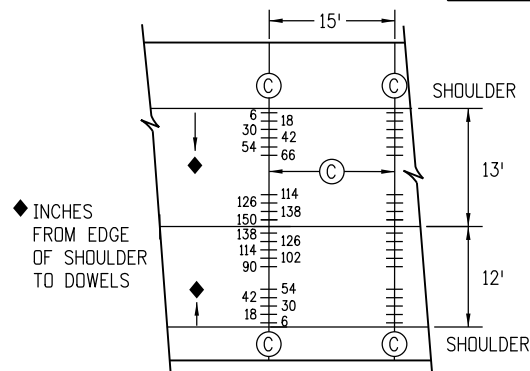


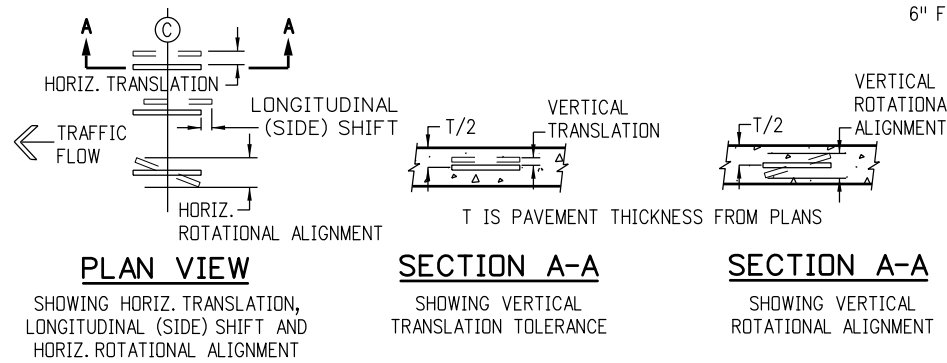
**TYPICAL JOINT LAYOUT FOR CONCRETE ROADWAY WITH CONCRETE SHOULDERS**

**GENERAL NOTES**

1. THIS STANDARD PLAN DOES NOT APPLY TO THIN CONCRETE OVERLAYS (WHITETOPPING).
2. TRANSVERSE CONSTRUCTION JOINTS SHALL BE LOCATED AT A (C) JOINT.
3. THIS JOINT LAYOUT SHALL BE USED AS A STANDARD OF THE JOINT LAYOUT FOR THE PROJECT. IF THE CONTRACTOR PROPOSES VARIATIONS FROM THIS STANDARD OR THE PROJECT HAS UNUSUAL OR IRREGULAR CONDITIONS NOT COVERED HEREIN, THE CONTRACTOR SHALL PREPARE A PAVEMENT JOINT LAYOUT FOR APPROVAL BY THE ENGINEER. SLABS 13 FT. IN WIDTH SHALL BE CONSTRUCTED ONLY WHERE DESIGNATED ON THE PLANS.
4. ON MULTILANE DIVIDED HIGHWAYS, THE MULTILANE DIRECTIONAL PAVEMENT AND BOTH SHOULDERS SHALL BE PLACED WITH (E) LONGITUDINAL SAWED CONTRACTION JOINTS.
5. ON MULTILANE DIVIDED HIGHWAYS SEPARATED BY A CONCRETE BARRIER, A (D) JOINT SHALL BE CONSTRUCTED AT ONE OF THE BARRIER FACES.
6. (D) JOINTS SHALL BE CONSTRUCTED BETWEEN THE TWO OPPOSING DIRECTIONS OF TRAVEL ON A MULTILANE UNDIVIDED HIGHWAY WHEN ALL OF THE FOLLOWING APPLY:
  - A. PAVEMENT IS CONTINUOUS ACROSS BOTH DIRECTIONS OF TRAVEL.
  - B. THERE IS NO MEDIAN BARRIER.
  - C. THE WIDTH OF THE PAVEMENT IN ONE DIRECTION IS GREATER THAN 80 FEET.
7. ON VARIABLE WIDTH SLABS, THE 2 FT. OR 4 FT. END OF SLAB WIDTH DIMENSION MAY VARY ±6 INCHES.
8. (L) JOINTS ARE TO BE USED WHEN A TRAFFIC LANE IS ADDED SEPARATELY, OR FOR TAPERS, OR FOR SPEED CHANGE LANES. ALTERNATIVE LONGITUDINAL JOINT LOCATIONS AT SPEED CHANGE LANES MAY BE USED IF APPROVED.
9. WHERE (C) JOINTS ARE SHOWN IN THE SHOULDER, THE DOWEL BARS WILL BE PLACED ON 12" CENTERS STARTING 6" FROM THE ROADWAY (E) JOINT.

