DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
X	X	X	X	X	X

REGISTERED CIVIL ENGINEER X DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER X No. X Exp. X CIVIL STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

DESIGN NOTES:

1. Specifications:

AASHTO LRFD Bridge Design Specifications, 6th Edition with California Amendments.

Loading:

Impact Factor (Apply to roof slab only):
IM = 33(1.0-0.125 D_E)≥0%
D_E - the minimum depth of earth cover

Earth Load:
Earth pressures for two conditions:
For culverts with piles or footing on rock
140 LB/CF vertical, 42 LB/CF horizontal.
140 LB/CF vertical, 140 LB/CF horizontal.
For culverts with footing on soil
140 LB/CF vertical, 42 LB/CF horizontal.
140 LB/CF vertical, 70 LB/CF horizontal.

Unit stresses:
f'c = 3600 psi (Culverts & Footings)
f'c = 4000 psi (Piles)
fy = 60,000 psi

Special reinforcement coverage:
Plans are not to be used for bottomless culverts in a corrosive environment or where there is a severe scour condition or in freeze-thaw locations.
Where culverts are exposed to action of salt water, thickness of concrete shall be increased to provide 4" coverage between steel and exposed surfaces.

2. Piles:
2'-0" Dia CIDH Concrete (Design Capacity 200 kips): see Standard Plan B2-3.

CONSTRUCTION NOTES:

Construction loads:
Strutting required as shown on Standard Plan D88.
Strutting may be required on culvert extensions when existing parapet is removed.

Roof and Walls:
When cover is less than span length-
Place 1/2" premolded expansion joint filler at 30'-0" 35/64 centers outside the paved roadway lanes and place Bridge Detail 3-2, Standard Plan B0-3, at 30'-0" 35/64 centers under paved roadway lanes.

When cover is more than span length-
Place 1/2" premolded expansion joint filler at 30'-0" 35/64 centers and additional 1/2" premolded expansion joints at locations of change in foundation character as directed by the engineer.

Construction joints:
Temporary joints may be permitted if normal (or radial) to ℄ of frame. Otherwise, the contractor is to submit a proposal for authorization.

BACKFILL:

No Wall joints may be used for extensions to increase stem height i.e., monolithic pour required for walls.

For construction loads refer to Standard Plan D88.

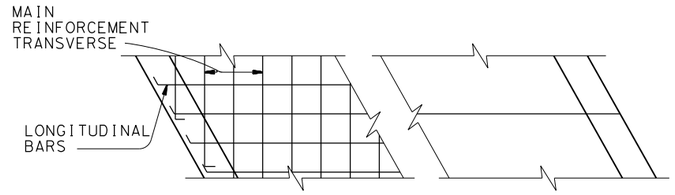
GENERAL NOTES:

Reinforcement placement:
Main reinforcement is to be placed transversely or, for curved culverts, radially. When radial, reinforcing spacing of the "a" & "b" bars is measured along the centerline. Stagger splices not shown. Hooks may be rotated or tilted, as necessary, for clearance.

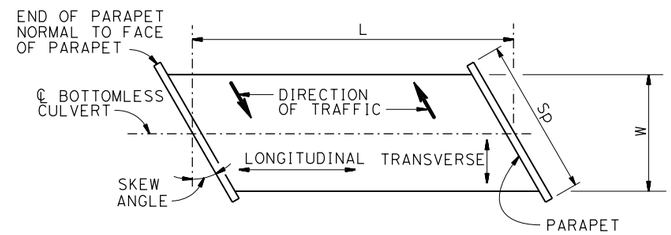
Provide paving notch when top is exposed and when pavement is portland cement concrete, and adjust quantities.

For design and details not shown, see Standard Plans D82 and D84.

Allowable skew angle to roadway is ≤ 20 degrees.
For larger skew angles refer to parapet details.

