COLORADO
Department of Transportation

Project Development Branch
Standards and Specifications Unit

DATE: May 29, 2019

TO: Members of the CDOT/CCA Specifications Committee

FROM: Shawn Yu, Standards and Specifications Unit Manager

SUBJECT: June 6, 2019 Specifications Committee Meeting Agenda

CDOT Meeting Time: 9:00 am
Location: CDOT HQ – 2829 Howard Pl., Denver, CO
Room 105 – T-Rex Conference Room

CDOT/CCA Meeting Time: 1:00 pm
Location: CDOT HQ – 2829 Howard Pl., Denver, CO
Room 105 – T-Rex Conference Room

Agenda	
Topics	**Presenters**
1. Introductions	Lacey
2. Recently Issued specs	Pihaly
3. 202 – Diamond Grinding Concrete Pavement	Stanford
4. 412 – Cross Stitching	Stanford
5. 412 – Concrete Pavement Dowel Bar Retrofit	Stanford
6. 412 – Slot Stitching	Stanford
7. 401 – Thin Lift Compaction Test Section – Density	Stanford
8. 630 – Non-Concrete Barrier (Temporary)	Palmer
9. 601 – Concrete Mix Designs	Stanford
10. Special Provisions to add to 2019 Standard Specs	Pihaly

*Next Spec Committee Meeting is planned for Thursday, September 12, 2019.

Spec Committee – June 6, 2019
Standards and Specifications Unit Update

(Since last meeting in March, 2019)

STANDARD SPECIAL PROVISIONS ISSUED

- **Revision of Section 105 – Cooperation by Contractor**
  - Deleted statement that Contractor would be provided six sets of Contract documents.
- **Revision of Section 108 – Failure to Complete Work on Time**
  - Revises Schedule of Liquidated Damages. Re-calculated and adjusted every two years. Reviewed and approved by FHWA.
- **Department of Labor General Decision Number for Highway Construction**
  - General decision numbers changed.
- **Revision of Section 107 – Water Quality Control**
  Revision of Section 208 – Erosion Control
  - The Colorado Department of Public Health and Environment issued a new Colorado Discharge Permit System-Stormwater Construction Permit (COR400000), which became effective on April 1st, 2019. This revision reflects the changes necessary to stay in compliance with the new permit. Other changes were made to better reflect industry standards for control measures (formerly called BMPs).

SPECIFICATION CHANGES UNDER REVIEW

- **Revision of Section 202 – Diamond Grinding Concrete Pavement**
  Revision of Section 412 – Cross Stitching
  Revision of Section 412 – Concrete Pavement Dowel Bar Retrofit
  Revision of Section 412 – Slot Stitching
  - Revisions are a result of a joint industry/CDOT task force. Approved by MAC. Includes three new M-Standard drawings to be issued.
- **Revision of Section 401 – Thin Lift Compaction Test Section - Density**
  - Clarifies "Project Selection Guidelines". Revises current specs for construction personnel on location of cores, in order to determine the percent compaction.
- **Revision of Section 630 – Non-Concrete Barrier (Temporary)**
  - Allows for other materials besides concrete to be used for temporary barrier.
- **Revision of Section 504, 606, 712 – Pre-Cast Concrete**
  - Added requirements for pre-cast to ensure long term durability of structures.
- **Revision of Section 601 – Concrete Mix Designs**
  - Added requirement for a proper air void system by requiring the mix to pass the super air meter requirements.

To view updates:
https://www.codot.gov/business/designsupport/cdot-construction-specifications/2017-construction-standard-specs

REVISION OF SECTION 202
DIAMOND GRINDING CONCRETE PAVEMENT

Section 202 of the Standard Specifications is hereby revised for this project as follows:

Subsection 202.01 shall include the following:

This work consists of diamond grinding existing concrete pavement to restore smoothness and texture at the locations indicated on the plans such that the surface area has a minimum average macrotexture depth of 0.05 inches when tested in accordance with Colorado Procedure 77B. The maximum grinding depth shall be 0.25 inches unless approved by the Engineer.

A hardness of approximately 7 is anticipated for the existing concrete pavement based on the Mohs hardness scale. For bidding purposes, the Contractor shall be responsible for verifying the hardness of the existing concrete pavement.

Subsection 202.02 shall include the following:

Prior to beginning work on the project, the Contractor shall submit to the Engineer for approval a detailed plan for accomplishing the grinding. The plan shall include a sequence for grinding which produces the desired surface ride qualities with a minimum macrotexture depth throughout the project. Grinding shall be performed in the longitudinal direction. The entire surface width of the driving and passing lane pavement shall be ground until the pavement surfaces on both sides of all transverse joints and random cracks are in the same plane and meet the smoothness requirements specified herein. Grinding shall begin and end at lines normal to the pavement centerline.

The Contractor shall grind driving and passing lane pavement surfaces within designated limits as shown on the plans. The finished grinding shall maintain the existing cross slope of the roadway in the driving and passing lanes. A feather pass shall be ground at the edge of traveled-way as indicated on the plans or as directed by the Engineer. No adverse drainage conditions shall be caused by the grinding operations. The sequence of work shall not allow for ponding of water in the travel lanes due to a weather event. Shoulders that require grinding will be designated on the plans.

Approach slabs and bridge decks shall not be ground and textured. Grinding depth shall transition to 0 inches before the approach slab interface.

One stratified random acceptance test for texture per 2,500 linear feet or fraction thereof in each lane and shoulder shall be taken with a minimum of one test per day.

Smoothness for this project will be measured by the Department in accordance with subsection 105.08. The MRI after grinding for each 0.10 mile section or fraction thereof shall have a MRI of 95 in/mile or less. Sections with a MRI greater than 95 in/mile shall be corrected by further diamond grinding.

At various locations within the driving and passing lanes, miscellaneous tie bars may be exposed due to wearing of the pavement surface. Removal of these tie bars will be incidental to the grinding and texturing work.

All grinding shall be parallel to the longitudinal joints. Adjacent passes shall be overlapped by a maximum of 2 inches**.**

Grinding shall be performed using diamond blades mounted on a self-propelled machine designed for grinding and texturing concrete pavement. The equipment shall weight a minimum 35,000 pounds including the grinding head and be of a size that will grind a strip at least 3 feet wide in a single pass. The effective wheel base of the machine shall be at least 12 feet. Grinding equipment that causes raveling, aggregate fractures or disturbance to the joints shall not be permitted. The equipment shall be maintained to ensure it is in proper working order, including the roundness of the match and depth of control wheels. Any wheels found to be out of round shall be immediately replaced. Smaller equipment may be approved by the Engineer for areas that the above equipment cannot reach.