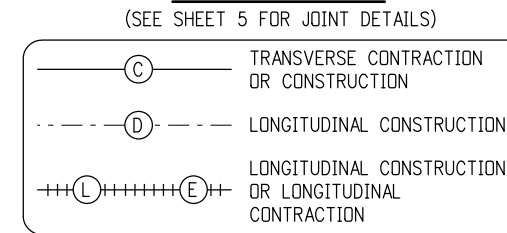


**DOWEL BAR DETAIL FOR (C) JOINT WITH 13 FT. AND 12 FT. WIDE SLABS**

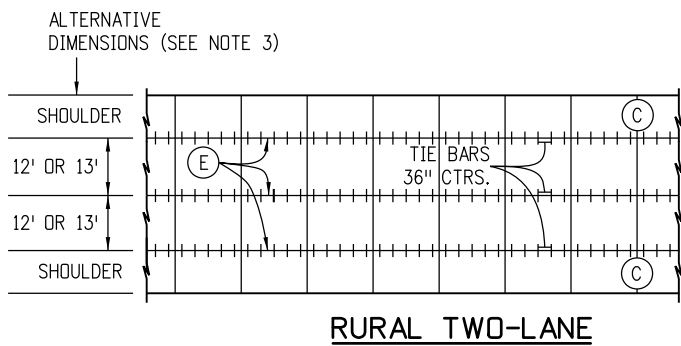


**DETAILS ILLUSTRATING DOWEL PLACEMENT TOLERANCES**  
SEE SUBSECTION 412.13(b)2 FOR ALLOWED TOLERANCE VALUES.

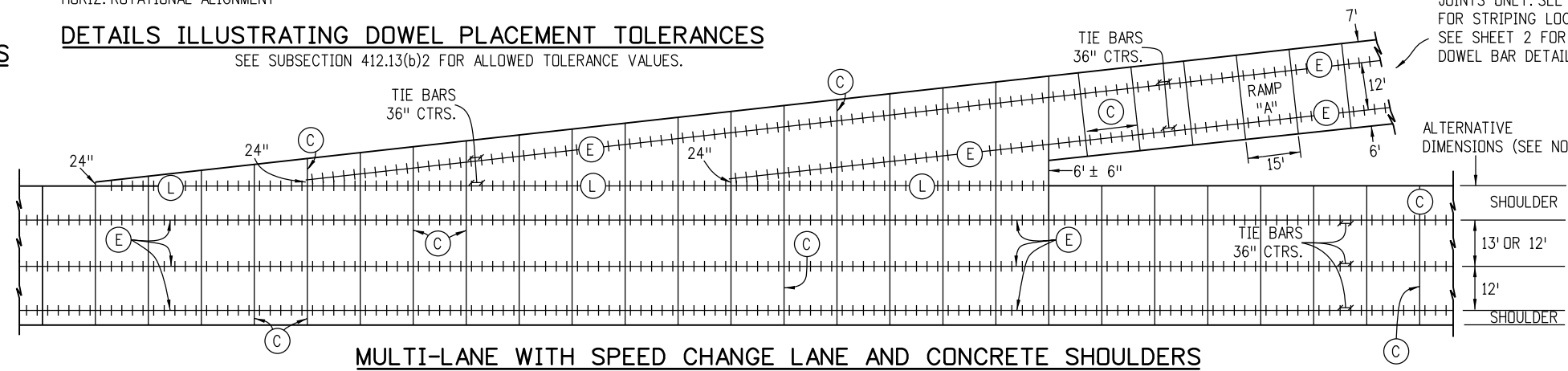
**JOINT LEGEND**



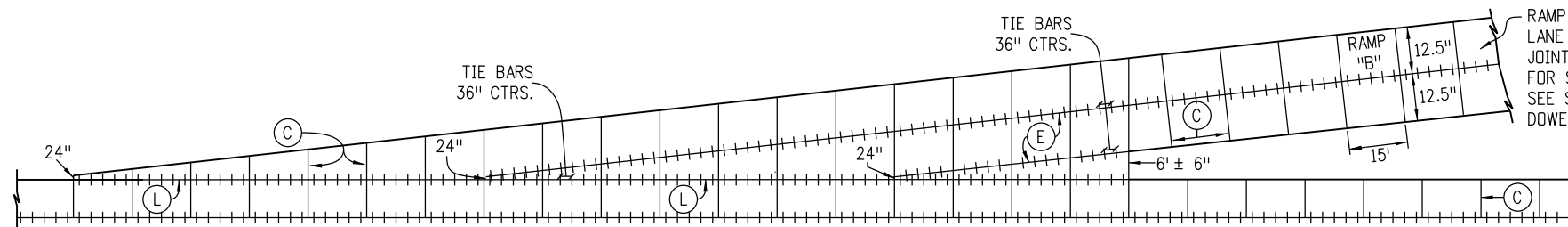
RAMP AND SPEED CHANGE LANE DIMENSIONING FOR JOINTS ONLY. SEE PLANS FOR STRIPING LOCATIONS. SEE SHEET 2 FOR RAMP DOWEL BAR DETAILS.



**RURAL TWO-LANE**



**MULTI-LANE WITH SPEED CHANGE LANE AND CONCRETE SHOULDERS**



**OPTIONAL LONGITUDINAL JOINT IN CENTER FOR SINGLE LANE SPEED CHANGE LANE**

**Computer File Information**

Creation Date: 07/04/12	Initials: JBK
Last Modification Date: 01/18/18	Initials: LTA
Full Path: www.coloradodot.info/business/designsupport	
Drawing File Name: 412010105.dgn	
CAD Ver.: MicroStation V8	Scale: Not to Scale Units: English

**Sheet Revisions**

Date:	Comments
07/24/12	Changed Tie Bar spacing from 30" to 36".
01/18/18	Changed all (CC) and (T) joints to (C) joints. Reduced all 14 foot slabs to 13 feet.

