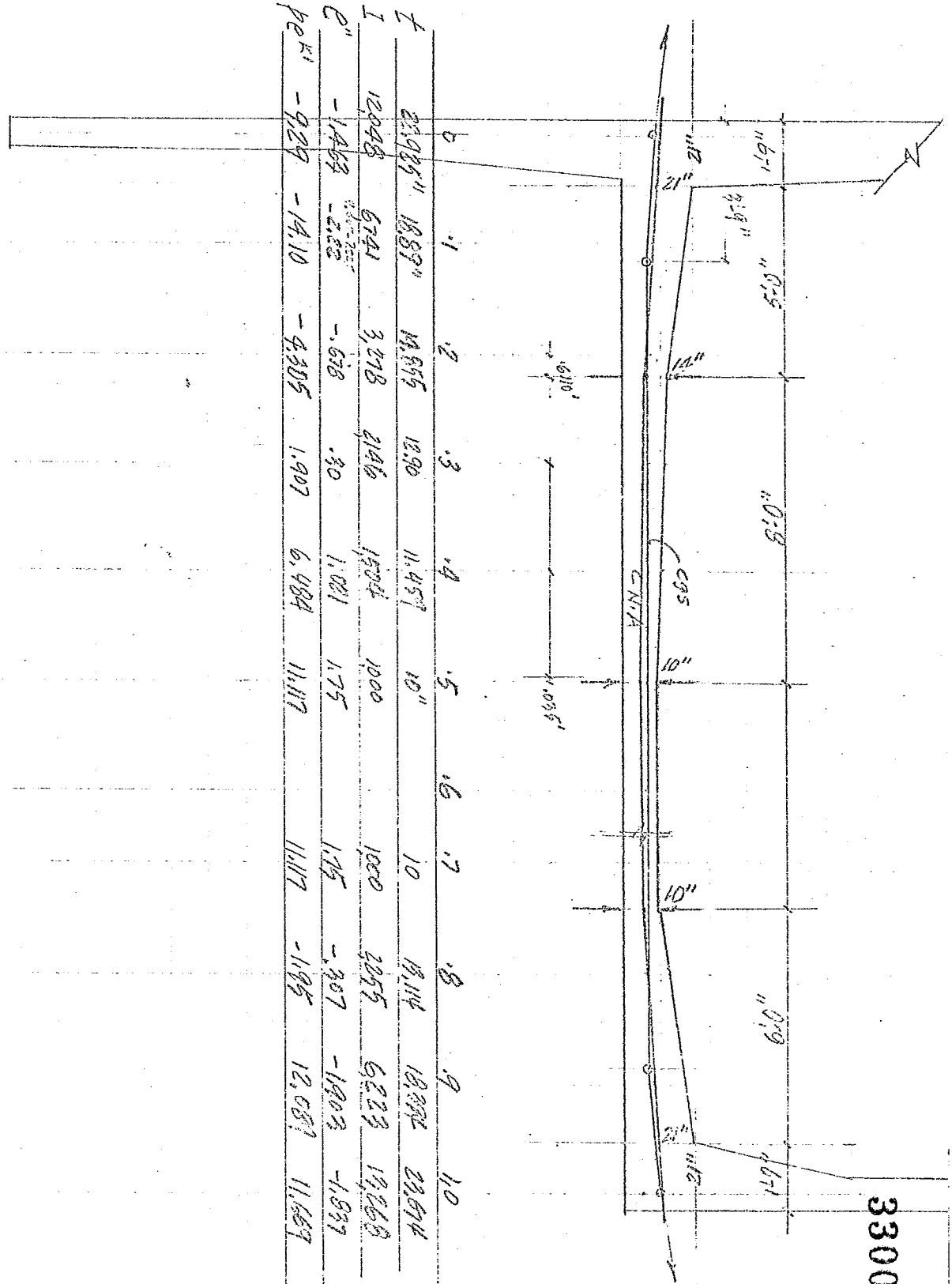
WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project ..... Sheet No. 18 of ..... sheets

S. R. 90 Made by YMT Check by ..... Date 4/83 Supv. [illegible]

	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	1.0
f	22.925"	18.89"	14.855	12.90	11.457	10"		10	13.114	18.384	23.674
I	12.048	6741	3,278	2146	1504	1000		1000	2255	6223	13,268
e"	-1.463	-2.22	-.678	.30	1.021	1.75		1.75	-.307	-1.903	-1.837
Pe#'	-9.29	-14.10	-4.305	1.907	6.484	11.117		11.117	-1.95	12.087	11.669



33003234

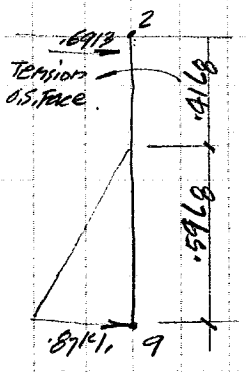
VERTICAL EXT. WALL

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project ..... Sheet No. 79 of ..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Member 8 17.42' Hydrostatic Force.



Face of support $M_H = 5.50^{K'} - .6913^{K}(1.75 - \frac{4\frac{1}{2}}{12}) = 4.55^{K}$

.1L8 $M_H = 5.50^{K'} - .6913^{K}(28.83).1 = 3.51^{K'}$ Tension O.F.

