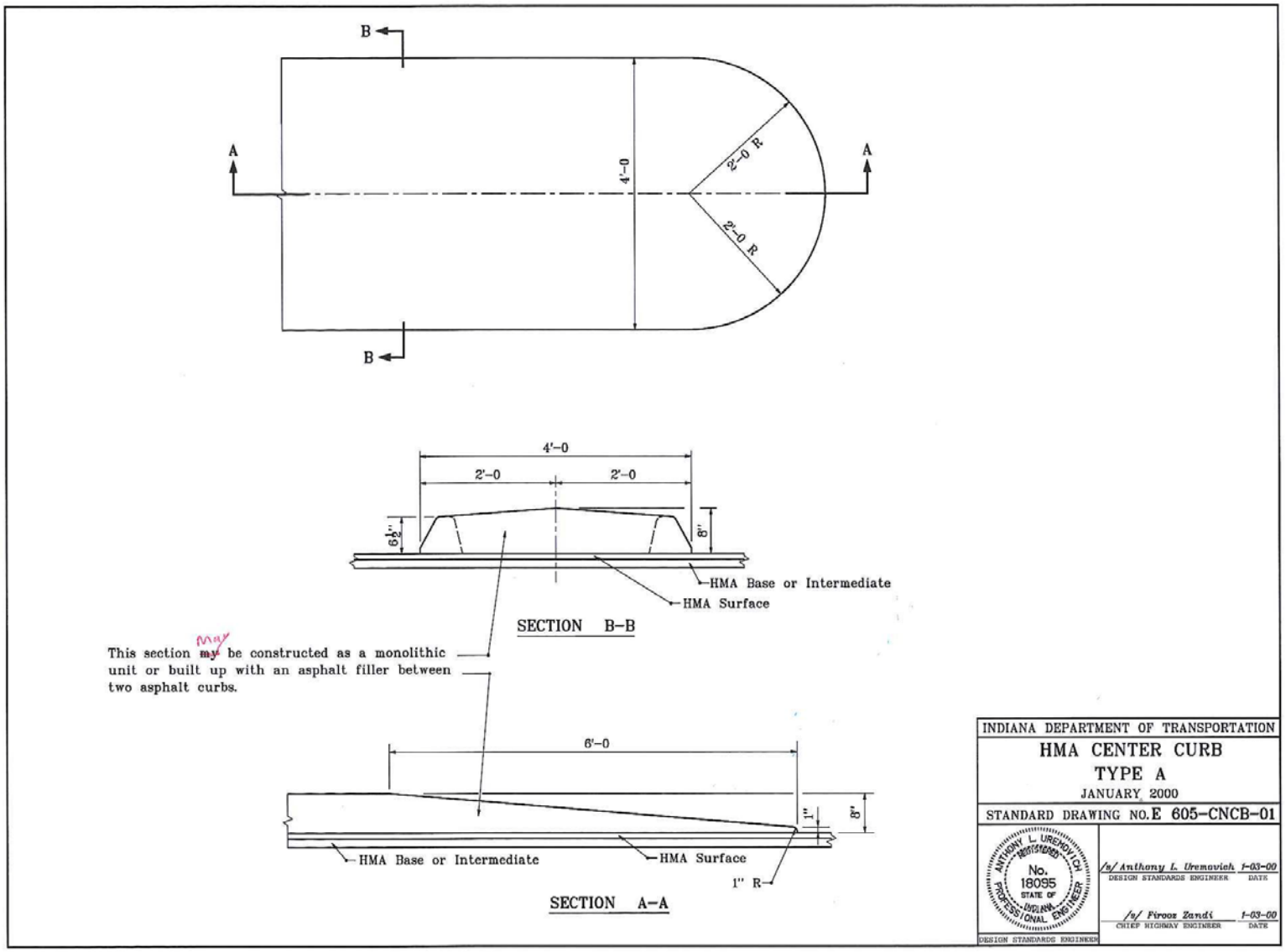
REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

EXISTING STANDARD DRAWINGS 605-CNCC-03 CONCRETE CENTER CURBS TYPE C & D (WITH MARKUPS)



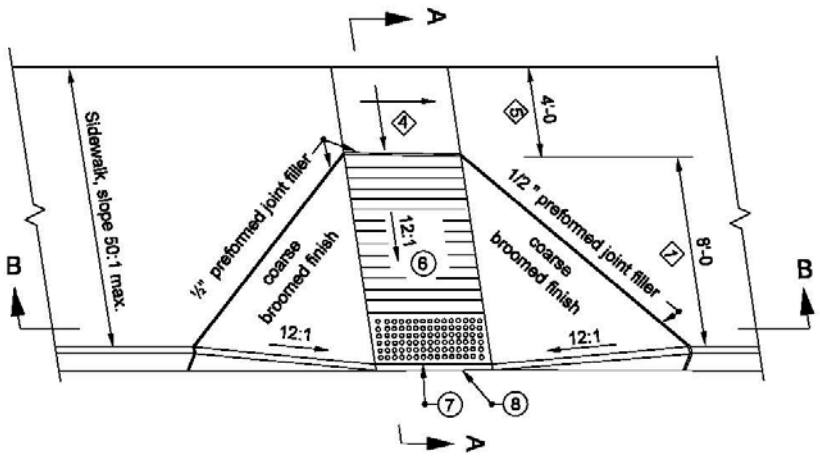
REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

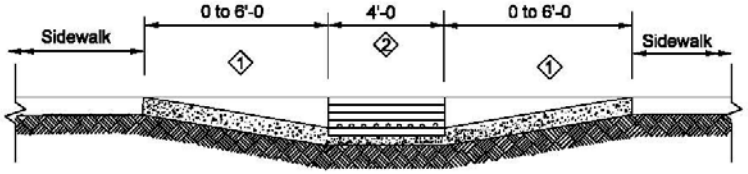
EXISTING STANDARD DRAWINGS 605-CNCB-01 HMA CENTER CURB TYPE A (WITH MARKUPS)



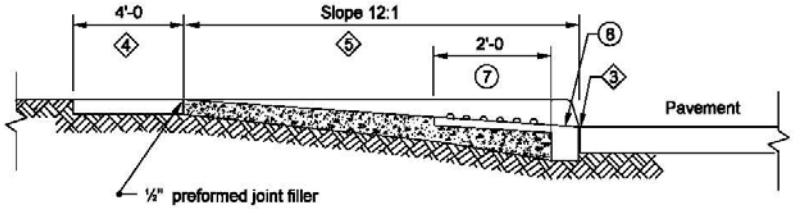
REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

BACKUP 01 EXISTING STANDARD DRAWINGS 604-SWCR-03 SIDEWALK CURB RAMP TYPE A (SEE PROPOSAL SHEET)





SECTION B-B



SECTION A-A

NOTES :

6. See Standard Drawing E 604-SWCR-02 for groove details.
7. See Standard Drawing E 604-SWCR-02 for details of the detectable warning.
8. See Standard Drawing E 604-SWCR-02 for alternate curb construction.
10. See Standard Drawing E 604-SWCR-01 and -02 for Location Plan and General Notes respectively.
11. See Standard Drawing E 604-SWCR-02 for typical ramp construction detail.

