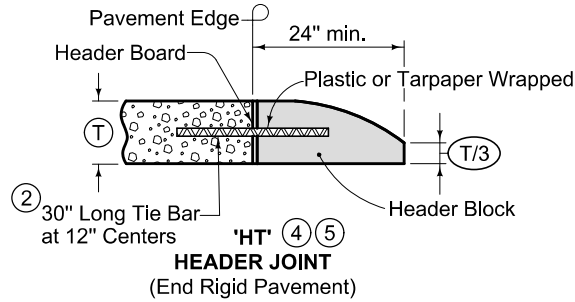
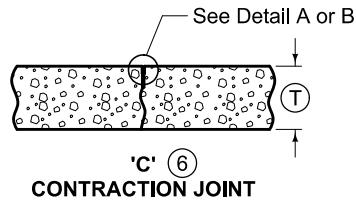
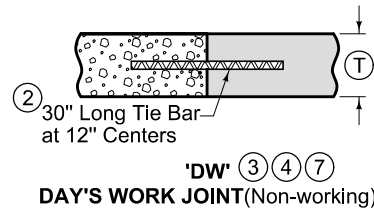
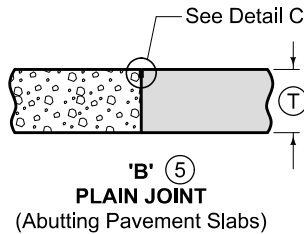
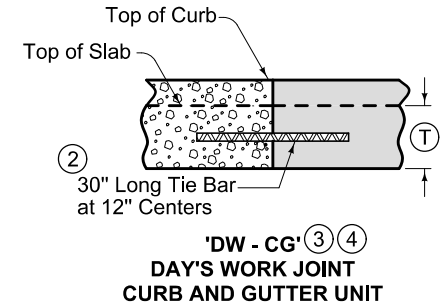
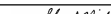


- ① See dowel assemblies for fabrication details.
- ② See Bar Size Table for Contraction Joints on Sheet 2.
- ③ Locate 'DW' joint at a mid-panel location between future 'C' or 'CD' joints. Place no closer than 5 feet to a 'C' or 'CD' joint.
- ④ Place bars within the limits shown under dowel assemblies.
- ⑤ Edge with 1/8 inch tool for length of joint. For HT joint, remove header block and board when second slab is placed.
- ⑥ Unless specified otherwise, use 'CD' transverse contraction joints in mainline pavement when T is greater or equal to 8 inches. Use 'C' joints when T is less than 8 inches.
- ⑦ 'RT' joint may be used in lieu of 'DW' joint at the end of the days work. Remove any pavement damaged due to the drilling at no additional cost to the Contracting Authority.



LEGEND	
	Existing Pavement
	Proposed Pavement

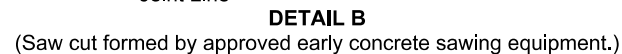
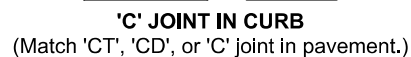
	SUDAS		IOWADOT	REVISION	
				9	04-16-19
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101			
		SHEET 1 of 8			
REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.					
					
Paul D. Weigand SUDAS DIRECTOR				Scott Miller DESIGN METHODS ENGINEER	

JOINTS

TRANSVERSE CONTRACTION



- ⑧ Saw 'CD' joint to a depth of $T/3 \pm 1/4"$; saw 'C' joint to a depth of $T/4 \pm 1/4"$.
- ⑨ When tying into old pavement, ⑧ represents the depth of sound PCC.



Ⓣ	Solid Dowel Diameter	Tubular Dowel Diameter	Tie Bar Size
< 8"	$\frac{3}{4}$ "	$\frac{7}{8}$ "	#6
≥ 8" but < 10"	1 $\frac{1}{4}$ "	1 $\frac{3}{8}$ "	#10
≥ 10"	1 $\frac{1}{2}$ "	1 $\frac{5}{8}$ "	#11

Tubular Dowel Bars will not be allowed for RD joints.



TRANSVERSE CONTRACTION

LEGEND



Proposed Pavement



REVISION	
9	04-16-19

FIGURE 7010.101

STANDARD ROAD PLAN

PV-101

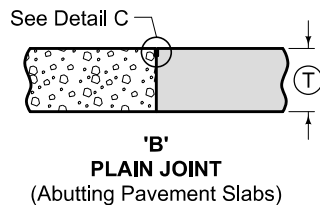
SHEET 2 of 8

REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.

