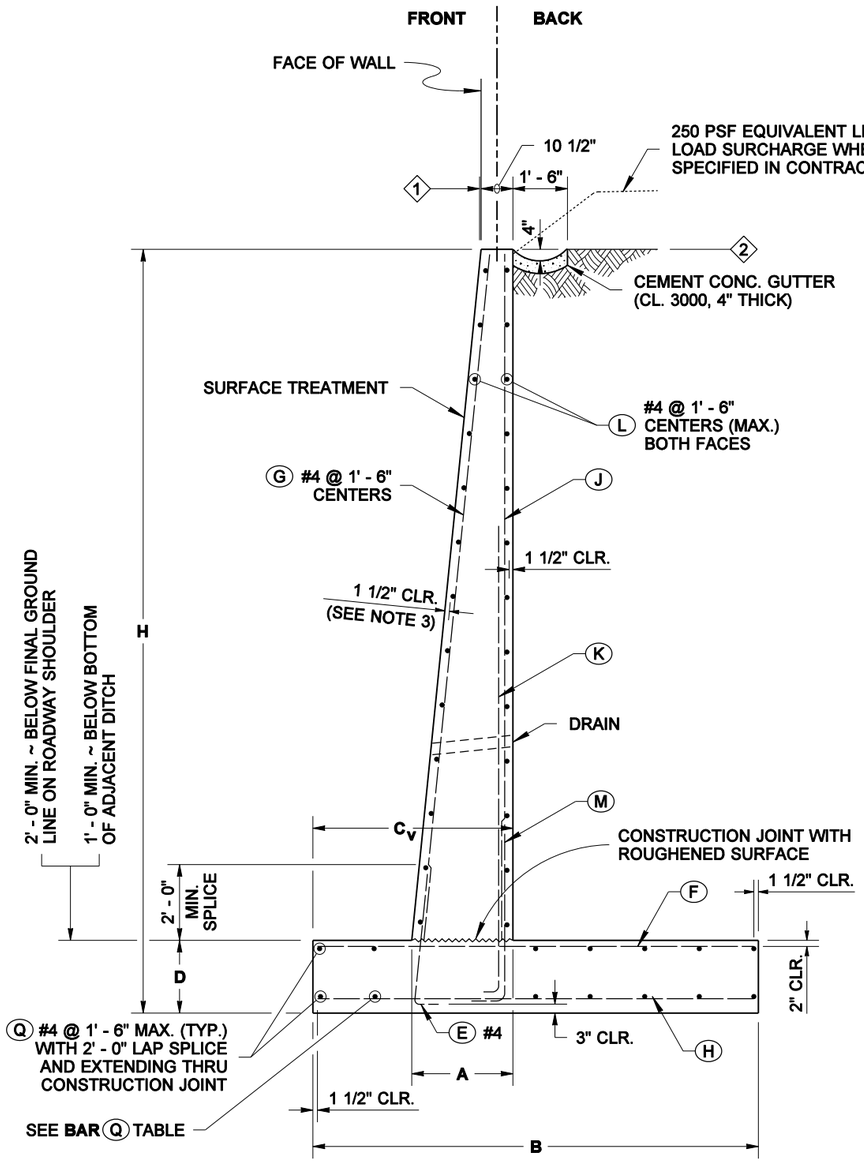
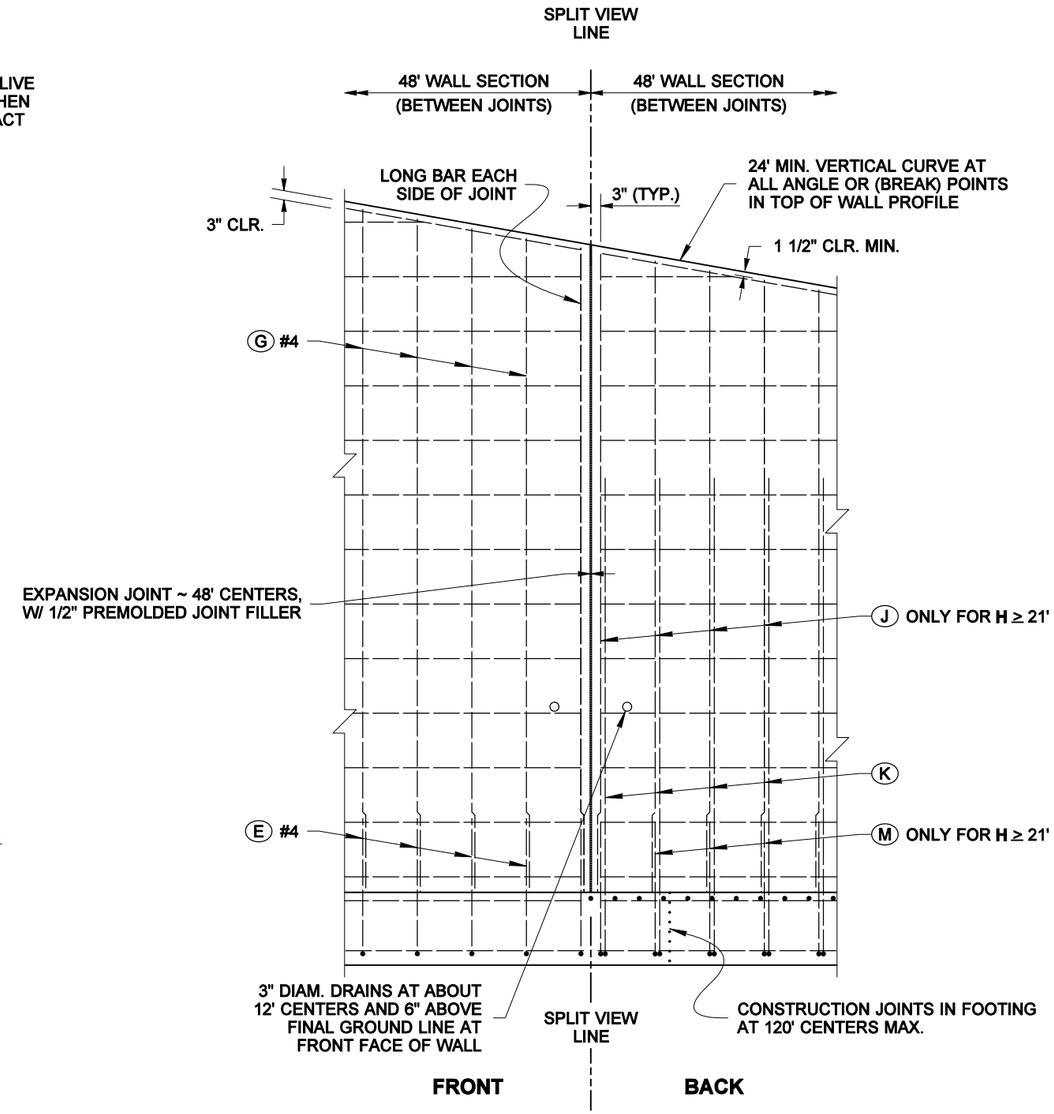
DRAWN BY: BILL BERENS



