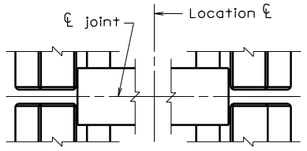
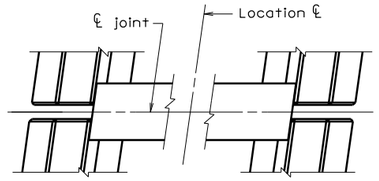
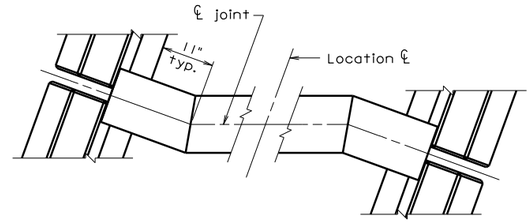
STATE	FEDERAL AID ROUTE	FEDERAL AID PROJECT	STATE ROUTE	STATE PROJECT	SHEET NO.
VA.	—				



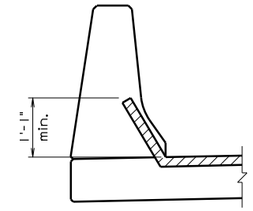
PLAN ELASTOMERIC EXPANSION DAM
Straight crossing



PLAN ELASTOMERIC EXPANSION DAM
Skewed crossing under 10°



PLAN ELASTOMERIC EXPANSION DAM
Skewed crossing over 10°



PARAPET SECTION
On ℄ expansion joint

Notes:

Shop drawings of the type of dam(s) selected and corresponding slab opening(s) and anchor details shall be submitted to the Engineer for review in accordance with these details and Section 105.10 of the Specifications.

Top of dam shall be set below top of slab in accordance with manufacturer's recommendation or 1/8", whichever is greater.

Concrete shall be placed beneath the dam in such a manner as to prevent the formation of air pockets in the concrete.

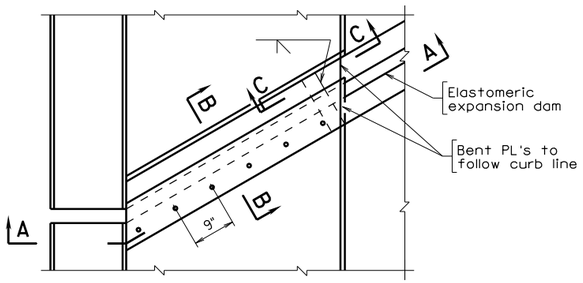
All bolts, nuts, washers and cap screws shall be ASTM A276, Type 304 stainless steel.

Non-stainless ferrous metal shall be ASTM A709, Grade 36 and shall be painted in accordance with Section 411 of the Specifications.

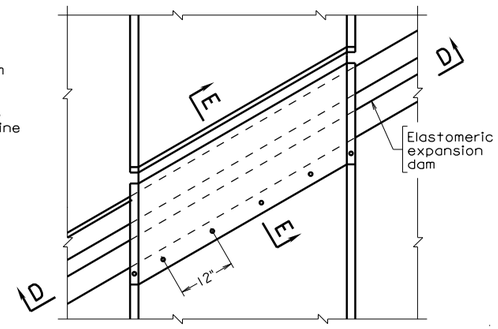
Completely welded curb and gutter sections shall be furnished for Types F2 and I.

Steel sections shall be furnished in minimum lengths of 18' and shall be field welded into continuous sections. Welds shall be ground smooth in areas where they will be in contact with the elastomer.

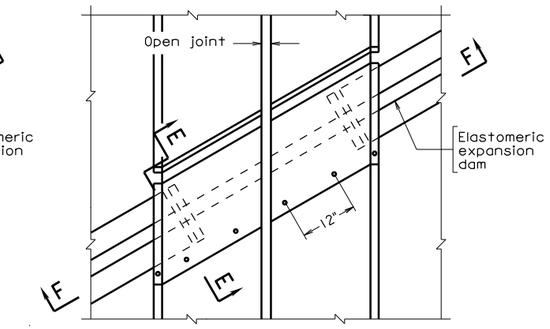
Where the total length of the joint is less than 40', the minimum length of steel sections shall be half of the total length of the joint.



PLAN AT SIDEWALK
Any Skew



PLAN AT RAISED MEDIAN
(Any Skew)



PLAN AT RAISED MEDIAN
WITH LONGITUDINAL JOINT
(Any Skew)

Dam Proprietary Nomenclature:

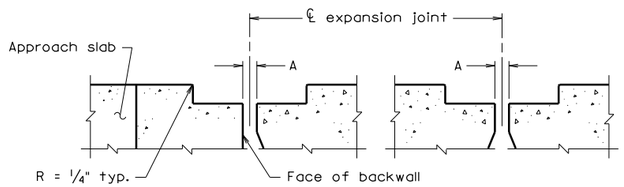
Type F2 = Acme Strip Seal, On-Flex Strip Seal (Structural Accessories), Steelflex SSC-M (D.S.Brown), E-Poxy Industries S400, & R. J. Watson RJM Strip Seal

Type I = Nonproprietary

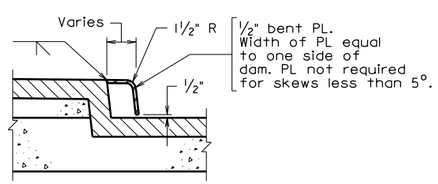
Abutment	Pier	Types allowed	A (at 60°F)	t	Total Movement	Skew Angle

"A" shall be increased or decreased for every 10°F temperature drop or rise respectively by "t". "A" is measured perpendicular to the joint centerline.