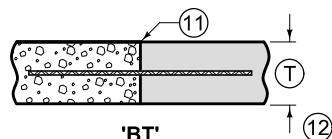
Paul D. Wiegand
SUDAS DIRECTOR

Shawn Nickerson
DESIGN METHODS ENGINEER

JOINTS

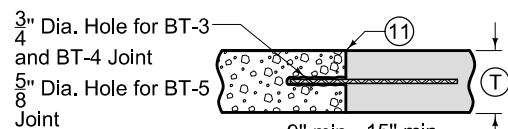


'B'
PLAIN JOINT
(Abutting Pavement Slabs)



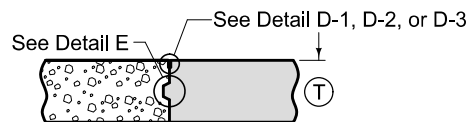
'BT'
ABUTTING PAVEMENT JOINT - RIGID TIE

(T)	Joint	Bars	Bar Length and Spacing
< 8"	'BT-1'	#4	36" Long at 30" Centers
		#5	30" Long at 30" Centers
≥ 8"	'BT-2'	#5	36" Long at 30" Centers

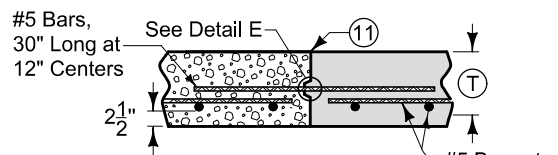


'BT'
ABUTTING PAVEMENT JOINT - RIGID TIE (Drilled)

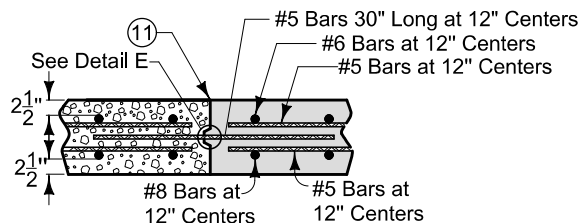
(T)	Joint	Bars	Bar Length and Spacing
< 8"	'BT-5'	#4	24" Long at 30" Centers
≥ 8"	'BT-3'	#5	24" Long at 30" Centers
	'BT-4'	#5	24" Long at 15" Centers



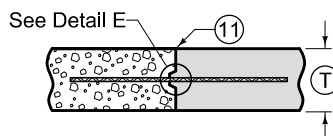
'K'
KEYED JOINT FOR ADJACENT SLABS
(Where T is 8" or more)



'KS-1'
[Single Reinforced Pavement (Bridge Approach)]



'KS-2'
[Double Reinforced Pavement (Bridge Approach)]

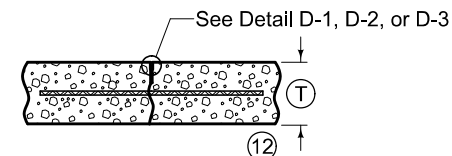


'KT'
ABUTTING PAVEMENT JOINT - KEYWAY TIE

(T)	Joint	Bars	Bar Length and Spacing
< 8"	'KT-1'	#4	30" Long at 30" Centers
≥ 8"	'KT-2'	#5	30" Long at 30" Centers
	'KT-3'	#5	30" Long at 15" Centers

LONGITUDINAL CONTRACTION

- ⑩ Bar supports may be necessary for fixed form paving to ensure the bar remains in a horizontal position in the plastic concrete.
- ⑪ Sawing or sealing of joint not required.
- ⑫ The following joints are interchangeable, subject to the pouring sequence:
'BT-1', 'L-1', and 'KT-1'
'KT-2' and 'L-2'
'KT-3' and 'L-3'



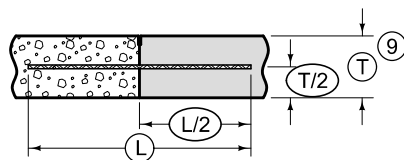
'L'
CONTRACTION JOINT

(T)	Joint	Bars	Bar Length and Spacing
< 8"	'L-1'	#4	36" Long at 30" Centers
≥ 8"	'L-2'	#5	36" Long at 30" Centers
	'L-3'	#5	36" Long at 15" Centers