.2L8 $M_H = 5.5^{K'} - .6913(28.83).2 = 1.51^{K'}$ Tension O.F.

.3L8 $M_H = 5.5 - .6913(28.83).3 = -.48^{K'}$ Tension I.F.

.4L8 $M_H = 5.5 - .6913(28.83).4 = -2.47^{K'}$ "

.5L8 $M_H = 5.5 - .6913(28.83).5 + \frac{1}{6}(.132^{K'})(2.594)^2 = -4.32^{K'}$ "
9.96K' .148K'

.6L8 $M_H = 5.5 - .6913(28.83).6 + \frac{1}{6}(.280^{K'})(2.882 + 2.594)^2 = -5.06^{K'}$ "
11.958 1.399K'

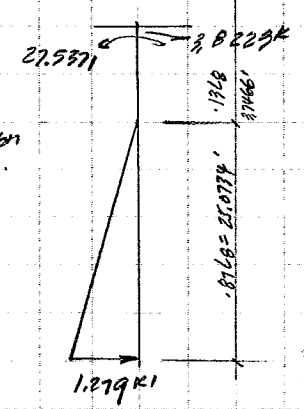
.7L8 $M_H = 5.5 - \quad " \quad (.7) + \frac{1}{6}(.427)[.29 \times 28.82)^2 = -3.48^{K'}$
4.97

.8L8 $M_H = 5.5 - \quad " \quad (.8) + \frac{1}{6}(.575)(.39 \times 28.82)^2 = 1.66^{K'}$ Tension O.F.
12.11

.9L8 $M_H = 5.5 - \quad (.9) + \frac{1}{6}(.7225)(.49 \times 28.82)^2 = 11.58^{K'}$ "
24.01

1.0L8 $M_H = 5.5 - \quad " \quad (1.0) + \frac{1}{6}(.87)(.59 \times 28.82)^2 = 27.50^{K'}$ O.K out check.
41.92

Member 8 Wave Force plus Hydrostatic pressure



.1L8 $M_{WH} = 27.5371 - 3.8223(28.82).1 = 16.52^{K'}$ Tension O.F.

.2 = " − " $.2 + \frac{1}{6}(.103^{K'})(2.0174)^2 = 5.58^{K'}$
.07K'

.3 = " − " $.3 + \frac{1}{6}(.25^{K'})(28.82 \times .17)^2 = -.451^{K'}$ Tension I.F.

.4 = " − " $.4 + \frac{1}{6}(.397)(28.82 \times .27)^2 = -12.52$ "

.5 = " − " $.5 + \frac{1}{6}(.544)(28.82 \times .37)^2 = -17.23$ "

.6 = " − " $.6 + \frac{1}{6}(.691)(28.82 \times .47)^2 = -37.00$ "

.7 = " − " $.7 + \frac{1}{6}(.838)(28.82 \times .57)^2 = -11.88$ "

.8 = " − " $.8 + \frac{1}{6}(.985)(28.82 \times .67)^2 = -.62$ "

.9 = " − " $.9 + \frac{1}{6}(1.132)(28.82 \times .77)^2 = 27.30$ Tension O.F.

1.0L8 = " − " $1.0 + \frac{1}{6}(1.279)(28.82 \times .87)^2 = 51.39^{K'}$ "