Colorado Department of Transportation  
 4201 East Arkansas Avenue  
 CDOT HQ, 4th Floor  
 Denver, CO 80222  
 Phone: 303-757-9021 FAX: 303-757-9868  
 Division of Project Support JBK/LTA

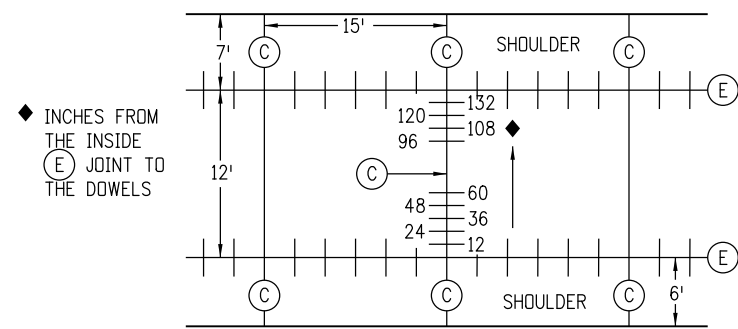
**CONCRETE PAVEMENT JOINTS**

Issued By: Project Development Branch on July 4, 2012

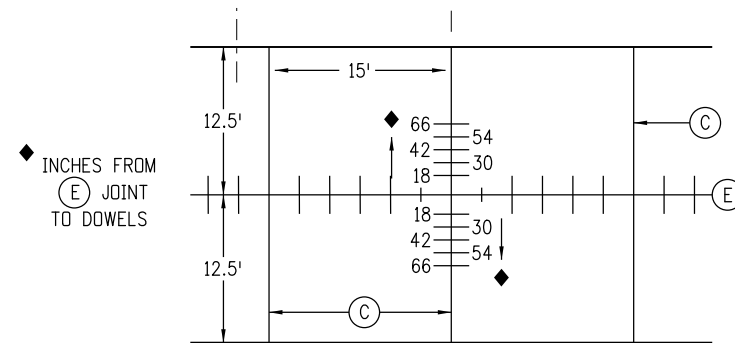
**STANDARD PLAN NO.**

M-412-1

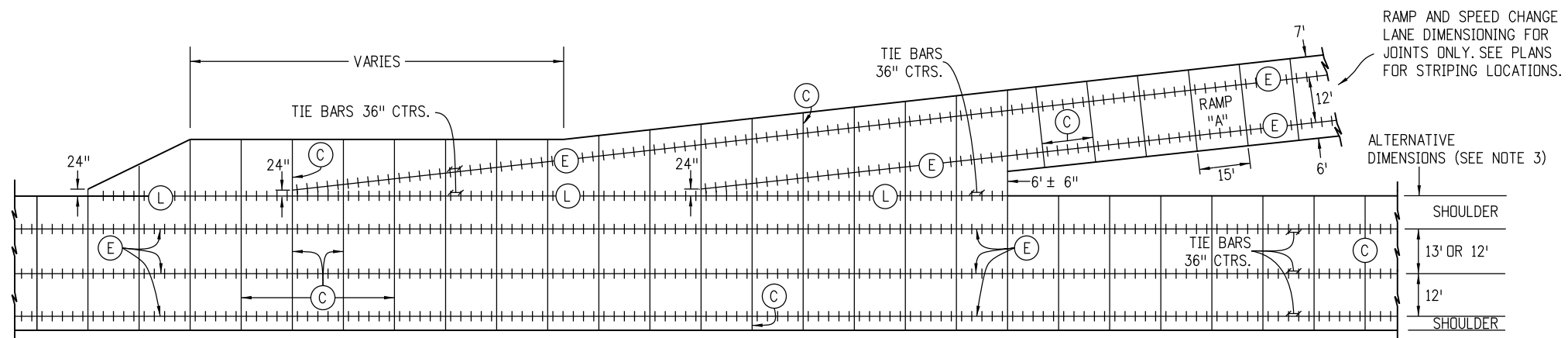
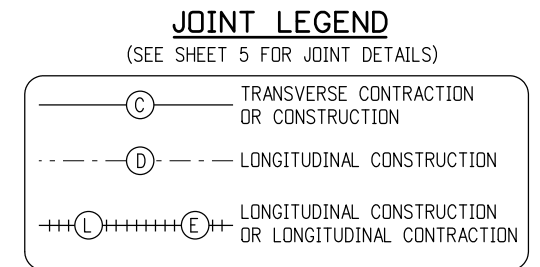
Sheet No. 1 of 5