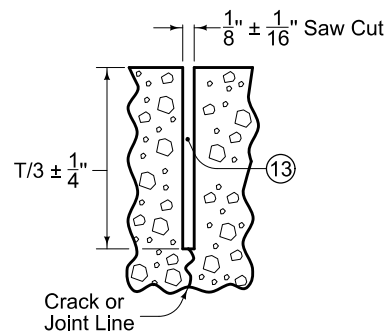
LEGEND	
	Existing Pavement
	Proposed Pavement

 SUDAS	 IOWA DOT	REVISION	
		9	04-16-19
		PV-101	
		SHEET 3 of 8	
FIGURE 7010.101	STANDARD ROAD PLAN		
REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.			
<i>Paul D. Weigand</i> SUDAS DIRECTOR		<i>Shawn Miller</i> DESIGN METHODS ENGINEER	

JOINTS

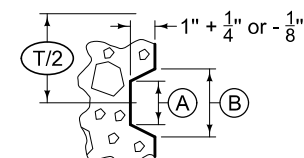


TIE BAR PLACEMENT
(Applies to all joints unless otherwise detailed.)



DETAIL D-1
(Required when specified in the contract documents.)

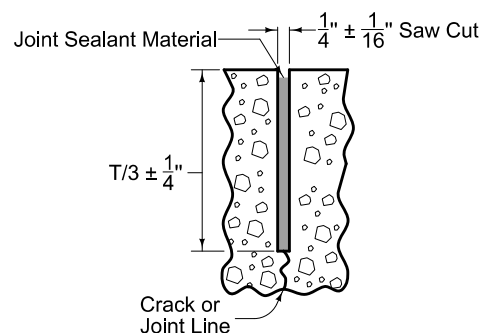
- ⑨ When tying into old pavement, (T) represents the depth of sound PCC.
- ⑬ Sealant or cleaning not required.



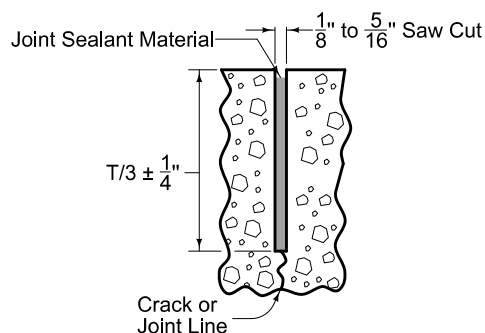
DETAIL E

KEYWAY DIMENSIONS

Keyway Type	Pavement Thickness (T)	(A)	(B)
Standard	8" or greater	1 3/4"	2 3/4"
Narrow	Less than 8"	1"	2"



DETAIL D-2
(Required when the Department of Transportation is not the Contracting Authority, or when specified in the contract documents)



DETAIL D-3
(Required when the Department of Transportation is the Contracting Authority, or when specified in the contract documents)

LEGEND	
	Existing Pavement
	Proposed Pavement

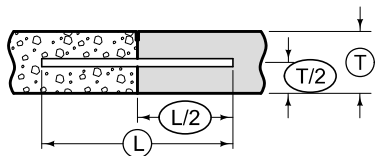
		REVISION	
		9	04-16-19
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101	
		SHEET 4 of 8	

REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.

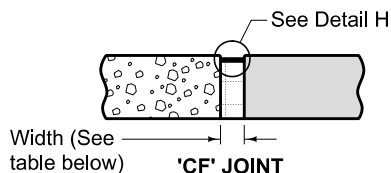
Paul D. Wiegand SUDAS DIRECTOR *Shawn M. Nelson* DESIGN METHODS ENGINEER

JOINTS

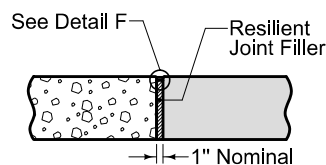
LONGITUDINAL CONTRACTION



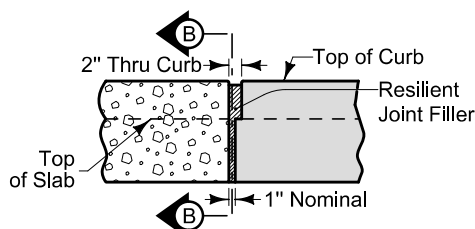
DOWEL PLACEMENT
(Applies to all joints unless otherwise detailed.)