2
REVISION OF SECTION 202
DIAMOND GRINDING CONCRETE PAVEMENT

The grinding process shall produce a pavement surface that is true to grade and uniform in appearance. Grooves shall be evenly spaced. Ridges on the outside edge next to the shoulder, auxiliary, or ramp lanes greater than 3/16 inch high shall be feathered out to the satisfaction of the Engineer in a separate, feather pass operation. No adverse drainage conditions shall be caused by the grinding operations.

The pavement surface after grinding shall have no depressions or misalignment of slope in the longitudinal direction exceeding 1/8 inch in 10 feet when measured with a 10-foot straightedge placed parallel to the centerline. The grinding coverage shall be at least 95 percent of the pavement surface area. All areas of deviation shall be reground at no additional cost.

When the texture depth is below the lower specified limit, the Contractor shall determine the area represented by this test. The area shall be determined by taking additional tests at 15 foot intervals parallel to the centerline in each direction from the affected location until two consecutive tests are found to be within the specified limits. Any surface with unacceptable texturing exceeding 25 linear feet in any lane or shoulder shall be reground (full width). After the Engineer approves the limits, the Contractor shall correct the deficient surface texture by grinding full width at no additional cost to the project. The corrected surface texture will be retested for acceptance. Correcting surface texture deficiencies shall occur prior to pavement smoothness testing. Upon the second unacceptable test result, the Contractor shall notify the Engineer, in writing, the action taken to provide an acceptable surface macrotexture. Upon the project's third unacceptable test result from the Department, the Engineer will notify the Contractor, in writing, and the pay estimate will be withheld until diamond grinding is taken to provide an acceptable surface macrotexture.

The slurry and residue, including joint sealant, resulting from the grinding operation shall not be allowed to flow across lanes occupied by traffic and shall be continuously removed during the grinding operation, leaving the pavement in a clean condition.

The Contractor shall haul the grinding residue to an approved suitable location at no additional cost. The Contractor shall obtain approval of the disposal method from the Engineer prior to beginning the grinding operation.

Subsection 202.11 shall include the following:

Diamond Grinding Concrete Pavement will be measured by the square yard of acceptable finished surface regardless of the number of passes required. The quantity of grinding and texturing will be determined by measuring the finished area ground within the limits indicated on the plans or as directed by the Engineer.

Subsection 202.12 shall include the following:

Diamond Grinding Concrete Pavement will be paid for at the contract unit bid price per square yard. Payment will be considered full compensation for all labor, materials, supplies, tools, water, equipment, and incidentals necessary for completing the work as specified.

Payment will be made under:

Pay Item	**Pay Unit**
Diamond Grinding Concrete Pavement	Square Yard

1
REVISION OF SECTION 412
CROSS STITCHING

Section 412 of the Standard Specifications is hereby revised for this project as follows:

Subsection 412.01 shall include the following:

This work consists of cross stitching longitudinal cracks and joints by directionally drilling holes in concrete pavement, injecting grout, and inserting deformed steel reinforcing bars in accordance with these specifications and the details shown on the plans. Cross stitching shall not be used for fixing defective work on new construction or for thin concrete overlays (6 inches or less).

Subsection 412.02 shall include the following:

Materials for cross stitching shall be #6 or #8 deformed steel reinforcing bars, grade 60, epoxy coated, with length as specified on the plans.

Epoxy or cementitious grout shall be on the Department's approved products list. The epoxy shall be either an epoxy or polyester resin. The epoxy or cementitious grout shall be submitted to the Engineer for approval at least five working days in advance of the commencement of cross stitching work.

Subsection 412.07 shall include the following:

The drill for boring the cross stitch holes shall be selected to minimize damage to the concrete surface. The drill shall be capable of low-impact operation in order to minimize spalling damage and prevent bottom breakout of the concrete pavement. The drill shall be skid or frame mounted. Hand held drilling will not be allowed.

The first ten holes shall be visually inspected to determine if the bottom of the slab has broken out, and measured for length of minimum embedment. Installation of the tie bars and epoxy shall not occur until the Contractor's drilling method has been inspected and approved. After the Contractor's method has been approved, the Contractor may proceed with cross stitching so long as the method and equipment remain the same. Drill bit changes do not require re-inspection. If the Contractor's method or equipment changes, the first ten holes made with the new method shall be visually inspected to determine if the bottom of the slab has broken out, and measured for length of minimum embedment.

Subsection 412.10 shall include the following:

Directionally drilled holes shall be 1.000 to 1.125 inches diameter for #6 bars and 1.125 to 1.375 inches diameter for #8 bars, and drilled at an angle from the horizontal designated on the plans. Holes shall be started at a distance shown on the plans on a line perpendicular to the crack/joint, and shall extend through the crack/joint. Drilled holes shall be spaced on 20 inch centers and shall alternate from side to side along the full length of the crack/joint. Holes shall not be drilled within 24 inches of an existing transverse joint. Holes shall not extend through the bottom of the slab.

Drilled holes shall be blown free of drill dust, dirt, and moisture with oil and moisture-free compressed air immediately before placing the grout.

Holes shall be filled with epoxy/grout by injecting from the bottom of the hole. The Contractor shall insert the tie bar and remove excess epoxy/grout and finish flush with the pavement surface.

Pavement may be opened to traffic when the epoxy/grout is dry to the touch.

Subsection 412.23 shall include the following:

Cross stitching will be measured for payment by the number of cross stitches placed.

REVISION OF SECTION 412
CROSS STITCHING

Subsection 412.24 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Cross Stitching	Each

The accepted quantity of drilled holes, filled with epoxy/grout and reinforcing bars will be paid for at the contract unit price per each hole drilled. Payment for deformed bars, grout, labor, materials, equipment, tools and incidentals necessary for completion of the work will not be measured and paid for separately, but shall be included in the work.