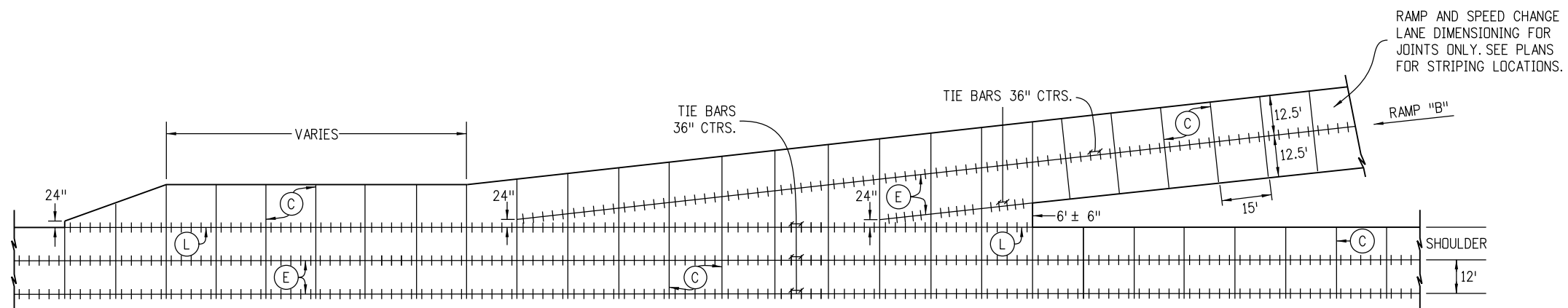
RAMP "A" DOWEL BAR DETAIL FOR C JOINT WITH A 12 FT. LANE



RAMP "B" DOWEL BAR DETAIL FOR C JOINT WITH CENTER LONGITUDINAL SPLIT LANE



MULTI-LANE WITH ACCELERATION AND DECELERATION LANES AND CONCRETE SHOULDERS



OPTIONAL LONGITUDINAL JOINT IN CENTER FOR SINGLE LANE ACCELERATION AND DECELERATION LANE

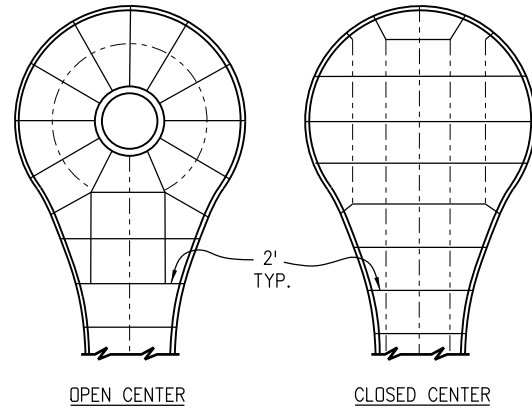
Computer File Information	
Creation Date: 07/04/12	Initials: JBK
Last Modification Date: 01/18/18	Initials: LTA
Full Path: www.coloradodot.info/business/designsupport	
Drawing File Name: 412010205.dgn	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

Sheet Revisions	
Date:	Comments
(R-X) 07/24/12	Changed Tie Bar spacing from 30" to 36".
(R-X) 01/18/18	Changed all (C) and (T) joints to (C) joints. Reduced all 14 foot slabs to 13 feet.
(R-X)	
(R-X)	

Colorado Department of Transportation  
 4201 East Arkansas Avenue  
 CDOT HQ, 4th Floor  
 Denver, CO 80222  
 Phone: 303-757-9021 FAX: 303-757-9868  
 Division of Project Support JBK/LTA

**CONCRETE PAVEMENT JOINTS**  
 Issued By: Project Development Branch on July 4, 2012

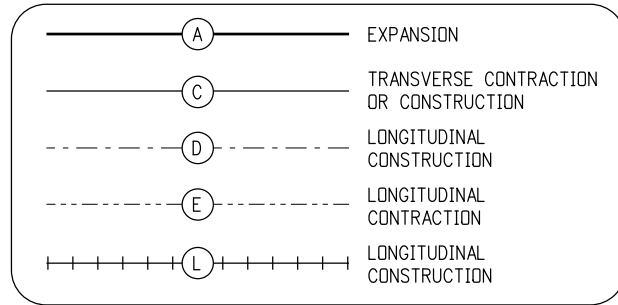
STANDARD PLAN NO.
M-412-1
Sheet No. 2 of 5



