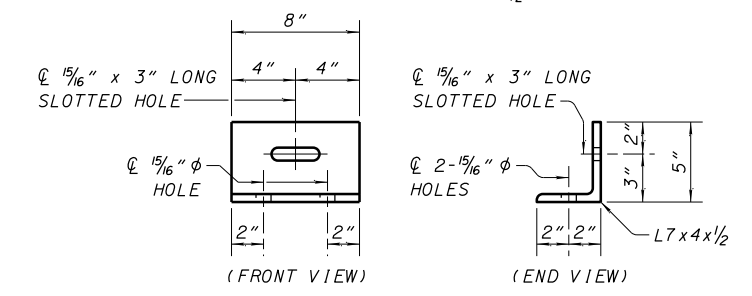
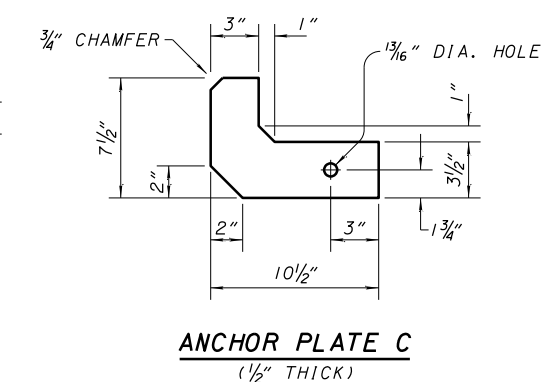
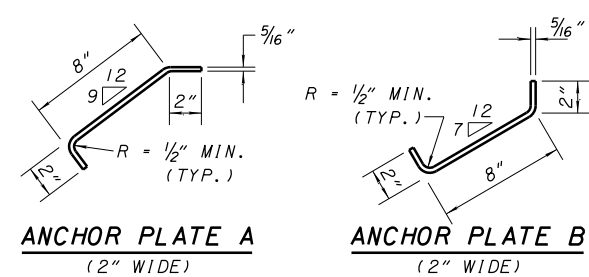
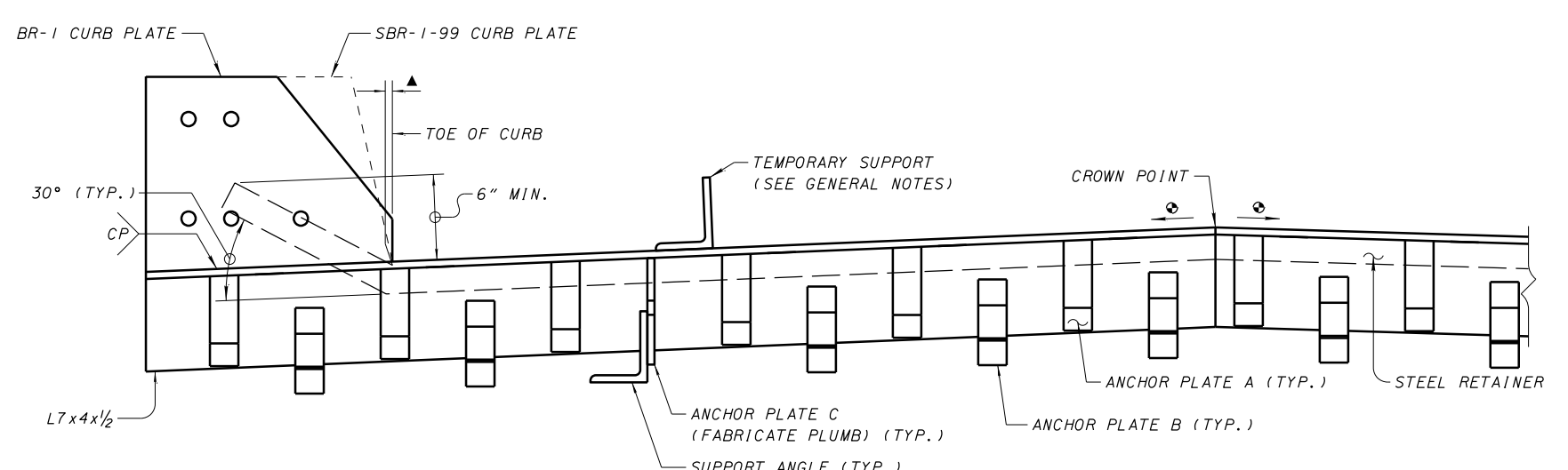


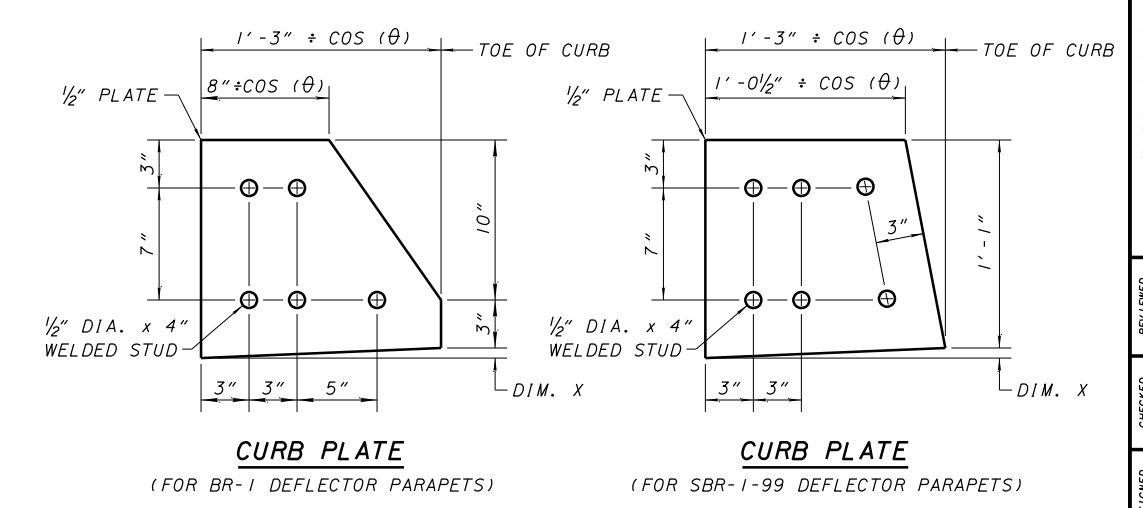
**PLAN VIEW**



**SUPPORT ANGLE**



**VIEW A-A**

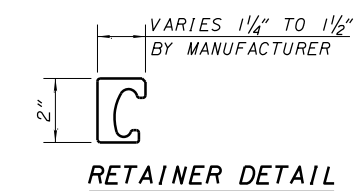


**CURB PLATE**

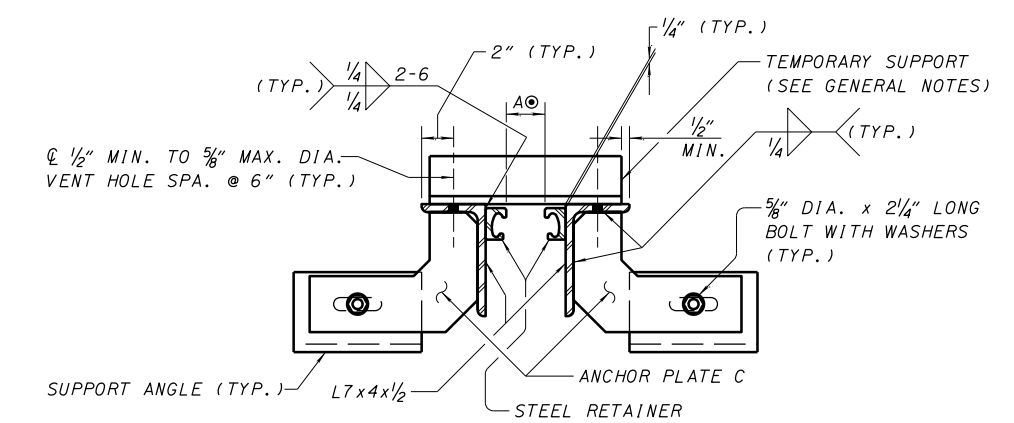
**CURB PLATE**

(FOR BR-1 DEFLECTOR PARAPETS)