CROSS STITCHING DETAILS

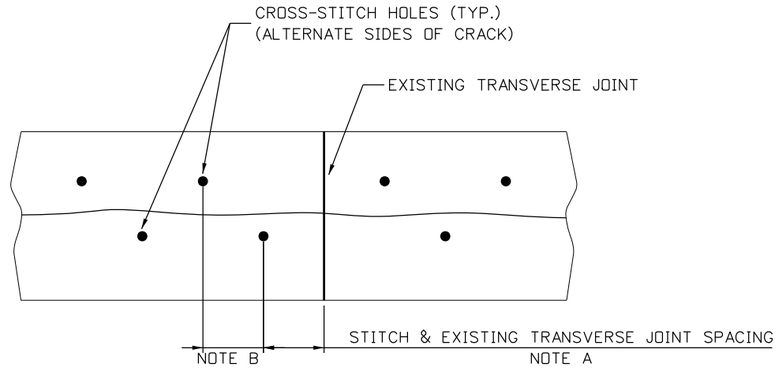
FOR PCCP ≥ 8" IN THICKNESS

TYPICAL
NOT TO SCALE

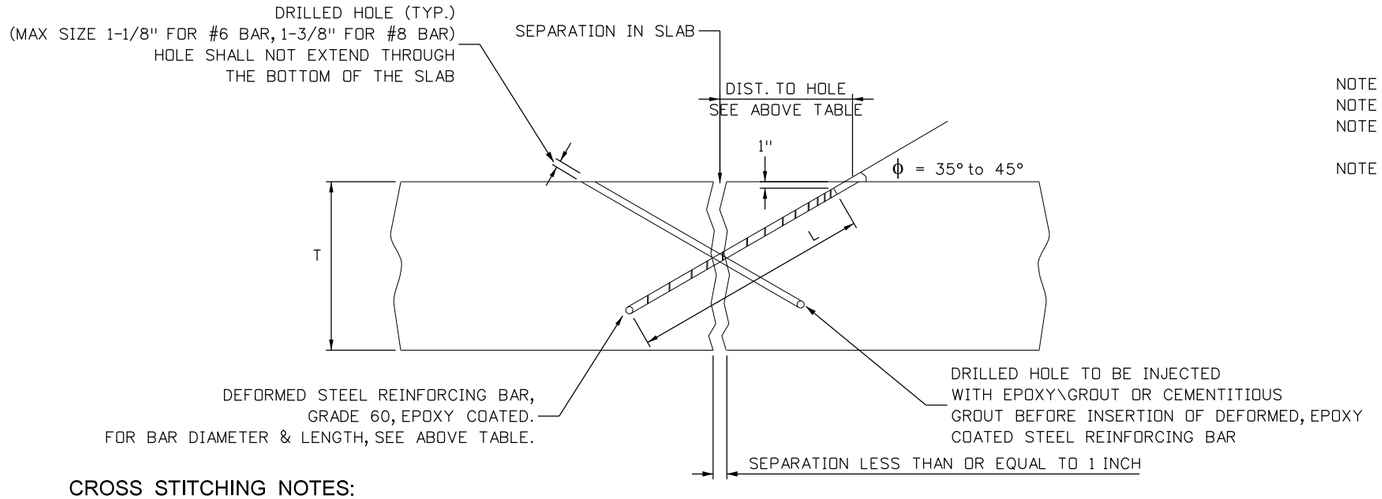
Cross Stitching Bar Dimensions and Location of Drill Holes

	Slab Thickness (T) (in.)							
	8	**9**	**10**	**11**	**12**	**13**	**14**	**≥15**
ϕ	**Distance to Hole (in.)**							
35	5.75	6.50	7.25	7.75	8.50	-	-	-
40	-	-	-	6.50	7.25	7.75	8.25	-
45	-	-	-	-	6.00	6.50	7.00	7.50
	Length of Bar (L) (in.)							
35	9.50	11.00	12.50	14.50	16.00	-	-	-
40	-	-	-	12.50	14.00	16.00	18.50	-
45	-	-	-	-	12.00	14.00	16.50	18.00
	Bar Number (#)	**(Epoxy Coated)**						
	6	6	6	6	6	8	8	8

PLAN VIEW



DETAIL OF CROSS STITCHING
CROSS-SECTIONAL VIEW



NOTE A: MINIMUM DISTANCE BETWEEN CROSS STITCH HOLE AND EXISTING TRANSVERSE JOINT IS 24".
NOTE B: DISTANCE BETWEEN CROSS STITCH HOLES IS 20".
NOTE C: EPOXY DEFORMED BAR INTO HOLE. LENGTH SHOWN IN TABLE PROVIDE 1 INCH COVER AT SURFACE AND ASSUME DRILLING PER NOTE D.
NOTE D: DO NOT DRILL HOLE COMPLETELY THROUGH SLAB. STOP DRILLING SO EPOXY/GROUT WILL NOT RUN OUT OF THE BOTTOM WHILE BACK FILLING.

CROSS STITCHING NOTES:

1. CROSS STITCH SHALL ALTERNATE SIDE TO SIDE WITH A HORIZONTAL STITCH SPACING PER NOTE A.
2. DEFORMED STEEL REINFORCING BAR SHALL BE INSTALLED TO A VERTICAL DEPTH OF 1" BELOW PAVEMENT SURFACE WITH A TOLERANCE OF + OR - 1/8".
3. AFTER INSTALLING GROUTED BAR NON-SHRINK EPOXY OR CEMENTITIOUS GROUT SHALL BE PLACED IN DRILLED HOLE EVEN WITH PAVEMENT SURFACE.
4. CROSS STITCHING MAY BE USED FOR LONGITUDINAL JOINT SEPARATION. USE DETAIL IN CONJUNCTION WITH CROSS STITCHING SPECIFICATION.

Print Date: 1/3/2019	Sheet Revisions			Colorado Department of Transportation	As Constructed
File Name: CONCRETE CROSS STITCHING 1.3.19.dgn	Date:	Comments	Init.	4670 Holly Street Denver, CO 80216-6408 Phone: 303-398-6738 FAX: 303-398-6781	No Revisions:
Horiz. Scale: 1:30 Vert. Scale: As Noted				Region 1 JIC/KDK	Revised:
Unit Information Unit Leader Initials					Void:

PLAN SHEET			Project No./Code
Designer: E. Prieve	Structure Numbers	X-XX-XX	Project Number
Detailer: Angela the Great		X-XX-XX	Code
Sheet Subset: XXXXXXX	Subset Sheets: XXX of XXX		Sheet Number XXX

lewieckic 2:13:27 PM C:\Users\lewieckic\Desktop\CVL - All my materials stuff\PCCP Task Force\CONCRETE CROSS STITCHING 1.3.19.dgn

REVISION OF SECTION 412
CONCRETE PAVEMENT DOWEL BAR RETROFIT

Section 412 of the Standard Specifications is hereby revised for this project as follows:

Subsection 412.01 shall include the following:

This work consists of placing epoxy coated smooth dowel bars in transverse joints as identified on the plans. This shall be done by cutting slots into the existing concrete pavement, installing dowel bars, and filling the slots at locations as shown on the plans. The surface shall be finished as approved by the Engineer. All work, including the concrete pavement slot preparation, inserting dowel bars, filling the slot with backfill material, and finishing the surface shall be performed in accordance with these specifications and the details shown on the plans.

Subsection 412.02 shall include the following:

Materials for dowel bars shall meet the requirements in subsection 709.03. Dowels shall be equipped with tight fitting, non-metallic end caps to allow 1/4 inch bar movement.

Concrete patching material to be used as backfill shall be a product on the CDOT Approved Products List. Concrete patching material shall attain an average compressive strength of at least 4,500 psi at 24 hours. Concrete patching material compressive strengths shall be tested according to ASTM C39 or ASTM C109. Concrete patching material shall provide a minimum bond strength of 1,000 psi at 24 hours, as tested by ASTM C882. Concrete patching material shall have a relative durability factor greater than 90 as tested by ASTM C666 method A. Concrete patching material shall have a maximum shrinkage of 0.13 percent at four days as tested by ASTM C157. The proposed material shall be submitted to the Engineer for approval at least five days in advance of the start of dowel bar placement. Installation of dowel bars shall not begin until approval has been received in writing from the Engineer.