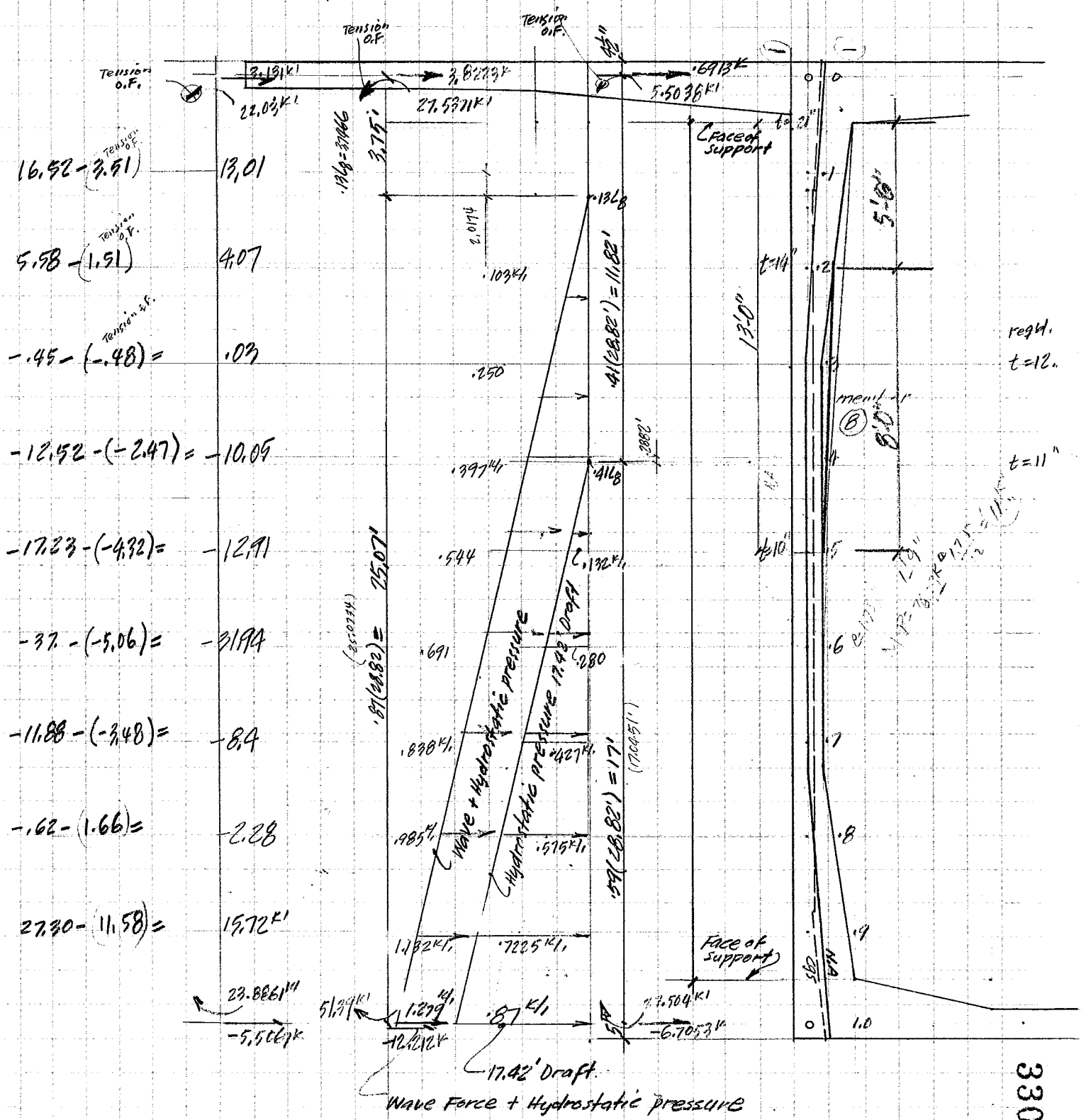
33003235

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 80 of ..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vertical Ext. Wall (Member 8)



33003236

DOT Form 232-007 Revised 10/82

Sheet No.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 81 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vertical Ext. Wall Member 8

Moments @ Face of Support (21" thick.)

$-M_{DL} = 4.43 - (4.43 - 3.87)\frac{16.5/12}{28.82} = 4.16^{k'}$ Tension I.F.

$-M_{L+I} = 8.32 - (8.32 - 7.11)$ " $= 7.74^{k'}$ "

$+M_{L+I} = 4.17 - (4.17 - 3.57)$ " $= 3.88^{k'}$ Tension O.F.

$M_H = 4.55 - (4.55 - 3.51)$ " $= 4.05^{k'}$ "

$M_{NH} = 30\%[22.03 - (22.03 - 13.01)$ "$] = 5.32^{k'}$ "

$M_T = 5.73 - (5.73 - 4.61)$ " $= 5.20^{k'}$ "

M_S: Tension O.F. $13.7^{k'}$, Tension I.F. $5.84^{k'}$, case A

$13.7^{k'} - (13.7^{k'} + 5.84)\frac{16.5''/12}{28.82} = 12.77^{k'}$ Tension O.F.

$6.08^{k'}$ Tension O.F., $11.78^{k'}$ Tension I.F.

$6.08 - (6.08 + 11.78)\frac{16.5/12}{28.82} = 5.23^{k'}$

$t = 21''$ $e = \frac{21''}{2} - \left[6.75 + \frac{10 - 6.75}{3.3'}(2')\right] = 1.8''$ (8.70) $M_{pe} = 76.03^{k}\left(\frac{1.8''}{12}\right) = 11.43^{k'}$ Tension I.F.

33003237

DOT FORM 232-007 REVISED 9/81

Sheet No. 7

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake wash. Floating Bridge - Stage II Sheet No. 82 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at Face of support — btwn $0L_8 \rightarrow .1L_8$

$t = 21''$ $c = 1.8''$ $M_{pe} = 11.43^{k'}$ Tension I.F.

$A = 21(12) = 252^{in^2}$ $S = \frac{12}{6}(21)^2 = 882^{in^3}$

Group S①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-4.16		
M_H	4.05		
M_L	-7.74 +3.88		
M_{pe}	-11.43		
M_{2nd}	12.77 (1.23)	5.23 (-6.31)	
	-6.51 5.11$^{k'}$	-14.05 -2.43	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	5.11	-14.05	
.3W	5.32	5.32	
	10.43	-8.73	

Group S④: S① + T 125%

	Case A	Case B	Case C
S①	5.11	-14.05	
T	5.20	-5.20	
	10.31	-19.25	

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③	10.43	-8.73	
T	5.20	-5.20	
	15.63	-13.93	

$f = -\frac{76.23}{252} \pm \frac{19.25(12)}{882} = -.303 \pm -.262 = -.564^{ksi}$ Max < 2.0 ksi
$= -.041^{ksi}$ Min. 0 ksi
OK

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①	-6.51 5.11	-14.05 -2.43	
DM	-4.05 -4.05	-4.05 -4.05	
	-10.56 1.06	18.10 -6.48	

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③	10.43	-8.73	
DM	-4.05	-4.05	
	6.38	-12.78	

$f = -\frac{76.23}{252} \pm \frac{18.10(12)}{882} = -.303 \pm -.246 = -.549^{ksi}$ Max < 2.0 ksi
$= -.056^{ksi}$ Min. $-.212^{ksi}$

33003238

Form 232-007

Sheet No. 4

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 83 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vert. Ext. Wall $\cdot 1 L_8$

$M_{DL} = -3.87^{K'}$ Tension I.F.