**CUL-DE-SAC**

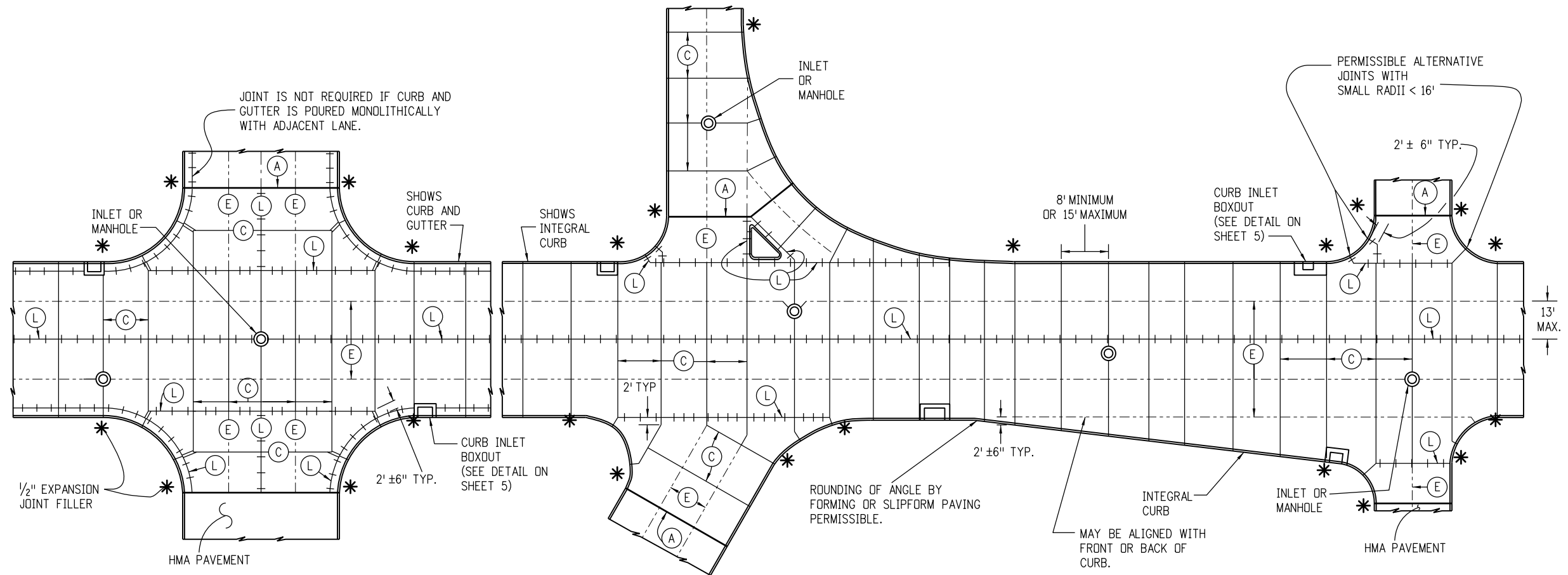
**JOINT LEGEND**

(SEE SHEET 5 FOR JOINT DETAILS)



**NOTES**

- LONGITUDINAL JOINTS SHALL BE PLACED ADJACENT TO LANE MARKINGS WHEN POSSIBLE, AND HAVE A MAXIMUM SPACING OF 13 FT. (15 FT. IS PERMITTED WITH MONOLITHIC CURB AND GUTTER).
- CONSTRUCT TRANSVERSE JOINTS PERPENDICULAR TO THE CENTERLINE OF PAVEMENT AND EXTEND THROUGH THE CURB OR CURB AND GUTTER.
- PLACE 1/2 IN. MIN. EXPANSION JOINT FILLER IN TOP 6 IN. OF CURB JOINT AT INTERSECTION RETURN RADIUS POINTS.
- THE CONTRACTOR SHALL, UNLESS OTHERWISE SHOWN ON THE PLANS, SELECT AND USE A BOND BREAKER AT INLETS, MANHOLES AND SIMILAR SIZE STRUCTURES. SMALLER STRUCTURES SUCH AS VALVE AND MONUMENT BOXES SHALL NOT REQUIRE A BOND BREAKER.
- WHERE A LONGITUDINAL JOINT PASSES LESS THAN 1 FT. FROM A CAST-IN-PAVEMENT MANHOLE OR SIMILAR SIZE STRUCTURE, A TYPICAL 2 FT. RADIAL JOINT, AS SHOWN IN THE DETAILS, SHALL BE USED.
- TRANSVERSE JOINTS SHALL EITHER INTERSECT THE CENTER OF CIRCULAR MANHOLES AND INLETS OR BE AT LEAST 4 FT. AWAY FROM THE EDGE OF CIRCULAR MANHOLES. SEE CURB INLET BOXOUT DETAIL ON SHEET 5.
- TRANSVERSE CONSTRUCTION JOINTS SHALL BE LOCATED AT A (C) JOINT.
- THE ENGINEERS SHALL HAVE AN OPTION TO USE INDIVIDUAL DOWELS IN THE (C) JOINT ON SHORT RUN (2' ± 6") TO CURB RADIUS RETURNS.



**TYPICAL CURBED PAVEMENT JOINT LAYOUT**

**Computer File Information**

Creation Date: 07/04/12	Initials: JBK
Last Modification Date: 01/18/18	Initials: LTA
Full Path: www.coloradodot.info/business/designsupport	
Drawing File Name: 412010305.dgn	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

**Sheet Revisions**

Date:	Comments
01/18/18	Changed all (C) and (T) joints to (C) joints. Reduced all 14 foot slabs to 13 feet.

**Colorado Department of Transportation**

4201 East Arkansas Avenue  
 CDOT HQ, 4th Floor  
 Denver, CO 80222  
 Phone: 303-757-9021 FAX: 303-757-9868  
**Division of Project Support**      **JBK/LTA**