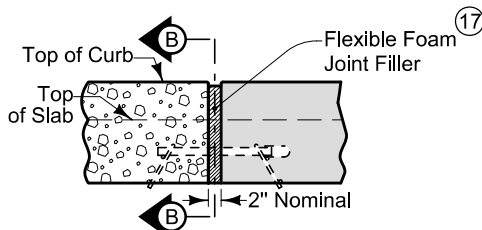
TYPE	WIDTH
CF-1	2"
CF-2	2 1/2"
CF-3	3"
CF-4	3 1/2"



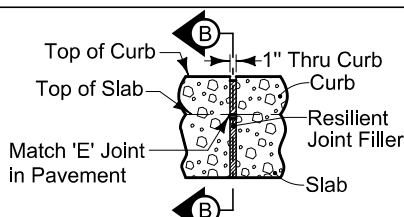
'E' 1" EXPANSION JOINT



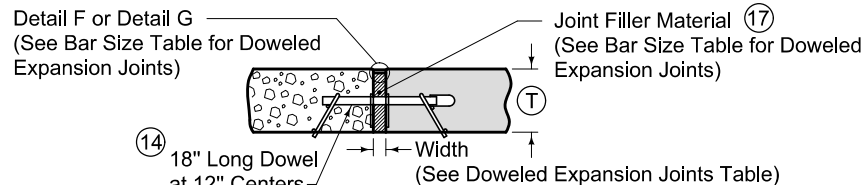
'E' JOINT IN CURB
(View at Back of Curb)



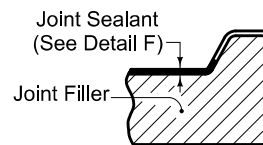
'EE' JOINT IN CURB
(View at Back of Curb)



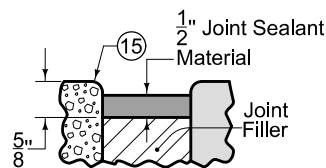
'ES' JOINT IN CURB
(View at Back of Curb)



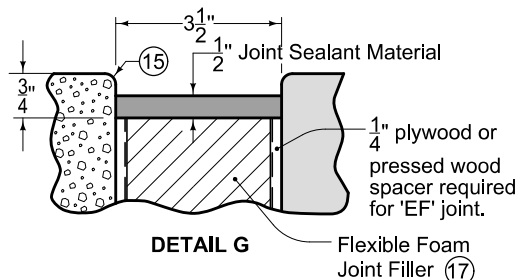
'ED', 'EE', 'EF' (16) DOWELED EXPANSION JOINT



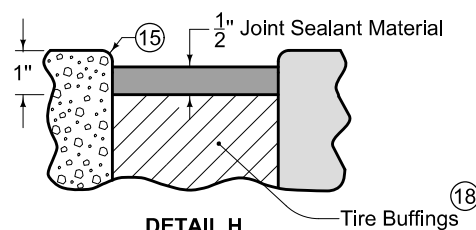
SECTION B-B



DETAIL F



DETAIL G



DETAIL H

EXPANSION

- (14) See Bar Size Table for Doweled Expansion Joints.
- (15) Edge with 1/4 inch tool for length of joint indicated if formed; edging not required when cut with diamond blade saw.
- (16) See Dowel Assemblies for fabrication details and placement limits. Coat the free end of dowel bar to prevent bond with pavement. At intake locations, dowel bars may be cast-in-place.
- (17) Predrill or preform holes in joint material for appropriate dowel size.
- (18) Compact tire buffings by spading with a square-nose shovel.

DOWELED EXPANSION JOINTS

TYPE	WIDTH	FILLER MATERIAL (17)
ED	1"	Resilient (Detail F)
EE	2"	Flexible Foam (Detail F)
EF	3 1/2"	Flexible Foam (Detail G)

BAR SIZE TABLE FOR DOWELED EXPANSION JOINTS

(T)	< 8"	≥ 8" but < 10"	≥ 10"
Dowel Diameter	3/4"	1 1/4"	1 1/2"

Tubular Dowel Bars will not be allowed for expansion joints.