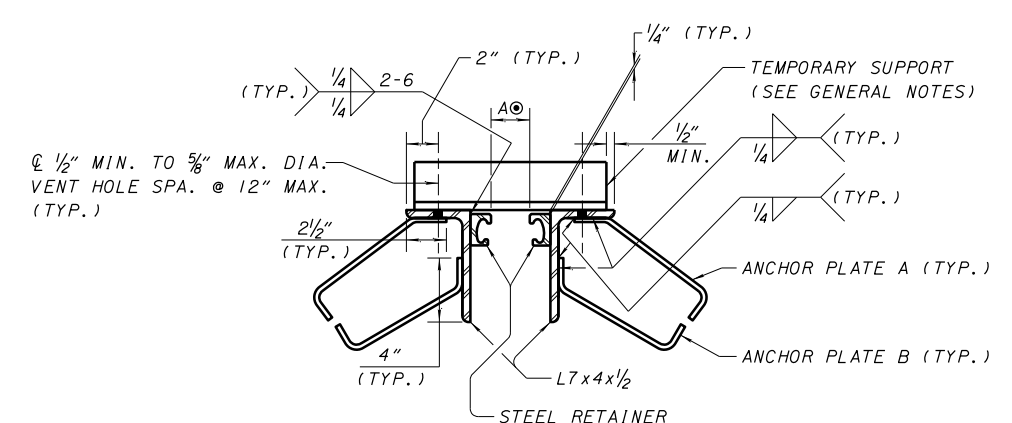
(FOR SBR-1-99 DEFLECTOR PARAPETS)



