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

Caltrans Metric

Paul Cotter
REGISTERED CIVIL ENGINEER

July 1, 1999
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Paul Cotter No. 34509 Exp. 9-30-99 CIVIL STATE OF CALIFORNIA

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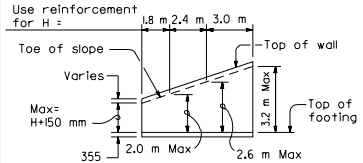
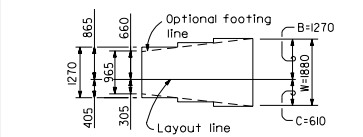
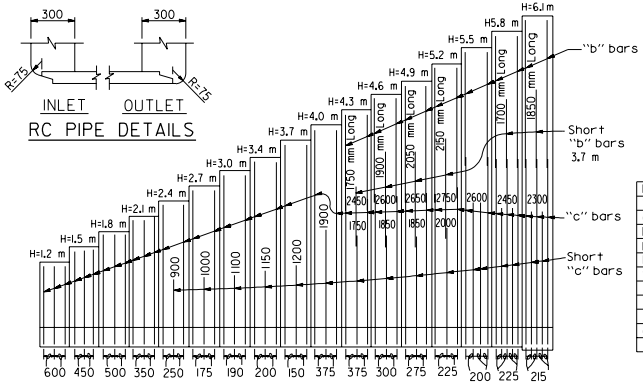



## TYPICAL LAYOUT EXAMPLE

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



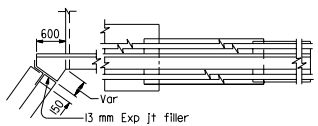

## RC PIPE DETAILS

## REINFORCED CONCRETE WINGWALLS

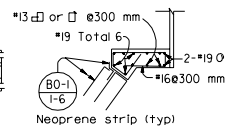
| Design "H" | 1.2 m | 1.5 m | 1.8 m | 2.1 m | 2.4 m | 2.7 m | 3.0 m | 3.4 m | 3.7 m | 4.0 m | 4.3 m | 4.6 m | 4.9 m | 5.2 m | 5.5 m | 5.8 m | 6.1 m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| W (mm) | 965 | 1120 | 1270 | 1420 | 1575 | 1730 | 1880 | 2030 | 2185 | 2335 | 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 m3/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

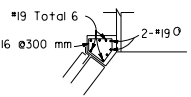
Unit Stresses: $f_s$ = 165 MPa, $f_c$ = 9 MPa, n = 10
Maximum Toe Pressure = 144 kPa.
Elevation, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field. Walls designed for 600 mm live load surcharge, 1:1.5 sloping surcharge not to exceed 1.5 m in 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".



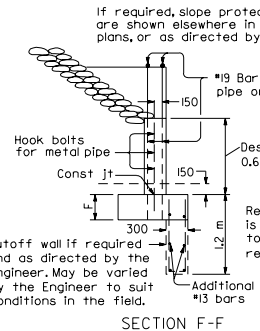

## PART PLAN A-A



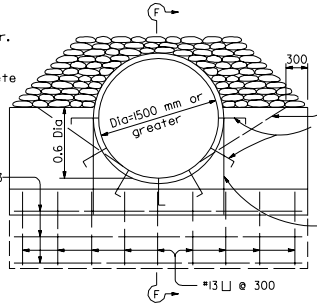

## SECTION B-B



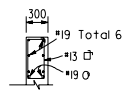

## SECTION C-C



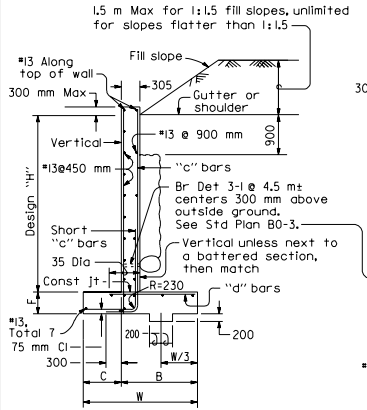

## SECTION F-F



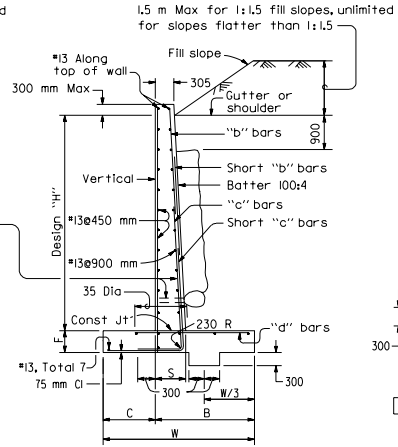

## TYPE C WALL



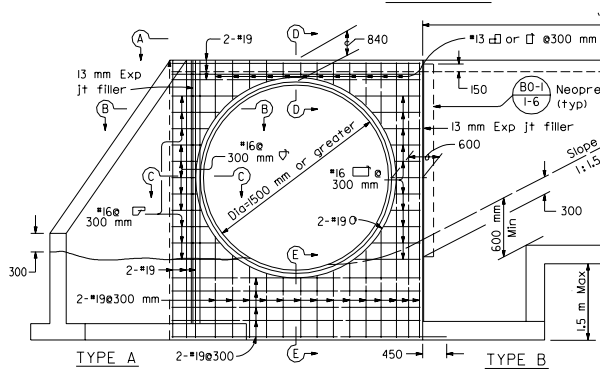

## SECTION D-D



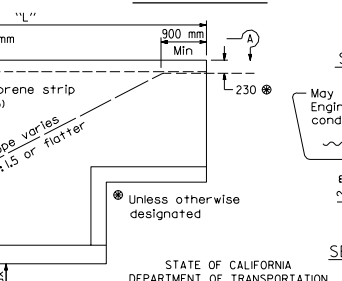

## TYPICAL SECTION
## H=1.2 m THRU 3.7 m




## TYPICAL SECTION
## H=4.0 m THRU 6.1 m



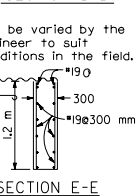

## TYPE A




## TYPE B

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

## END ELEVATION
## STRAIGHT WINGWALLS




## SECTION E-E

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**

**1999 STD. PLAN D90**