Subsection 412.13 shall include the following:

Slots for dowel bars shall be cut perpendicular to the transverse joint as shown on the plans by using a slot cutting machine or walk-behind saw. Slots shall be of adequate length and width to accommodate the dowel bar, as shown on the plans or as directed. The concrete in the slot shall be removed by using a lightweight jackhammer weighing a maximum of 30 pounds, or hand tools, to half slab depth. All damage to the concrete slab outside of the slot shall be repaired or replaced at the Contractor’s expense. Slots shall be placed at locations shown on the plans.

Slots shall be removed of all debris and cleaned prior to placement of dowel bars by sandblasting or other procedure so that clean aggregate is exposed. Prior to placement of backfill material, each dowel bar shall be equipped with a 1/4 to 3/8-inch thick foam core board to provide a tight seal at the joint. Dowels shall be placed on chairs so that the bar is sitting a minimum of 1/2 inch above the bottom of slot and perpendicular to the transverse joint. The chairs shall be epoxy coated steel or plastic rigid enough to hold the dowel in place during grout placement. The existing transverse joints shall be sealed with an approved joint sealant along the bottom and sides of the slot to prevent backfill material from infiltrating the joint. The joint sealant material shall be on the CDOT Approved Products list and shall be approved by the Engineer prior to use.

Backfill material to be placed shall be mixed according to the manufacturer’s recommendations. Once in the slot, the material shall be vibrated thoroughly so that the entire bar is encased with the consolidated material. The slot shall be slightly overfilled, and the area shall be diamond ground once the material has cured to provide a smooth pavement surface. After grinding, transverse joints shall be sawed and sealed in accordance with subsection 412.18.

Subsection 412.22 shall include the following:

The pavement shall not be opened to traffic until all dowel bars have been installed at a joint and the concrete has obtained a minimum compressive strength of 3,000 psi. Pavement shall be cleaned before opening to traffic.

Subsection 412.23 shall include the following:

REVISION OF SECTION 412
CONCRETE PAVEMENT DOWEL BAR RETROFIT

Dowel bar retrofit in concrete pavement will be measured as the actual number of dowel bars placed and accepted.

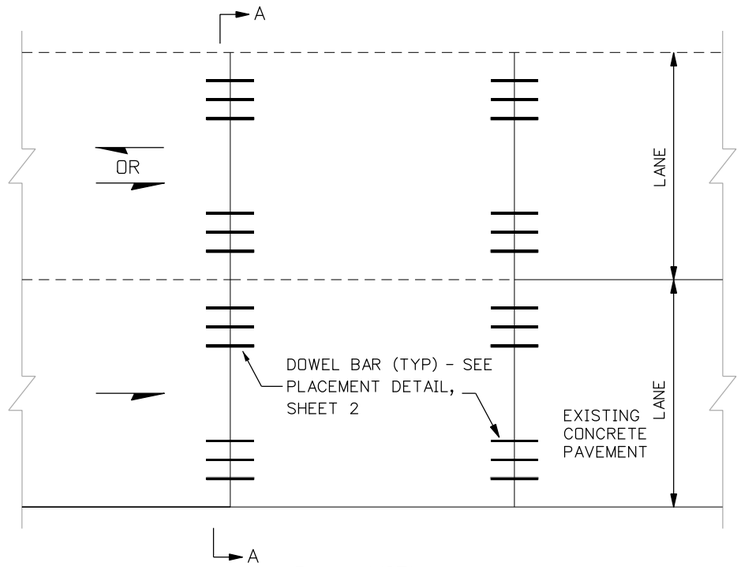
Subsection 412.24 shall include the following:

Pay Item	**Pay Unit**
Concrete Pavement Dowel Bar Retrofit	Each

The accepted quantity of dowel bar slots cut, filled with accepted patching material, and dowel bars will be paid for at the contract unit price per each bar installed. Payment for cutting slots, support chairs, joint sealant, patching, and all labor, materials, equipment, tools and incidentals necessary for completion of the work will not be measured and paid for separately, but shall be included in the work. Payment will not be made for extra work required to repair damage to the adjacent pavement that occurs during dowel bar retrofitting.

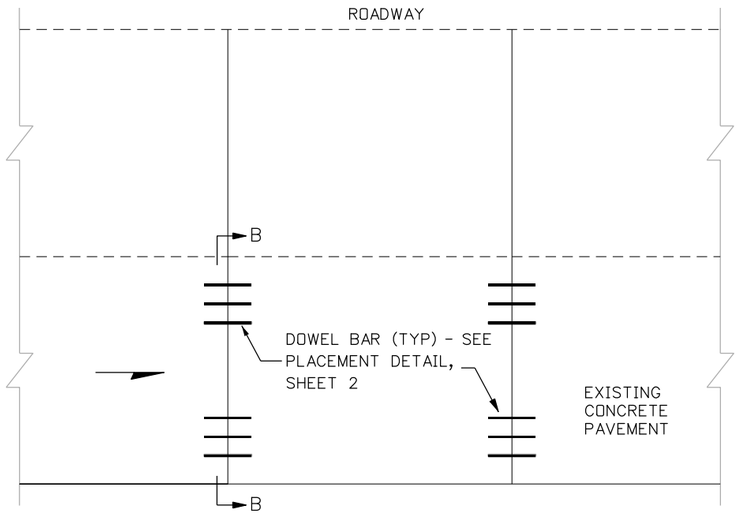
DOWEL BAR RETROFIT DETAILS

TYPICAL
NOT TO SCALE



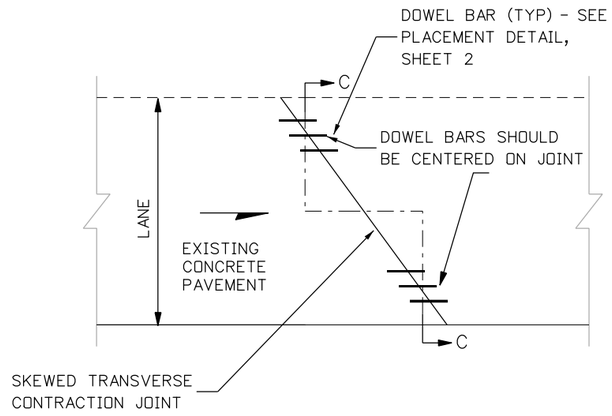
PLAN VIEW
DOWEL BAR RETROFIT

FOR MULTI-LANE DIVIDED HIGHWAY (ONE WAY TRAFFIC)
FOR EACH LANE IN UNDIVIDED HIGHWAY (TWO WAY TRAFFIC)