$M_{L+I} = -7.11$, $+3.57$

$M_H = 3.51$

$M_{NW} = 30\% (13.01) = 3.90^{K'}$

$M_T = 4.61$

M_S : case A $13.7 - (13.7 + 5.84) \cdot 1 = 11.75^{K'}$ Tension O.F.

B $6.08 - (6.08 + 11.78) \cdot 1 = 4.29^{K'}$

$t = 18.57''$ $e = \frac{18.57''}{2} - \left[6.75 + \frac{10 - 6.75}{3.3}(.513)\right] = 2.03''$ (7.255) $M_{pe} = 76.23^{K}\left(\frac{2.03}{12}\right) = 12.89^{K'}$ Tension I.F.

33003239

DOT FORM 232-007 REVISED 9/81

Sheet No. 5

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 90 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at .168

$t = 18.57''$ $c = 2.03''$ $M_{pe} = -12.89^{k'}$ Tension 2.F.
$A = 18.57(12) = 223$ $S = \frac{12}{6}(18.57)^2 = 690^{in^3}$

Group S①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-3.87		
M_H	3.51		
M_L	-7.11 + 3.57		
M_{pe}	-12.89		
M_{2nd}	11.75 (-1.50)	4.29	
	-8.61 2.07	-16.07	-5.39

Group S③: S① + .3 Wave 125%

	Case A		Case B	Case C
S①	-8.61	2.07	-16.07	
.3W	3.90	3.90	3.90	
	-4.71	5.97	-12.17	

Group S④: S① + T 125%

	Case A		Case B	Case C
S①	-8.61	2.07	-16.07	
T	-4.61	4.61	-4.61	
	-13.22	6.68	-20.68	

Group S⑥: S③ + T 140%

	Case A		Case B	Case C
S③	-4.71	5.97	-12.17	
T	-4.61	4.61	-4.61	
	-9.32	10.58	-16.78	

$$f = -\frac{16.23}{223} \pm \frac{-20.68(12)}{690} = -.342 \pm -.360 = -.702^{ksi} \text{ Max} < 2.0^{ksi}$$
$$= +.018^{ksi} \text{ Min } 0^{ksi}$$
small tension 2.F.

Flood Damage

Group S⑦: S① + DM

	Case A		Case B	Case C
S①	-8.61	2.07	-16.07	-5.39
DM	-3.51	-3.51	-3.51	-3.51
	-12.12	-1.44	-19.58	-8.90

Group S⑨: S③ + DM

	Case A		Case B	Case C
S③	-4.71	5.97	-12.17	
DM	-3.51	-3.51	-3.51	
			-15.68	

$$f = \frac{-16.23}{223} \pm \frac{19.58(12)}{690} = -.342 \pm -.341 = -.683^{ksi} \text{ Max} < 2.0^{ksi}$$
$$= -.001^{ksi} \text{ Min. } -.212^{ksi}$$
O.K.

33003240

Form 232-007 Sheet No.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 85 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vertical EXT Wall .3L8 $t = 12''$

$M_{DL} = -2.76^{k'}$

$M_{L+I} = -4.69 \quad +2.76$

$M_H = -.48$

$M_{NH} = 30\%(.03) \doteq 0$

$M_T = \pm 2.37$

M_S case A. $M_S = 13.7 - (13.7 + 5.84).3 = 7.84^{k'}$ Tension o.F.

B $M_S = 6.08 - (6.08 + 11.78).3 = .07^{k'}$ "

13.7

$t = 10'' \quad e = \frac{10''}{2} - 6.75 = -1.75'' \quad M_{pe} = 76.23''\left(+\frac{1.75}{12}\right) = +11.12^{k'}$ Tension o.F.

$t = 11'' \quad e = \frac{11}{2} - 6.75 = -1.25'' \quad M_{pe} = 76.23\left(\frac{1.25}{12}\right) = 7.94^{k'}$ Tension o.F.

$t = 12'' \quad e = \frac{12}{2} - 6.75 = -.75'' \quad M_{pe} = 76.23\left(\frac{.75}{12}\right) = 4.76^{k}$ "

33003241

DOT FORM 232-007 REVISED 9/81

Sheet No. 7

Transverse Design — pontoon D near Wall 5
Section at .3L8

$t = 12.90$ $e = 13$ $M_{pe} = 1.91^{k}$ tension o.F.

