Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER

October 30, 2015
PLANS APPROVAL DATE

Carl W. Duan
No. C59976
Exp. 6-30-16
CIVIL
REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

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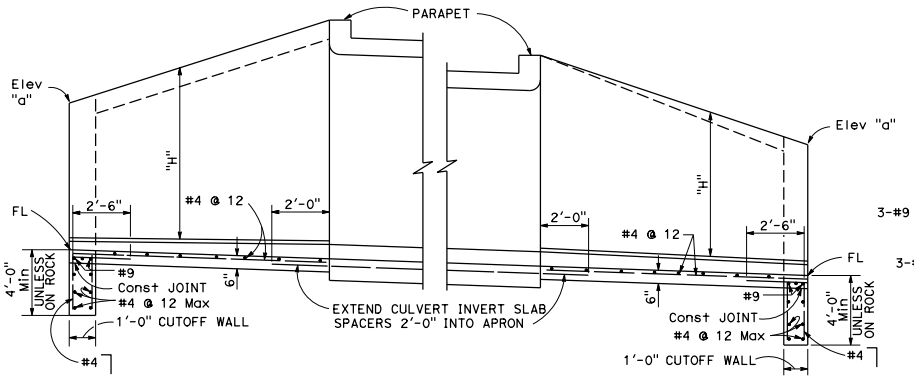
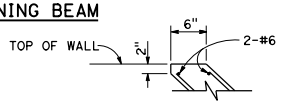
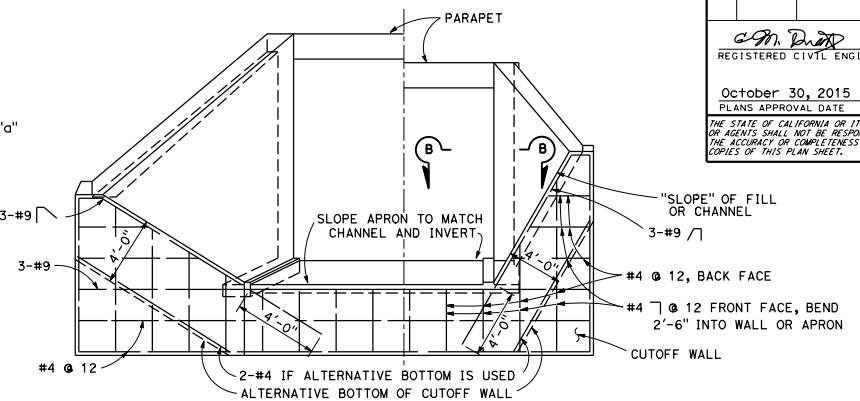


TYPICAL WITH STIFFENING BEAM TYPICAL WITHOUT STIFFENING BEAM

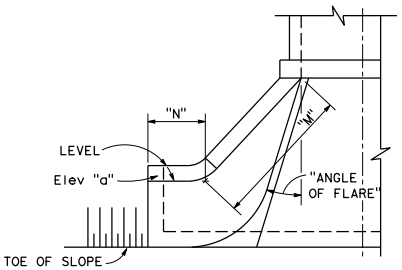
PART LONGITUDAL SECTION



WITHOUT STIFFENING BEAM

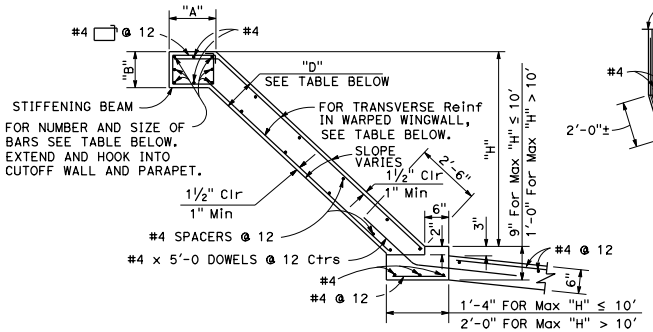


END ELEVATION

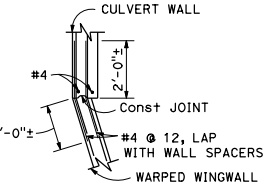


ALTERNATIVE WARPED WINGWALL

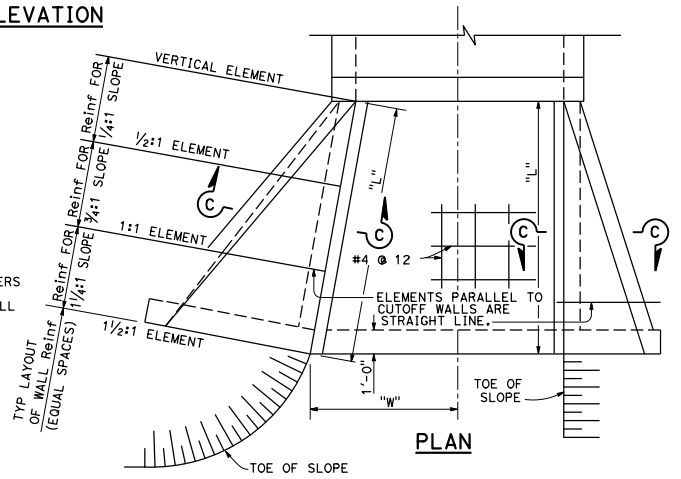
Use where additional protection to toe of embankment is required.



SECTION C-C



SECTION B-B



PLAN

WARPED WINGWALLS

WALL DIMENSIONS AND REINFORCING

ELEMENT SLOPE	"H"	8' OR LESS	10'	12'	14'	16'	18'	20'
¼:1	FRONT FACE Reinf	#4 @ 12	#4 @ 7	#5 @ 7	#5 @ 5	#6 @ 6	#7 @ 7	#7 @ 6
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12
¾:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 8	#4 @ 8	#4 @ 8	#4 @ 6	#4 @ 6
	REAR FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 10	#4 @ 7	#4 @ 6	#5 @ 8
1¼:1	FRONT FACE Reinf	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12	#4 @ 12
	REAR FACE Reinf	#4 @ 8	#4 @ 8	#4 @ 5	#5 @ 6	#6 @ 7	#6 @ 6	#7 @ 6
"D" AT CUTOFF WALL		6"	6"	6"	7½"	8"	9½"	11"
"D" AT CULVERT		6"	6"	6"	8"	9½"	11"	1'-1"

STIFFENING BEAM DIMENSIONS AND REINFORCING

"H" Max	"L" Max	12'	14'	16'	18'	20'	25'	30'	35'	40'
6'		NO BEAM, PLACE 2-#6 IN EACH FACE ALONG TOP OF WALL.								
8'			"A"= 1'-0"							
10'			"B"= 9"				"A"= 1'-6"			
12'								"A"= 1'-10"		
14'		TOTAL 6-#6		"B"= 1'-0"			"B"= 1'-3"		"A"= 2'-2"	
16'										"B"= 1'-6"
18'			TOTAL 6-#7			TOTAL 8-#8				
20'									TOTAL 8-#9	

NOTES: Walls designed for 2'-0" surcharge; earth density = 120 pcf; equivalent fluid pressure = 36 pcf.
Vary "D" of warped wall uniformly from that at cutoff wall to that at culvert, for maximum "H" > 12'-0".
Where abrasion is anticipated increase apron thickness to 7" minimum to provide 2" minimum reinforcement coverage.
Dimensions "L", "W", "H", "M", "N", Elevation "a", " Angle of flare", and end "Slope" (as applicable) are shown on the plans.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

BOX CULVERT WARPED WINGWALLS

NO SCALE

D86A

10-15-15