**CONCRETE PAVEMENT JOINTS**

Issued By: Project Development Branch on July 4, 2012

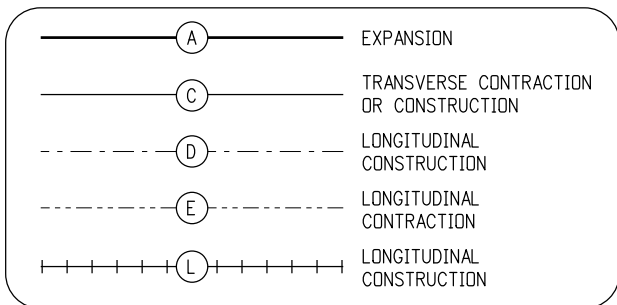
**STANDARD PLAN NO.**

M-412-1

Sheet No. 3 of 5

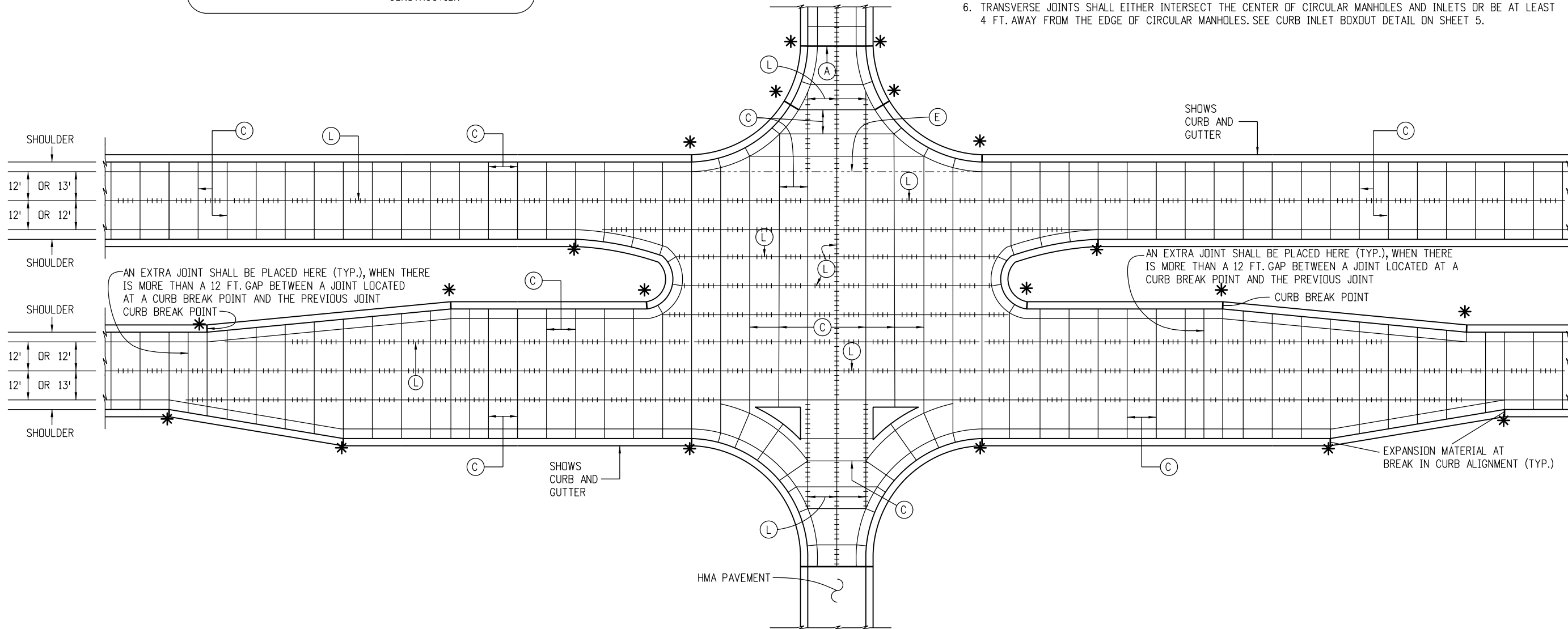
**JOINT LEGEND**

(SEE SHEET 5 FOR JOINT DETAILS)



**NOTES**

- LONGITUDINAL JOINTS SHALL BE PLACED ADJACENT TO LANE MARKINGS WHEN POSSIBLE, AND HAVE A MAXIMUM SPACING OF 13 FT. (15 FT. IS PERMITTED WITH MONOLITHIC CURB AND GUTTER).
- CONSTRUCT TRANSVERSE JOINTS PERPENDICULAR TO THE CENTERLINE OF PAVEMENT AND EXTEND THROUGH THE CURB OR CURB AND GUTTER.
- PLACE 1/2 IN. MIN. EXPANSION JOINT FILLER IN TOP 6 IN. OF CURB JOINT AT INTERSECTION RETURN RADIUS POINTS.
- THE CONTRACTOR SHALL, UNLESS OTHERWISE SHOWN ON THE PLANS, SELECT AND USE A BOND BREAKER AT INLETS, MANHOLES AND SIMILAR SIZE STRUCTURES. SMALLER STRUCTURES SUCH AS VALVE AND MONUMENT BOXES DO NOT REQUIRE A BOND BREAKER.
- WHERE A LONGITUDINAL JOINT WOULD PASS LESS THAN 1 FT. FROM A CAST-IN-PAVEMENT MANHOLE OR SIMILAR SIZE STRUCTURE, A TYPICAL 2 FT. RADIAL JOINT, AS SHOWN IN THE DETAILS, SHALL BE USED.
- TRANSVERSE JOINTS SHALL EITHER INTERSECT THE CENTER OF CIRCULAR MANHOLES AND INLETS OR BE AT LEAST 4 FT. AWAY FROM THE EDGE OF CIRCULAR MANHOLES. SEE CURB INLET BOXOUT DETAIL ON SHEET 5.