$A = 12.90(12) = 154.8$ $S = \frac{12}{6}(12.9)^2 = 332.8^{in^3}$

Group S①: $D + H + (L + I) + M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-2.76	"	
M_H	-.48	"	
M_L	-4.69 +2.76	"	
M_{pe}	1.91	"	
M_{2nd}	7.84 (6.51)	.07$^{k'}$ (-1.26)	
	1.82 8.87	-5.95 1.10	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	8.87	-5.95	
.3W	0	0	
	8.87	-5.95	

Group S④: S① + T 125%

	Case A	Case B	Case C
S①	8.87	-5.95	
T	2.37	-2.37	
	11.24	-8.32	

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③			
T			

$f = -\frac{76.23}{154.8} \pm \frac{11.24(12)}{332.8} = -.492 \pm .405 = -.898^{ksi}$ Max $< 2.0^{ksi}$

$= -.087^{ksi}$ Min. 0^{ksi}

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①			
DM	$M_H = .48^{k'}$ small.		

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③			
DM			

$f = \_\_\_ \pm \_\_\_ = \_\_\_ \pm \_\_\_ = \_\_\_^{ksi}$ Max $< 2.0^{ksi}$

$= \_\_\_^{ksi}$ Min. $-.212^{ksi}$

33003242

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 81 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at 3L8

$t = 10''$ 11" $\quad e = +1.75$ 1.25" $\quad M_{pe} = +11.12^{k'}$ 7.94 k' Tension o.F.

$A = 10(12) = 120$ 11(12) 132 $\quad S = \frac{12}{6}(10)^2 = 200$ $\frac{12}{6}(11)^2 = 242$

Group S①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-2.76		
M_H	-.48		
M_L	-4.69 +2.36		
M_{pe}	11.12		
M_{2nd}	7.84 (15.72)	.07 (7.85)	
	11.03 7.85	18.08 14.90	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	11.03	18.03	
.3W	0	0	
		18.03	

Group S④: S① + T 125%

	Case A	Case B	Case C
S①	18.03		
T	2.37		
	20.40		

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③	18.03		
T	2.37		
	20.40		

$\frac{76.23}{12(12)} = .529^{k'}$ $\quad \frac{14.09(12)}{288} = .587^{k'}$ $\quad +.058^{k'}$

$f = -\frac{76.23}{120} \pm -\frac{20.40(12)}{200} = -.635 \pm -1.224 =$ ksi Max < 2.0 ksi
$-.578 \quad -.896$ N.G.
$= $ ksi Min. 0 ksi

$t = 12''$ $\quad \frac{76.23}{12(12)} \pm \frac{(17.27 - 7.94 + 4.76)12}{\frac{12}{6}(12)^2} = -.529 \pm .587, -1.117$ N.G.
+.058 tension out face.

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①			
DM			

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③			
DM			

$f = \quad \pm \quad = \quad \pm \quad =$ ksi Max < 2.0 ksi
$= $ ksi Min. -.212 ksi

33003243

N.G.

(8)

Form 232-007 Sheet No.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 88 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vertical Ext. Wall, 4C8 $t = 11''$

$M_{DL} = -2.20^{k'}$

$M_{LL} = -3.48^{k'} \quad +1.75^{k'}$

$M_H = -2.47^{k'}$

$M_{WW} = 30\%(-10.05) = -3.02^{k'}$

$M_T = \pm 1.25^{k'}$

M_S case A $M_S = 13.70 - (13.7 + 5.84) \cdot .4 = 5.88^{k'}$ Tension O.F.

case B $M_S = 6.08 - (6.08 + 11.78) \cdot .4 = -1.06^{k'}$ Tension I.F.

$t = 10''$ $e = \frac{10}{2} - 6.75 = -1.75''$ $M_{pe} = P\left(\frac{1.75}{12}\right) = 11.12^{k'}$ tension O.F.

$t = 11''$ $e = \frac{11}{2} - 6.75 = -1.25$ $M_{pe} = P\left(\frac{1.25}{12}\right) = 7.94^{k'}$ tension O.F.

3300324

DOT FORM 232-007 REVISED 9/81 Sheet No.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 89 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at .4L8

$\frac{76.23^{k'}}{12(10)} \cdot \frac{200}{12} = 10.58^{k'}$ max M @ zero tension

$t = 10''$ $e = 1.75''$ $M_{pe} = 11.12^{k'}$

$A = 12(10) = 120$ $S = \frac{12}{6}(10)^2 = 200$

12(11) = 132 242

Group S①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-2.20		
M_H	-2.47		
M_L	-3.48 +1.75		
M_{pe}	11.12		
M_{2nd}	5.88 (12.33)	-1.06 (5.39)	
	8.85 14.08	1.91 7.14	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	14.08		
.3W	-3.02		
	11.06		

Group S④: S① + T 125%

	Case A	Case B	Case C
S①	14.08		
T	± 1.25		
	15.33		

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③	11.06		
T	1.25		

$f = -\frac{76.23}{120} \pm \frac{15.33(12)}{200} = -.635 \pm -.920 = -1.160$ ksi Max < 2.0 ksi
$= -.025$ ksi Min. 0 ksi

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①			
DM			

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③			
DM			

$f = \quad \pm \quad = \quad \pm \quad =$ ksi Max < 2.0 ksi
$=$ ksi Min. -.212 ksi

33003245

10

Form 232-007 Sheet No.