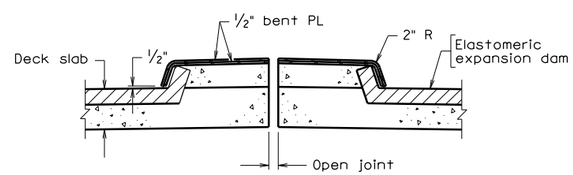
Total movement is the movement the dam must be capable of providing to allow for the effects of temperature changes, girder end rotation under live load and racking caused by the skew angle.



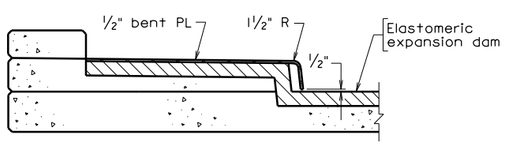
AT ABUTMENT AT PIER
SECTION THROUGH JOINT RECESS



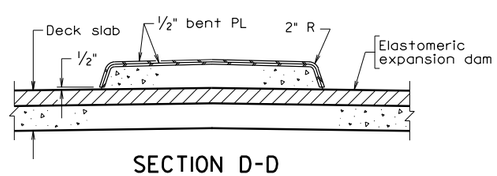
SECTION C-C



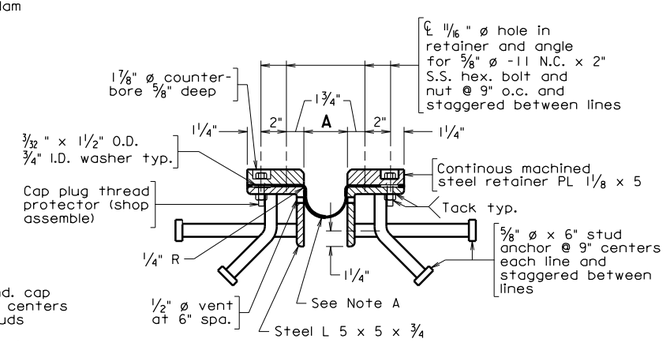
SECTION F-F



SECTION A-A



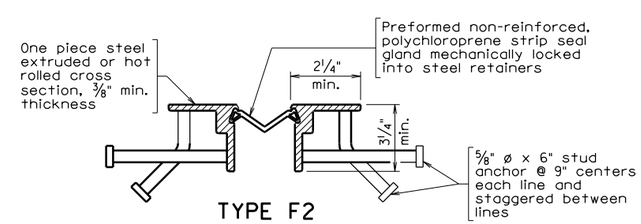
SECTION D-D



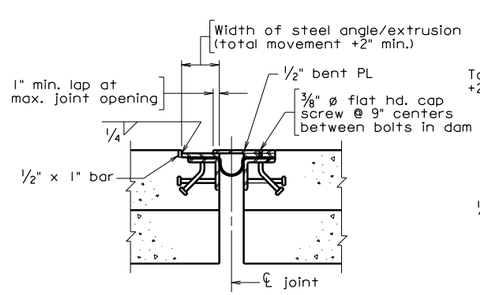
Note A:

1/8" thick continuous synthetic fabric reinforced sheet elastomeric gland: Constant width = 14", 50 or 60 Durometer, and punch 1 1/2" ø holes through gland to match bolt locations

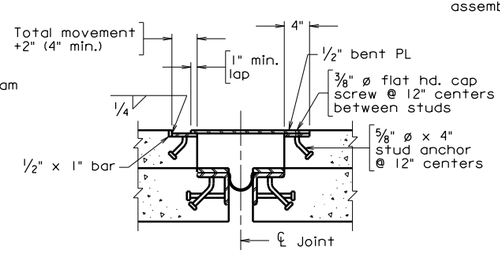
TYPE I
TYPES OF EXPANSION DAMS



TYPE F2



SECTION B-B



SECTION E-E

No.	Description	Date

Revisions

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

STRUCTURE AND BRIDGE DIVISION

ELASTOMERIC EXPANSION DAM

Designed: .....
Drawn: ....S&B DIV
Checked: .....