INDIANA DEPARTMENT OF TRANSPORTATION

SIDEWALK CURB RAMP
TYPE A

SEPTEMBER 2005

STANDARD DRAWING NO. E 604-SWCR-03

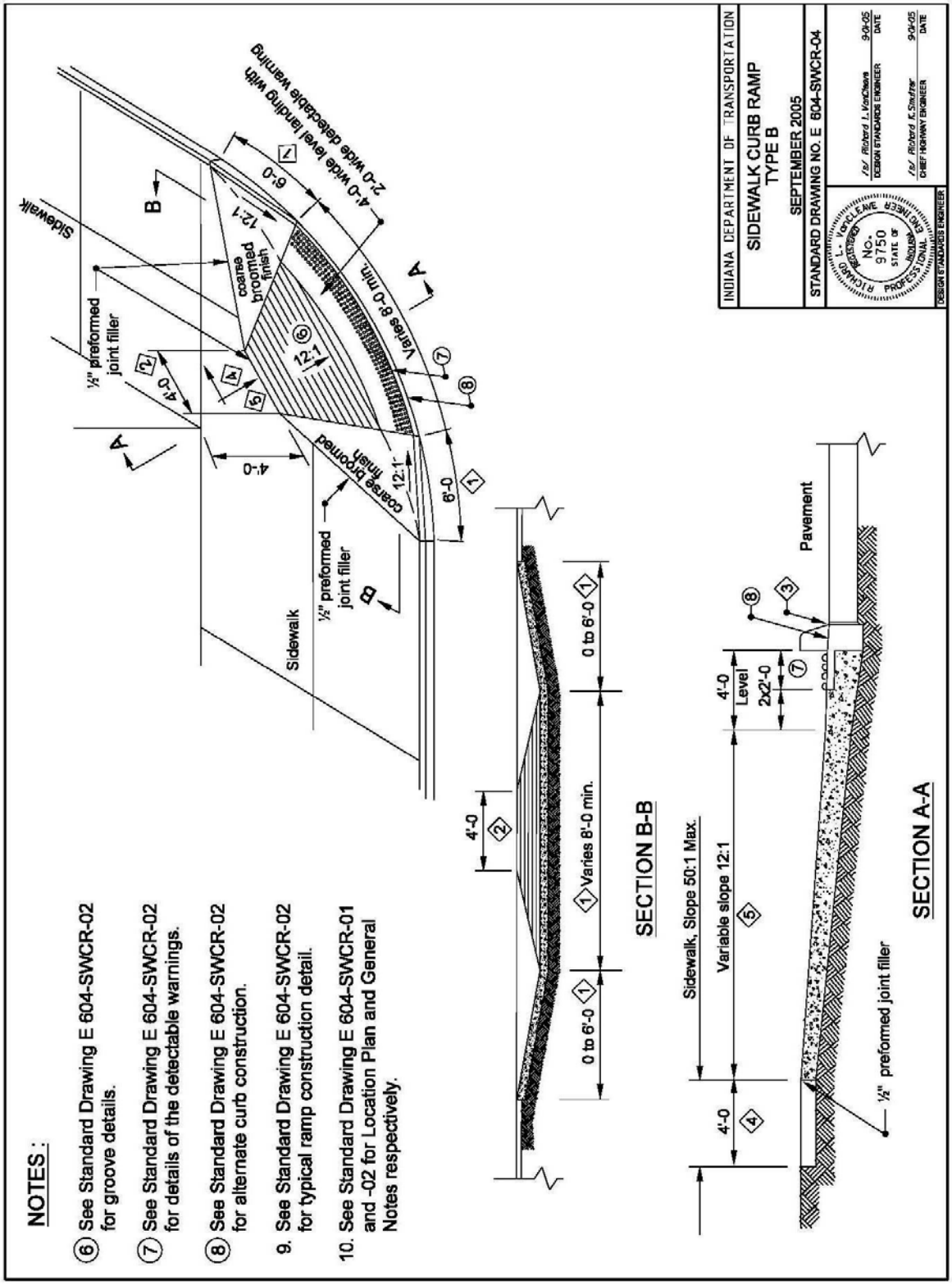
RICHARD L. VANCLEAVE REGISTERED No. 9750 STATE OF INDIANA PROFESSIONAL ENGINEER
DESIGN STANDARDS ENGINEER

/s/ Richard L. VanCleave 9-01-05
DESIGN STANDARDS ENGINEER DATE

/s/ Richard K. Smutzer 9-01-05
CHIEF HIGHWAY ENGINEER DATE

REVISION TO STANDARD SPECIFICATIONS AND DRAWINGS

BACKUP 02 EXISTING STANDARD DRAWINGS 604-SWCR-04 SIDEWALK CURB RAMP TYPE B (SEE PROPOSAL SHEET)



COMMENTS AND ACTION

604.03 PORTLAND CEMENT CONCRETE SIDEWALKS AND CURB RAMPS
605.06 CONCRETE CENTER CURBING
605.09 METHOD OF MEASUREMENT
605.10 BASIS OF PAYMENT
605-CNCC-02 CONCRETE CENTER CURB TYPE B
605-CNCC-03 CONCRETE CENTER CURBS TYPE C & D
605-CNCB-01 HMA CENTER CURB TYPE A

DISCUSSION: This item was introduced and presented by Mr. Boruff who explained the intention of these revisions as shown on the proposal sheet. Mr. Bruno handed out revisions to the original submittal. Mr. Bruno further explained the need for a visual contrast against the concrete for the ADA ramps, and that if the standard drawings were followed with regards to the slope of the ramps, then the current/existing curb ramps would not get painted.

Mr. Vancleave commented that they are currently working with FHWA and others to address this issue.

Mr. Miller suggested we not make too many changes until we know what the ADA requirements are going to be, and agreed that the center noses should be painted, regardless.

Mr. Bruno further explained the requirements concerning painting of the curbs. The group discussed whether or not the curb itself should be painted. Mr. Bruno stated that we need to be ADA compliant.

Mr. Keefer asked who would make the determination to paint the curb. Mr. Pankow said the designer should do that. Mr. Vancleave suggested following FHWA recommendations. Mr. Keefer recommended that the designer show more than just a plan view and provide more detail so the Contractor won't have to "warp it in".

Mr. Miller and Mr. Pankow suggested this be reviewed further and not be voted on at this time. Mr. Pankow asked about using reflectors instead of painting and Mr. Boruff and Mr. Bruno clarified that the IDM says that paint or Reflective Pavement Markers, RPM's, can be used, and that some LPA's prefer RPM's. Mr. Bruno stated that the MUTCD says that if the curb is 8 inches high then it is to be painted.

There was further discussion in review of the drawings attached as a backup to this item. When asked about the RPM's, Mr. Bruno explained that the LPA's put them on since INDOT RPM's are snow-plowable, and the ones used by the LPA's are not, since the snow-plowable RPM's are not as reflective. Mr. Miller mentioned placing RPM's at roundabouts. Mr. Pankow stated that lighting would be more effective at roundabouts. Mr. Caplinger and Mr. Pankow asked if we should have a pay item for painting the center curb for rehab projects.

Mr. Cales stated that there already is a pay item for curb painting in 808, so there is no need to create a new pay item in 605. Mr. Cales also mentioned to Mr. Boruff that we have time to look at this again in order to make it in time for the next version of the Standard Spec book. It was also recommended to add a pay item for "Paint, Center Curb . . . . EACH".

This item was subsequently withdrawn and the handed out revisions to the original submittal are not shown in these minutes due to further review.

APPROVED MINUTES

COMMENTS AND ACTION

604.03 PORTLAND CEMENT CONCRETE SIDEWALKS AND CURB RAMPS
605.06 CONCRETE CENTER CURBING
605.09 METHOD OF MEASUREMENT
605.10 BASIS OF PAYMENT
605-CNCC-02 CONCRETE CENTER CURB TYPE B
605-CNCC-03 CONCRETE CENTER CURBS TYPE C & D
605-CNCB-01 HMA CENTER CURB TYPE A

(CONTINUED)

Motion: Mr. Second: Mr. Ayes: Nays:	Action: _____ Passed as Submitted _____ Passed as Revised __X__ Withdrawn
Standard Specifications Sections affected: 604.03 pg 372; 605.06 pg 379; 605.09 pg 381 and 605.10 pg 382. Recurring Special Provision affected: NONE Standard Sheets affected: 605-CNCC-02 CONCRETE CENTER CURB TYPE B 605-CNCC-03 CONCRETE CENTER CURBS TYPE C & D 605-CNCB-01 HMA CENTER CURB TYPE A Design Manual Sections affected: Section 45-2.02(02) GIFE Sections cross-references: NONE	_____ 2014 Standard Specifications Book _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____ Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y___N___ By _____ Addition or _____ Revision Received FHWA Approval? _____

APPROVED MINUTES

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS
REVISION TO STANDARD SPECIFICATIONS

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The provision for substituting pavement marking materials for contracts with winter completion dates is unnecessarily specific on the types of contracts where marking materials may be changed.