BAR Q #4		
LOCATION	WALL HEIGHT (H)	QTY.
TOP OF FOOTING	≤ 12'	5
	13' ≤ 16'	6
	17' ≤ 22'	7
	23' ≤ 28'	9
	29' ≤ 35'	11
BOTTOM OF FOOTING	≤ 12'	5
	13' ≤ 16'	6
	17' ≤ 22'	7
	23' ≤ 28'	9
	29' ≤ 35'	11

TYPICAL SECTION

1. OFFSET ~ SET TOP OF WALL BACK:
   H ≤ 20' ..... OFFSET = 1/2"
   H ≥ 20' ..... OFFSET (inches) = $\frac{H(ft)}{8}$ - 2
2. WHEN THE CONTRACT SPECIFIES CABLE FENCE, BACKFILL AND THE CEMENT CONCRETE GUTTER SHALL BE PLACED 6" MIN. FROM THE TOP OF THE WALL



SPLIT ELEVATION VIEW
(SHOWING SEPARATE REBAR LAYERS)

NOTES

1. All concrete shall be Class 4000, except as noted.
2. For backfill requirements, see Standard Plan D-4.
3. When Wall Type 2SW (saltwater) is specified, the concrete cover over steel in the front face and the total wall thickness shall be increased by 1".
4. When Wall Type 2SW (saltwater) is specified, concrete in the table column "Material Quantity" shall be increased by (0.003 x H) CY/LF.
5. Concrete in the 48 foot wall sections shall be placed separately between expansion joints with a minimum 24 hour period before placing concrete in the adjacent section.
6. This wall has been designed in accordance with the requirements of the AASHTO LRFD Bridge Design Specifications 4th Edition 2007 and interims through 2008. The seismic design of these walls has been completed using an effective PGA of 0.51 g.
7. If Traffic Barriers are required, see Standard Plans D-15.10, D-15.20 and D-15.30.

SLOPING FACE WALL DESIGN WITH A 250 PSF SURCHARGE OR TRAFFIC BARRIER

BIJAN KHALEGHI
STATE OF WASHINGTON
27695
STRUCTURAL ENGINEER
PROFESSIONAL ENGINEER

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION, IS KEPT ON FILE AT THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION. A COPY MAY BE OBTAINED UPON REQUEST.

REINFORCED CONCRETE RETAINING WALL TYPE 2 AND 2SW
STANDARD PLAN D-10.15-01

SHEET 1 OF 2 SHEETS

APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER
12-02-08 — DATE

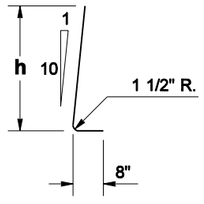
Washington State Department of Transportation