**RETAINER DETAIL**

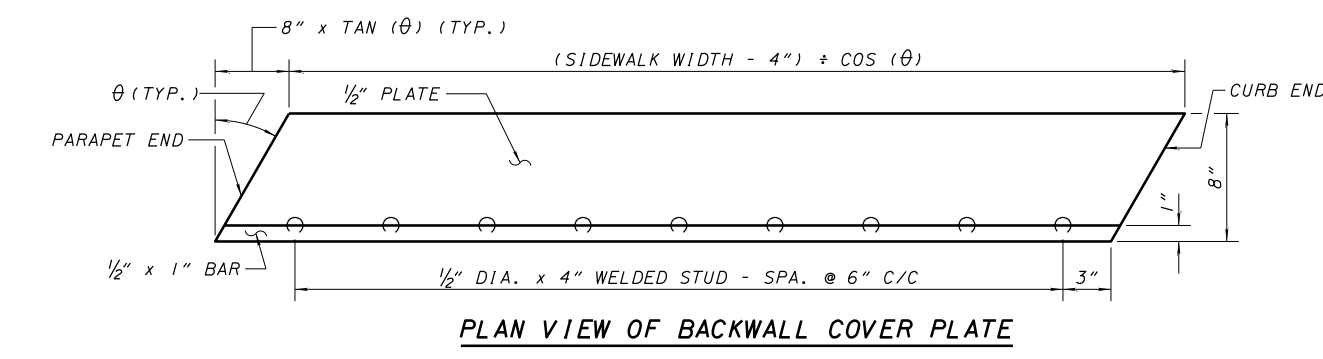
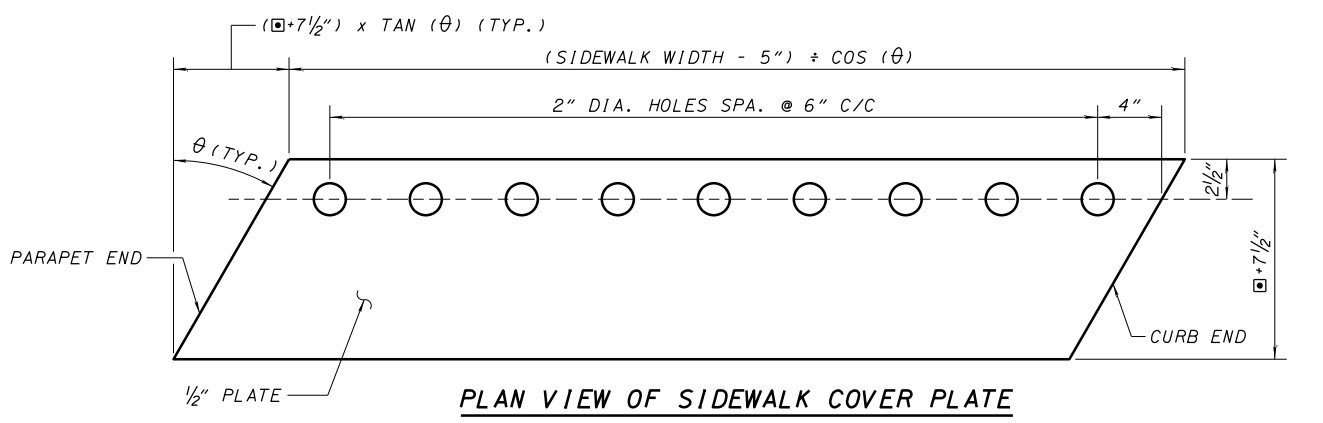
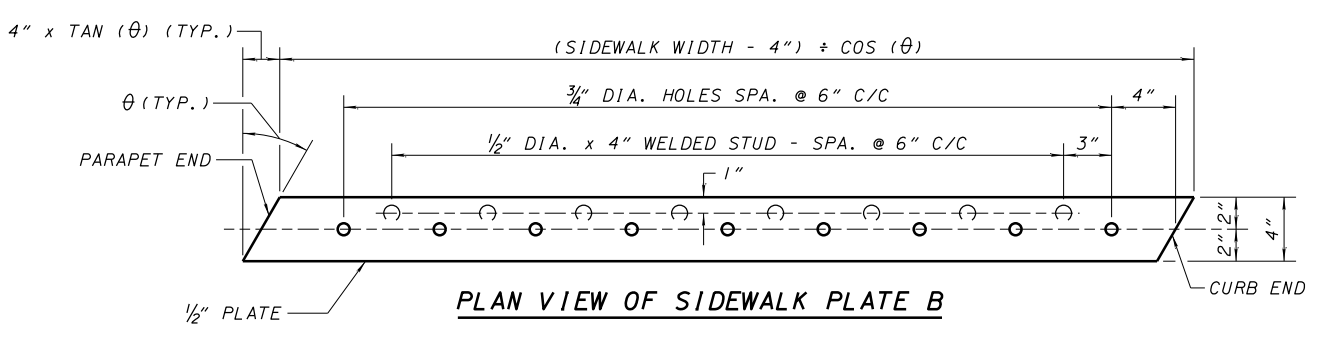
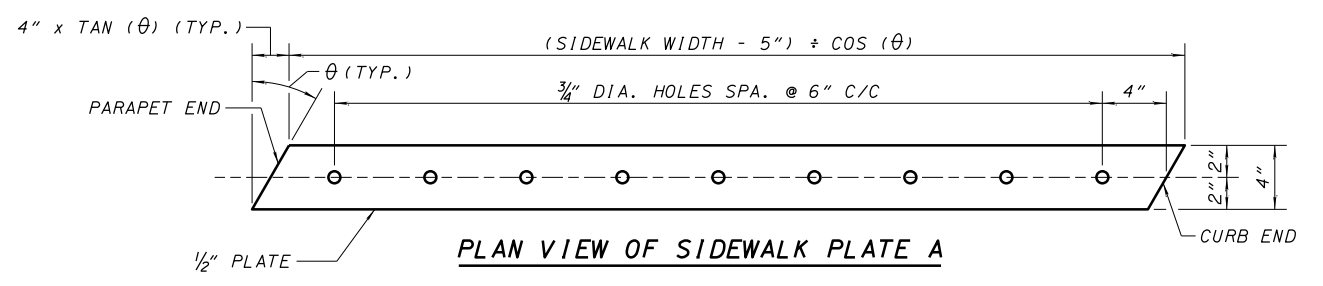
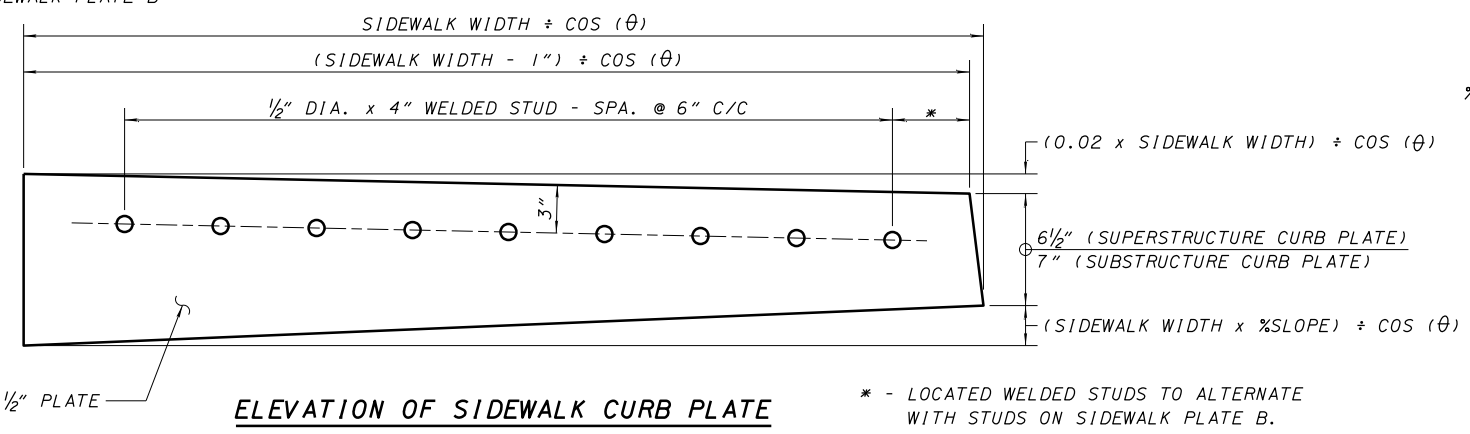
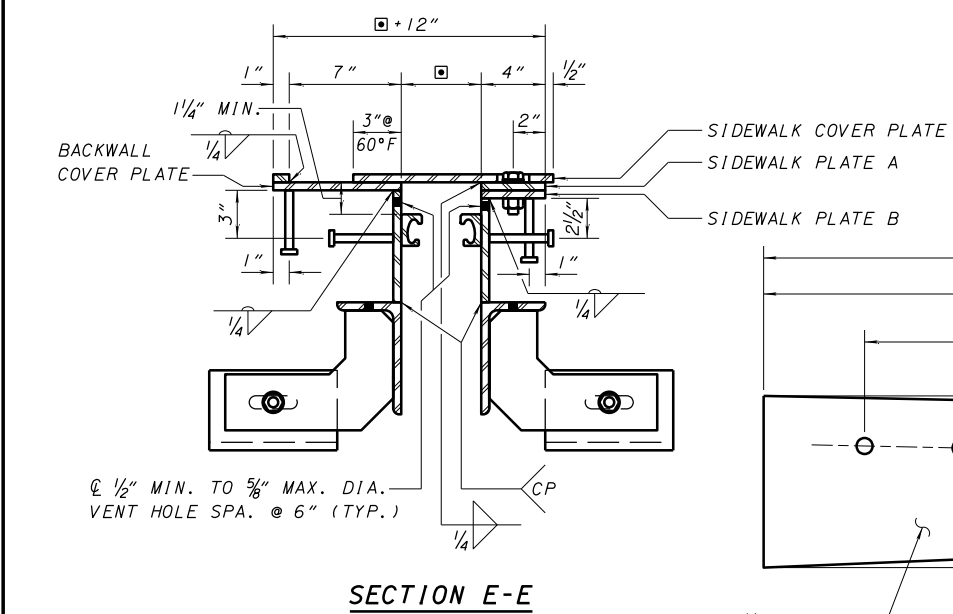
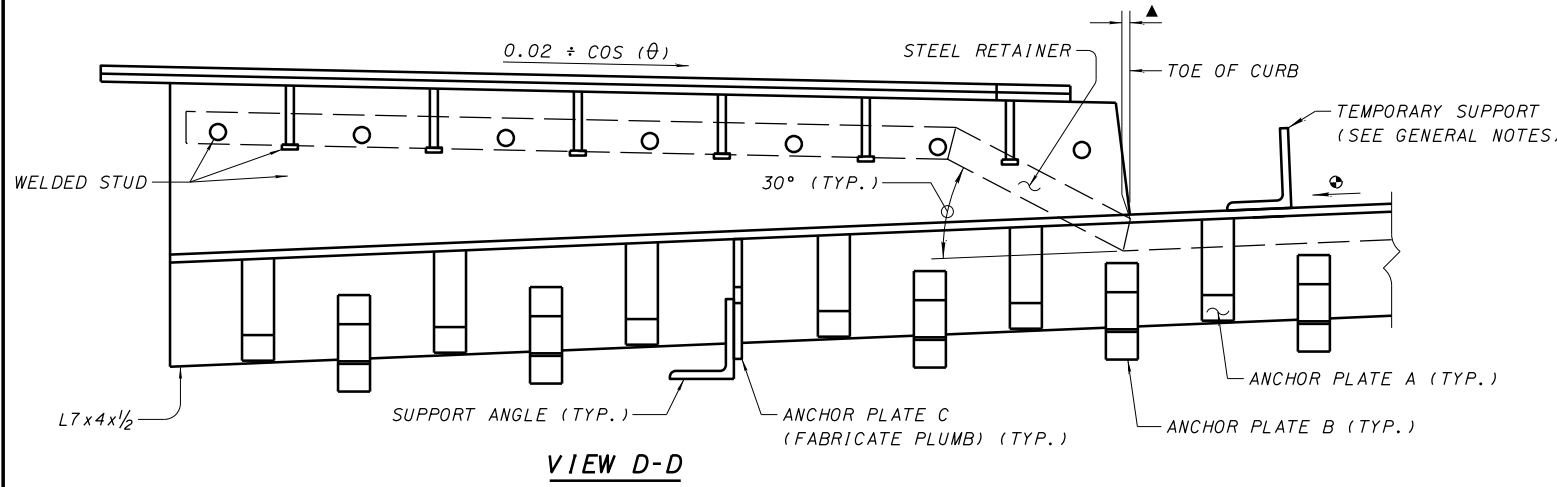
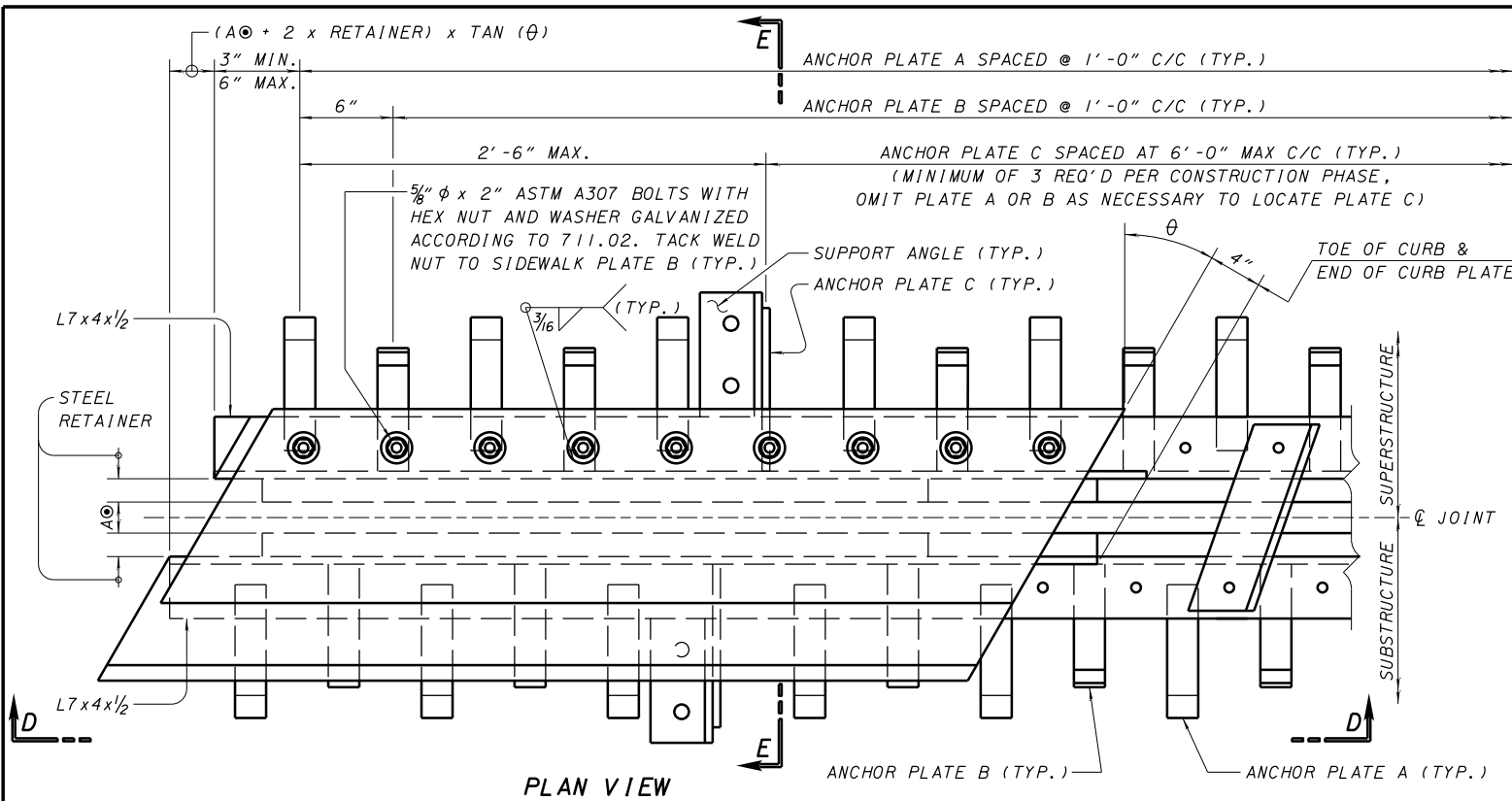


**SECTION B-B**



**SECTION C-C**

- LEGEND**
- DIM. X = (15" x % SLOPE) ÷ COS (θ)
  - % SLOPE = PAVEMENT CROSS SLOPE, MEASURED PERPENDICULAR TO THE CENTERLINE OF SURVEY
  - θ = SKEW ANGLE
  - ▲ - 0" MIN. TO 1/2" MAX. AT BREAKPOINT IN RETAINER FOR SQUARE BRIDGES. ON SKEWED BRIDGES, THIS DIMENSION WILL ONLY APPLY TO THE SIDE OF JOINT ASSEMBLY WHICH IS NEAREST TO THE CURB
  - ◆ - FABRICATE EACH L7x4x1/2 TO MATCH THE BRIDGE CROSS SLOPE MEASURED PARALLEL TO THE EXPANSION JOINT.
  - ⊙ - DETERMINE DIM. "A" FROM TABLE PROVIDED IN PROJECT PLANS.

