DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

Caltrans Metric

REGISTERED CIVIL ENGINEER

July 1, 2004
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Dallas Forester No. C37765 Exp. 12-31-04 CIVIL STATE OF CALIFORNIA

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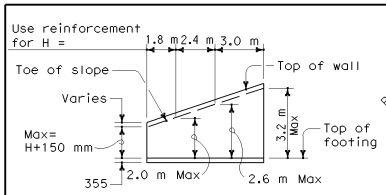
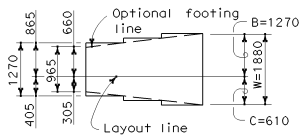
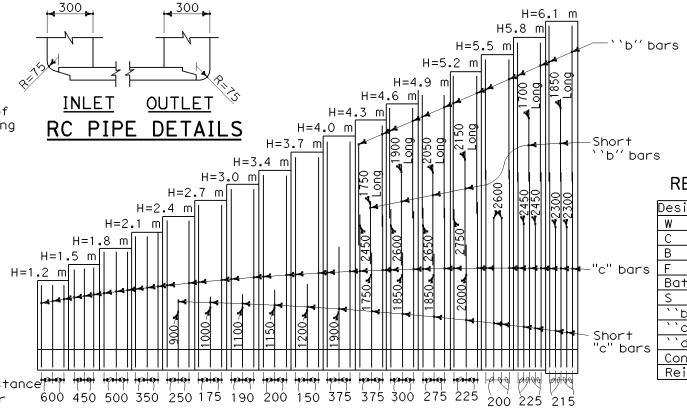


INLET OUTLET

RC PIPE DETAILS



TYPICAL LAYOUT EXAMPLE



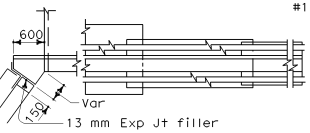
Number above ``b'' and ``c'' bars indicates distance from top of footing to upper end of bars. Bar cutoffs may be varied in increments of 150 mm.

REINFORCED CONCRETE WINGWALLS

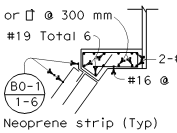
Design ``H''	1.2 m	1.5 m	1.8 m	2.1 m	2.4 m	2.7 m	3.0 m	3.4 m	3.7 m	4.0 m	4.3 m	4.6 m	4.9 m	5.2 m	5.5 m	5.8 m	6.1 m
W (mm)	965	1120	1270	1420	1575	1730	1880	2030	2185	2335	2440	2640	2845	3050	3250	3455	3660
C (mm)	305	355	405	455	510	560	610	660	710	760	815	915	1015	1120	1220	1320	1425
B (mm)	660	765	865	965	1065	1170	1270	1370	1475	1575	1625	1725	1830	1930	2030	2135	2235
F (mm)	355																405
Batter	None									4:100							
S (mm)	305									470	480	490	500	520	530	550	560
``b'' bars	None									#16@375	#16@300	#16@275	#16@225	#19@600	#19@450	#22@430	
``c'' bars	#13@600	#13@450	#16@500	#16@350	#16@250	#16@175	#19@190	#22@200	#22@150	#29@375	#32@375	#32@300	#32@275	#32@225	#32@200	#36@225	#36@215
``d'' bars	#13@600	#13@450	#16@500	#16@350	#16@250	#19@350	#22@380	#25@400	#22@300	#25@375	#29@375	#29@300	#29@275	#29@225	#29@200	#32@225	#32@215
Conc m^3/m	0.80	0.95	1.10	1.23	1.38	1.53	1.68	1.83	1.98	2.56	2.76	2.96	3.16	3.41	3.64	3.89	4.31
Reinf kg/m	19	24	28	37	45	55	73	92	113	109	134	155	183	210	253	281	307

NOTES

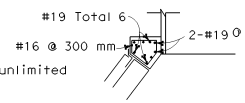
Unit Stresses: f_s = 165 MPa, f_c = 9 MPa, n = 10
Maximum Toe Pressure = 144 kPa.
Elevation, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field. Walls designed for 600 mm live load surcharge, 1 : 1.5 sloping surcharge not to exceed 1.5 m in elevation plus 600 mm live load surcharge, or unlimited 1:2 surcharge.
If 1 : 1.5 slope exceeds 1.5 m, use Type 2 retaining wall.
Wall height may be exceeded by 150 mm before going to the next greater ``H''.