WALL HT H	DIMENSIONS				FOOTING REINFORCEMENT																		STEM REINFORCEMENT				MATERIAL QUANTITY		MAXIMUM SOIL PRESSURE (PSF)			
					BAR (E) #4		BAR (F)			BAR (H)			BAR (K)					BAR (M)					BAR (J)			(G) #4						
	B	C_V	D	A	LENGTH	h	SIZE	SPA.	LENGTH	SIZE	SPA.	LENGTH	SIZE	SPA.	LENGTH	h	b	SIZE	SPA.	LENGTH	h	b	SIZE	SPA.	LENGTH	LENGTH	CONC. CY / LF	STEEL LBS / LF	SERVICE	STRENGTH	EXTREME EVENT 1	EXTREME EVENT 2
5'	6' - 9"	3' - 0"	1' - 0"	1' - 4"	2' - 7"	2' - 0"	#4	1' - 6"	6' - 6"	#4	1' - 6"	6' - 6"	#4	1' - 6"	5' - 2"	4' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3' - 10 1/2"	0.41	23.8	900	1244	1163	1620
6'	6' - 9"	3' - 0"	1' - 0"	1' - 5 1/2"	2' - 7"	2' - 0"	#4	1' - 6"	6' - 6"	#4	1' - 6"	6' - 6"	#4	1' - 6"	6' - 2"	5' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	4' - 10 1/2"	0.46	26.3	987	1351	1380	1878
7'	7' - 0"	3' - 3"	1' - 0"	1' - 6 1/2"	2' - 7"	2' - 0"	#4	1' - 6"	6' - 9"	#4	1' - 6"	6' - 9"	#4	1' - 6"	7' - 2"	6' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	5' - 10 1/2"	0.53	28.9	1076	1476	1548	2006
8'	7' - 0"	3' - 3"	1' - 0"	1' - 7 1/2"	2' - 7"	2' - 0"	#4	1' - 0"	6' - 9"	#4	1' - 6"	6' - 9"	#4	1' - 0"	8' - 2"	7' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	6' - 10 1/2"	0.58	34.7	1225	1687	1837	2332
9'	7' - 3"	3' - 6"	1' - 0"	1' - 9"	2' - 7"	2' - 0"	#4	1' - 0"	7' - 0"	#4	1' - 6"	7' - 0"	#4	1' - 0"	9' - 2"	8' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7' - 10 1/2"	0.65	37.7	1325	1833	2043	2486
10'	7' - 6"	3' - 6"	1' - 0"	1' - 10"	2' - 7"	2' - 0"	#4	9"	7' - 3"	#4	1' - 6"	7' - 3"	#4	1' - 0"	10' - 2"	9' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8' - 10 1/2"	0.73	42.2	1493	2075	2385	2744
11'	7' - 9"	3' - 6"	1' - 0"	1' - 11 1/2"	2' - 7"	2' - 0"	#4	7"	7' - 6"	#4	1' - 6"	7' - 6"	#4	10"	11' - 2"	10' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9' - 10 1/2"	0.81	48.6	1677	2341	2780	3027
12'	8' - 0"	3' - 9"	1' - 0"	2' - 0 1/2"	2' - 7"	2' - 0"	#5	9"	7' - 9"	#4	1' - 6"	7' - 9"	#4	9"	12' - 2"	11' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10' - 11"	0.89	53.8	1797	2522	3066	3221
13'	8' - 3"	3' - 9"	1' - 0"	2' - 1 1/2"	2' - 7"	2' - 0"	#5	7"	8' - 0"	#4	1' - 6"	8' - 0"	#4	8"	13' - 2"	12' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	11' - 11"	0.97	62.7	2004	2826	3563	3545