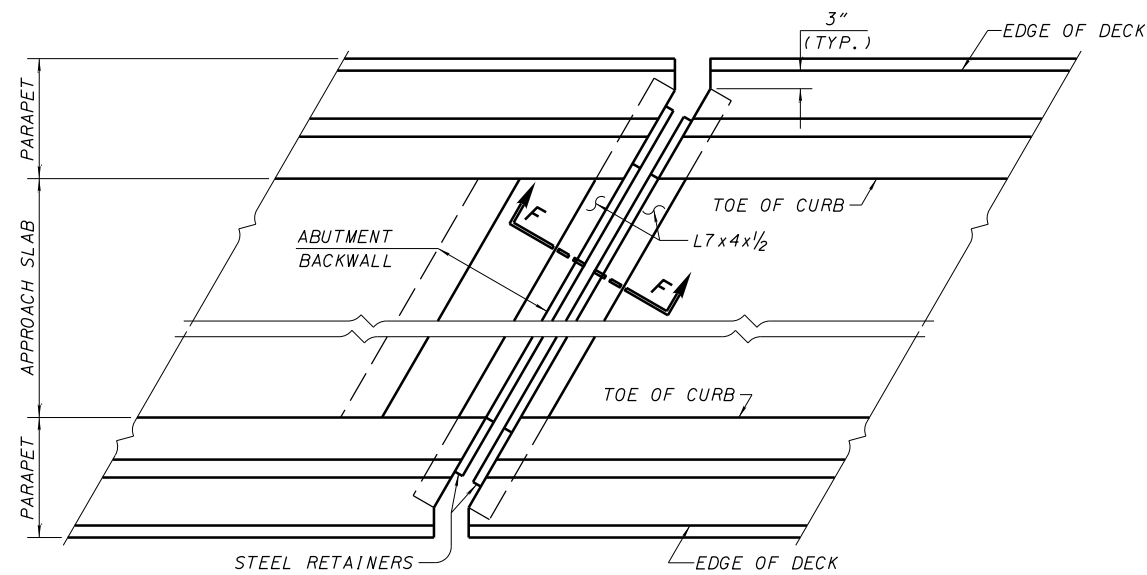


**LEGEND**

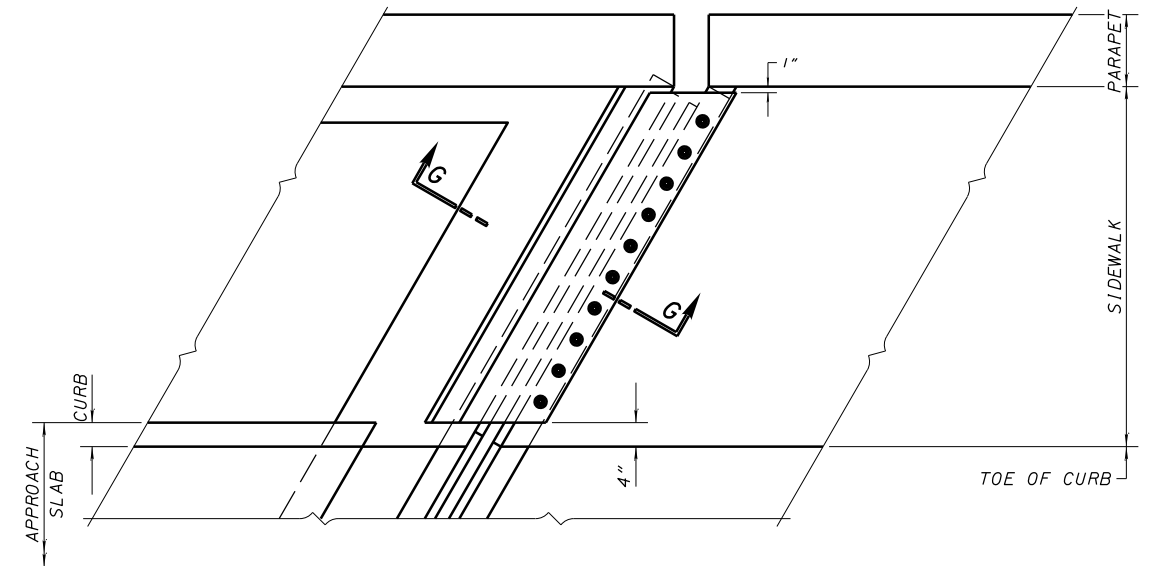
- % SLOPE = PAVEMENT CROSS SLOPE, MEASURED PERPENDICULAR TO THE CENTERLINE OF SURVEY
- θ = SKEW ANGLE
- ▲ - 0" MIN. TO 1/2" MAX. AT BREAKPOINT IN RETAINER FOR SQUARE BRIDGES. ON SKEWED BRIDGES, THIS DIMENSION WILL ONLY APPLY TO THE SIDE OF JOINT ASSEMBLY WHICH IS NEAREST TO THE CURB
- ◆ - FABRICATE EACH L7x4x1/2 TO MATCH THE BRIDGE CROSS SLOPE MEASURED PARALLEL TO THE EXPANSION JOINT.
- ⊙ - DETERMINE DIM. "A" FROM TABLE PROVIDED IN PROJECT PLANS.
- - DIM. A ⊙ + 2 x WIDTH OF STEEL RETAINER

\* - LOCATED WELDED STUDS TO ALTERNATE WITH STUDS ON SIDEWALK PLATE B.

FOR ADDITIONAL INFORMATION REFER TO SECTION B-B OR C-C ON SHEET 1/5.

