

DESIGN:
AASHTO LRFD Bridge Design Specifications, 2012 Edition with California Amendments, preface dated January 2014

LIVE LOADING:
Impact Factor (Apply to roof slab only):
 $IM = 33(1.0 - 0.125 D_E) \geq 0\%$

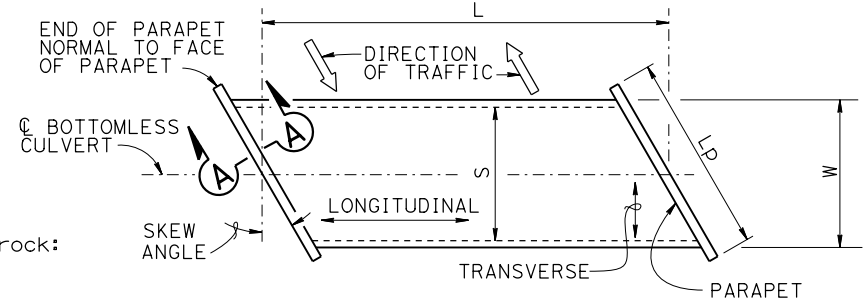
EARTH LOADING:
Earth pressures for two conditions:
For culverts with pile foundation or footing on rock:
CASE 1: 140 LB/CF vertical, 42 LB/CF horizontal
CASE 2: 140 LB/CF vertical, 140 LB/CF horizontal

For culverts with footing on soil:
CASE 3: 140 LB/CF vertical, 42 LB/CF horizontal
CASE 4: 140 LB/CF vertical, 70 LB/CF horizontal

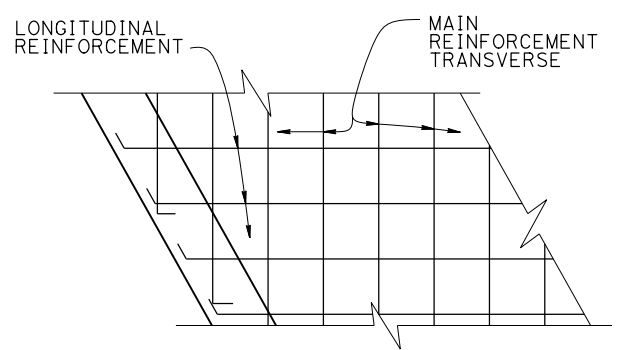
REINFORCED CONCRETE:
 $f'_c = 3.6$ ksi (Culverts & Footings)
 $f'_c = 4.0$ ksi (Piles)
 $f_y = 60$ ksi

PILES:
Class 200 kip pile in Standard Plans B2-8

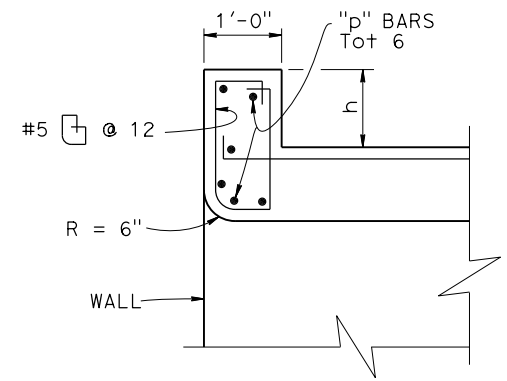
- NOTES:**
1. Main reinforcement is to be placed transversely or for curved culverts, radially. When radial, reinforcing spacing of the transverse bars in the top slab is measured along the centerline.
 2. Provide paving notch when top is exposed and when pavement is Portland Cement Concrete, see "ALTERNATIVE PAVING NOTCH" detail on "CIP BOTTOMLESS CULVERT WALL, SLAB, AND PILE DETAILS" sheet for details.
 3. For design and details not shown, see Standard Plans D82 and D84.
 4. Strutting required as shown on Standard Plan D88. Strutting may be required on culvert extensions when existing parapet is removed.
 5. Roof and Walls:
When cover is less than span length:
Place 1/2" premolded expansion joint filler at 30'-0"± centers outside the paved roadway lanes and place weakened planes per Bridge Detail 3-2, Standard Plan B0-3, at 30'-0"± centers under paved roadway lanes.
When cover is more than span length:
Place 1/2" premolded expansion joint filler at 30'-0"± centers and additional 1/2" premolded expansion joints at locations of change in foundation character as directed by the Engineer.
 6. Construction joints:
Temporary joints permitted if normal (or radial) to \bar{C} of frame.