14'	8' - 9"	3' - 9"	1' - 0"	2' - 3"	2' - 7"	2' - 0"	#5	5"	8' - 6"	#4	1' - 6"	8' - 6"	#4	7"	14' - 2"	13' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	12' - 11"	1.07	74.4	2190	3089	3977	3706
15'	9' - 6"	3' - 9"	1' - 3"	2' - 4"	2' - 10"	2' - 3"	#5	5"	9' - 3"	#4	1' - 6"	9' - 3"	#4	7"	15' - 2"	14' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	13' - 8"	1.25	80.4	2359	3313	4280	3766
16'	10' - 0"	4' - 0"	1' - 3"	2' - 5"	2' - 10"	2' - 3"	#6	6"	9' - 9"	#4	1' - 6"	9' - 9"	#4	6"	16' - 2"	15' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	14' - 8"	1.36	95.6	2459	3455	4496	3845
17'	10' - 6"	4' - 3"	1' - 6"	2' - 6"	3' - 1"	2' - 6"	#6	6"	10' - 3"	#4	1' - 6"	10' - 3"	#4	5"	17' - 2"	16' - 7"	8"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	15' - 5"	1.55	103.9	2572	3615	4733	3951
18'	11' - 0"	4' - 6"	1' - 6"	2' - 7"	3' - 1"	2' - 6"	#6	5"	10' - 9"	#4	1' - 0"	10' - 9"	#5	7"	18' - 3"	17' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16' - 5"	1.67	121.6	2671	3756	4951	4047
19'	11' - 6"	5' - 0"	1' - 9"	2' - 8"	3' - 4"	2' - 9"	#6	6"	11' - 3"	#4	1' - 0"	11' - 3"	#5	6"	19' - 3"	18' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	17' - 2"	1.87	126.5	2701	3800	4989	4051
20'	12' - 3"	5' - 0"	1' - 9"	2' - 9 1/2"	3' - 4"	2' - 9"	#6	5"	12' - 0"	#4	1' - 0"	12' - 0"	#5	5"	20' - 3"	19' - 7"	10"	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	18' - 2"	2.02	149.0	2855	4005	5275	4186
21'	12' - 9"	5' - 6"	2' - 0"	2' - 10"	3' - 7"	3' - 0"	#7	7"	12' - 6"	#4	11"	12' - 6"	#6	1' - 4"	10' - 4 1/2"	9' - 7"	12"	#6	1' - 4"	5' - 2"	4' - 4"	11"	#6	1' - 4"	19' - 4"	18' - 11 1/2"	2.25	141.1	2888	4052	5322	4207
22'	13' - 3"	5' - 9"	2' - 0"	2' - 11 1/2"	3' - 7"	3' - 0"	#7	6"	13' - 0"	#4	10"	13' - 0"	#6	1' - 4"	11' - 5"	10' - 7 1/2"	12"	#6	1' - 4"	5' - 2"	4' - 4"	11"	#6	1' - 4"	20' - 4"	19' - 11 1/2"	2.39	157.4	2987	4193	5540	4323
23'	13' - 9"	6' - 0"	2' - 3"	3' - 0 1/2"	3' - 10"	3' - 3"	#7	6"	13' - 6"	#4	10"	13' - 6"	#6	1' - 4"	12' - 6 1/2"	11' - 9"	12"	#6	1' - 4"	5' - 5"	4' - 7"	11"	#6	1' - 4"	21' - 1"	20' - 8 1/2"	2.64	164.2	3103	4356	5786	4462
24'	14' - 3"	6' - 3"	2' - 3"	3' - 1 1/2"	3' - 10"	3' - 3"	#7	6"	14' - 0"	#4	8"	14' - 0"	#6	1' - 4"	13' - 7"	12' - 9 1/2"	12"	#6	1' - 4"	5' - 5"	4' - 7"	11"	#6	1' - 4"	22' - 1"	21' - 8 1/2"	2.79	175.1	3202	4497	6004	4582