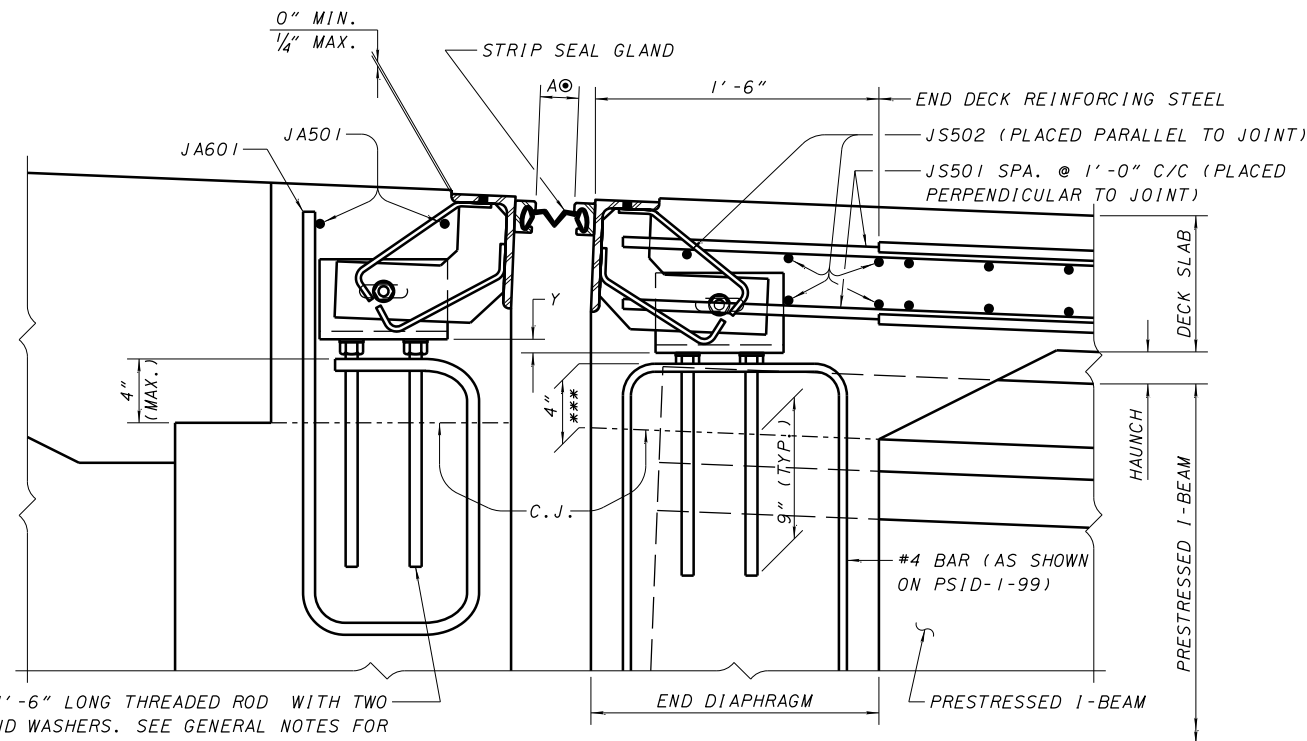


**PART PLAN AT ABUTMENT**  
**BRIDGES WITH DEFLECTOR PARAPET**  
 (BR-1 RAILING IS SHOWN, SBR-1-99 SHALL BE SIMILAR)



**PART PLAN AT ABUTMENT**  
**BRIDGES WITH SIDEWALKS**

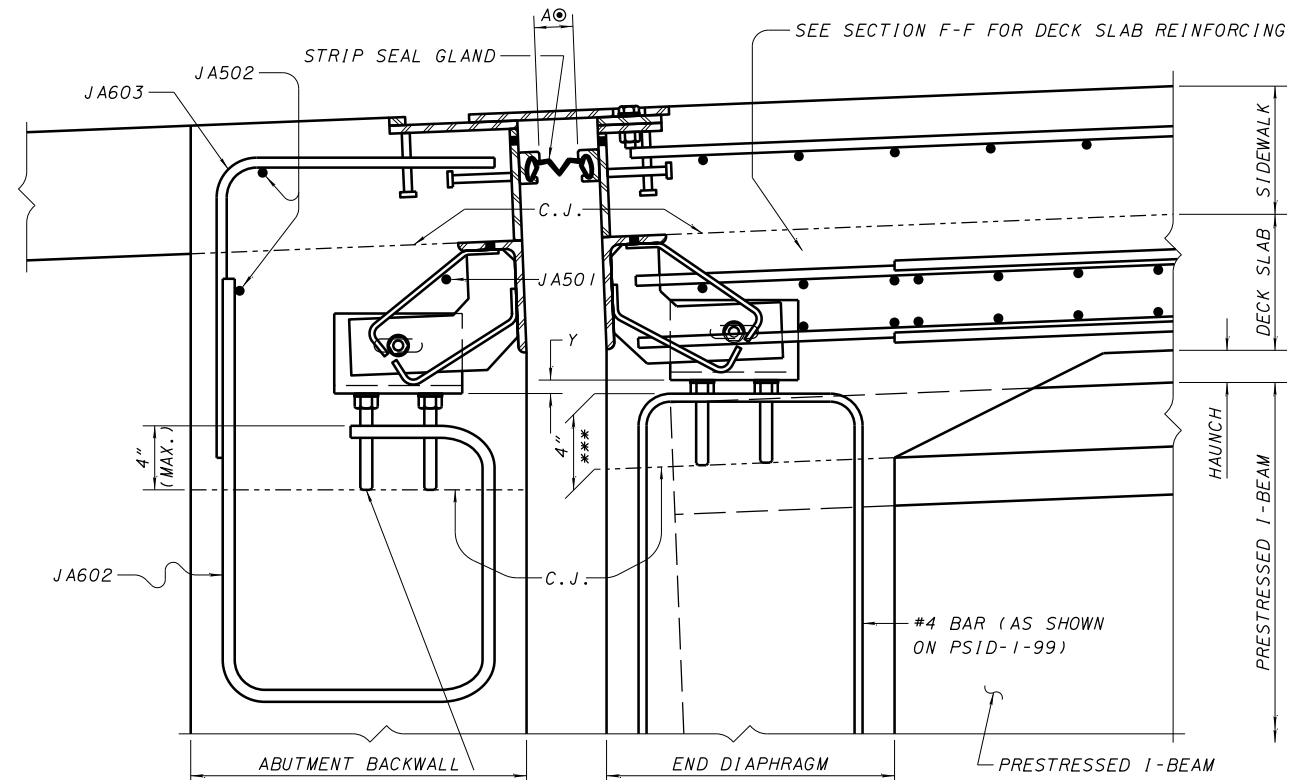
NOTE: FOR SKEWED SUPERSTRUCTURES, FIELD BEND THE JS501 BARS AS NECESSARY AT THE ACUTE CORNERS TO MAINTAIN CONCRETE CLEAR COVER AT THE DECK EDGE.



3/4" DIA. x 1'-6" LONG THREADED ROD WITH TWO HEX NUTS AND WASHERS. SEE GENERAL NOTES FOR THREADED ROD AND JOINT SUPPORT & ANCHORAGE REQUIREMENTS. (TYP.)

**SECTION F-F**  
 (SECTION SHOWN AT ANCHORED SUPPORT)

FOR ADDITIONAL JOINT ASSEMBLY DETAILS, SEE SECTION B-B OR SECTION C-C ON SHEET 1/5.



3/4" DIA. x 9" LONG THREADED ROD WITH TWO HEX NUTS AND WASHERS. SEE GENERAL NOTES FOR THREADED ROD AND JOINT SUPPORT & ANCHORAGE REQUIREMENTS. (TYP.)

**SECTION G-G**  
 (SECTION SHOWN AT UNANCHORED SUPPORT)

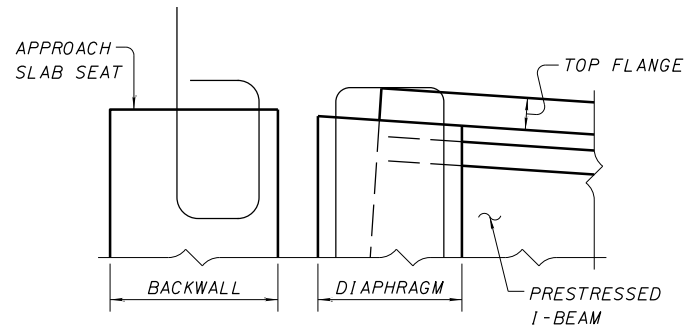
FOR ADDITIONAL JOINT ASSEMBLY DETAILS, SEE SECTION E-E ON SHEET 2/5.

**LEGEND**

- ⊙ - DETERMINE DIM. "A" FROM TABLE PROVIDED IN PROJECT PLANS.
- ⊠ - DIM. A⊙ + 2 x WIDTH OF STEEL RETAINER
- C.J. = CONSTRUCTION JOINT
- \*\*\* - MEASURED TO THE HIGHEST SIDE OF THE DIAPHRAGM.
- Y = %GRADE x (DIM. A⊙ + 18 1/2")
- %GRADE = INSTANTANEOUS PROFILE GRADE AT THE CENTERLINE OF THE JOINT

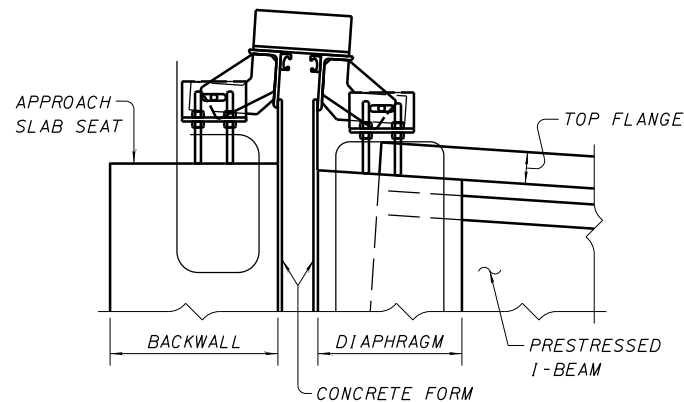
INSTALLATION OF JOINT ASSEMBLY

GENERAL NOTES



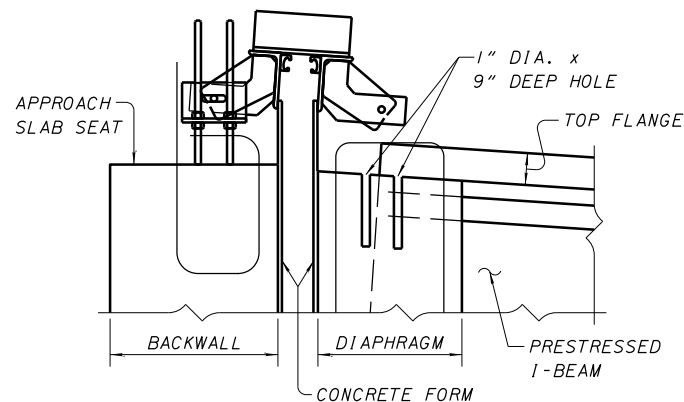
STEP 1

PLACE BACKWALL CONCRETE UP TO THE APPROACH SLAB SEAT. PLACE DIAPHRAGM CONCRETE UP TO THE BOTTOM OF THE I-BEAM TOP FLANGE. ALLOW CONCRETE TO CURE FOR AT LEAST 48 HRS.