**MULTI-LANE INTERSECTION WITH SPEED CHANGE LANE AND CONCRETE SHOULDERS**

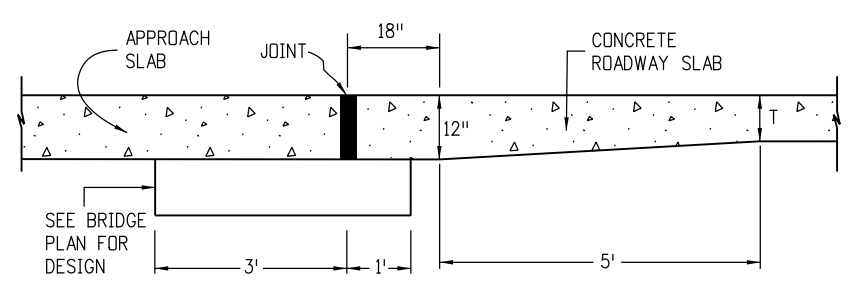
Computer File Information	
Creation Date: 07/04/12	Initials: JBK
Last Modification Date: 01/18/18	Initials: LTA
Full Path: www.coloradodot.info/business/designsupport	
Drawing File Name: 412010405.dgn	
CAD Ver.: MicroStation V8 Scale: Not to Scale Units: English	

Sheet Revisions	
Date:	Comments
01/18/18	Changed all (C) and (T) joints to (C) joints. Reduced all 14 foot slabs to 13 feet.

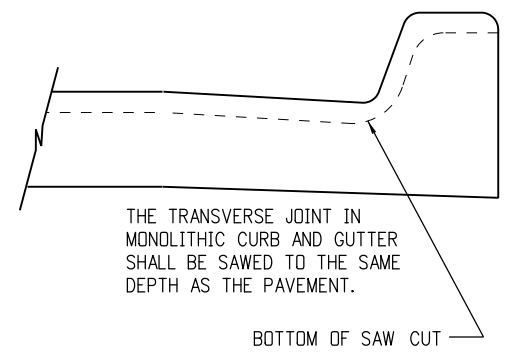
Colorado Department of Transportation  
 4201 East Arkansas Avenue  
 CDOT HQ, 4th Floor  
 Denver, CO 80222  
 Phone: 303-757-9021 FAX: 303-757-9868  
 Division of Project Support **JBK/LTA**

**CONCRETE  
PAVEMENT JOINTS**  
 Issued By: Project Development Branch on July 4, 2012

STANDARD PLAN NO.
M-412-1
Sheet No. 4 of 5



**BRIDGE APPROACH**



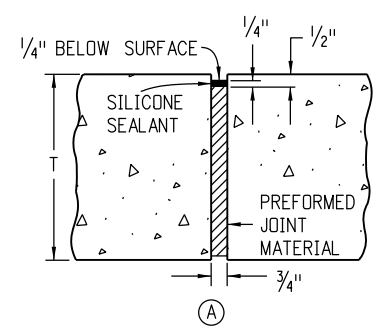
**NOTE**

PAVEMENT THICKNESS (T), SHALL BE AS SHOWN ON THE PLANS.

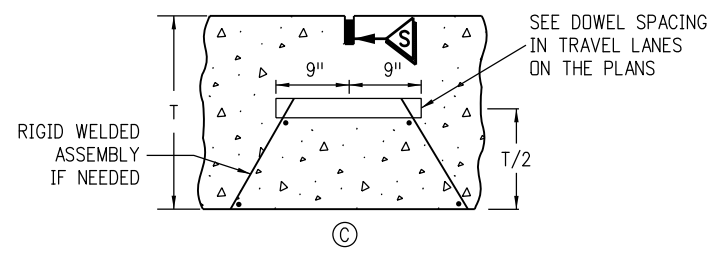
PAVEMENT THICKNESS (T)	TIE BAR SIZE	DOWEL BAR DIAMETER
7 IN. ≤ T < 8 IN.	NO. 4	1 IN.
8 IN. ≤ T ≤ 10 IN.	NO. 5	1.25 IN.
10 IN. < T ≤ 15 IN.	NO. 6	1.50 IN.

**REINFORCING SIZE TABLE**

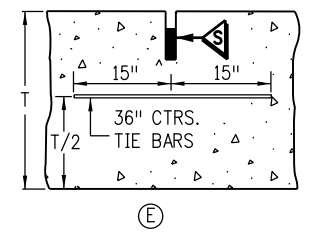
TIE BAR SIZE IS NO. 5 WHEN PAVEMENT IS PLACED ON UNBOUND BASES.  
 TIE BAR IS NO. 6 WHEN PAVEMENT IS PLACED ON LIME TREATED SOIL, ASPHALT OR CEMENT TREATED, MILLED ASPHALT, OR RECYCLED ASPHALT BASES.