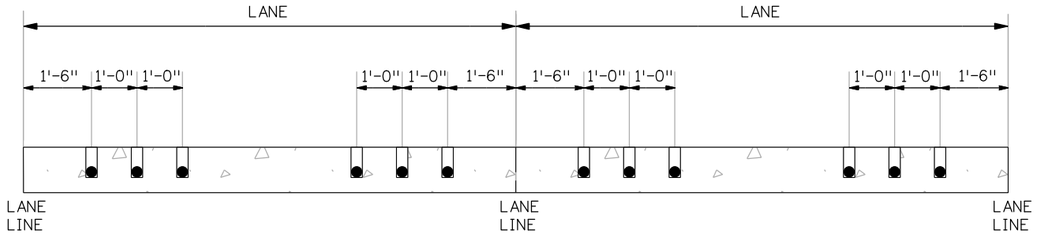


PLAN VIEW
DOWEL BAR RETROFIT

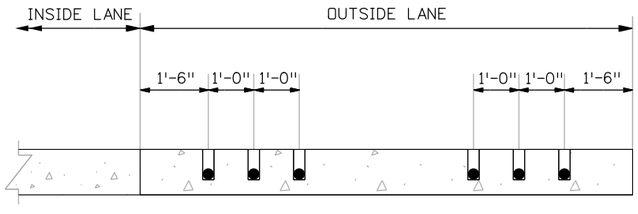
FOR SINGLE LANE RETROFITS



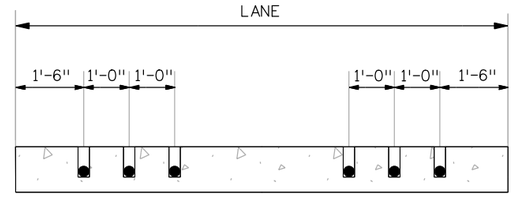
PLAN VIEW
SKEWED JOINT DETAIL



SECTION A



SECTION B



SECTION C

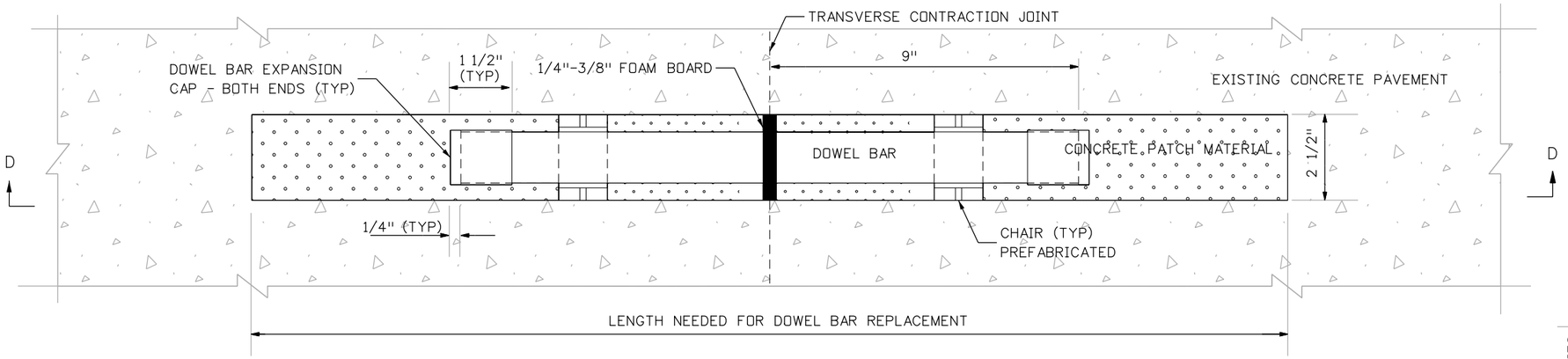
NOTE: IF A LONGITUDINAL JOINT IS PRESENT IN THE WHEEL PATH OR AT THE MIDDLE OF THE SLAB, CONTACT THE ENGINEER.

NOTE: DOWELS SHALL BE A MINIMUM OF 1.5 FT AWAY FROM ANY LONGITUDINAL JOINT.

Print Date: 11/26/2018	Sheet Revisions			Colorado Department of Transportation	As Constructed	DOWEL BAR RETROFIT DETAIL SHEET 1 OF 2	Project No./Code
Drawing File Name: DOWEL BAR RETROFIT CONCRETE (1) 11.21.18.dgn	Date:	Comments	Init.	4670 Holly Street Denver, CO 80216-6408 Phone: 303-398-6702 FAX: 303-398-66781	No Revisions:	Designer: C. Lewiecki	Structure Numbers:
Horiz. Scale: 1:100 Vert. Scale: As Noted				Region 1 JIC	Revised:	Detailer:	
Unit Information Unit Leader Initials					Void:	Sheet Subset:	Subset Sheets: Sheet Number