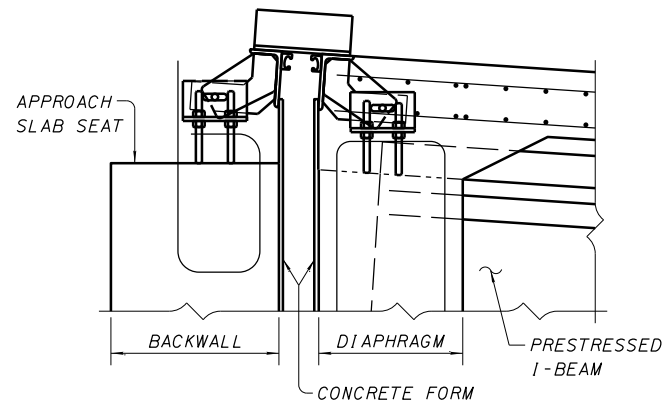
STEP 2

CAREFULLY POSITION THE JOINT ASSEMBLY ON THE TOP OF THE BACKWALL AND DIAPHRAGM USING THE 3/4" DIA. THREADED RODS FOR SUPPORT. ADJUST THE JOINT ASSEMBLY TO THE PROPER GRADE AND SURFACE ELEVATION. THE TWO L7x4x1/2 ANGLES SHALL REMAIN PARALLEL TO EACH OTHER AND PERPENDICULAR TO THE ROADWAY GRADIENT.



STEP 3

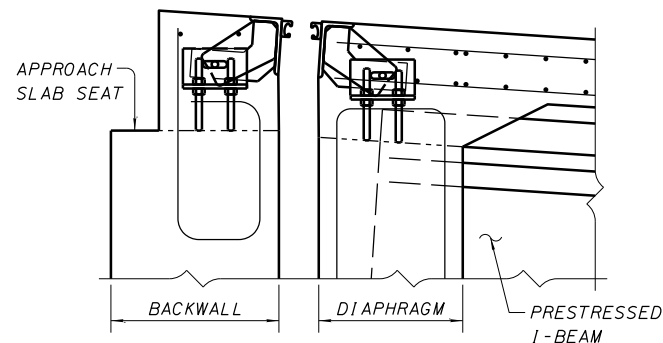
MARK THE LOCATION OF EACH 1'-6" LONG THREADED ROD ON THE SURFACE OF THE CONCRETE BACKWALL AND DIAPHRAGM. REMOVE SUPPORT ANGLE AND DRILL THE TWO 1" DIA. x 9" DEEP HOLES. REINSTALL SUPPORT ANGLE AND INSTALL THREADED RODS IN THE HOLES ACCORDING TO CMS 510 USING NON-SHRINK GROUT, 705.22. REPEAT THE THREADED ROD INSTALLATION FOR THE ADJACENT SUPPORT ON THE OPPOSITE SIDE OF THE JOINT.



STEP 4

PLACE THE JS501 & JS502 REINFORCING STEEL BARS. MAKE ALL NECESSARY ADJUSTMENTS TO THE JOINT FOR GRADE AND ELEVATION AND PLACE SUPERSTRUCTURE CONCRETE. TO ACHIEVE COMPLETE CONSOLIDATION UNDER THE JOINT ARMOR, VIBRATE THE CONCRETE ACCORDING TO 511 UNTIL PASTE EMERGES FROM EACH VENT HOLE. REMOVE SPILLAGE FROM THE TOP SURFACE OF THE JOINT ARMOR.

LOOSEN, BUT DO NOT REMOVE, TEMPORARY JOINT ARMOR SUPPORTS NO LONGER THAN TWO HOURS AFTER THE CONCRETE IS PLACED UNDER THE JOINT ARMOR.



STEP 5

PLACE THE JA501 REINFORCING STEEL BARS. PLACE A 10'-0" LONG STRAIGHT-EDGE SUPPORTED ON THE FINISHED SURFACE OF THE BRIDGE TO PROJECT THE FINAL SURFACE ELEVATION OF THE BACKWALL.

MAKE ALL FINAL ADJUSTMENTS TO THE JOINT FOR DIMENSION A, GRADE AND ELEVATION. TIGHTEN ALL TEMPORARY JOINT ARMOR SUPPORTS.

PLACE THE BACKWALL CONCRETE DURING STABLE OR RISING AMBIENT TEMPERATURES. CONCLUDE PLACEMENT AT OR IMMEDIATELY BEFORE THE DAY'S PEAK AMBIENT TEMPERATURE. TO ACHIEVE COMPLETE CONSOLIDATION UNDER THE JOINT ARMOR, VIBRATE THE CONCRETE ACCORDING TO 511 UNTIL PASTE EMERGES FROM EACH VENT HOLE. REMOVE SPILLAGE FROM THE TOP SURFACE OF THE JOINT ARMOR.

LOOSEN AND REMOVE TEMPORARY JOINT ARMOR SUPPORTS NO LONGER THAN TWO HOURS AFTER THE CONCRETE IS PLACED UNDER THE JOINT ARMOR.

ALTERNATE INSTALLATION PROCEDURE:

AT LEAST 30 DAYS PRIOR TO THE INSTALLATION OF THE JOINT ASSEMBLY, SUBMIT WRITTEN DESCRIPTIONS OF ALTERNATE INSTALLATION PROCEDURES TO THE ENGINEER FOR APPROVAL.

**STRIP SEAL:** FURNISH EXTRUDED POLYCHLOROPRENE MATERIAL CONFORMING TO ASTM D2628. DUE TO THE CONFIGURATION OF THE SEAL, THE RECOVERY TEST IS NOT APPLICABLE. THE PHYSICAL PROPERTIES OF THE STRIP SEAL SHALL CONFORM TO TABLE "E".

THE MANUFACTURER OR AN ACCREDITED LABORATORY SHALL TEST EACH LOT AS SPECIFIED AND SUBMIT TWO COPIES OF CERTIFIED TEST DATA SHOWING COMPLIANCE TO THE ODOT OFFICE OF MATERIALS MANAGEMENT. THE SEAL AND RETAINER ARE AN INTEGRAL SYSTEM DESIGNED AND SUPPLIED BY THE SAME MANUFACTURER. SEE "CONSTRUCTION PROCEDURE" FOR INSTALLATION.

TABLE E  
(PHYSICAL PROPERTIES OF SEAL ELEMENT)

PROPERTY	REQUIREMENT	ASTM METHOD
TENSILE STRENGTH, MIN. PSI	2000	D412
ELONGATION @ BREAK, MIN. (PERCENT)	250	D412
HARDNESS, TYPE A DUROMETER, POINTS	60 ± 5	MODIFIED D2240
OVEN AGING, 70 HR @ 212°F TENSILE STRENGTH, LOSS, MAX. ELONGATION, LOSS, MAX.	20 PERCENT 20 PERCENT	D573
HARDNESS, TYPE A DUROMETER, POINTS CHANGE	0 TO +10	MODIFIED D2240
OIL SWELL, ASTM OIL 3 70 HR @ 212°F, WEIGHT CHANGE MAX	45 PERCENT	D471
OZONE RESISTANCE 20 PERCENT STRAIN, 300 PPHM IN AIR, 70 HR @ 104°F (WIPE WITH TOLUENE TO REMOVE SURFACE CONTAMINATION)	NO CRACKS	D1149
LOW TEMPERATURE STIFFENING 7 Days @ 14°F HARDNESS, TYPE A DUROMETER, POINTS CHANGE	0 TO +15	MODIFIED D2240
COMPRESSION SET, 70 HR @ 212°F MAX.	40 PERCENT	D395 METHOD B

**LUBRICANT-ADHESIVE:** FURNISH A ONE PART MOISTURE CURING POLYURETHANE COMPOUND MEETING THE REQUIREMENTS OF ASTM D4070 AND AS SPECIFIED BY THE SEAL MANUFACTURER. SEE "CONSTRUCTION PROCEDURE" FOR APPLICATION.

**JOINTS IN STRIP SEALS:** FURNISH SEALS IN ONE CONTINUOUS PIECE UNLESS OTHERWISE APPROVED BY THE ENGINEER.

**SEAL RETAINERS:** FURNISH SOLID SHAPE STEEL RETAINERS, AS DIMENSIONED ON SHEET 2 OF 5 "RETAINER DETAIL", THAT ARE EXTRUDED, HOT ROLLED OR MACHINED. RETAINERS MANUFACTURED FROM BENT PLATE OR BUILT UP PIECES ARE NOT ACCEPTABLE. THE MANUFACTURER SHALL SPECIFY THE INTERNAL DIMENSIONS OF THE RETAINER TO ACHIEVE A POSITIVE SEAL AND ANCHORAGE.