25'	14' - 9"	6' - 6"	2' - 6"	3' - 2 1/2"	4' - 1"	3' - 6"	#7	6"	14' - 6"	#4	8"	14' - 6"	#6	1' - 4"	14' - 8"	13' - 10 1/2"	12"	#6	1' - 4"	5' - 8"	4' - 10"	11"	#6	1' - 4"	22' - 10"	22' - 5 1/2"	3.06	180.6	3318	4660	6252	4725
26'	15' - 6"	6' - 9"	2' - 6"	3' - 3 1/2"	4' - 1"	3' - 6"	#8	7"	15' - 3"	#4	7"	15' - 3"	#6	1' - 4"	15' - 8 1/2"	14' - 11"	12"	#6	1' - 4"	5' - 8"	4' - 10"	11"	#6	1' - 4"	23' - 10"	23' - 5 1/2"	3.24	198.4	3391	4753	6346	4785
27'	16' - 0"	7' - 0"	2' - 9"	3' - 4 1/2"	4' - 4"	3' - 9"	#8	7"	15' - 9"	#4	7"	15' - 9"	#6	1' - 2"	16' - 9 1/2"	16' - 0"	12"	#6	1' - 2"	5' - 11"	5' - 1"	11"	#6	1' - 2"	24' - 7"	24' - 2 1/2"	3.53	214.5	3508	4916	6593	4933
28'	16' - 6"	7' - 3"	3' - 0"	3' - 5 1/2"	4' - 7"	4' - 0"	#8	7"	16' - 3"	#4	7"	16' - 3"	#6	10"	15' - 11"	15' - 1 1/2"	12"	#6	10"	6' - 2"	5' - 4"	11"	#6	10"	25' - 4"	24' - 11 1/2"	3.83	243.9	3626	5079	6842	5082
29'	17' - 0"	7' - 6"	3' - 3"	3' - 6 1/2"	4' - 10"	4' - 3"	#8	7"	16' - 9"	#4	6"	16' - 9"	#8	1' - 4"	16' - 0"	15' - 0"	1' - 3"	#8	1' - 4"	8' - 4"	7' - 2"	1' - 3"	#8	1' - 4"	26' - 1"	25' - 8 1/2"	4.14	267.4	3743	5243	7092	5232
30'	17' - 6"	8' - 0"	3' - 3"	3' - 7 1/2"	4' - 10"	4' - 3"	#8	6"	17' - 3"	#5	9"	17' - 3"	#8	1' - 4"	17' - 0 1/2"	16' - 0"	1' - 3"	#8	1' - 4"	8' - 4"	7' - 2"	1' - 3"	#8	1' - 4"	27' - 1"	26' - 9"	4.33	290.5	3765	5279	7128	5258
31'	18' - 0"	8' - 3"	3' - 6"	3' - 8 1/2"	5' - 1"	4' - 6"	#8	6"	17' - 9"	#5	8"	17' - 9"	#8	1' - 4"	18' - 1 1/2"	17' - 1"	1' - 3"	#8	1' - 4"	8' - 7"	7' - 5 1/2"	1' - 3"	#8	1' - 4"	27' - 10"	27' - 6"	4.65	303.1	3883	5444	7379	5411
32'	18' - 9"	8' - 6"	3' - 9"	3' - 9 1/2"	5' - 4"	4' - 9"	#8	6"	18' - 6"	#5	8"	18' - 6"	#8	1' - 2"	19' - 2 1/2"	18' - 2"	1' - 3"	#8	1' - 2"	8' - 10"	7' - 8"	1' - 3"	#8	1' - 2"	28' - 7"	28' - 3"	5.03	330.6	3978	5563	7509	5512
33'	19' - 3"	8' - 9"	4' - 0"	3' - 10"	5' - 7"	5' - 0"	#8	6"	19' - 0"	#5	8"	19' - 0"	#8	1' - 0"	19' - 2"	18' - 1 1/2"	1' - 3"	#8	1' - 0"	9' - 1"	7' - 11"	1' - 3"	#8	1' - 0"	29' - 4"	29' - 0"	5.38	361.5	4096	5727	7760	5667
34'	19' - 9"	9' - 0"	4' - 3"	3' - 11"	5' - 10"	5' - 3"	#8	6"	19' - 6"	#5	7"	19' - 6"	#9	10"	17' - 4 1/2"	16' - 1 1/2"	1' - 6"	#9	10"	10' - 8"	9' - 3 1/2"	1' - 6"	#9	10"	30' - 1"	29' - 9"	5.74	454.5	4214	5892	8012	5822
35'	20' - 3"	9' - 3"	4' - 6"	4' - 0"	6' - 1"	5' - 6"	#8	6"	20' - 0"	#5	7"	20' - 0"	#10	1' - 0"	18' - 9"	17' - 4 1/2"	1' - 8"	#10	1' - 0"	12' - 3 1/2"	10' - 9 1/2"	1' - 8"	#10	1' - 0"	30' - 10"	30' - 6"	6.12	487.8	4332	6057	8265	5978