LEGEND

	Existing Pavement
	Proposed Pavement

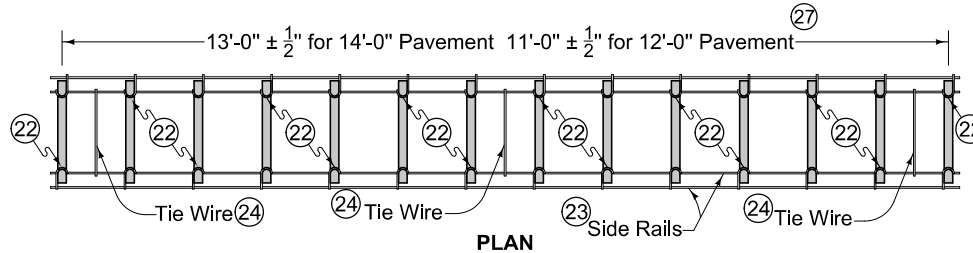
		REVISION
		9 04-16-19
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101
		SHEET 5 of 8

REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.

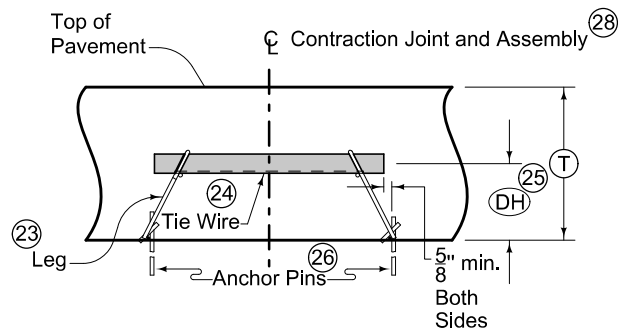
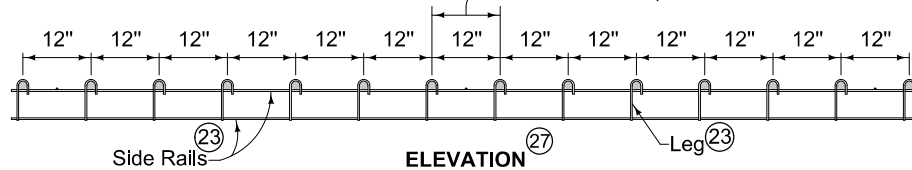
Paul D. Weigand SUDAS DIRECTOR *Shawn Miller* DESIGN METHODS ENGINEER

JOINTS

CONTRACTION JOINTS



Spaces between dowel bars are nominal dimensions with a $\frac{1}{4}$ " allowable tolerance.



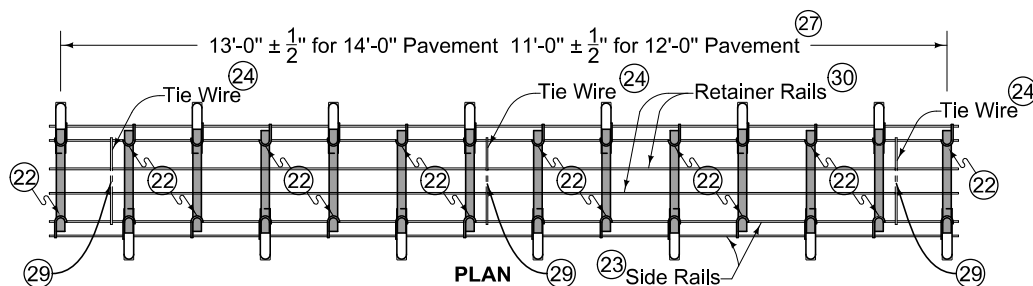
DOWEL ASSEMBLIES (19) (20) (21)

DOWEL HEIGHT AND DIAMETER FOR DOWELED CONTRACTION JOINTS			
(T)	(DH) (25)	Diameter (Solid)	Diameter (Tubular)
7" to 7 $\frac{1}{2}$ "	3 $\frac{1}{2}$ "	$\frac{3}{4}$ "	$\frac{7}{8}$ "
8" to 9 $\frac{1}{2}$ "	4 $\frac{1}{4}$ "	1 $\frac{1}{4}$ "	1 $\frac{3}{8}$ "
10" to 11 $\frac{1}{2}$ "	5 $\frac{1}{4}$ "	1 $\frac{1}{2}$ "	1 $\frac{5}{8}$ "
12" to 13"	6 $\frac{1}{4}$ "	1 $\frac{1}{2}$ "	1 $\frac{5}{8}$ "
Tubular Dowel Bars will not be allowed for RD joints.			