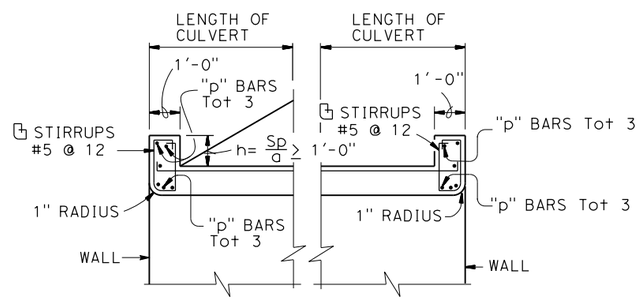


PART PLAN-SKEWED



BOTTOMLESS CULVERT TERMINOLOGY

(W = Width, L = Length, Sp = Parapet Span, (feet))

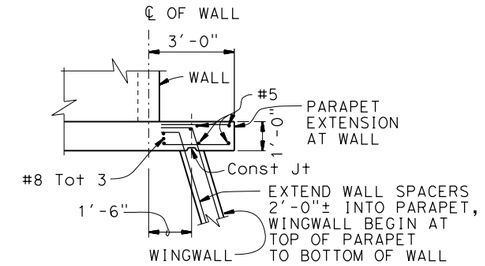


s = CLEAR SPAN, a = 12 COSINE SKEW ANGLE

PARAPET DETAIL WITH SKEW ANGLE

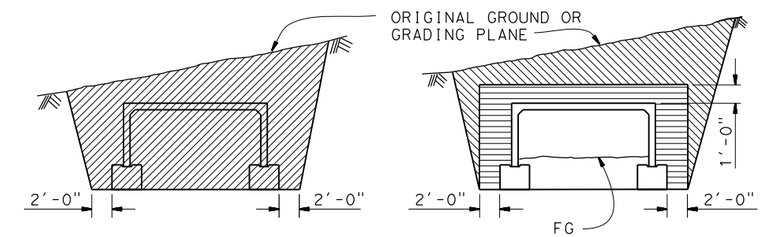
PARAPET "p" BARS			
SPAN \ SKEW ANGLE	0° TO 15°	16° TO 30°	31° TO 45°
12'	#6	#7	#8
14'	#7	#8	#9
16'	#8	#9	#10
18'	#9	#10	#10
20'	#10	#10	#10

PARAPET REINFORCEMENT

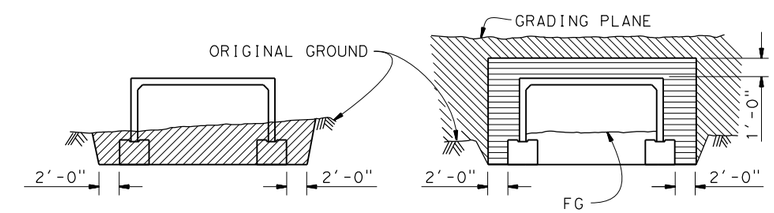


WINGWALL DETAIL, TYPE A, B, C

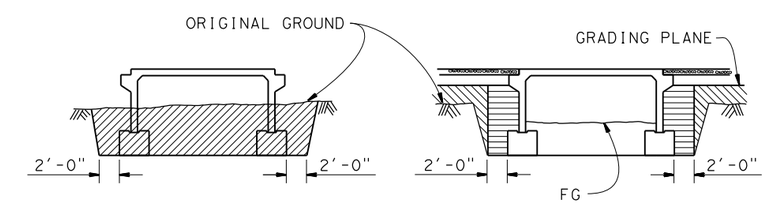
(See STANDARD PLAN D84)



IN TRENCH



IN EMBANKMENT



EXPOSED TOP

EXCAVATION

BACKFILL

LEGEND:

- STRUCTURE EXCAVATION (CULVERT)
- STRUCTURE BACKFILL (CULVERT) 95% RELATIVE COMPACTION
- ROADWAY EMBANKMENT
- ORIGINAL GROUND
- FINISH GRADE

STANDARD DRAWING

FILE NO. xs17-050-1

APPROVAL DATE July 2014

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES

BRIDGE NO. X

POST MILE X

X

CIP BOTTOMLESS CULVERT GENERAL CONFIGURATIONS

DS OSD 2147A (ENGLISH STANDARD DRAWING "XS" BORDER REV. (02-02-11)

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: X
PROJECT NUMBER & PHASE: X
CONTRACT NO.: X

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 6-19-14

SHEET X OF X

FILE => $REQUEST

USERNAME => $USER DATE PLOTTED => $DATE TIME PLOTTED => $TIME