AT JOINT UPTURNS, ESPECIALLY ON SKEWED BRIDGE DECKS, THE USE OF SPLIT RETAINERS MAYBE NECESSARY TO ENSURE PROPER SEAL GLAND INSTALLATION. WHERE THE SPLIT RETAINERS ARE REQUIRED, THE MANUFACTURER SHALL OBTAIN THE ENGINEER'S APPROVAL FOR THE DESIGN.

BEFORE THE GLAND IS INSTALLED, CORRECT ANY DEFECTS IN THE STEEL RETAINER OR THE ACTUAL EXPANSION JOINT THAT COULD CAUSE DAMAGE TO THE GLAND.

**JOINTS IN RETAINERS:** WELDS SHALL BE WATER TIGHT, PARTIAL PENETRATION WELDS AROUND THE OUTER PERIPHERY OF THE ABUTTING SURFACES. GRIND FLUSH ALL WELDS IN CONTACT WITH THE SEAL AND JOINT ARMOR. DO NOT USE SHORT PIECES OF RETAINERS LESS THAN 6'-0" LONG, UNLESS REQUIRED AT CURBS OR SIDEWALKS. DO NOT PROVIDE ADDITIONAL SPLICES

**JOINTS IN RETAINERS: <CONTINUED>**  
IN RETAINERS AT CURB OR SIDEWALK SECTIONS OTHER THAN THOSE DETAILED IN THE STANDARD BRIDGE DRAWINGS.

**ARMOR STEEL:** ALL ANGLE SHAPES SHALL BE ASTM A709, GRADE 50 OR 50W. ALL OTHER STEEL PARTS INCLUDING RETAINERS, SHALL BE ASTM A709, GRADE 36, 50 OR 50W.

**JOINTS IN ARMOR STEEL:** SHOP OR FIELD JOINTS IN THE ARMOR SHALL BE COMPLETE PENETRATION WELDS GROUND FLUSH WHERE IN CONTACT WITH THE RETAINER.

**ARMOR COATING:** COAT ALL STEEL PARTS OF THE JOINT ASSEMBLY ACCORDING TO 516.

**TEMPORARY SUPPORTS:** THE FABRICATOR SHALL DESIGN AND INSTALL TEMPORARY SUPPORTS TO RESIST SHIPPING, ERECTION AND CONSTRUCTION FORCES WITHOUT DAMAGE TO THE STEEL ARMOR OR COATING. THESE SUPPORTS SHALL BE ADJUSTABLE IN THE FIELD TO ACCOUNT FOR VARIABLE TEMPERATURE SETTINGS. INSTALL THE SUPPORTS AFTER THE FABRICATION AND COATING IS COMPLETE.

**THREADED RODS:** FURNISH 3/4" DIAMETER THREADED RODS AND NUTS CONFORMING TO ASTM A307 OR A709, GRADE 36. GALVANIZE ACCORDING TO 711.02. THREADS SHALL BE FULL LENGTH.

**JOINT SUPPORT & ANCHORAGE REQUIREMENTS:**  
UNTIL THE CONCRETE HAS BEEN PLACED AND CURED, THE JOINT ASSEMBLY SHALL BE SUPPORTED ON THE 3/4" DIA. THREADED RODS. FOR EACH PHASE OF CONSTRUCTION, ANCHOR AT LEAST ONE SUPPORT LOCATION ON BOTH THE SUPERSTRUCTURE AND ABUTMENT SIDE OF THE JOINT WITH TWO 1'-6" LONG THREADED RODS. LOCATE THE ANCHORAGE NEAR THE CENTER OF THE JOINT LENGTH.

SEAL INSTALLATION:

- EXAMINE THE RETAINER FOR SOILAGE OR DEFECTS THAT CAN DAMAGE THE SEAL PRIOR TO SEAL INSTALLATION. REPAIR DEFECTS.
- NOT MORE THAN 24 HOURS PRIOR TO SEAL INSTALLATION, BLAST THE RETAINER INTERIOR PER SSPC SP6 "COMMERCIAL BLAST CLEANING", WITHOUT DAMAGING ADJACENT COATINGS. REMOVE ALL BLASTING MEDIA FROM THE RETAINER.
- CLEAN ALL SURFACES OF THE SEAL WITH METHYL ETHYL KETONE (MEK), TOLUENE (T) OR OTHER MANUFACTURER SPECIFIED SOLVENT USING CLEAN DISPOSABLE CLOTHS. MAINTAIN THE SURFACE CLEANLINESS UNTIL INSTALLATION.
- IMMEDIATELY BEFORE APPLYING THE LUBRICANT-ADHESIVE, BONDING SURFACES MUST BE CLEAN, DRY AND WARMER THAN 45°F. BONDING SURFACES MUST BE MAINTAINED IN THIS CONDITION UNTIL THE SEAL IS INSTALLED. LIBERALLY APPLY THE LUBRICANT-ADHESIVE TO BOTH THE RETAINER AND THE SEAL USING THE MANUFACTURER'S SPECIFIED METHODS FOR COMPLETE AND UNIFORM COVERAGE.
- INSTALL THE SEAL WITH EQUIPMENT AND PROCEDURE SPECIFIED BY THE MANUFACTURER. ELONGATION OF THE SEAL OR STRUCTURAL DAMAGE TO THE SEAL CAUSED BY INSTALLATION METHODS WILL BE CAUSE FOR REJECTION.
- REMOVE EXCESS LUBRICANT-ADHESIVE AFTER INSTALLATION.

**REINFORCING STEEL:** THE REINFORCING STEEL DETAILED IN SECTIONS F-F AND G-G ON SHEET 3/5 WILL BE PAID FOR WITH ITEM 509 EPOXY COATED REINFORCING STEEL. A BENDING DIAGRAM AND BAR LIST IS PROVIDED ON SHEET 5/5.

DESIGNER NOTES:

**PROJECT PLANS** SHALL LIST DIMENSIONS "A" AND "Y" FOR TEMPERATURES BETWEEN 30°F AND 90°F IN 10° INCREMENTS. INCLUDE BARS JS501 AND JS502 WITH THE SUPERSTRUCTURE STEEL PORTION OF ITEM 509 AND JA501, JA502, JA601, JA602 AND JA603 WITH THE SUBSTRUCTURE STEEL PORTION OF ITEM 509.

**JOINT SEAL GLANDS** AT FIXED BEARINGS SHALL BE THE SAME SIZE AS AT THE EXPANSION BEARINGS WITH A DIMENSION "A" OF 2" AT ANY AMBIENT TEMPERATURE.

**LIMITATION:** SKEW ANGLES SHALL NOT BE GREATER THAN 60°.

DESIGN AGENCY: OFFICE OF STRUCTURAL ENGINEERING  
 STATE OF OHIO DEPARTMENT OF TRANSPORTATION: 01-20-06 DATE: *Tom Kell*  
 ADMINSTRATOR: *Tom Kell*  
 REVIEWED: EXJ-6-06  
 CHECKED: *Sam*  
 DESIGNED: SAM  
 DRAWN: SAM  
 REVISIONS: 01-18-13  
 STANDARD: STRIP SEAL EXPANSION JOINTS FOR CONCRETE I-BEAM SUPERSTRUCTURES  
 4 / 5