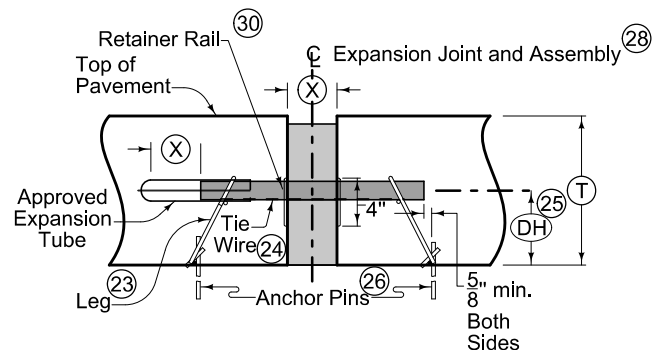
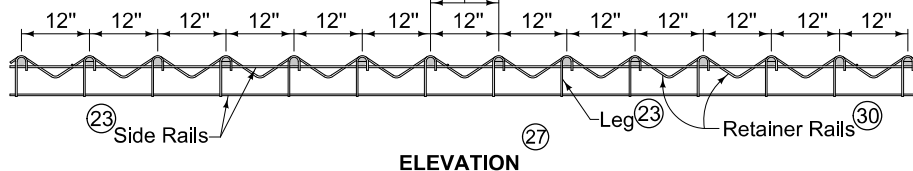
- (19) Use 18 inch long dowel bars with a tolerance of $\pm \frac{1}{8}$ inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within $\pm \frac{1}{8}$ inch.
- (20) Use wires with a minimum tensile strength of 50 ksi.
- (21) Details apply to both transverse contraction and expansion joints.
- (22) Weld alternately throughout.
- (23) 0.306 inch diameter wire. Wire sizes shown are the minimum required.
- (24) Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.
- (25) Measured from the centerline of dowel bar to bottom of lower side rail + $\frac{1}{4}$ inch.
- (26) Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.
- (27) If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.
- (28) Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than $\frac{1}{4}$ inch horizontal skew from end of basket to end of basket.

SUDAS	IOWADOT	REVISION	
		9	04-16-19
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101	
		SHEET 6 of 8	
REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.			
Paul D. Wiegand SUDAS DIRECTOR		Stuart M. Miller DESIGN METHODS ENGINEER	
JOINTS			

EXPANSION JOINTS



Spaces between dowel bars are nominal dimensions with a $\frac{1}{4}$ " allowable tolerance.



SECTION THRU EXPANSION JOINT

JOINT OPENING AND EXPANSION TUBE EXTENSION		
Joint Type	(X)	Minimum Tube Length
"ED"	1"	6"
"EE"	2"	7"
"EF"	$3\frac{1}{2}$ "	9"

DOWEL HEIGHT AND DIAMETER FOR DOWELED EXPANSION JOINTS

(T)	(DH) (25)	Diameter
7" to $7\frac{1}{2}$ "	$3\frac{1}{2}$ "	$\frac{3}{4}$ "
8" to $9\frac{1}{2}$ "	$4\frac{1}{4}$ "	$1\frac{1}{4}$ "
10" to $11\frac{1}{2}$ "	$5\frac{1}{4}$ "	$1\frac{1}{2}$ "
12" to 13"	$6\frac{1}{4}$ "	$1\frac{1}{2}$ "

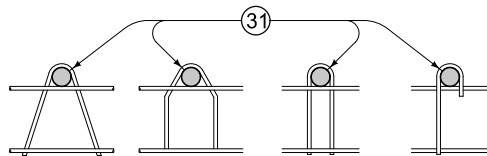
Tubular Dowel Bars will not be allowed for expansion joints.

DOWEL ASSEMBLIES

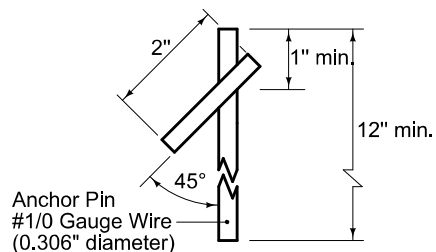
(19) (20) (21)

- (19) Use 18 inch long dowel bars with a tolerance of $\pm 1/8$ inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within $\pm 1/8$ inch.
- (20) Use wires with a minimum tensile strength of 50 ksi.
- (21) Details apply to both transverse contraction and expansion joints.
- (22) Weld alternately throughout.
- (23) 0.306 inch diameter wire. Wire sizes shown are the minimum required.
- (24) Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.
- (25) Measured from the centerline of dowel bar to bottom of lower side rail + $1/4$ inch.
- (26) Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.
- (27) If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.
- (28) Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than $1/4$ inch horizontal skew from end of basket to end of basket.
- (29) Clip and remove center portion of tie during field assembly.
- (30) $1/4$ inch diameter wire.

