

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	
No.	X
Exp.	X

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TABLE OF PILE SPACING: CLASS 45 - CONCRETE PILES

DESIGN H	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'
W	7'-3"	7'-6"	8'-0"	8'-6"	9'-6"	10'-3"	11'-0"	12'-3"	14'-0"	14'-9"	17'-3"	19'-0"	21'-3"	22'-9"
F	1'-6"	1'-6"	1'-6"	1'-6"	1'-6"	1'-9"	2'-0"	2'-3"	2'-9"	3'-0"	3'-3"	3'-9"	4'-0"	4'-6"
M	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
N	5'-3"	5'-6"	6'-0"	6'-6"	7'-6"	8'-3"	9'-0"	10'-3"	12'-0"	12'-9"	15'-3"	17'-0"	19'-3"	20'-9"
ROW 1	8'-0"	8'-0"	8'-0"	7'-0"	6'-0"	4'-6"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"
ROW 2	16'-0"	16'-0"	16'-0"	14'-0"	15'-0"	11'-3"	10'-0"	12'-0"	6'-0"	4'-0"	4'-0"	4'-0"	4'-0"	4'-0"
ROW 3								8'-0"	8'-0"	6'-0"	6'-0"	4'-0"	4'-0"	4'-0"
ROW 4										6'-0"	6'-0"	4'-0"	4'-0"	4'-0"
ROW 5													6'-0"	6'-0"
CONFIGURATION	I	I	I	I	I	I	I	II	II	II	III	III	III	III

TABLE 1: TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

DESIGN H	STEM WITH HAUNCH													
	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'
STEM BATTER	0	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	1/2:12	5/8:12	3/4:12	7/8:12	1:12	1:12
STEM THICKNESS @ TOP	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
a BARS				#6@18**	#7@18**	#8@18**	#9@18**	#10@18**	#8 @ 9*	#8 @ 9*	#7 @ 6*	#10@12**	#9 @ 9*	#11@12**
Y				8'-0"	6'-6"	7'-6"	8'-0"	9'-0"	9'-6"	11'-0"	11'-6"	13'-0"	14'-0"	15'-6"
b BARS	#5 @ 12	#5 @ 12	#5 @ 9	#6@18**	#7@18**	#8@18**	#9@18**	#10@18**	#8 @ 9*	#8 @ 9*	#7 @ 6*	#10@12**	#9 @ 9*	#11@12**
Y	CONT	CONT	CONT	CONT	10'-6"	13'-0"	15'-0"	17'-6"	19'-6"	21'-0"	18'-6"	19'-0"	25'-6"	23'-6"
c BARS					#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 18	#6 @ 12	#7 @ 12	#7 @ 18	#7 @ 12
SHORT d BARS					#8@18**	#8@18**	#9@18**	#8@12**	#8@12**	#6 @ 6*	#8 @ 9*	#7 @ 6*	#9 @ 9*	#9 @ 9*
X					5'-6"	6'-6"	6'-6"	7'-6"	9'-6"	10'-0"	12'-0"	13'-0"	15'-0"	16'-0"
d BARS	#5 @ 12	#5 @ 9	#6 @ 9	#7 @ 9	#8@18**	#8@18**	#9@18**	#8 @ 12*	#8@12**	#6 @ 6*	#8 @ 9*	#7 @ 6*	#9 @ 9*	#9 @ 9*
X	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT
TOTAL e BARS	12 #6	12 #6	10 #5	12 #5	12 #5	14 #5	14 #5	16 #5	18 #5	18 #5	20 #5	22 #5	26 #5	26 #5

TABLE 2: TABLE OF REINFORCING STEEL DIMENSIONS AND DATA

DESIGN H	STEM WITH HAUNCH							STEM WITHOUT HAUNCH						
	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'	32'	
BATTER	0	0	0	0	0	0	0	0	0	1/4:12	1/2:12	1/2:12	1/2:12	
STEM THICKNESS @ HAUNCH	1'-0"	1'-0"	1'-0"	1'-0"	1'-3"	1'-3"								
STEM THICKNESS @ TOP							1'-6"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	2'-0"	
a BARS				#6@12**	#5 @ 6*	#9@18**	#9 @ 12*	#9@12**	#9@12**	#7 @ 6*	#7 @ 6*	#7 @ 6*	#9 @ 9*	#11@12**
Y				5'-6"	5'-6"	7'-0"	7'-0"	8'-0"	8'-6"	9'-6"	11'-0"	12'-6"	13'-6"	14'-6"
b BARS	#5 @ 9	#6 @ 9	#6@12**	#5 @ 6*	#9@18**	#9 @ 12*	#9@12**	#9 @ 12*	#7 @ 6*	#7 @ 6*	#7 @ 6*	#9 @ 9*	#11@12**	
Y	CONT	CONT	CONT	CONT	9'-6"	9'-6"	11'-0"	11'-6"	17'-0"	19'-6"	21'-6"	24'-0"	24'-0"	
c BARS					#7 @ 18	#7 @ 12	#7 @ 12	#7 @ 12	#6 @ 12	#6 @ 12	#6 @ 12	#7 @ 18	#7 @ 12	
SHORT d BARS					#8@18**	#8@18**	#9@18**	#8@12**	#8@12**	#6 @ 6*	#8 @ 9*	#7 @ 6*	#9 @ 9*	#9 @ 9*
X					5'-6"	6'-6"	6'-6"	7'-6"	9'-6"	10'-0"	12'-0"	13'-0"	15'-0"	16'-0"
d BARS	#5 @ 9	#6 @ 9	#7 @ 9	#8@18**	#8@18**	#9@18**	#8@12**	#8@12**	#6 @ 6*	#8 @ 9*	#7 @ 6*	#9 @ 9*	#9 @ 9*	
X	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	CONT	
TOTAL e BARS	12 #6	10 #5	12 #5	12 #5	14 #5	14 #5	16 #5	18 #5	18 #5	20 #5	22 #5	26 #5	26 #5	