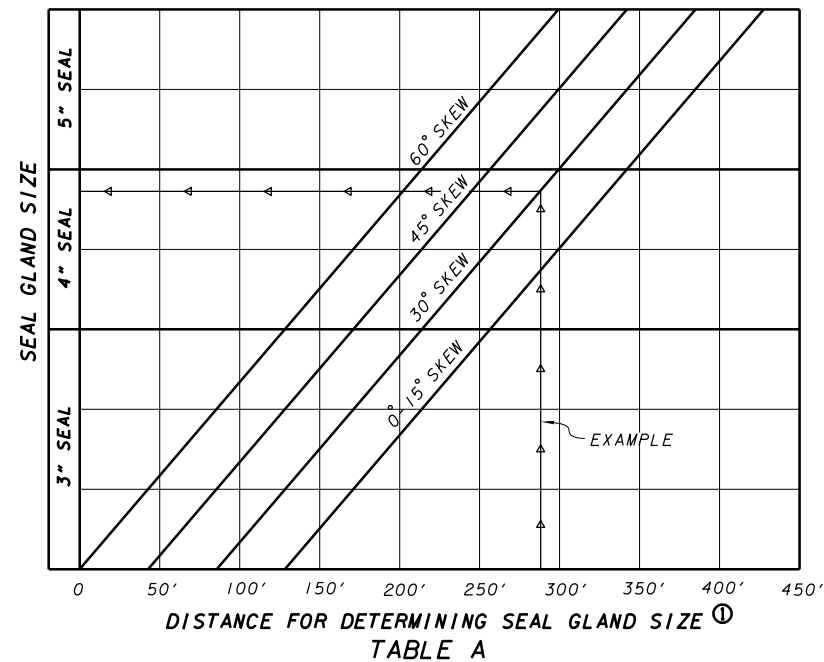


TABLE A  
DISTANCE FOR DETERMINING SEAL GLAND SIZE ①

**LEGEND**

- ① - THIS IS THE ACTUAL DISTANCE FROM THE CENTERLINE OF JOINT TO THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE MEASURED ALONG THE CENTERLINE OF ROADWAY. THIS DIMENSION SHALL BE A MAXIMUM OF 299' FOR 60° SKEWS, 342' FOR 45° SKEWS, 385' FOR 30° SKEWS AND 427' FOR 0° THRU 15° SKEWS. THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE IS THAT POINT WHICH HAS ZERO HORIZONTAL MOVEMENT DURING TEMPERATURE CHANGES.
- ② - THIS DISTANCE FOR EXPANSION JOINTS HAVING SKEW ANGLES OF 15° OR LESS IS THE ACTUAL DISTANCE TO THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE ALONG THE CENTERLINE OF ROADWAY. THIS DISTANCE FOR EXPANSION JOINTS HAVING SKEW ANGLES OVER 15° BUT NOT GREATER THAN 60° IS ARRIVED AT BY MULTIPLYING THE ABOVE DEFINED DISTANCE ALONG THE CENTERLINE OF ROADWAY BY THE COSINE OF THE EXPANSION JOINT SKEW ANGLE.
- ③ - THIS IS THE JOINT OPENING (DIMENSION "A") REQUIRED AT THE TIME OF ABUTMENT BACKWALL CONCRETE PLACEMENT, BASED ON THE DAY'S ANTICIPATED PEAK AMBIENT TEMPERATURE.
- ④ - MINIMUM JOINT OPENING (DIMENSION "A") AT TIME OF SEAL GLAND INSTALLATION SHALL NOT BE LESS THAN 1 1/2". IF THE JOINT OPENING IS LESS, INSTALLATION SHALL BE POSTPONED UNTIL THE TEMPERATURE DROPS A SUFFICIENT AMOUNT TO ALLOW THE MINIMUM 1 1/2" OPENING.

**EXAMPLE**

GIVEN - THE DISTANCE FROM THE CENTERLINE OF THE JOINT TO THE THERMAL NEUTRAL POINT OF THE SUPERSTRUCTURE ALONG THE CENTERLINE OF THE ROADWAY IS 287.5'. THE SKEW ANGLE OF THE EXPANSION JOINT IS 30° AND THE ANTICIPATED AMBIENT TEMPERATURE AT TIME OF JOINT INSTALLATION IS 65° F.

FIND - REQUIRED STRIP SEAL GLAND SIZE AND THE JOINT OPENING (DIMENSION "A") AT THE TIME OF JOINT ARMOR INSTALLATION.

SOLUTION -

- (A) ENTER TABLE "A" AT ① WITH 287.5' AND FIND THAT THE REQUIRED STRIP SEAL GLAND SIZE IS 4 INCHES.
- (B) ENTER TABLE "C" AT ② WITH 287.5' X COSINE OF 30° = 248.98' AND FIND REQUIRED JOINT OPENING AT 65°F IS 1.86".

NOTE: STEP (B) REQUIRED ONLY AT TIME OF CONSTRUCTION.

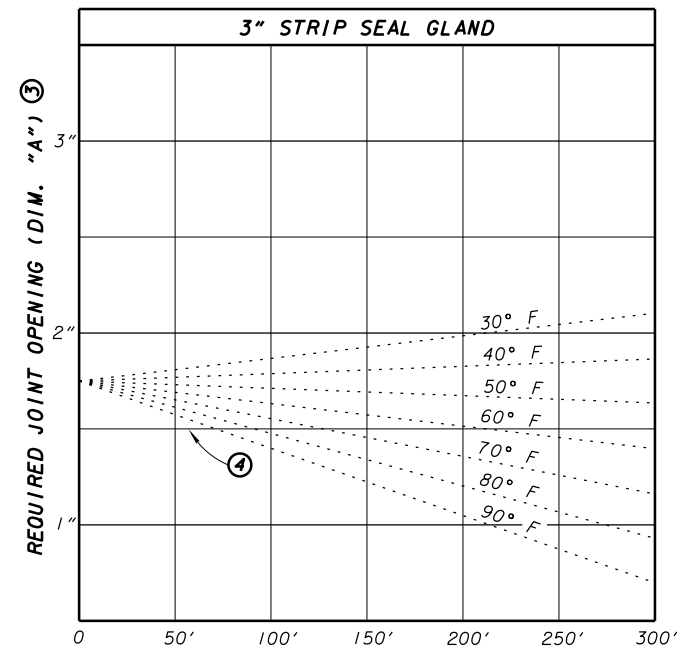


TABLE B  
DISTANCE FOR DETERMINING JOINT OPENING ②

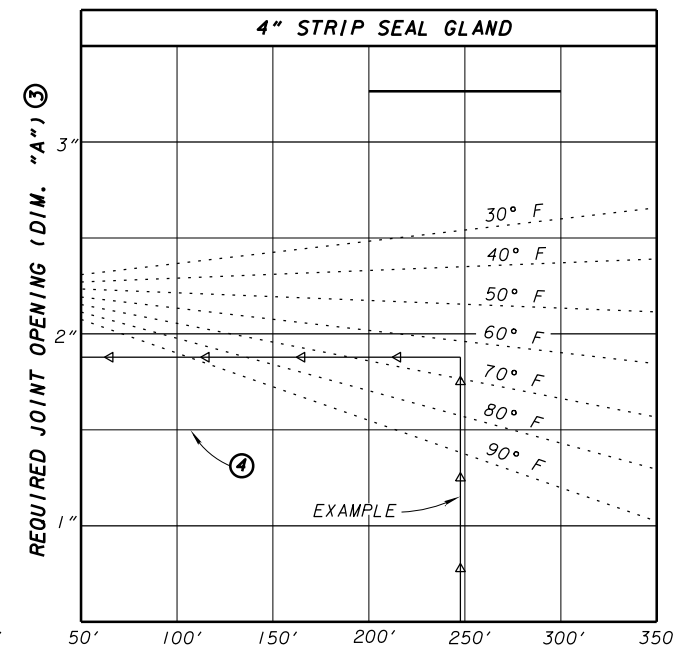


TABLE C  
DISTANCE FOR DETERMINING JOINT OPENING ②

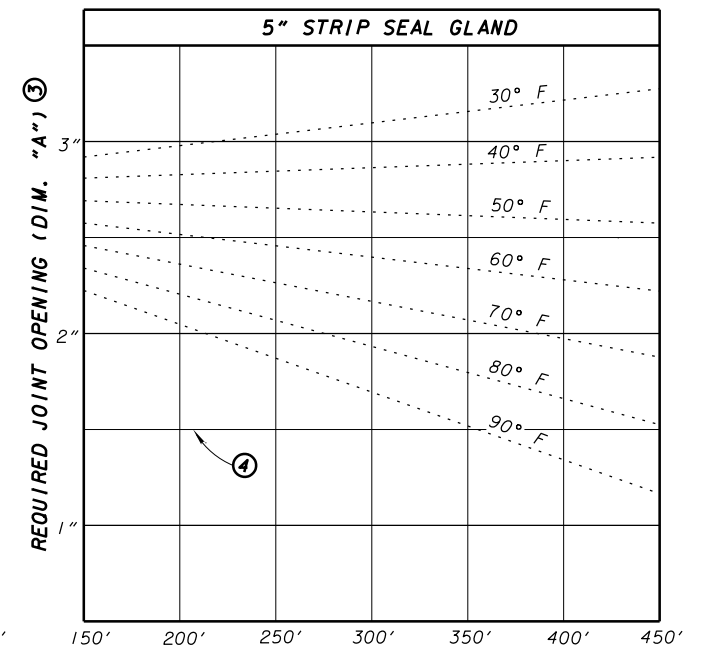
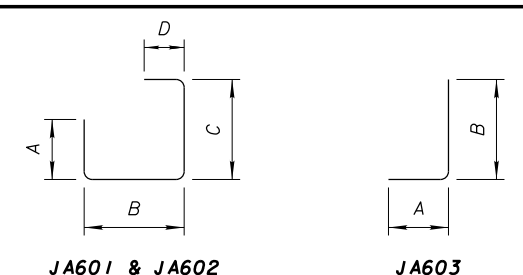


TABLE D  
DISTANCE FOR DETERMINING JOINT OPENING ②

MARK	LENGTH	TYPE	DIMENSIONS			
			A	B	C	D
JS501	3' - 6"	STR				
JS502	⊕	STR				
JA501	⊕	STR				
JA502	⊕	STR				
JA601	1+44"	BT	1+12"	11"	1' - 6"	9"
JA602	1+50"	BT	1+12"	1' - 5"	1' - 6"	9"
JA603	1+13"	BT	11"	1+4"		

**BENDING DIAGRAMS**



JA601 & JA602

JA603

⊕ - SEE PROJECT PLANS  
t = APPROACH SLAB THICKNESS