Also, the retroreflectivity values are difficult to accurately measure for chip-sealed pavements where the surface is uneven. Chip seal pavement contracts are infrequent, but an exception to the retroreflectivity requirements is needed.

PROPOSED SOLUTION: Revise 808.07 to indicate that marking materials may be substituted for all contracts with completion dates and add an exception so that retroreflectivity based quality adjustments do not apply to markings installed on chip-sealed pavements.

APPLICABLE STANDARD SPECIFICATIONS: 808.07

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: None

Submitted By: David Boruff, P.E.

Title: Traffic Administration Section Supervisor

Organization: INDOT

Phone Number: (317) 234-7975

Date: 09/14/12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Review by 800 Subcommittee (contractor, consultant, and district representatives)

APPROVED MINUTES

REVISION TO STANDARD SPECIFICATIONS

SECTION 808 – PAVEMENT TRAFFIC MARKINGS
808.07 PAVEMENT MARKING MATERIAL APPLICATION, EQUIPMENT, AND PERFORMANCE REQUIREMENTS

The Standard Specifications are revised as follows:

SECTION 808, BEGIN LINE 133, DELETE AND INSERT AS FOLLOWS:

808.07 Pavement Marking Material Application, Equipment, and Performance Requirements

All double line markings, such as a no passing zone or the center line of an undivided multi-lane roadway, shall be applied in one pass. When a hand propelled machine is used, the single pass application of double line markings will not be required and control points shall be spaced at a maximum of 10 ft longitudinally.

For ~~new or modernized traffic signal installation~~ contracts with completion dates ~~in winter months~~ when conditions do not permit application of ~~durable~~ ~~markings, traffic paint~~ ~~markings~~ *the specified marking materials, other materials* may be substituted with an appropriate unit price adjustment if approved by the Engineer.

Markings shall be installed in accordance with the manufacturer's recommendations, except that the minimum requirements stated herein shall also apply. Products specifically designed for application temperatures below the stated minimums herein are not required but may be used if approved by the Engineer. When directed, the Contractor shall provide the Department with original copies of all necessary current manufacturers' installation manuals prior to beginning installation work, and no installation work shall begin prior to the Department's receipt of these manuals. These manuals shall become the property of the Department.

The markings shall be protected from traffic until dry to eliminate tracking.

The markings shall meet or exceed the following performance criteria:

1. Color. The daytime and nighttime color of the applied markings shall be in accordance with ASTM D 6628 when determined in accordance with ASTM E 811 and E 1349.

2. Durability. The pavement markings shall have a minimum resistance to wear of 97% in accordance with ASTM D 913.

3. Retro-reflectivity. *With the exception of chip seal pavement contracts*, contracts with 50,000 lft ~~(15,000 m)~~ or more of longitudinal paint line or 10,000 lft ~~(3,000 m)~~ or more longitudinal durable marking line shall have retro-reflectivity measured. *Quality adjustments based on retro-reflectivity will not be made for markings on chip-sealed surfaces.*

APPROVED MINUTES

REVISION TO STANDARD SPECIFICATIONS

SECTION 808 – PAVEMENT TRAFFIC MARKINGS
808.07 PAVEMENT MARKING MATERIAL APPLICATION, EQUIPMENT, AND PERFORMANCE REQUIREMENTS

Longitudinal lines shall meet required minimum initial and retained average retro-reflectivity measurements. All other contracts and markings shall meet the required longitudinal line minimum measurements and will be measured by the Department at the discretion of the Engineer, except that quality adjustments will not apply. Retained retro-reflectivity is the value at the time of the warranty expiration in accordance with 808.09 and will be measured by the Department at the discretion of the Engineer.

APPROVED MINUTES

COMMENTS AND ACTION

808.07 PAVEMENT MARKING MATERIAL APPLICATION, EQUIPMENT, AND PERFORMANCE REQUIREMENTS

DISCUSSION: Mr. Boruff introduced this item and stated the need for the change in marking materials for this type of application.

Mr. Miller stated that we already have a RSP for 808, and is concerned about making constant changes to the RSP. Mr. Boruff stated that they still have more to do in regards to 808 and the 808 RSP.

Further discussion ensued between Mr. Keefer and Mr. Boruff regarding varying conditions at the time of application concerning differing preservation treatments and how soon the pavement markings can be applied.

Further discussion ensued concerning retroreflectivity, with input from industry regarding the readings you can get from the machine when testing on a new chip seal surface. Mr. Walker confirmed that slight movements can result in very different readings.

Mr. Walker recommended addressing each type of surface separately rather than listing only exceptions here. Mr. Boruff will address this further at a later time. This item was withdrawn.

* Note: The Standards Committee approved the following proposed revision to 808.07 (begin line 140) as an editorial change to the Standard Specifications for 2014:

For ~~new or modernized traffic signal installation~~ contracts with completion dates ~~in winter months~~ when conditions do not permit application of ~~durable~~ ~~markings, traffic paint~~ ~~markings~~ *the specified marking materials, other materials* may be substituted with an appropriate unit price adjustment if approved by the Engineer.

Motion: Mr. Second: Mr. Ayes: Nays:	Action: _____ Passed as Submitted _____ Passed as Revised __X__ Withdrawn
Standard Specifications Sections affected: 808.07 pg 769 and 770. Recurring Special Provision affected: NONE Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	__X__ 2014 Standard Specifications Book (*only approved revision, see note) _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ _____ Revise RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____ Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y___N___ By _____ Addition or _____ Revision Received FHWA Approval? _____

APPROVED MINUTES

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS

REVISION TO SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: The recurring special provision does not address the cure time requirement before markings are installed. If applied prior to curing markings may not adhere properly.

PROPOSED SOLUTION: Revise RSP to show a five day cure time similar to the cure requirement for joint sealing.

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: None

APPLICABLE SECTION OF GIFE: None

APPLICABLE RECURRING SPECIAL PROVISIONS: 412-R-549

Submitted By: David Boruff, P.E.

Title: Traffic Administration Section Manager

Organization: INDOT

Phone Number: (317) 234-7975

Date: 09/24/12

APPLICABLE SUB-COMMITTEE ENDORSEMENT? Review by 800 Subcommittee (contractor, consultant, and district representatives)

APPROVED MINUTES

412-R-549 FOG SEAL

(Revised 01-19-12)

The Standards Specifications are revised as follows:

SECTION 412, BEGIN LINE 1, INSERT AS FOLLOWS:

SECTION 412 – FOG SEAL

412.01 Description

This work shall consist of applying asphalt emulsion to the pavement surface in accordance with 105.03.

MATERIALS

412.02 Materials

Materials shall be in accordance with the following:

Asphalt Emulsion, AE-F.....902.01(b)
Fine Aggregate.....904.02

CONSTRUCTION REQUIREMENTS

412.03 Equipment

A distributor in accordance with 409.03(a) shall be used.

412.04 Weather Limitations

Fog seal operations shall not be conducted on a wet pavement, when the ambient air or pavement temperature is below 60°F, or when other unsuitable conditions exist, unless approved by the Engineer. Fog seal shall not be applied to travel or auxiliary lanes before May 1 or after October 1.