PART PLAN A-A

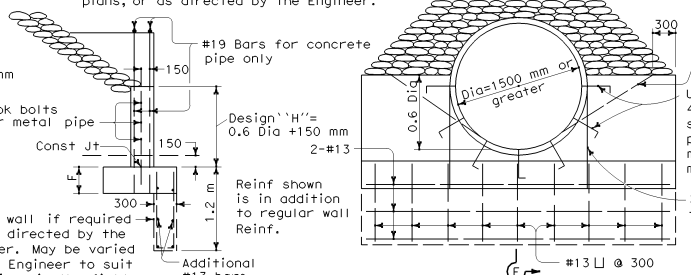


SECTION B-B



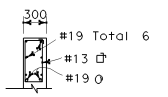
SECTION C-C

If required, slope protection details are shown elsewhere in the road plans, or as directed by the Engineer.

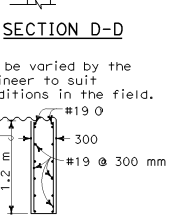


SECTION F-F

TYPE C WALL

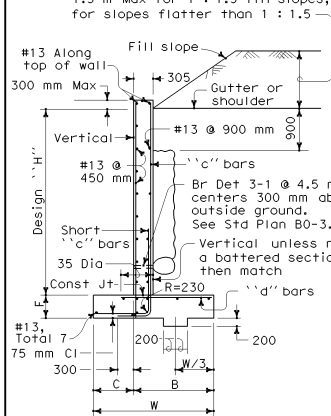


SECTION D-D



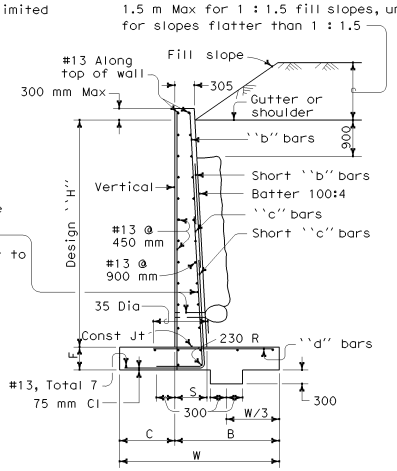
SECTION E-E

1.5 m Max for 1 : 1.5 fill slopes, unlimited for slopes flatter than 1 : 1.5

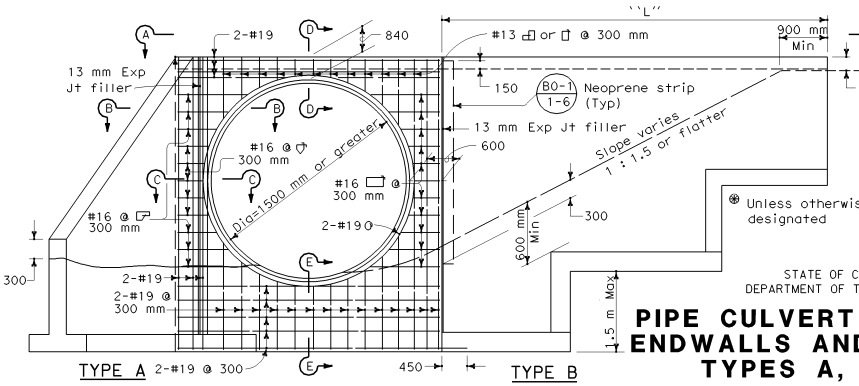


TYPICAL SECTION
H=1.2 m THRU 3.7 m

1.5 m Max for 1 : 1.5 fill slopes, unlimited for slopes flatter than 1 : 1.5



TYPICAL SECTION
H=4.0 m THRU 6.1 m



TYPE A 2-#19 @ 300

END ELEVATION

STRAIGHT WINGWALLS

TYPE B

For footing step dimensions and reinforcement see ``Footing Step'' on Std Plan B3-8.

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

PIPE CULVERT HEADWALLS, ENDWALLS AND WINGWALLS TYPES A, B AND C

NO SCALE

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

D90

2004 Std PLAN D90

04-01-04