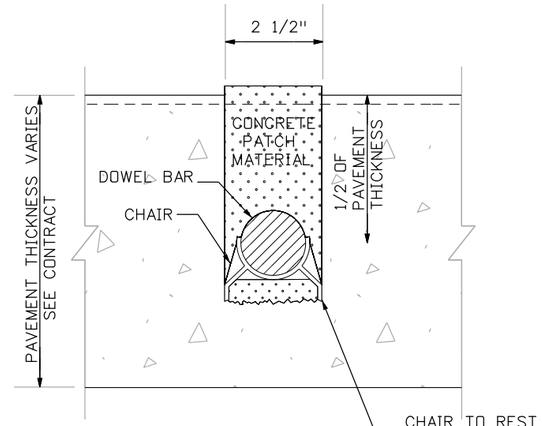
DOWEL BAR RETROFIT DETAILS

TYPICAL
NOT TO SCALE

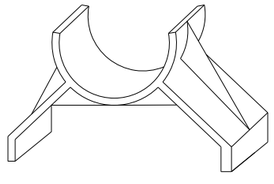


PLAN VIEW

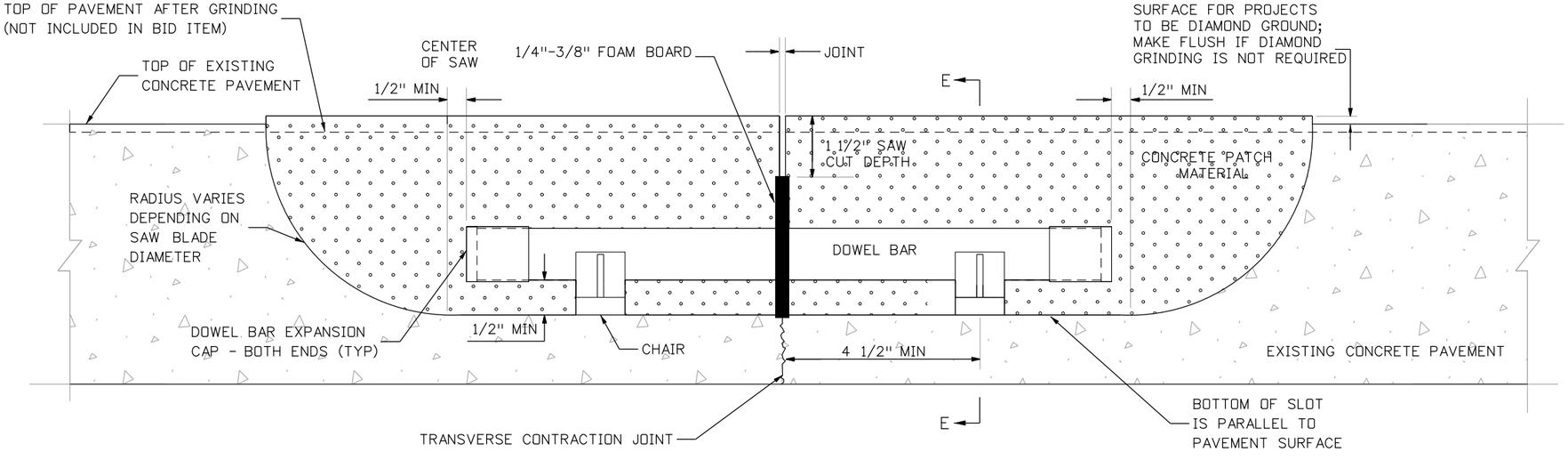
PAVEMENT THICKNESS (T)	DOWEL BAR DIAMETER
7 IN. ≤ T < 8 IN.	1 IN.
8 IN. ≥ T ≤ 10 IN.	1.25 IN.
10 IN. > T ≤ 15 IN.	1.50 IN.



SECTION E



TYPICAL CHAIR DETAIL



SECTION D

Print Date: 11/21/2018	Sheet Revisions		
Drawing File Name: DOWEL BAR RETROFIT CONCRETE (2) 11.21.18.dgn	Date:	Comments	Init.
Horiz. Scale: 1:100 Vert. Scale: As Noted			
Unit Information Unit Leader Initials			

Colorado Department of Transportation
4670 Holly Street
Denver, CO 80216-6408
Phone: 303-398-6702 FAX: 303-398-66781
Region 1 JIC

As Constructed
No Revisions:
Revised:
Void:

DOWEL BAR RETROFIT DETAIL
SHEET 2 OF 2

Designer: C. Lewiecki
Detailer:
Sheet Subset:
Structure Numbers
Subset Sheets:

Project No./Code

Sheet Number

1
REVISION OF SECTION 412
SLOT STITCHING

Section 412 of the Standard Specifications is hereby revised for this project as follows:

Subsection 412.01 shall include the following:

This work consists of installing tie bars across cracks in concrete pavement in accordance with these specifications and the details shown on the plans. Slot stitching shall not be used for thin concrete overlays (6 inches or less).

Subsection 412.02 shall include the following:

Concrete patching material to be used as backfill shall be a product on the CDOT Approved Products List. Concrete patching material shall attain an average compressive strength of at least 4,500 psi at 24 hours. Concrete patching material compressive strengths shall be tested according to ASTM C39 or ASTM C109. Concrete patching material shall provide a minimum bond strength of 1,000 psi at 24 hours, as tested by ASTM C882. Concrete patching material shall have a relative durability factor greater than 90 as tested by ASTM C666 method A. Concrete patching material shall have a maximum shrinkage of 0.13 percent at four days as tested by ASTM C157.

Steel tie bars shall be 18 inches long #6 deformed steel tie bars, grade 60, and epoxy coated.

Subsection 412.13 shall include the following:

Slot Formation. Slots shall be made from multiple saw cuts made with a diamond impregnated saw blade to a depth as shown on the plans. Slots shall be approximately perpendicular to the general trend of the crack. Slots shall be 1.75 to 2.25 inches wide. Lightweight jackhammers weighing less than 35 pounds or hand tools shall be used to remove the “fins” formed by sawing. The length of the slot shall allow the tie bar to be placed at the mid-depth of the slab with a 1 inch space between the ends of the tie bar and the ends of the slot. Deviations from this method require a method statement detailing the means and methods for how the Contractor will perform the work.

The Contractor shall demonstrate slot stitching work for approval using the proposed equipment and procedures. The first five slots shall be visually inspected for bottom of the slab breakouts and minimum dimensions. Installation of tie bars and concrete patching material shall not occur until the Contractor’s method has been inspected and approved. After the Contractor’s method has been approved, the Contractor shall proceed with slot stitching as long as the method and equipment remain the same. Saw blade changes do not require re-inspection. If the Contractor’s method or equipment changes, the first five slots of the new method shall be visually inspected for bottom of the slab breakouts and measured for minimum dimensions. Tie bars shall be provided at locations and spacing as detailed on the plans.

Damages to the concrete pavement caused by the Contractor’s operations shall be repaired at the Contractor’s expense.

Slots shall be sand blasted or water blasted to remove saw slurry and blow cleaned with high pressure oil-free air to remove sand, water, and dust.

Tie bars shall be placed on support chairs to rest horizontal at the mid-depth of the slab.

Concrete patching material mixing, placement, placement during cold temperatures, consolidation, and curing shall be in accordance with the manufacturer’s recommendations. A mix may be extended with aggregate per the manufacturer’s recommendations up to 90 percent of the manufacturer’s maximum extension. The maximum aggregate size shall be 3/8 inch for the extending aggregate.

Patching material shall be placed and consolidated in the slot. Patching material shall fill the space under and around the bar. Tie bars shall not be dislodged or moved out of position.

The surface of the concrete patching material shall be level with the adjacent pavement.

REVISION OF SECTION 412
SLOT STITCHING

Subsection 412.22 shall include the following:

The pavement shall not be opened to traffic until all tie bars have been installed at a joint and the concrete has obtained a minimum compressive strength of 3,000 psi. Pavement shall be cleaned before opening to traffic.

Subsection 412.23 shall include the following:

Slot stitching will be measured for each completed and accepted tie bar complete in place.