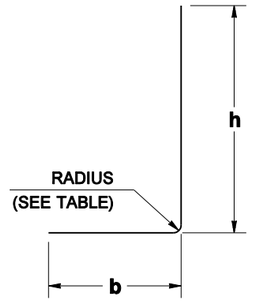
REINFORCEMENT NOTES

(1) IF TRAFFIC BARRIER IS USED, ADD 0.110 CY OF CONCRETE CLASS 4000 FOR BARRIER ALTERNATE 1. ADD 0.152 CY/LF OF CONCRETE CLASS 4000 FOR BARRIER ALTERNATE 2. SEE STANDARD PLAN D-15.10

(2) ADD 16 LB/LF OF REINFORCING STEEL FOR BARRIER ALTERNATE 1 OR 23 LB/LF OF REINFORCING STEEL FOR BARRIER ALTERNATE 2. SEE STANDARD PLAN D-15.10



BAR (E)
@ 1' - 6" CENTERS



BAR	RADIUS
#4	1 1/2"
#5	1 7/8"
#6	2 1/4"
#7	2 5/8"
#8	3"
#9	4 3/4"
#10	5 3/8"
#11	6"

BARS (K) AND (M)

BAR	MIN. SPLICE
#4	2' - 0"
#5	2' - 0"
#6	2' - 0"
#7	2' - 6"
#8	3' - 3"
#9	4' - 2"
#10	5' - 3"

DRAWN BY: BILL BERENS

SLOPING FACE WALL DESIGN WITH A 250 PSF SURCHARGE

BIJAN KHALEGHI
STATE OF WASHINGTON
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REINFORCED CONCRETE RETAINING WALL TYPE 2 AND 2SW
STANDARD PLAN D-10.15-01

SHEET 2 OF 2 SHEETS

APPROVED FOR PUBLICATION

Pasco Bakotich III — STATE DESIGN ENGINEER
12-02-08 — DATE

Washington State Department of Transportation