DESIGN DATA

DESIGN: LOAD FACTOR DESIGN (LFD)
CONCRETE: REINFORCED CONCRETE, $f_c = 3600$ psi
 $f_y = 60000$ psi

LOADING CASE:

LEVEL GROUND WITH 240 psf LIVE LOAD SURCHARGE AND 16' SOUNDWALL.
 SEISMIC LOAD DEAD LOAD = 0.3 DEAD LOAD
 WIND LOAD = 30 psf
 DEAD LOAD OF SOUNDWALL = 1414 lb/lf
 DEAD LOAD OF BARRIER = 372 lb/lf

SEISMIC LOAD: SOIL

$K_h = 0.3g$
 $K_v = 0.0$
 $K_{oe} =$ MONOBE-OKABE METHOD

SOIL: $\phi = 34^\circ \gamma = 120$ pcf

EQUIVALENT FLUID PRESSURE:
 = 36 pcf MAX. FOR DETERMINATION OF TOE PRESSURE
 = 27 pcf MAX. FOR DETERMINATION OF HEEL PRESSURE

LOAD COMBINATIONS:

GROUP A : $\beta D + 1.7E + 1.7SC$
 GROUP B : $\beta D + 1.7E + 1.3W$
 GROUP C :
 STEM : $1.0D + 1.0E + 1.0EQD + 1.0EQE$
 FOOTING : $D + PYM$
 WHERE : $\beta = 1.0$ OR 1.3 WHICHEVER CONTROLS DESIGN
 D = DEAD LOAD
 E = LATERAL EARTH PRESSURE
 SC = LIVE LOAD SURCHARGE
 W = WIND LOAD
 EQD = SEISMIC DEAD LOAD
 EQE = SEISMIC LATERAL EARTH PRESSURE

CONT = CONTINUOUS
 * = a AND b [SHORT d & d] BARS ARE BUNDLED TOGETHER.
 ** = ALTERNATE a AND b BARS AS SHOWN IN DETAIL A.
 ALTERNATE SHORT d AND d BARS.

GENERAL NOTES

- CLASS 45-CONCRETE PILES WERE USED FOR THE DESIGN.
- PILE BATTER SHOWN ARE 1:3.
- MINIMUM DISTANCE BETWEEN CENTER PILE AND EDGE OF FOOTING IS 1'-6".
- REDUCTION FACTORS:
 GROUPS A & B : $\phi = 0.75$
 GROUP C : $\phi = 1.0$
- LATERAL RESISTANCE OF EACH PILE:
 GROUPS A & B : = 30 kip
 GROUP C : = 40 kip
- MAXIMUM SPACING BETWEEN PILES IS SHOWN IN THE TABLE REDUCE TO SUIT THE LENGTH OF FOOTING.
- MINIMUM DISTANCE BETWEEN ANY TWO PILES IS 3'-0". REDUCE TO SUIT THE LENGTH OF FOOTING.

STANDARD DRAWING		STATE OF CALIFORNIA			DIVISION OF ENGINEERING SERVICES		BRIDGE NO. X		X	
FILE NO. xs14-370-1x	APPROVAL DATE July 2011	DEPARTMENT OF TRANSPORTATION			PROJECT NUMBER & PHASE: X		POST MILE X		RETAINING WALL TYPE 5SWBP - DETAILS NO. 1	
DS OSD 2147A (ENGLISH STANDARD DRAWING "XS" BORDER REV. [02-02-11])		ORIGINAL SCALE IN INCHES FOR REDUCED PLANS			UNIT: X		CONTRACT NO.: X		DISREGARD PRINTS BEARING EARLIER REVISION DATES	
		0 1 2 3							REVISION DATES SHEET OF X X	