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 90 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YKC/RTS

Transverse Design — pontoon D near Wall 5
Section at .4 L_B

$t = 11.46''$ $c = 1.021''$ $M_{pe} = 6.48^k$ tension o.k.
$A = 11.46(12) = 137.5^{in^2}$ $S = \frac{12}{6}(11.46)^2 = 262.7^{in^3}$

Group S① : D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-2.20	"	
M_H	-2.47	"	
M_L	-3.48 +1.75	"	
M_{pe}	6.48	"	
M_{grd}	5.88	-1.06	
	(7.69)	(.75)	
	4.21	9.44 -2.73	2.50

Group S③ : S① + .3 Wave 125%

	Case A	Case B	Case C
S①	9.44	-2.73	
.3W	-3.02	-3.02	
	6.42	-5.75	

Group S④ : S① + T 125%

	Case A	Case B	Case C
S①	9.44		
T	1.25		
	10.69		

Group S⑥ : S③ + T 140%

	Case A	Case B	Case C
S③	6.42	-5.75	
T	1.25	-1.25	
	7.67	-7.0	

$f = -\frac{76.23}{137.5} \pm \frac{10.69(12)}{262.7} = -.554 \pm .488 = -1.043^{ksi}$ Max < 2.0^{ksi}
$= -.066^{ksi}$ Min. 0^{ksi}
o.k.

Flood Damage

Group S⑦ : S① + DM

	Case A	Case B	Case C
S①	9.44		
DM	+2.47		
	11.91 small		

Group S⑨ : S③ + DM

	Case A	Case B	Case C
S③	6.42		
DM	2.47		
	9.89		

$f = -.554 \pm \frac{11.91(12)}{262.7} = -.554 \pm -.544 = -1.098^{ksi}$ Max < 2.0^{ksi}
$= -.010^{ksi}$ Min. $+.212^{ksi}$
o.k.

33003246

Form 232-007

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 91 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vertical Ext. Wall 1.5k8 t=10"

$M_{DL} = -1.64$

$M_{L+I} = -2.26^{k'} + 1.16^{k'}$

$M_H = -4.32$

$M_{NW} = 30\%(-12.91) = -3.87^{k'}$

$M_T = \pm 1.13$

M_S Case A $M_S = 13.7 - (13.7 + 5.84).5 = 3.93^{k'}$ Tension O.F.

B $M_S = 6.08 - (6.08 + 11.78).5 = -2.85^{k'}$ Tension I.F.

$t = 10"$ $e = \frac{10}{2} - 6.25 = 1.75"$ $M = P\left(\frac{1.75"}{12}\right) = 11.12^{k'}$

3300324

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Sheet No.

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake Wash. Floating Bridge - Stage II Sheet No. 92 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near Wall 5
Section at '568

$t = 10''$ $c = 1.25$ $M_{pe} = P\left(\frac{1.25}{12}\right) = 11.12^{k'}$ tension o.f.

$A = 10(12) = 120$ $S = \frac{12}{6}(10)^2 = 200$

Group 5①: $D + H + (L + I) + M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-1.64		
M_H	-4.32		
M_L	-2.26 +1.16		
M_{pe}	11.12		
M_{2nd}	3.97 (9.09)	-2.85	
	6.83 10.25		

Group 5③: 5① + .3 Wave 125%

	Case A	Case B	Case C
5①	10.25		
.3W	-3.87		
	6.38		

Group 5④: 5① + T 125%

	Case A	Case B	Case C
5①	10.25		
T	.13		
	10.38		

Group 5⑥: 5③ + T 140%

	Case A	Case B	Case C
5③	6.38		
T	.13		
	6.51		

$f = \frac{76.23}{120} \pm \frac{10.38(12)}{200} = -.635 \pm -.623 = -1.258^{ksi}$ Max $< 2.0^{ksi}$
$= -.012^{ksi}$ Min. 0^{ksi}
OK.

Flood Damage

Group 5⑦: 5① + DM

	Case A	Case B	Case C
5①	10.25		
DM	+4.32		
	14.57		

Group 5⑨: 5③ + DM

	Case A	Case B	Case C
5③	6.38		
DM	4.32		
	10.70		

$f = -.635 \pm \frac{14.57(12)}{200} = -.635 \pm -.874 = -1.509^{ksi}$ Max $< 2.0^{ksi}$
$= +.239^{ksi}$ Min. $+.212^{ksi}$

12.7% overstress
Tension o.f.

33003248

12

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WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 93 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vert. Ext. Wall .7 L8 $t = 10''$

$M_D = -.53^{K'}$

$M_{L+I} = -.05^{K'}, +.16^{K'}$

$M_H = -3.48^{K'}$

$M_{NH} = 30\%(-8.4) = -2.52$

$M_T = \pm 2.10$

M_S CASE A $M_S = 13.7 - (13.7 + 5.84).7 = .022$ Tension O.F.

B $M_S = 6.08 - (6.08 + 11.78).7 = -6.42^{K'}$ Tension I.F.

$t = 10''$ $e = \frac{10}{2} - 6.25 = -1.25''$ $M_{pe} = P\left(\frac{1.25}{12}\right) = 7.94^{K'}$ Tension O.F.