412.05 Preparation of Surface

Surfaces shall be clean and free of any foreign or loose material.

All castings, detector housings, and snowplowable raised pavement markers shall be covered to prevent coating with fog seal prior to application of the fog seal. These coverings shall be removed prior to opening to traffic.

412.06 Application of Asphalt Material

The asphalt material shall be applied uniformly at the rate of 0.10 ± 0.02 gal./sq yd. Asphalt material shall be applied in such a way as to ensure even and uniform coverage to the pavement surface.

412.07 Protection of Surface

APPROVED MINUTES

REVISION TO SPECIAL PROVISIONS

412-R-549 FOG SEAL

Fine aggregate or other approved blotting material shall be applied to pedestrian crosswalks, driveways or other areas as directed by the Engineer. Brooming of ponded areas shall be required prior to opening to traffic on treated surfaces, as directed.

Traffic shall not be permitted on the freshly sealed surface until the asphalt material has sufficiently cured to prevent tracking.

412.08 Application of Pavement Markings

The fog seal shall be cured a minimum of 5 days prior to applying permanent pavement markings in accordance with 808.

412.0~~8~~9 Method of Measurement

Fog seal will be measured by the square yard complete in place.

412.~~09~~10 Basis of Payment

Fog seal will be paid for at the contract unit price per square yard.

Payment will be made under:

Pay Item	***Pay Unit Symbol***
Fog Seal	*SYS*

The costs of all asphalt materials, fine aggregate, surface preparation, and all other necessary incidentals shall be included in the cost of the pay item.

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COMMENTS AND ACTION

412-R-549 FOG SEAL

DISCUSSION: This item was presented by Mr. Boruff who explained the need for this revision as shown above.

Mr. Pankow asked if this would be affected by other changes as discussed earlier. A brief discussion revealed that it would depend on the application, such as a seal coat or over a centerline joint seal application.

Mr. Berebitsky stated that industry is concerned if the markings will stick to the fog seal when applied over the centerline rumble strips and joint seals. Mr. Walker and others agreed that it should not be a problem.

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Motion: Mr. Boruff Second: Mr. Cales Ayes: 9 Nays: 0	Action: __X__ Passed as Submitted _____ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: NONE Recurring Special Provision affected: 412-R-549 FOG SEAL Standard Sheets affected: NONE Design Manual Sections affected: NONE GIFE Sections cross-references: NONE	__X__ 2014 Standard Specifications Book _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ __X__ Revise RSP (No.412-R-549) Effective March 01, 2013 Letting RSP Sunset Date: Sep. 01, 2013 Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____ Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y___N___ By _____ Addition or _____ Revision Received FHWA Approval? __YES

SPECIFICATION, SPECIAL PROVISIONS AND DRAWINGS

REVISION TO SPECIAL PROVISION

PROPOSAL TO STANDARDS COMMITTEE

PROBLEM(S) ENCOUNTERED: Portions of the 732 modular block wall special provision are confusing or need revision, including the method of measurement and basis of payment.

PROPOSED SOLUTION: Revise the provision to pattern the method of measurement and basis of payment sections to be consistent with the MSE wall specification. This will help minimize confusion with designers and contractors.

APPLICABLE STANDARD SPECIFICATIONS: None

APPLICABLE STANDARD DRAWINGS: None

APPLICABLE DESIGN MANUAL SECTION: 410-5.02

APPLICABLE SECTION OF GIFE:

APPLICABLE RECURRING SPECIAL PROVISIONS: 732-R-310

PAY ITEMS AFFECTED: 732 pay items

Submitted By: Elizabeth Phillips

Title: Design Resources Engineer

Organization: INDOT

Phone Number: 232-6775

Date: September 25, 2012

APPLICABLE SUB-COMMITTEE ENDORSEMENT: INDOT Retaining Wall Committee

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REVISION TO SPECIAL PROVISIONS

732-R-310 MODULAR CONCRETE BLOCK RETAINING WALLS

732-R-310 MODULAR CONCRETE BLOCK RETAINING WALL

(Revised 05-23-11)

The Standard Specifications are revised as follows:

SECTION 732, BEGIN LINE 1, DELETE AND INSERT AS FOLLOWS:

SECTION 732 – ~~BLANK~~*MODULAR CONCRETE BLOCK RETAINING WALL*

732.01 Description

This work shall consist of design as required, furnishing materials, and placement of modular block wall units ~~with or without ground reinforcement~~in accordance with 105.03. The modular block wall unit shall have ground reinforcement if shown on the plans or required by the manufacturer.

~~The Contractor shall perform the necessary work to verify that the foundation is at the correct elevation, that the wall is constructed to the correct alignment, and that the work is in accordance with the specified tolerances. The checking of alignments and tolerances shall include verifying that the plumb of the modular block wall units is in accordance with 732.09 over the entire height of the wall. Alignment shall be checked at each layer of modular block wall units after the backfill behind the modular block wall units has been compacted, and the results shall be recorded.~~

732.02 General Design Requirements

The modular block wall shall consist of an aggregate leveling pad, concrete modular block wall units, and ~~when~~if specified, ground reinforcement elements.~~ that are to~~shall ~~be mechanically connected to the facing units.~~ Ground reinforcement shall have sufficient strength, frictional resistance, and quantity as required by design, and shall be mechanically connected to the facing units.

~~All m~~Modular block wall units shall be constructed ~~in accordance with~~as shown on the approved working drawings based on the requirements herein. The recommendations of the wall system supplier shall not override the minimum performance requirements shown herein.

The top of the modular block wall shall be designed to prevent the removal of the top course of blocks.

If the wall ~~manufacturer~~system provider needs additional information to complete the design, the Contractor shall be responsible for obtaining such information.

All appurtenances behind, in front of, under, mounted upon, or passing through the wall such as drainage structures, utilities, or other appurtenances shown on the plans shall be accounted for in the stability design of the wall.

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732-R-310 MODULAR CONCRETE BLOCK RETAINING WALLS

The modular block wall design shall follow the general dimensions of the wall envelope shown on the plans. The ~~plans will locate~~working drawings shall show the location of the leveling pad ~~to be~~ at or below the theoretical leveling pad elevation shown on the plans. The top of the modular block wall unit shall be at or above the top of the wall elevation shown on the plans.

~~*The top of the modular block wall shall be designed to prevent the removal of the top course of blocks.*~~

Cast-in-place concrete will not be an acceptable replacement for ~~any~~ modular block wall unit ~~within the areas noted~~ areas indicated by the wall envelope.

Modular block wall units shall be designed to accommodate a differential settlement of 1 linear unit in 100. Where shown on the plans, slip joints to accommodate excessive or differential settlement shall be included.

Only one typical modular block face finish shall be used per contract.

732.03 Design Criteria

~~*The design by the manufacturer shall be in accordance with the requirements for the internal and the external stability of the wall mass, the bearing pressure, and overturning. The design shall be in accordance with the applicable requirements of the AASHTO LRFD Bridge Design Specifications unless otherwise specified herein.*~~

~~*External loads which affect the internal stability shall be accounted for in the design. The size of all structural elements shall be determined such that the design load stresses do not exceed the factored stresses shown in the AASHTO LRFD Bridge Design Specifications, unless otherwise shown on the plans.*~~

The maximum ~~standard~~ modular block wall unit face area shall be 1 sq ft ~~(0.09 m^2)~~. The minimum depth of modular block wall units shall be 9 in. ~~(225 mm)~~.