Subsection 412.24 shall include the following:

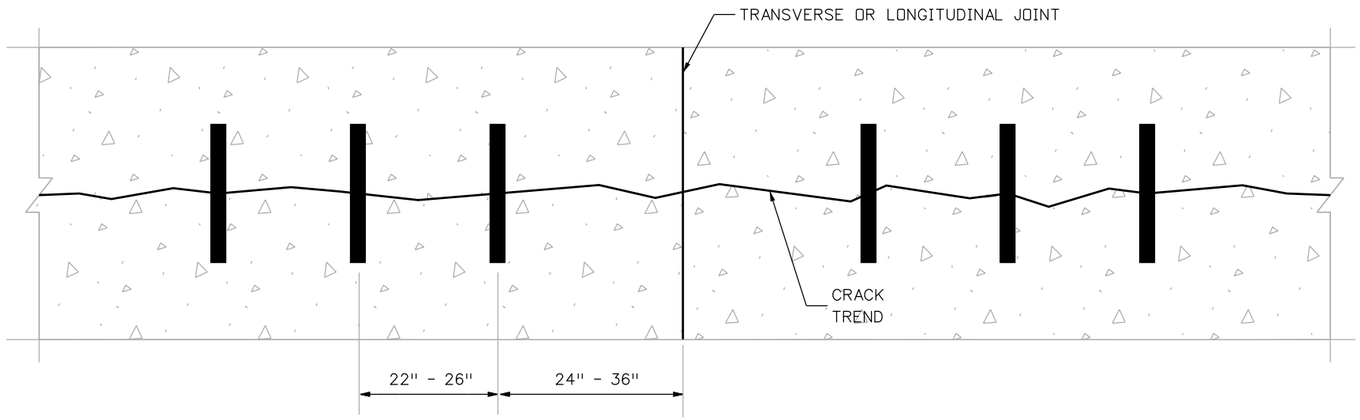
Pay Item	**Pay Unit**
Slot Stitching	Each

The work performed and materials furnished in accordance with this item will be paid for at the unit price bid. This price is full compensation for furnishing all materials, tools, labor, equipment and incidentals necessary to complete the work. Payment will not be made for extra work required to repair damage to the adjacent pavement that occurs during slot stitching.

SLOT STITCHING DETAILS

TYPICAL
NOT TO SCALE

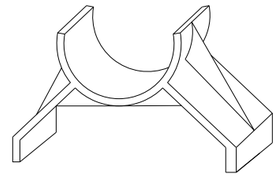
FOR PCCP = 8"



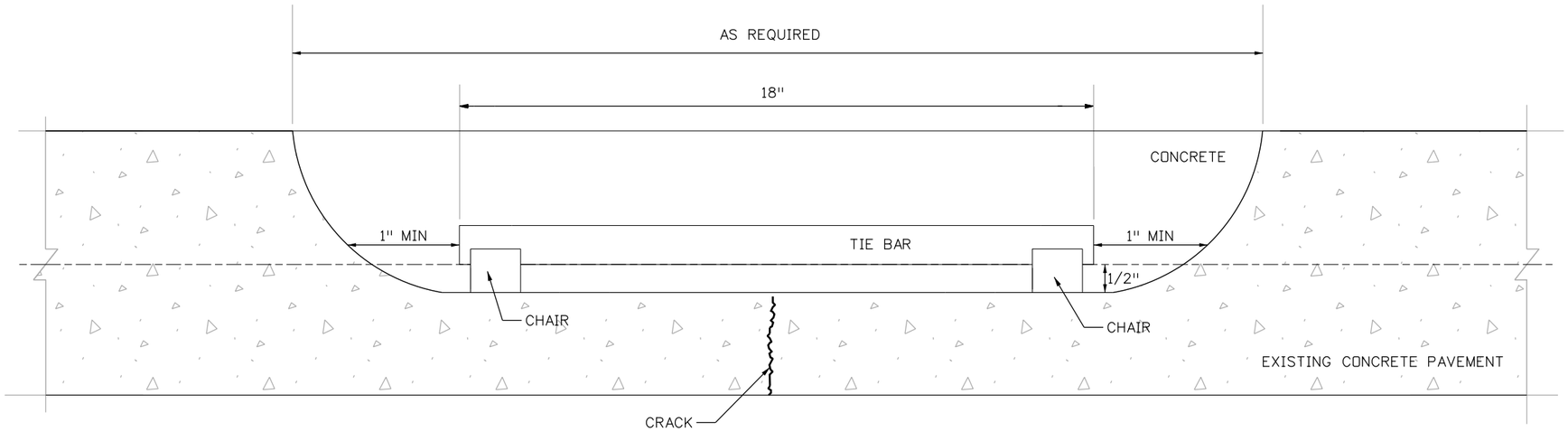
PLAN VIEW

PAVEMENT THICKNESS (T)	TIE BAR SIZE
T ≤ 6 IN.	#4
6 IN. > T < 8 IN. on unbound base	#5
6 IN. > T < 8 IN. on lime treated, asphalt or cement treated, milled asphalt, or recycled asphalt bases	#6

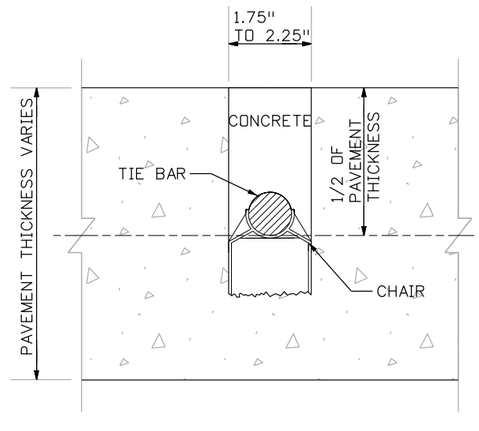
TIE BARS SHOULD BE PLACED APPROXIMATELY PERPENDICULAR TO THE GENERAL TREND OF THE CRACK.



TYPICAL CHAIR DETAIL
(ONE REQUIRED ON
EACH END OF BAR)



CROSS SECTION VIEW



END VIEW

Print Date: 11/26/2018	Sheet Revisions	Colorado Department of Transportation	As Constructed
Drawing File Name: SLOT STITCHING DETAILS 11.26.18.dgn	Date: / Comments / Init.	4670 Holly Street Denver, CO 80216-6408 Phone: 303-398-6702 FAX: 303-398-66781	No Revisions:
Horiz. Scale: 1:100 Vert. Scale: As Noted		Region 1 JIC	Revised:
Unit Information Unit Leader Initials			Void:

SLOT STITCHING DETAILS			Project No./Code
Designer: C. Lewiecki	Structure Numbers		
Detailer:			
Sheet Subset:	Subset Sheets:		Sheet Number

COLORADO DEPARTMENT OF TRANSPORTATION

SUBMITTAL OF NEW SPECIFICATION OR SPECIFICATION CHANGE

Log No. (Assigned by Standards and Specifications Unit)

TO: Standards & Specifications Unit
Project Development Branch

FROM:
Michael Stanford, MAC
(Region, Branch or Technical Committee)

SPECIFICATION SECTION NO.	ITEM	Priority
401	401	Routine ☒ Fast ☐

Reason for this new or changed specification:

This revision was needed to clarify “Project Selection Guidelines” for design personnel, as well as revise current specifications for construction personnel on the location of cores, in order to determine the percent compaction.