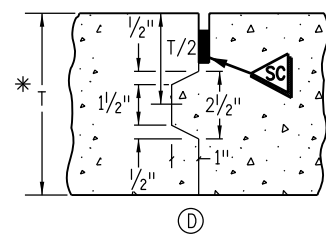
**EXPANSION JOINT**



**DOWELED TRANSVERSE CONSTRUCTION OR CONTRACTION JOINT**  
(TRANSVERSE WEAKENED PLANE JOINT)

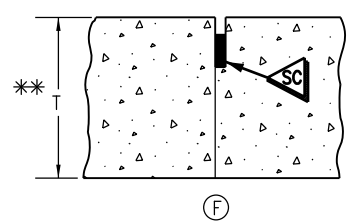


**LONGITUDINAL CONTRACTION JOINT**  
(LONGITUDINAL WEAKENED PLANE JOINT)



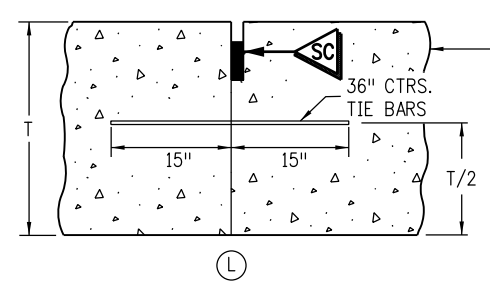
**LONGITUDINAL CONSTRUCTION JOINT**

\* USE ONLY IF T ≥ 8 IN. FORM ONLY FEMALE KEYWAY

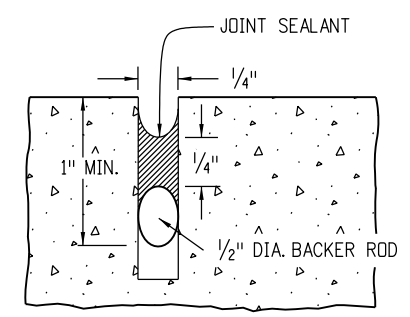


**LONGITUDINAL CONSTRUCTION JOINT**

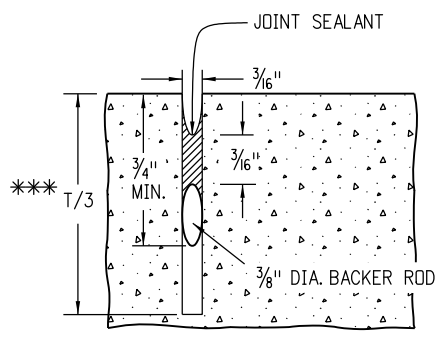
\*\* USE ONLY IF T < 8 IN.



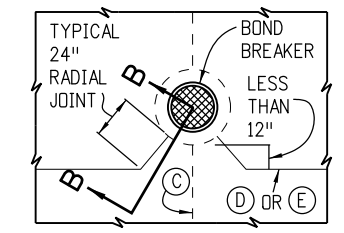
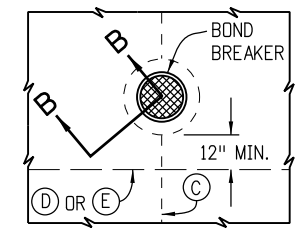
**LONGITUDINAL CONSTRUCTION JOINT**



**SEAL AT CONSTRUCTION JOINT**

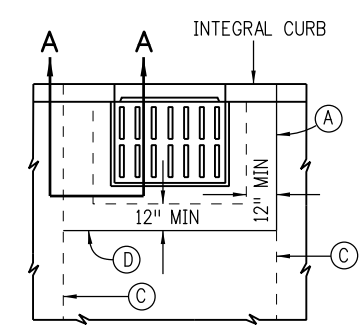


**SAWED JOINT**  
\*\*\* USE T/4 WHEN T < 8 IN.

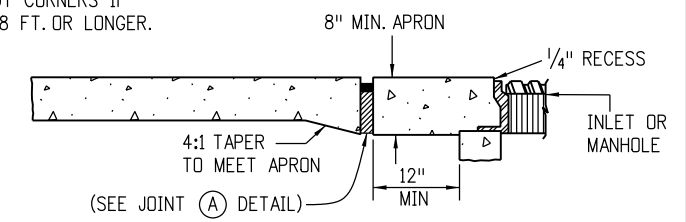


**INLET OR MANHOLE CAST IN PAVEMENT**

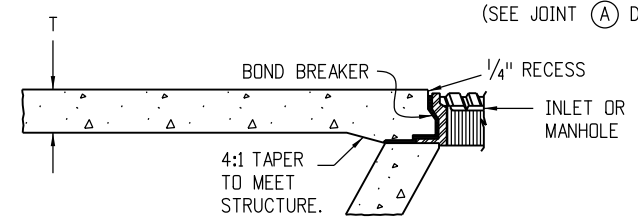
INSTALL TRANSVERSE JOINT AT BOTH BOXOUT CORNERS IF BOXOUT IS 8 FT. OR LONGER.



**CURB INLET BOXOUT**



**SECTION A-A**



**SECTION B-B**

BOND BREAKER SHALL BE COMPOSED OF PLASTIC SHEET, BUILDING PAPER OR OTHER APPROVED MATERIAL THAT PREVENTS BONDING.

**Computer File Information**

Creation Date: 07/04/12	Initials: JBK
Last Modification Date: 01/18/18	Initials: LTA
Full Path: www.coloradodot.info/business/designsupport	
Drawing File Name: 412010505.dgn	
CAD Ver.: MicroStation V8	Scale: Not to Scale Units: English

**Sheet Revisions**

Date:	Comments
07/24/12	Changed Tie Bar spacing from 30" to 36".
	Modified the Reinforcing Size Table.
01/18/18	Changed all (C) and (T) joints to (C) joints.

Colorado Department of Transportation  
 4201 East Arkansas Avenue  
 CDOT HQ, 4th Floor  
 Denver, CO 80222  
 Phone: 303-757-9021 FAX: 303-757-9868  
 Division of Project Support **JBK/LTA**

**CONCRETE PAVEMENT JOINTS**

Issued By: Project Development Branch on July 4, 2012

**STANDARD PLAN NO.**

M-412-1

Sheet No. 5 of 5