~~*The phi, ϕ, angle for the internal design of the volume shall be assumed 34°. The ϕ angle of the backfill behind the modular block earth mass shall be assumed 30°. Before construction begins, the structure backfill selected shall be tested by the Contractor to confirm compliance with the frictional requirement. The wall supplier shall be furnished a copy of the testing results for the backfill. The friction angle of the foundation soils shall be assumed 30°.*~~

~~*The wall shall be defined by the wall envelope shown on the plans. For design purposes, the height of wall H shall be measured from the theoretical top of the leveling pad to the top of the wall. For a level surcharge situation, the top of the wall shall be measured to the top of the coping or to the gutter line of the traffic barrier. The top of the wall shall be the theoretical top of the modular block wall units only when a coping or barrier is not used. For an abutment face,*~~

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732-R-310 MODULAR CONCRETE BLOCK RETAINING WALLS

~~*the design height H shall be defined as the height measured from the top of the leveling pad to the top of the roadway surface. For a wall with a sloping surcharge the top of the wall shall be measured at a point 0.3H back from the face where the design height is H and the actual wall height is H.*~~

Modular block wall units shall be dry stacked in a running bond configuration. Vertically adjacent units shall be connected with an approved shear connection~~s~~. Approved shear connections consist of steel pins, concrete lips on the blocks, or other connections as approved by the Engineer.

~~*The ground reinforcement shall be the same length from the bottom to the top of each modular block wall section. Differing ground reinforcement elements shall be clearly marked for ease of construction. The minimum length of the ground reinforcement shall be 8 ft (2.44 m) or 0.7H for a wall without sloping surcharges, 0.7H for a wall with sloping surcharges, or in accordance with the AASHTO LRFD Bridge Design Specifications for an abutment on a spread footing.*~~

~~*The ground reinforcement for modular block wall sections shall be sized using the lesser of the factored loads for each specific connection and each specific reinforcing element. The connection's applied factored load and effective pullout length shall be determined in accordance with the AASHTO LRFD Bridge Design Specifications.*~~

~~*The ground reinforcement length shall be as required for internal design or as shown on the plans. The length shall exceed the minimum noted as required for design consideration. 100% of the ground reinforcement, which is designed and placed in the reinforced earth volume shall extend to and shall be connected to the modular block wall units.*~~

The internal stability shall be the responsibility of the Contractor. The design for internal stability shall be in accordance with the AASHTO LRFD Bridge Design Specifications. The design by the Engineer will consider the external stability of the modular block wall mass including the applied bearing pressure, overturning, sliding, and stability of temporary construction slopes.

(a) Geotechnical Considerations

The theoretical failure plane within the soil mass shall be analyzed so that the soil-stabilizing component extends sufficiently beyond the failure plane to stabilize the material. External loads which affect the internal stability such as those applied through piling, bridge footings, traffic, crashwall, or slope surcharge, shall be accounted for in the design. The sizes of all structural elements shall be determined such that the design load stresses do not exceed the factored stresses shown in the AASHTO LRFD Bridge Design Specifications.

The internal friction angle, φ, for the internal design of the modular block wall backfill volume shall be assumed to be 34°. The φ of the backfill behind the modular block wall backfill

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volume shall be assumed to be 30°. The φ for the internal design of the foundation soils shall be assumed to be 30°. For the external design parameters, such as but not limited to, bearing capacity, sliding, overturning, eccentricity, and global stability, the actual soil strength parameters used shall be obtained from the geotechnical report.

The factored applied bearing pressures under the stabilized mass for each reinforcement unit's length shall be indicated on the working drawings. It shall not exceed the maximum factored soil bearing resistance shown on the plans. Passive pressure in front of the wall mass shall be assumed to be zero for design purposes.

(b) Height of Wall for Internal Stability

The wall limits shall be defined by the wall envelope shown on the plans.

1. *For a wall with a level surcharge, the design height of the wall, H, shall be measured from the theoretical top of the leveling pad to the top of the coping or to the gutter line of the traffic barrier. The top of the wall shall be the theoretical top of the face panels only where a coping or barrier is not used.*

2. *For a wall with a sloping surcharge, the design height of the wall, Z, shall be measured from the theoretical top of the leveling pad to a point above the top of the wall as calculated from the formula as follows:*

$$Z = H + \frac{0.3H \tan\beta}{1\text{-}0.3 \tan\beta}$$

where β = surcharge slope angle as measured from the top of the coping, and

H = height of the wall from the theoretical top of the leveling pad to the top of the coping.

3. *For an abutment face, the design height of the wall, H, shall be measured from the theoretical top of the leveling pad to the top of the roadway surface.*

(c) Ground Reinforcement

The ground reinforcement length shall be the controlling length resulting from the internal or external design or as shown on the plans. All of the ground reinforcement shall extend to and shall be connected to the modular block wall units.

The ground reinforcement shall be the same length from the bottom to the top of each wall section regardless of the type of ground reinforcement used. Differing ground reinforcement elements shall be marked for ease of construction. This element may be used individually or in a prefabricated grouping.

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The ground reinforcement for modular block wall sections shall be sized using the lesser of the factored loads for each specific connection and each specific reinforcing element. The connection's applied factored load and effective pullout length shall be determined in accordance with the AASHTO LRFD Bridge Design Specifications.

For mats, grids, or strip steel, the minimum zinc coating thickness shall be 2 oz/sq ft. Such thickness shall be assumed to be 4 mils for purpose of calculation of reduced structural section.

Where the presence of opposing walls limits the length of ground reinforcing, the design shall account for the reduced length and internal and external stability calculations shall be made to check for adequate factor of safety.

~~*The factored bearing pressures under the stabilized mass for each reinforcement unit's length shall be clearly indicated on the working drawings and shall be equal to or less than the maximum factored soil bearing resistance shown on the plans. Passive pressure in front of the wall mass will be assumed to be zero for design purposes.*~~

732.04 Submittals

The Contractor shall submit working drawings and design calculations in accordance with 105.02. Wall construction operations shall not begin until the Contractor receives written notice that the working drawings are approved.

(a) The working drawings shall include all details, dimensions, quantities, ~~and~~ cross-sections, and general notes necessary to construct the wall and shall include, but shall not be limited to~~,~~ the following:

1. ~~A p~~Plan and elevation ~~sheet or~~ sheets ~~for each wall~~ showing views which detail the placing position and connection of all ground reinforcing elements in areas where piling, utility, or other structures are near the wall.

2. ~~An elevation view of the wall which shall include the elevation at the top of the wall at all horizontal and vertical break points at least every 50 ft (15 m) along the face of the wall, all steps in the leveling pads, the designation as to the type of modular block wall unit, the length of ground reinforcement, the distance along the face of the wall to where changes in length of the ground reinforcement occur, and an indication of the original and final ground lines and maximum bearing pressures~~Plan sheets of the wall that indicate the offsets from the construction centerline to the face of the wall at all changes in horizontal alignment.

3. ~~A plan view of the wall that indicates the offsets from the construction centerline to the face of the wall at all changes in horizontal alignment. A~~

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~~*plan view and elevation view which detail the placing position and connection of all ground reinforcing elements in areas where piling, utility, or other structures are near the wall*~~*Elevation views of the wall which shall include the following:*

a. elevations at the top of the wall at all horizontal and vertical break points at least every 50 ft along the face of the wall,

b. all steps in the aggregate leveling pad,

c. the designation as to the type of modular block wall unit,

d. the length of ground reinforcement units,

e. the distance along the face of the wall to where changes in length of the ground reinforcement occur,

f. an indication of the original and final ground lines and maximum bearing pressures.

~~*4. A typical cross-section or cross-sections showing elevation relationship between ground conditions and proposed grades*~~

~~*5. All general notes required for constructing the wall*~~

~~*6. All horizontal and vertical curve data affecting the wall*~~

~~*7. A listing of the summary of quantities on the elevation sheet for each wall*~~

(b) All modular block wall units shall show all dimensions necessary to construct the element and the location of soil reinforcing system devices embedded in the units.