33003249

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13

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project 3rd Lake wash. Floating Bridge - Stage II Sheet No. 94 of ____ sheets
S. R. 90 Made by YMT. Check by ____ Date ____ Supv. YFC/RTS

Transverse Design — pontoon D near wall 5
section at 17 L8

$t = 10''$ $c = 1.25$ $M_{pe} = 7.94^{k'}$ Tension o.F.
$A = 12(10) = 120$ $S = \frac{12}{6}(10)^2 = 200$

Group 5①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	-.53	"	
M_H	-3.48	"	
M_L	-.05 +1.16	"	
M_{pe}	7.94	"	
M_{2nd}	.02 (3.95)	-6.42 (-2.49)	
	3.90 4.11	-2.54 -2.33	

Group 5③: 5① + .3 Wave 125%

	Case A	Case B	Case C
5①	4.11	-2.54	
.3W	-2.52	-2.52	
	1.59	-5.06	

Group 5④: 5① + T 125%

	Case A	Case B	Case C
5①	4.11	-2.54	
T	2.10	-2.10	
	+6.21	-4.64	

Group 5⑥: 5③ + T 140%

	Case A	Case B	Case C
5③		-5.06	
T		-2.10	
		$-7.16^{k'}$	

$$f = -\frac{76.23}{120} \pm -\frac{7.16(12)}{200} = -.635 \pm -.430 = -1.065^{ksi} \text{ Max} < 2.0^{ksi}$$
$$= -.206^{ksi} \text{ Min.} \quad 0^{ksi}$$
o.K.

Flood Damage

Group 5⑦: 5① + DM

	Case A	Case B	Case C
5①	4.11		
DM	+3.48		
	7.59 small		

Group 5⑨: 5③ + DM

	Case A	Case B	Case C
5③	1.59		
DM	3.48		
	5.07 small		

$f = \_\_\_ \pm \_\_\_ = \_\_\_ \pm \_\_\_ = \_\_\_^{ksi}$ Max $< 2.0^{ksi}$
$= \_\_\_^{ksi}$ Min. $-.212^{ksi}$

33003250

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BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 95 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vertical Ext. Wall 18 L8 $t = 13.11''$

$M_D = .03^{k'}$

$M_{L+I} = -.66 + 1.37$

$M_H = -1.66^{k'}$

$M_{NH} = 30\% (-2.28) = -.68$

$M_T = \pm 3.22^{k'}$

M_S Case A $M_S = 13.7 - (13.7 + 5.84) .8 = -1.93^{k'}$ tension I F.

B $M_S = 6.08 - (6.08 + 11.78) .8 = -8.21^{k'}$ " "

$t = 13.11''$ $e = \frac{13.11}{2} - 6.75 = -.193''$ $M_{pe} = P\left(\frac{.193}{12}\right) = 1.23^{k'}$ tension O.F.

33903251

Transverse Design — pontoon D near Wall 5
section at .868

$t = 13.11''$ $e = .19''$ $M_{pe} = 1.23^{k'}$ tension O.F.

$A = 13.11(12) = 157^{in^2}$ $S = \frac{12}{6}(13.11)^2 = 344^{in^3}$

Group 5①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	.03	"	
M_H	-1.66	"	
M_L	-.66 +1.37	"	
M_{pe}	1.23	"	
M_{2nd}	-1.93	-8.21	
	(-2.33)	(-8.61)	
	-2.99 -.96	-9.27 -7.24	

Group 5③: 5① + .3 Wave 125%

	Case A	Case B	Case C
5①	-2.99	-9.27	
.3W	-.68	-.68	
	-3.67	-9.95	

Group 5④: 5① + T 125%

	Case A	Case B	Case C
5①		-9.27	
T		-3.22	
		-12.49 Tension I.F.	

Group 5⑥: 5③ + T 140%

	Case A	Case B	Case C
5③		-9.95	
T		-3.22	
		-13.17	

$f = -\frac{76.23}{157} \pm \frac{13.17(12)}{344} = -.486 \pm -.460 = -.945^{ksi}$ Max $< 2.0^{ksi}$

$= -.026^{ksi}$ Min. 0^{ksi}

O.K.

Flood Damage

Group 5⑦: 5① + DM

	Case A	Case B	Case C
5①		-9.27	
DM		+1.66	
		-7.61 small	

Group 5⑨: 5③ + DM

	Case A	Case B	Case C
5③		-9.95	
DM		+1.66	
		-8.29 small	

$f = \_\_\_ \pm \_\_\_ = \_\_\_ \pm \_\_\_ =$ ^{ksi} Max $< 2.0^{ksi}$

$=$ ^{ksi} Min. $-.212^{ksi}$

3300325 2

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 97 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vert. Ext. wall

$M_D = .58^{k'}$

$M_{L+I} = -1.25^{k'} + 2.58^{k'}$

$M_H = 11.58^{k'}$ tension o.F.

$M_{NW} = 30\% (15.72) = 4.72^{k'}$

$M_T = \pm 4.34^{k'}$

M_S case A $M_S = 13.7 - (13.7 + 5.84).9 = -3.89^{k'}$ tension I.F

B $M_S = 6.08 - (6.08 + 1.78).9 = -9.99^{k'}$ "

$t = 18.29''$ $e = \frac{18.29}{2} - 7.18 = 2.0''$ $M_{pe} = P\left(\frac{2''}{12}\right) = -12.70^{k'}$ tension I.F.

