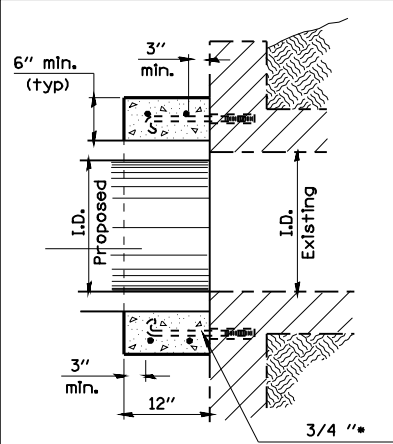
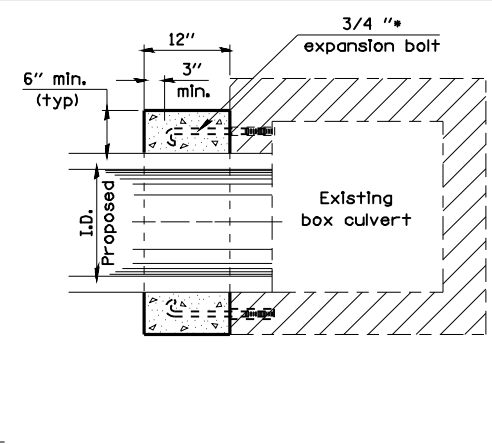


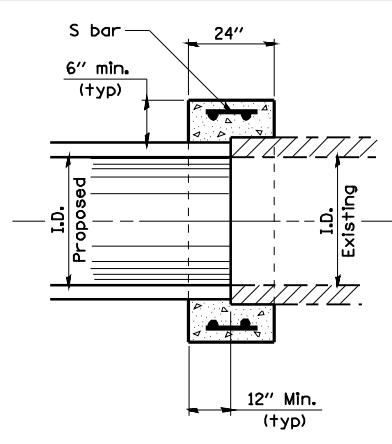
**PIPE CULVERT EXTENSION COLLAR**



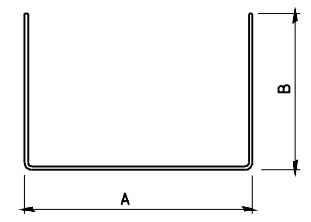
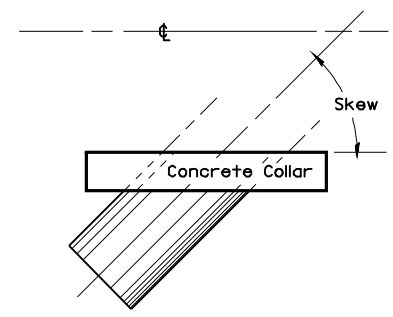
**Section Type A**  
(Box end extension)



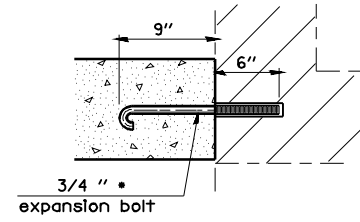
**Section Type B**  
(Pipe in side extension)



**Section Type C**  
(Pipe end to pipe end extension  
No expansion bolts required)



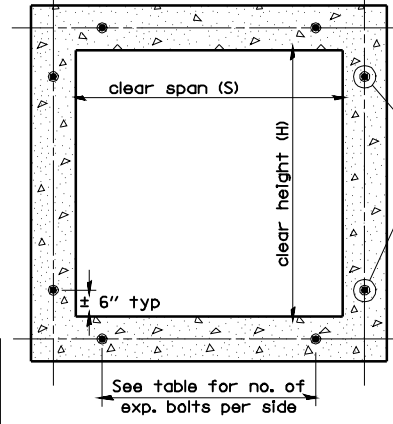
**#4 U - bar**



**Expansion Bolt Detail**

- Notes:**
- Expansion bolts shall consist of self drilling expansion shields and 3/4" hooked bolts. Hooked bolts shall extend a minimum of 9" into new concrete. Minimum Certified Proof Load - 4,080 lbs.
  - Use minimum of 1 (one) expansion bolt at each corner.

**BOX CULVERT POURED IN PLACE EXTENSION**



**Section Thru Barrel**

**EXPANSION BOLTS REQUIRED FOR CULVERT EXTENSIONS**

H or S	No. Expansion Bolts Req'd. Per Side			
	Extension ≤ 15ft		Extension > 15ft	
	No.	Spacing	No.	Spacing
24"	*	*	*	*
30"	2	18"	2	18"
36"	2	24"	2	24"
48"	3	18"	3	18"
60"	4	16"	3	24"
72"	5	15"	4	20"
84"	5	18"	4	24"
96"	6	17"	5	21"
108"	6	19"	5	24"
120"	7	18"	6	21"
132"	8	17"	6	24"
144"	8	19"	7	22"

Note: Number of expansion bolts in table based on non-skewed culverts.  
\* Use minimum 1 (one) expansion bolt in each corner.

Station	Section Type	Skew	Existing Culvert		Proposed Culvert		Collar		Reinforcement Bars						Expansion Bolts 3/4"	Class S1 Concrete Collar					
			Size	I.D.	O.D.	Height	Width	S bar	U bar					lb							
									No.	Size	Length	No.	Size	A	B	Lap	Length		Each	yg <sup>3</sup>	
420+60.97 RT.	A	04°30'30"	2'x2'	30"	37"	4'-1"	4'-1"	4	#4	0'-8"	4	#4	3'-7"	2'-5"	15"	8'-5"	25	4	0.34		
420+97.18 LT.	A	19°29'21"	2'x2'	30"	37"	4'-1"	4'-1"	4	#4	0'-8"	4	#4	3'-7"	2'-5"	15"	8'-5"	25	4	0.34		
<b>Total</b>																			<b>50</b>	<b>8</b>	<b>0.68</b>

REVISIONS	
NAME	DATE