(c) The details for construction of walls around drainage facilities and the outletting of internal drainage from the modular block wall volume.

(d) All details of the architectural treatment.

(e) The details for diverting ground reinforcement around obstructions such as piles, catch basins, landscape plantings where the bottom of the root ball extends below the top level of ground reinforcement, and other ~~*utilities shall be submitted for approval*~~*obstructions.*

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(f) The details for mechanical connection between the modular block wall unit and the ground reinforcement.

MATERIALS

732.05 Materials

~~*The Contractor shall make arrangements to supply the materials described herein, including concrete modular block wall units, fasteners, joint materials, ground reinforcement, and all necessary incidentals.*~~

Materials shall be in accordance with the following:

Admixtures for Concrete 912.03*
Air Cooled Blast Furnace Slag 901.09
B Borrow 211.02
*Coarse Aggregate, Class A or Higher, Size No. ~~8** or~~ 91 .... 904*
*Coarse Aggregate, Class D or Higher, Size No. 8** 904*
~~*Concrete Admixtures** ..... 912.03*~~
Concrete 702
Fine Aggregate, Size No. 23 904
Fly Ash 901.02
Geogrid, Type I 918.05
Geotextile 918.03
Portland Cement ..... 901.01(b)
Structure Backfill ..... ~~904.05~~211.03.1
Water 913.01

* ~~*Coarse aggregate No. 8 used as drainage fill shall consist of 100% crushed stone*~~*Admixtures in accordance with ASTM C 1372 may be used for the modular block if approved by the Engineer.*

** ~~*Admixtures in accordance with ASTM C 1372 may be used for the modular block if approved by the Engineer*~~*Coarse aggregate No. 8 used as drainage fill shall consist of 100% crushed stone.*

Aggregate for the leveling pad shall be compacted aggregate No. 53 and shall be in accordance with applicable requirements of 303. Drainage fill used immediately behind the modular block wall, as shown on the plans shall be coarse aggregate No. 8 in accordance with 904.02~~3~~. ~~Backfill material used in the modular block wall volume shall be structure backfill, type 3, in accordance with 211. The size of the structure backfill selected for use in the reinforced area of the modular block volume shall remain the same for that wall's volume.~~

If g~~G~~round reinforcement is required, it shall be either steel in accordance with 910.07 or geogrid. The ground reinforcement supplied shall be the same type as that used with the pullout test and shall be consistent throughout the contract work. ~~A type A certification in accordance with 916 for geogrid shall be submitted to the Engineer prior to use of the material.~~

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Backfill material used in the modular block wall volume shall be structure backfill, type 3, in accordance with 211. The size of the structure backfill selected for use in the reinforced area of the modular block volume shall remain the same for that wall's volume.

~~Backfill material used in the modular block wall volume shall be structure backfill, type 3, in accordance with 211.~~ Where ground reinforcement is required, nominal size aggregate No. 30 shall not be used, and the angle of internal friction, φ, shall be a minimum of 34° when tested under consolidated drained conditions in accordance with AASHTO T 236 or T 297. ~~The internal friction or ϕ angle of the structure backfill in the reinforced backfill shall be not less than 34° in accordance with AASHTO T 236 or AASHTO T 297 under consolidated drained conditions.~~ Testing for ~~the ϕ angle~~ shall be performed on the portion ~~finer than~~that passes the No. 8 (2.36 mm) sieve, using a sample of the material compacted to 95% in accordance with AASHTO T 99, methods C, or D. ~~No t~~Testing for ~~the ϕ angle~~ will ~~is~~ not be required ~~when~~if ~~80~~20~~80~~80% or more of the material~~s~~ is ~~are~~ retained on ~~or above~~ or above the ~~are greater than~~ No. 4 (4.75 mm) sieve. If the ground reinforcement is steel, structure backfill shall be in accordance with the backfill requirements for MSE walls contained in 211.03.1. ~~An approved geotechnical laboratory shall perform the tests.~~

If ground reinforcement is used, a type A certification in accordance with 916 for the above additional testing of the structure backfill shall be furnished to the Engineer. An approved geotechnical laboratory shall perform the tests. One copy of all test results performed by the Contractor, which are necessary to demonstrate compliance with the specifications, shall also be furnished to the Office of Geotechnical Services.

~~Structure backfill criteria shall be as followsin accordance with the following:~~

~~Property~~	~~Criteria~~	~~Test Method~~
~~pH~~	~~5 < pH < 10~~	~~AASHTO T 289~~
~~Organic Content~~	~~1 % max.~~	~~AASHTO T 267~~
~~Permeability & Gradation~~	~~30 ft/day (9 m/day) (min.)~~	~~AASHTO T 215 AASHTO T11 & T27~~

~~All of the above tests shall be run a minimum of once per 2 calendar years per source.~~

~~ACBF shall be in accordance with the pH, organic content, and permeability requirements of structure backfill as noted above, and in ITM 212.~~

If ACBF or coarse aggregate No. 8 ~~(2.36 mm)~~ are used, and soil, B borrow, structural backfill, or coarse aggregate No. 53 are to be placed above the ACBF or coarse aggregate No. 8 ~~(2.36 mm) aggregate~~, a single layer of geotextile shall be placed on top of the ACBF or coarse aggregate No. 8 ~~(2.36 mm) aggregate~~ in accordance with 616.11. A type C certification in accordance with 916 for the geotextile materials shall be furnished to the Engineer prior to use.

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~~*The structure backfill shall be supplied in accordance with 904 and a*~~*A* ~~*type A certification in accordance with 916 for the above additional testing of the structure backfill shall be furnished to the Engineer prior to use*~~ *if ground reinforcement is used*~~*.*~~ *An approved geotechnical laboratory shall perform the tests.*~~ ~~*One copy of all test results performed by the Contractor, which are necessary to demonstrate compliance with the specifications, shall also be furnished to the Department's Geotechnical Section. An approved geotechnical laboratory shall perform the tests.*~~

(a) Concrete Modular Block Wall Units

Concrete modular block retaining wall units shall be in accordance with ASTM C 1372, except for the modifications below, and shall have a minimum compressive strength of 4,000 psi ~~*(27.5 MPa)*~~ *at 28 days. Modular block wall units utilizing type I or II cement will be considered acceptable for placement in the wall when 7-day strengths exceed 3,500 psi* ~~*(24.1 MPa)*~~*. The modular block wall unit's compressive strength shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength is in accordance with the requirements stated above.*

Retarding agents, accelerating agents, coloring pigments, or additives containing chloride shall not be used without approval.

1. Testing and Inspection

a. Material properties shall be in accordance with the requirements of 732.05 in lieu of Section 4.

b. Table 1, "Strength and Absorption Requirements", shall be modified to require that the average compressive strength, when sampled and tested in accordance with ASTM C 140, of a three CMU compressive strength sample shall be 4,000 psi ~~*(27.5 MPa)*~~ *with no individual unit less than 3,500 psi* ~~*(24.1 MPa)*~~*. Maximum absorption shall be 6%.*

~~*c. The modular block wall unit's compressive strength shall be considered acceptable regardless of curing age when compressive test results indicate that the compressive strength is in accordance with 732.05(a).*~~

~~*d*~~*c. Freeze-thaw durability testing shall be completed in accordance with Section 8.3 by a laboratory approved by the Department. Test results on all mix designs used in the manufacture of modular blocks shall have been completed in accordance with ASTM C 1372*~~ *and be within 12 months prior to delivery*~~*. If a change to the mix design, such as proportioning or material source, is desired, the modified mix design shall be retested for freeze-thaw. A type A certification in accordance with 916 for the freeze-*

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thaw durability testing shall be submitted to the Engineer prior to use of the blocks.