33003253

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Transverse Design — pontoon D near wall 5 $t = 18.4''$ ok -
Section at .968

$t = 18.39''$ $e = 2''$ $M_{pe} = -12.70^{k'}$ tension I.F.

$A = 18.39(12) = 221$ $S = \frac{12}{6}(18.39)^2 = 676$

Group 5①: $D + H + (L + I) + M_{p/s}$ 100%

	Case A	Case B	Case C
M_D	.58	"	
M_H	11.58	"	
M_L	-1.85 +2.58	"	
M_{pe}	-11.70	"	
M_{2nd}	-3.89	-9.99	
	(-3.43)	(-9.53)	
	-4.68 -.85	-10.78 -6.95	

Group 5③: 5① + .3 Wave 125%

	Case A	Case B	Case C
5①	-4.68	-10.78	
.3W	4.72	4.72	
	.04	-6.06	

Group 5④: 5① + T 125%

	Case A	Case B	Case C
5①	-4.68	-10.78	
T	-4.34	-4.34	
		-15.12	

Group 5⑥: 5③ + T 140%

	Case A	Case B	Case C
5③		-6.06	
T		-4.34	
		-10.40	

$f = -\frac{76.23}{221} \pm \frac{15.12(12)}{676} = -.345 \pm -.268 = -.613^{ksi}$ Max $< 2.0^{ksi}$

$= -.077^{ksi}$ Min. 0^{ksi}

ok ✓

Flood Damage

Group 5⑦: 5① + DM

	Case A	Case B	Case C
5①	-10.78		
DM	-11.58		
	-22.36		

Group 5⑨: 5③ + DM

	Case A	Case B	Case C
5③		-6.06	
DM		-11.58	
		-16.64	

$f = -.345 \pm \frac{22.36(12)}{676} = -.345 \pm -.397 = -.742^{ksi}$ Max $< 2.0^{ksi}$

$= +.052^{ksi}$ Min. $+.212^{ksi}$

ok -

3303251

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION
BRIDGE & STRUCTURES BRANCH

Project..... Sheet No. 99 of..... sheets

S. R. ..... Made by ..... Check by ..... Date ..... Supv. .....

Vert. Ext. Wall Face of support near point 9 L8. t = 21" ✓

$M_{DL} = 1.14^{K'} - (1.14^{K'} - .58)\frac{1.33'}{2.882} = .88^{K'}$ Tension O.F.

$-M_{L+I} = 1.86 - (1.86 - 1.26)$ " $= 1.58^{K'}$ I.F.

$+M_{L+I} = 3.79 - (3.79 - 2.58)$ " $= 3.23^{K'}$ O.F.

$M_H = 27.50 - (27.50 - 11.58)$ " $= 20.13$ O.F.

$M_{KW} = 30\% \left[23.89 - (23.89 - 15.72)\frac{1.33}{2.882}\right] = 6.03$ O.F.

$-M_T = 5.46 - (5.46 - 4.34)$ " $= 4.39$

M_S Case A $M_S = 13.7 - (13.7 + 5.84)\frac{28.82 - 1.33}{28.82} = -4.94^{K'}$ tension I.F.

B $M_S = 6.08 - (6.08 + 11.78)$ " $= -10.96^{K'}$ tension I.F.

$t = 21"$ $e = \frac{21}{2} - 8.7" = 1.8"$ $M_{pe} = P\left(\frac{1.8}{12}\right) = 11.43^{K'}$ Tension I.F.

33003255

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19

Transverse Design — pontoon D near Wall 5
Section at Face of support near 1.0L8

$t = 21''$ $c = 1.8''$ $M_{pe} = -11.43^{k'}$ Tension 2.F.

$A = 21(12) = 252$ $S = \frac{12}{6}(21)^2 = 882$

Group S①: D + H + (L + I) + $M_{P/S}$ 100%

	Case A	Case B	Case C
M_D	.88	"	
M_H	20.13	"	
M_L	-1.58 +3.23	"	
M_{pe}	-11.43	"	
M_{2nd}	-4.94 (9.64)	-10.96 (-1.38)	
	3.06 7.87	-2.96 1.85	

Group S③: S① + .3 Wave 125%

	Case A	Case B	Case C
S①	7.87		
3W	6.03		
	13.90		

Group S④: S① + T 125%

	Case A	Case B	Case C
S①	7.87		
T	4.39		
	12.26		

Group S⑥: S③ + T 140%

	Case A	Case B	Case C
S③	13.90		
T	4.39		
	18.29		

$$f = -\frac{76.23}{252} \pm -\frac{18.29(12)}{882} = -.303 \pm -.249 = -.551^{ksi} \text{ Max} < 2.0^{ksi}$$
$$= -.054^{ksi} \text{ Min. } 0^{ksi}$$
O.K.

Flood Damage

Group S⑦: S① + DM

	Case A	Case B	Case C
S①	-2.96		
DM	-20.13		
	-23.09		

Group S⑨: S③ + DM

	Case A	Case B	Case C
S③			
DM			

$$f = -.303 \pm \frac{-23.09(12)}{882} = -.303 \pm -.314 = -.617^{ksi} \text{ Max} < 2.0^{ksi}$$
$$= +.011^{ksi} \text{ Min. } +.212^{ksi}$$
O.K.

33003256