The change to the Thin Lift Compaction Test Section - Density Specification was a joint Task Force effort with CDOT and the Asphalt Industry and approved by the Materials Advisory Committee via e-vote in April 2019.

New or Revised Specification:

See Attached

NOTE: See Procedural Directive 513.1 for a description of appropriate specification development procedures.

DATE

REVISION OF SECTION 401
THIN LIFT COMPACTION TEST SECTION – DENSITY

Section 401 of the Standard Specifications is hereby revised for this project as follows:

Subsection 401.17 shall include the following:

All Hot Mix Asphalt (HMA) materials or work will be evaluated for conformity to the Contract in accordance with subsection 105.05 except HMA that is used for patching and temporary pavement. The Contractor shall determine the necessary roller compaction process needed to produce a target pavement density of 94.0 percent of the average daily theoretical maximum specific gravity (RICE) values in accordance with Colorado Procedure 44 Method B. During the first day of production, three stratified random locations will be selected by the Department. At each location, a minimum of three 4-inch diameter cores shall be taken by the Contractor within an 18-square foot area of pavement. The Department will take possession of the set of three cores from each location and determine the intermediate percent relative compaction for each core. Each set of three cores will be averaged to produce the percent compaction for each location. A minimum of three locations will be used to measure the percent compaction of the first day of production. All coring shall be completed by the Contractor and submitted to the Department.

Full production of the thin lift shall not begin until the required project compaction process is successfully established by the Contractor and approved by the Engineer. The approved compaction process shall be used for the duration of the thin lift paving. Changes to the thin lift mixture shall require a new roller compaction process.

During production, density tests shall be taken at a frequency of one set of three cores per 500 tons of HMA placed. Each 4-inch diameter core in the set shall be taken by the Contractor within an 18- square foot area of pavement at each stratified random location. The Department will take possession of a set of three cores from each location to determine the intermediate percent compaction for each core. Each set of three cores will be averaged to produce the percent compaction for each location.

The Contractor will be immediately notified when the Department locates areas of in-place density less than 89.8 percent of average RICE for the material. The actual area of pavement to be removed full width and replaced will be determined by the Contractor taking one 4-inch diameter exploratory core at 50-foot intervals or less in each direction from the affected location until two successive locations are found in each direction which are greater than 90.9 percent of the average RICE for the material.

In subsection 401.22 delete the sixth paragraph and replace with the following:

Coring for in-place density, coring for longitudinal joint density, core hole repair, and associated expenses will not be paid for separately but shall be included in the work. Traffic control for this work will be paid for in accordance with the contract.

Use this specification only with the concurrence from your Region Materials Engineer.
Note to Designer: Delete instructions from final draft
Insert this specification when 1.5” inches thick or less of HMA is placed on a roadway with a Drivable Life of **“Moderate” or “Good” as defined by the Pavement Management Program (4 years or greater)** and the project is scheduled to be constructed within one year of the date the Drivable Life was determined.

This specification should only be used when there is only one HMA layer placed.

This specification should not be used when pre-overlay work such as planing, leveling course, heater remixing, or other in-place recycling processes are specified.

Date

REVISION OF SECTION 630
NON-CONCRETE BARRIER (TEMPORARY)

Section 630 of the Standard Specifications is hereby revised for this project as follows:

Delete subsection 630.08 and replace with the following:

630.08 Barrier (Temporary). Temporary Barrier shall comply with the crash test requirements contained in NCHRP Report 350 (for devices manufactured prior to 2020) or MASH (acceptable for all temporary barrier). Retroreflectorization is required on all temporary barrier as detailed in Standard Plans S-612-1 and M-606-14, and shall meet material qualities in accordance with Section 713. All barrier types shall be designed to accommodate appropriate end treaments, transitions and deliniation devices. Previously damaged barrier shall not be installed and barrier damaged after installation shall be removed and replaced, or repaired (for minor damage not affecting design intent) per manufacturer.

(a) *Concrete Barrier (Temporary)*. Concrete Barrier (Temporary) shall conform to Precast Type 7 Concrete Barrier as detailed in Standard Plan M-606-14. Undamaged and unpainted sections of Concrete Barrier (Temporary) with stabilization pins as shown on the plans may be used as Guard Rail Type 7 (Precast-Portable), when approved.

(b) *Non-Concrete Barrier (Temporary)*. Non-Concrete Barrier (Temporary) shall be approved by the Engineer prior to use. Metal barrier shall be made of galvanized steel. All non-concrete barrier types shall be designed to allow for proper drainage runoff. Barrier shall be installed and maintained according to manufacturer requirements, include all necessary components for installation and product specific documention relevant to any installation, maintenance, repair, removal and inspection shall be provided by the Contractor, prior to Engineer approval.

In subsection 630.17 delete the third paragraph and replace with the following:

Traffic channelizing devices consisting of vertical panels, traffic cones, or drum channelizing devices will be measured by the unit. Temporary barrier (Concrete and Non-Concrete) will be measured by the linear foot. Barricades will be measured by the number used. Barricade warning lights shall be furnished as a part of this item when required by the Traffic Control Plan (TCP). Advance Warning Flashing or Sequencing Arrow Panels will be measured by the unit according to size.

Subsection 630.18 shall include the following:

Payment will be made under:

Pay Item	**Pay Unit**
Non-Concrete Barrier (Temporary)	Linear Foot

COLORADO DEPARTMENT OF TRANSPORTATION

SUBMITTAL OF NEW SPECIFICATION OR SPECIFICATION CHANGE

Log No. (Assigned by Standards and Specifications Unit)

TO: Standards and Specifications Unit, Project Development, Suite 290	FROM: Eric Prieve MAC (Region, Branch or Technical Committee)

SPECIFICATION SECTION NO.	ITEM	Priority
601	412 & 601	Routine ☒ Fast ☐

Reason for this new or changed specification:
Revised mix design requirements to require a proper air void system by requiring the mix to pass the super air meter requirements.

Specification was developed with the CRMCA.

MAC Approved 5-8-2019

New or Revised Specification:
See attached

NOTE: See Procedural Directive 513.1 for a description of appropriate specification development procedures.

CDOT Form 1215 10/01

REVISION OF SECTION 601
CONCRETE MIX DESIGNS

Section 601 of the Standard Specifications is hereby revised for this project as follows:

In subsection 601.05 add the following to the second paragraph:

(9) Air entrained concrete shall have a SAM number of 0.20 psi or less as determined by AASHTO TP118 Characterization of the Air-Void System of Freshly Mixed Concrete by the Sequential Pressure Method (Super Air Meter).

Mix designs on the CDOT Approved Products List prior to Month Day, Year (this date will be the date the specification is issued) will be approved for use on the project even if AASHTO TP118 results are not included with the trial mix data. Mix designs that are not on the CDOT APL will not be approved for use on the project unless results of AASHTO TP118 are provided, regardless of the trial mix date.