BOTTOMLESS CULVERT TERMINOLOGY



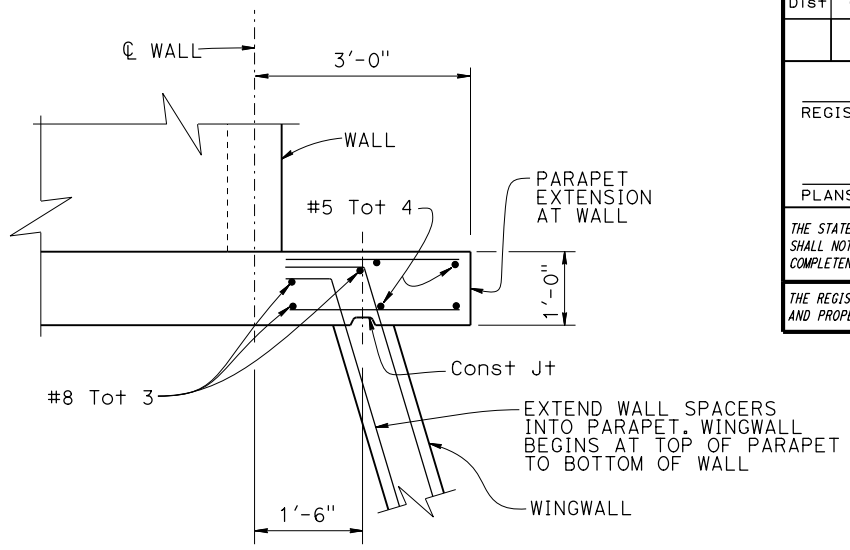
PART PLAN-SKEWED



SECTION A-A

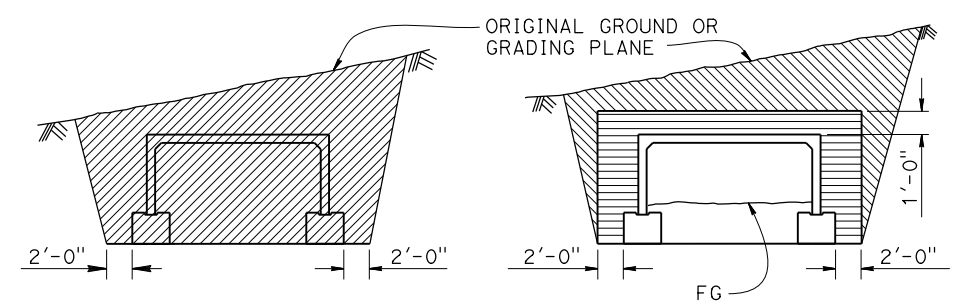
- LEGEND:**
- Structure Excavation (Culvert)
 - Structure Backfill (Culvert) 95% Relative Compaction
 - Roadway Embankment
 - W Width
 - L Length
 - Lp Parapet Length
 - h Parapet Height
 - S Span
 - D_E Minimum Depth of Earth Cover above the structure

PARAPET REINFORCEMENT							
PARAPET "p" BARS & HEIGHT "h"							
SPAN	SKEW ANGLE	0° TO 15°		16° TO 30°		31° TO 45°	
		p	h	p	h	p	h
12'		#6	1'-0"	#6	1'-2"	#6	1'-6"
14'		#7	1'-0"	#7	1'-4"	#7	1'-8"
16'		#8	1'-2"	#8	1'-6"	#8	2'-0"
18'		#9	1'-3"	#9	1'-9"	#9	2'-3"
20'		#10	1'-5"	#10	2'-0"	#10	2'-6"

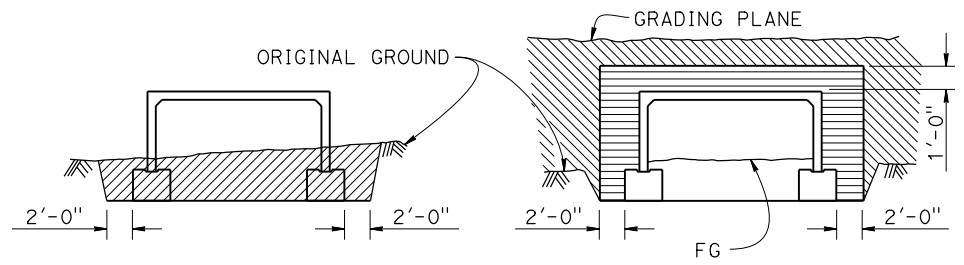


WINGWALL DETAIL (TYPE A, B, C)

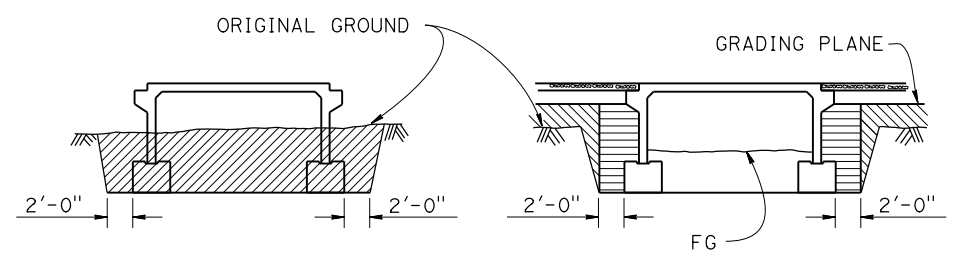
NOTE: See Standard Plan D84



IN TRENCH



IN EMBANKMENT



EXCAVATION

EXPOSED TOP

BACKFILL

NO SCALE

BRIDGE STANDARD DETAILS		
xs17-050-1 FILE NO.	September 2023 APPROVAL DATE	The components of the Bridge Standard Details have been prepared under the responsible charge of the Technical Owner, a registered civil engineer in the State of California

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION			
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DIVISION OF ENGINEERING SERVICES	
BRIDGE No. XX-XXXX	POST MILE X.X

CIP BOTTOMLESS CULVERT GENERAL CONFIGURATIONS	
REVISION DATES	SHEET OF X X