~~e~~d. *Sampling and testing of the manufacturer's production lots will be conducted by the Engineer in accordance with ASTM C 140. If the compressive strength test result does not meet the requirements of 732.05(a), the production lot units may not be used. The manufacturer may resample the same production lot in the presence of the Engineer for retesting. The Engineer will test the additional samples in accordance with ASTM C 140. If the retested samples meet the requirements of 732.05(a), the production lot may be used. If the retested samples do not meet the requirements of 732.05(a), all the units from the production lot may not be used.*

2. Rejection

Units shall be subject to rejection due to failure to be in accordance with the requirements specified above. In addition, the following defects may be sufficient cause for rejection.

a. *Defects which indicate imperfect molding*

b. *Defects which indicate honeycombed or open texture concrete*

c. *Defects in the physical characteristics of the concrete, such as broken or chipped concrete, or color variations or dunnage marks on the front face due to excessive form oil or other reasons.*

The Engineer will determine whether spalled, honeycombed, chipped, or otherwise defective concrete shall be repaired or be cause for rejection. Repair of concrete, if permitted, shall be completed in a satisfactory manner. Repair to concrete surfaces, which are to be exposed to view after completion of construction shall be subject to approval.

3. Marking

The date of manufacture, the production lot number, and the place mark shall be clearly scribed on the rear face of each unit or on each shipping pallet.

4. Handling, Storage, and Shipping

All modular block wall units shall be handled, stored, and shipped so as to eliminate the danger of chipping, cracks, fractures, and excessive bending stresses.

(b) ~~Aggregate Leveling Pad~~Blank

~~*Aggregate for the leveling pad shall be compacted aggregate No. 53 and shall be in accordance with the applicable requirements of 303.*~~

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~~(c) Ground Reinforcement~~

~~The ground reinforcement shall be geogrid. The ground reinforcement used shall be consistent with that used in the pullout test and shall be consistent throughout the project.~~

~~A type A certification in accordance with 916 for geogrids shall be submitted to the Engineer prior to use of the materials.~~

~~(d) Backfill Material~~

~~Backfill material used in the modular block wall structure volume shall be structure backfill. B borrow shall be placed behind the reinforcement and the structure backfill.~~

~~A type A certification in accordance with 916 for the structure backfill shall be furnished prior to use of the materials. One copy of all test results performed by the Contractor, which are necessary to demonstrate compliance with the specifications, shall be furnished to the Engineer.~~

~~Drainage fill used behind the modular block wall, as shown on the plans shall be coarse aggregate No. 8 (2.36 mm) in accordance with 904.02.~~

CONSTRUCTION REQUIREMENTS

732.06 General Requirements

The wall supplier representative shall provide technical instruction, guidance in preconstruction activities including the preconstruction conference, and on-site technical assistance to the Contractor during construction.

732.07 Foundation Preparation

The foundation for the ~~structure~~modular block wall shall be graded level for the width shown on the plans. ~~Prior to wall construction, the foundation, if not in rock, shall be compacted in accordance with 203. The base of the wall excavation shall be proofrolled with an approved compacting equipment. If unsuitable foundation material is encountered, it shall be removed and replaced with B borrow in accordance with 211.02 and compacted in accordance with 211.04.~~ Foundation preparation shall otherwise be in accordance with 731.07.

At each foundation level, an aggregate leveling pad shall be provided as shown on the plans.

732.08 Retaining Wall Excavation

~~This work shall consist of the excavation of material whose removal is necessary for the construction of the modular block wall sections in accordance with the plans and the requirements herein. Excavation shall include the construction and subsequent removal of all necessary bracing, shoring, sheeting, cribbing, all pumping, bailing, and draining.~~

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~~*Prior to starting excavation operations at the wall site, clearing and grubbing shall be in accordance with 201.03. The Contractor shall clear and grub the area for the excavation in accordance with the limits shown on the plans. All timber, stumps, and debris shall be disposed of in accordance with 201.03.*~~

~~*The Contractor shall notify the Engineer a minimum of 7 calendar days or other time as mutually agreed upon before beginning the excavation so that measurements can be taken of the undisturbed ground.*~~

~~*Where necessary for safety, the excavation shall be shored or braced in accordance with State and local safety standards. Excavation and related work shall be performed such that no portion of the wall is endangered by subsequent operations.*~~

~~*The method for shoring, sheeting, or bracing the excavation opening shall be shown on the working drawings, submitted, and will be approved before beginning the excavation.*~~

~~*After the excavation for each wall location has been performed, the Contractor shall notify the Engineer. The aggregate leveling pad shall not be placed until the Engineer has approved the depth of the excavation and the foundation material.*~~

~~*All sheeting and bracing shall be removed as the backfilling progresses.*~~

~~*All material for backfill shall be subject to approval and shall be free from large or frozen lumps, wood, or other undesirable material. All backfill shall be compacted in accordance with 203.*~~

Excavation shall be in accordance with 731.08.

732.09 Wall Erection

Modular block wall units shall be stored to minimize contact with the ground or being covered by standing water. Modular block wall units having face discoloration shall ~~*have the discoloration removed by means of a chemical wash*~~ *not be used.*

The Contractor shall perform the necessary work to verify that the foundation is at the correct elevation, that the wall is constructed to the correct alignment, and that the work is in accordance with the specified tolerances.

Modular block wall units shall be placed in successive horizontal lifts in the sequence shown on the plans as backfill placement proceeds. As backfill material is placed behind the units, the units shall be maintained in vertical position. Horizontal alignment tolerances shall not exceed 3/4 in. when measured with a 10 ft straightedge. Alignment shall be checked at each layer of modular block wall units after the backfill behind the modular block wall units has been

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compacted, and the results shall be recorded. Checking of alignments and tolerances shall include verifying that the modular block wall units are plumb over the entire height of the wall.

~~*Modular block wall units placed in contact with the ground or covered by standing water shall have face discoloration removed by means of a chemical wash. Modular block wall units shall be stored to minimize contact with the ground or being covered by standing water.*~~

~~*Horizontal alignment tolerances shall not exceed 3/4 in. (19 mm) when measured with a 10 ft (3 m) straightedge.*~~

Ground reinforcement shall be placed normal to the face of the wall, unless otherwise shown on the plans and shall be constructed in accordance with 214.04. ~~*Backfill shall be compacted in accordance with 732.10.*~~

732.10 Backfill Placement

Backfill placement shall ~~*closely*~~ *follow erection of each course of modular block wall units* ~~*with or without ground reinforcement*~~*. All sheeting and bracing shall be removed as the backfilling progresses. Backfill shall be placed so as to avoid damage or disturbance to the wall materials or misalignment of the modular block wall units. All material for backfill shall be subject to approval and shall be free from large or frozen lumps, wood, or other undesirable material. Wall materials that become damaged or disturbed during backfill placement shall be removed and replaced or corrected as directed. All misalignment or distortion of the modular block wall units due to placement of backfill outside the limits described herein shall be corrected as directed.*

The work shall also include backfilling beyond the theoretical length of the ground reinforcement in accordance with the details shown on the plans and the disposal of surplus of unsuitable excavated materials as permitted.

Backfill placement and compaction shall otherwise be in accordance with 731.11.