Date	Plan No.	Sheet No.
	BEJ-3	

Not to scale

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bej3.dgn

06-14-2010

BEJ-3

VDOT S&B DIVISION
RICHMOND, VA
STRUCTURAL ENGINEER

ELASTOMERIC EXPANSION DAM

NOTES TO DESIGNER:

Procedure for Selecting Expansion Dam:

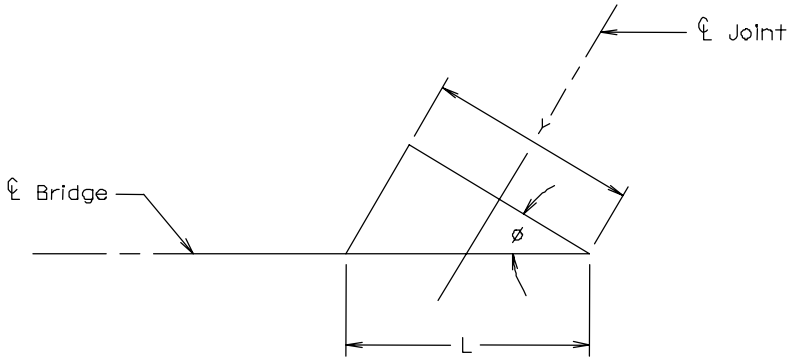
1. Determine if preformed elastomeric joint sealer (compression seal) can be used. See Manual of the Structure and Bridge Division, Volume V – Part 2, Chapter 14.

2. If compression sealer cannot be used, determine total longitudinal movement. Convert this to movement perpendicular to joint. All dimensions in these notes are perpendicular to the joint centerline.

3. Check table below for dams that can be used based on total movement and skew angle:

DAM SELECTION CRITERIA		
Type	Manufacturer's Rated Movement Capacity	Allowable Skew Range
F2	0" to 4"	0° - 22°
I	0" to 4"	0° - 22°

Types F2 and I may be used on skews over 22° by using the following procedure to calculate the Total Movement::



Ø = Skew angle

L = Calculated longitudinal movement

Y = Total movement dam must be capable of providing to allow for the effects of temperature changes and racking caused by the skew angle. (This is not the actual movement and can exceed 3 $^{1}/_{2}$" so long as A_{max} does not.)

Skew	Total Movement (Y)
0° to 22°	L cos Ø
Over 22°	2.5L sin Ø

NOTES TO DESIGNER (cont'd):

Example: Calculated longitudinal movement L = 2".

Skew angle Ø = 40°.

Total movement Y = 2.5L sin Ø = 2.5(2) sin 40 = 3.21".

Enter 3 $^1/_4$" in total movement column on standard.

Actual movement = L cos Ø = 2 cos 40 = 1.53".

$A_{max} = A_{min}$ + actual movement = 1" + 1 $^1/_2$" = 2 $^1/_2$" < 3 $^1/_2$" O.K.

$A = A_{min} + {}^1/_2$ actual movement = 1" + $^3/_4$" = 1 $^3/_4$".

Enter 1 $^3/_4$" in column A on standard.

4. Determine minimum opening in concrete slab (Amin):

Expansion Length	Minimum Opening	
	Type F2	Type I
O' to 100'	$^3/_4$"	$^1/_2$"
Over 100' to 200'	1"	$^3/_4$"
Over 200' to 300'	1 $^1/_4$"	1"
Over 300'	1 $^1/_2$"	1 $^1/_4$"

5. Determine maximum opening of concrete slab (Amax):

$$A_{max} = A_{min} + L \cos Ø$$

Note: The maximum opening between the rigid portions of the dam at roadway surface shall not exceed 3 $^1/_2$" for Types F2 and I.

6. When joint requirements do not fit within the dam selection criteria, tooth expansion joint should be used.

7. When an expansion dam is required at a joint with only fixed bearings because of the skew and/or rotation depth, set A = Amin + $^1/_2$".

NOTES TO DESIGNER (cont'd):

Design/Detailing Requirements:

1. Pay items for expansion dam shall be based on total movement as follows:

   0" to 2"
   2" + to 3"
   3" + to 4"

2. Abutment design may be affected by the tensile and/or compressive forces transmitted by dams. Under extreme conditions any dam may transmit tensile and/or compressive forces of 300 lbs./lin.ft. of dam.

3. Where expansion dams are used, the ends of the deck slabs and abutment backwalls require additional reinforcing.

4. The following note shall be added to abutment and superstructure details as appropriate:

   The Contractor shall adjust reinforcing steel as required to clear shear connectors.

ADD THE FOLLOWING NOTES, DIMENSIONS, DETAILS, ETC. TO STANDARD:

Complete table by indicating abutment or pier designation, types (of dams) allowed (e.g. F2, I), A @ 60°F, t, total movement and skew angle.

A @ 60°F = slab opening at mid temp = A_{min} + ½ actual movement

t = temperature variation per 10°F as follows:

Span Length	t
40'-59'	$^{3}/_{64}$"
60'-99'	$^{1}/_{16}$"
100'-124'	$^{3}/_{32}$"
125'-149'	$^{7}/_{64}$"
150'-199'	$^{1}/_{8}$"
200'-249'	$^{11}/_{64}$"
250'-300'	$^{7}/_{32}$"