SUDAS	IOWADOT	REVISION
		9 04-16-19
FIGURE 7010.101	STANDARD ROAD PLAN	PV-101
		SHEET 7 of 8
REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.		
<i>Paul D. Weigand</i> SUDAS DIRECTOR		<i>Shawn Miller</i> DESIGN METHODS ENGINEER
JOINTS		

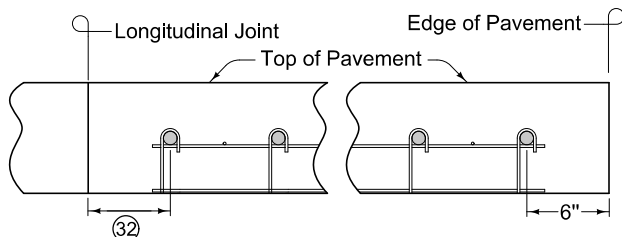


OPTIONAL LEG SHAPES

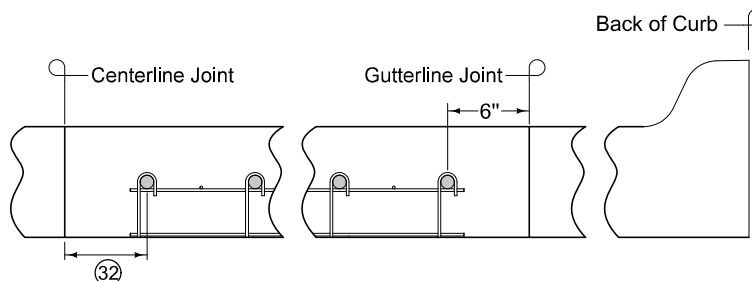


ANCHOR PIN

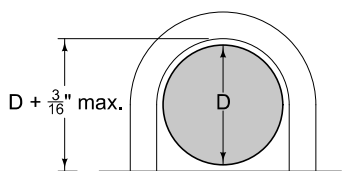
- ①9 Use 18 inch long dowel bars with a tolerance of $\pm 1/8$ inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within $\pm 1/8$ inch.
- ②0 Use wires with a minimum tensile strength of 50 ksi.
- ②1 Details apply to both transverse contraction and expansion joints.
- ③1 Diameter of bend around dowel is dowel diameter + $1/8$ to $3/16$ inches.
- ③2 For uniform lane widths: 3" - 6". For taper and variable width pavements: 3" - 12".



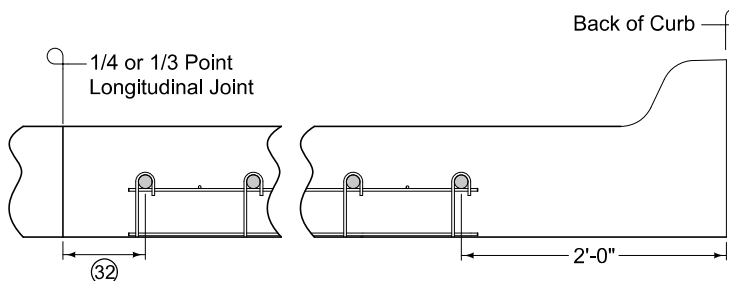
PLACEMENT LIMITS
(Rural Section)



PLACEMENT LIMITS
(Curb and Gutter - Gutterline Jointing)



BEND AROUND DOWEL ③1



PLACEMENT LIMITS
(Curb and Gutter - 1/4 or 1/3 Point Jointing)

DOWEL ASSEMBLIES ①9 ②0 ②1

 SUDAS	 IOWADOT	REVISION	
		9	04-16-19
		PV-101	
		SHEET 8 of 8	
FIGURE 7010.101	STANDARD ROAD PLAN	REVISIONS: Added tubular dowel option to transverse contraction joints. Modified circle note 2. Added new circle note 14 and renumbered remaining notes.	
 SUDAS DIRECTOR		 DESIGN METHODS ENGINEER	
JOINTS			