~~*Structure backfill shall be compacted to 95% of the maximum dry density in accordance with AASHTO T 99. Compaction equipment shall be in accordance with 409.03(d). Density of the compacted aggregate will be determined in accordance with 203.24(b). If coarse aggregate No. 8 backfill material is used, compaction shall consist of 4 passes with a vibratory roller, and 1 pass with the same roller in static mode. A vibratory roller shall be equipped with a variable amplitude system, a speed control device, and have a minimum vibration frequency of 1,000 vibrations per min. A roller in accordance with 409.03(d)4 may be used. All displacement or rutting of the aggregate shall be repaired prior to placing subsequent material.*~~

~~*The maximum loose lift thickness shall not exceed 8 in. (200 mm) except that lifts 3 ft (0.9 m) from the wall or closer shall not exceed 5 in. (125 mm) in loose thickness. This lift thickness shall be decreased if necessary, to obtain the specified density.*~~

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~~*Compaction within 3 ft (0.9 m) of the back face of the modular block wall units shall be achieved by means of a minimum of 5 passes with a lightweight mechanical tamper, roller, or vibratory system.*~~

~~*At the end of each day's operation, the last level of backfill shall be sloped away from the modular block wall units. In addition, surface runoff from adjacent areas shall not be permitted to enter the wall construction site.*~~

~~*Cutting or altering of the basic structural section of the ground reinforcing at the site will be prohibited, unless the cutting is preplanned and detailed on the approved working drawings. Cutting shall only be considered if adequate additional ground reinforcement is provided to produce the required ground reinforcement strength shown in the approved calculations.*~~

732.11 Method of Measurement

~~*Modular block wall units with or without ground reinforcement will be measured by the square yard (square meter) of wall surface area. Erection of modular block wall units will be measured by the square yard (square meter) of wall surface area. Common excavation will be measured by the cubic yard (cubic meter) in accordance with 203.27 to the neat lines shown on the plans. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09.*~~

The measurement ~~for~~of concrete modular block wall units with or without ground reinforcement and wall erection will be based on the square foot area contained within the neat line limits of the wall envelope shown on the plans and not that of the wall system supplier.~~ The wall envelope limits will be considered to be the vertical distance from the top of the leveling pad to the top of the wall, and the horizontal distance from the beginning to the end of the leveling pad.~~

Common excavation will be measured by the cubic yard in accordance with 203.27(a) to the neat lines shown on the plans. Structure backfill and B borrow will be measured in accordance with 211.09. Unsuitable foundation materials, if found, will be measured in accordance with 211.09. Coarse aggregate No. 8 used as drainage fill will be measured by the cubic yard based on the theoretical volume to the neat lines as shown on the plans. Clearing and grubbing, compacted aggregate No. 53, ~~and compacted aggregate No. 8~~ and ~~geogrid~~ ground reinforcement will not be measured. Geotextile materials ~~if used in accordance with 732.05~~ will not be measured. Drainage of the backfill including piping~~, aggregates, or~~ and geotextile materials used in the drainage system will not be measured.

732.12 Stockpiled Modular Block Units

Partial payment may be made for block wall units stockpiled on the project site or at the Contractor's approved storage location. Partial payment will include the delivered cost of the units, as verified by invoices that include freight charges. The Contractor shall furnish the

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invoices. The partial payment will not exceed 75% of the contract unit price for modular block wall with or without ground reinforcement. Prior to authorizing partial payment, the Engineer will verify that the units are in accordance with 732.05(a).

732.13 Basis of Payment

~~M~~The accepted quantities of modular block wall units with or without ground reinforcement will be paid for at the contract unit price per square ~~yard~~foot ~~(square meter) of wall surface area~~. Erection of ~~M~~modular block wall units will be paid for by the square ~~yard~~foot ~~(square meter) of wall surface area~~. Common excavation will be paid for ~~at the contract unit price per cubic yard (cubic meter)~~ in accordance with 203.28 ~~to the neat lines shown on the plans~~. Structure backfill and B borrow will be paid for in accordance with 211.10. Unsuitable foundation materials will be paid for in accordance with 211.10. The accepted quantities of coarse aggregate No. 8 used as drainage fill will be paid for as aggregate for drainage fill at the contract unit price per cubic yard, complete in place.

Payment will be made under:

Pay Item	***Pay Unit Symbol***
Aggregate for Drainage Fill	*CYS*
Modular Block Wall	*~~SYS (m2)~~SFT*
Modular Block Wall with Ground Reinforcement	*~~SYS (m2)~~SFT*
Modular Block Wall Erection	*~~SYS (m2)~~SFT*

~~The cost of aggregate and geotechnical testing shall be included in the cost of wall~~ The cost of designing the wall system, services including the testing laboratory, certified testing personnel, and the testing and inspection of modular block wall units shall be included in the cost of the pay items of this section.

The cost of ~~modular blocks including~~ materials, ground ~~reinforcing~~reinforcement~~,~~ if required, fasteners, cutting or altering the ground reinforcement at the site, repair or replacement of units damaged or removed due to backfill placement, compressive-strength retesting if required, retesting or replacing failed block units, and incidentals shall be included in the cost of ~~modular block wall with ground reinforcement~~of the pay items of this section.

The cost of all labor and materials required ~~to~~for prepar~~e~~ing the wall foundation, clearing and grubbing, compacted aggregate ~~size~~ No. 53 ~~or No. 8~~, ~~ground reinforcement~~, coarse aggregate No. 8 placed outside the neat lines as shown on the plans, replacement materials damaged during backfill placement if required, ~~place the ground reinforcing,~~ and erecting the modular block units shall be included in the cost of wall erection.

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~~*The cost of performing the laboratory tests by an approved geotechnical laboratory for structural backfill or ACBF slag shall be included in the cost of modular block wall with or without ground reinforcement.*~~

The cost of all labor and materials for geotextiles ~~*materials*~~ *shall be included in the cost of* ~~*other structural backfill*~~*the pay items of this section.*

~~*The cost of cutting or altering the ground reinforcing at the site shall be included in the cost of modular block wall with ground reinforcement.*~~

~~*The cost of all modular block wall materials including modular block wall units, compressive strength retesting if required, and incidentals shall be included in the cost of the concrete modular block wall with or without ground reinforcement.*~~

~~*The cost of clearing and grubbing, compacted aggregate No. 53, compacted aggregate No. 8, ground reinforcement, or replacement materials damaged during backfill placement if required, shall be included in the cost of wall erection.*~~

~~*The cost of retesting or replacing failed modular block wall units will be included in the cost of the concrete modular block wall with or without ground reinforcement.*~~

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COMMENTS AND ACTION

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DISCUSSION: This item was introduced and presented by Ms. Phillips who stated that these revisions are intended to mirror the revisions made to the MSE walls specification.

Ms. Phillips and Mr. Reilman then walked the committee through each page of the RSP and explained each revision made, including the new revisions as illustrated in the hand out by Mr. Reilman. Further editorial revisions were incorporated as suggested by Mr. Pankow, Mr. Reilman, and Mr. Walker. Those editorial revisions are shown in these minutes.

Mr. Fisher commented on the change in the pay item units and how it will affect existing contracts. It was agreed that it is something we will need to watch for and proceed accordingly.

The motion was revised.

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Motion: Ms. Phillips Second: Mr. Cales Ayes: 9 Nays: 0	Action: _____ Passed as Submitted __X__ Passed as Revised _____ Withdrawn
Standard Specifications Sections affected: NONE Recurring Special Provision affected: 732-R-310 MODULAR CONCRETE BLOCK RETAINING WALL Standard Sheets affected: NONE Design Manual Sections affected: 410-5.02 GIFE Sections cross-references: NONE	__X__ 2016 Standard Specifications Book _____ Revise Pay Items List _____ Create RSP (No._____) Effective _____ Letting RSP Sunset Date: _____ __X__ Revise RSP (No.732-R-310) Effective June 01, 2013 Letting RSP Sunset Date: Sep. 01, 2015 (2016 SS) Standard Drawing Effective _____ _____ Create RPD (No. _____) Effective _____ Letting _____ Technical Advisory GIFE Update Req'd.? Y ___ N ___ By _____ Addition or _____ Revision Frequency Manual Update Req'd? Y___N___ By _____ Addition or _____ Revision Received FHWA Approval? __YES