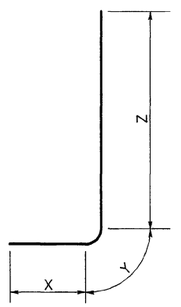
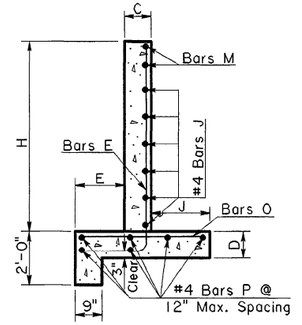
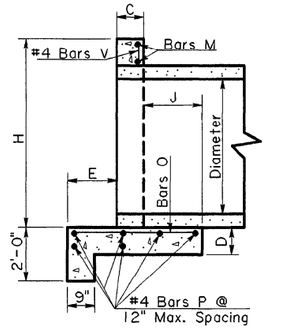
OPENING			H	E	C	J	D	L	M	S	BARS E							#4 BARS J		BARS O			#4 BARS P		#4BARS H		#4BARSV		BARS M			CONC.	STEEL	OPENING		
Dia. in.	No.	Area sq.ft.	Lgth. ft.in.	Lgth. ft.in.	Lgth. ft.in.	Lgth. ft.in.	Lgth. ft.in.	Lgth. ft.in.	Lgth. ft.in.	Lgth. ft.in.	Size	No.	Lgth. ft.in.	Spc. in.	X ft.in.	Y in.	Z ft.in.	No.	Lgth. ft.in.	Size	No.	Lgth. ft.in.	Spc. in.	No.	Lgth. ft.in.	No.	Lgth. ft.in.	No.	Lgth. in.	Size	No.	Lgth. ft.in.	CU. YDS.	LBS.	Area sq.ft.	No.	Dia. in.
15	1	1.2	2- 8	0- 5	0- 6	3- 1	0-10	5- 4	12- 3	1- 3	4	12	3- 7	12.0	0- 6	2	2-11	4	5- 0	4	13	3- 8	12.0	7	11-11	0	0- 0	1	8	4	2	11-11	2.48	146	1.2	1	15
15	2	2.5	2- 8	0- 5	0- 6	3- 1	0-10	5- 4	15- 2	1- 3	4	15	3- 7	12.0	0- 6	2	2-11	4	5- 0	4	16	3- 8	12.0	7	14-10	2	0-11	2	8	4	2	14-10	3.04	180	2.5	2	15
15	3	3.7	2- 8	0- 5	0- 6	3- 1	0-10	5- 4	18- 0	1- 3	4	18	3- 7	12.0	0- 6	2	2-11	4	5- 0	4	19	3- 8	12.0	7	17- 8	4	0-11	3	8	4	2	17- 8	3.58	213	3.7	3	15
15	4	4.9	2- 8	0- 5	0- 6	3- 1	0-10	5- 4	20-11	1- 3	4	21	3- 7	12.0	0- 6	2	2-11	4	5- 0	4	22	3- 8	12.0	7	20- 7	6	0-11	4	8	4	2	20- 7	4.14	247	4.9	4	15
15	5	6.1	2- 8	0- 5	0- 6	3- 1	0-10	5- 4	23- 9	1- 3	4	24	3- 7	12.0	0- 6	2	2-11	4	5- 0	4	24	3- 8	12.0	7	23- 5	8	0-11	5	8	4	2	23- 5	4.68	277	6.1	5	15
15	6	7.4	2- 8	0- 5	0- 6	3- 1	0-10	5- 4	26- 8	1- 3	4	27	3- 7	12.0	0- 6	2	2-11	4	5- 0	4	27	3- 8	12.0	7	26- 4	10	0-11	6	8	4	2	26- 4	5.24	311	7.4	6	15
18	1	1.8	2-11	0- 5	0- 6	3- 3	0-10	5-10	13- 7	1- 3	4	14	3-10	12.0	0- 6	2	2-11	4	5- 6	4	14	3-10	12.0	7	13- 3	0	0- 0	1	8	4	2	13- 3	2.87	166	1.8	1	18
18	2	3.6	2-11	0- 5	0- 6	3- 3	0-10	5-10	16- 9	1- 3	4	17	3-10	12.0	0- 6	2	2-11	4	5- 6	4	17	3-10	12.0	7	16- 1	2	0-11	2	8	4	2	16- 1	3.49	203	3.6	2	18
18	3	5.3	2-11	0- 5	0- 6	3- 3	0-10	5-10	19-11	1- 3	4	20	3-10	12.0	0- 6	2	2-11	4	5- 6	4	21	3-10	12.0	7	19- 7	4	0-11	3	8	4	2	19- 7	4.12	241	5.3	3	18
18	4	7.1	2-11	0- 5	0- 6	3- 3	0-10	5-10	23- 1	1- 3	4	23	3-10	12.0	0- 6	2	2-11	4	5- 6	4	24	3-10	12.0	7	22- 9	6	0-11	4	8	4	2	22- 9	4.75	277	7.1	4	18
18	5	8.8	2-11	0- 5	0- 6	3- 3	0-10	5-10	26- 3	1- 3	4	26	3-10	12.0	0- 6	2	2-11	4	5- 6	4	27	3-10	12.0	7	25-11	8	0-11	5	8	4	2	25-11	5.38	313	8.8	5	18
18	6	10.6	2-11	0- 5	0- 6	3- 3	0-10	5-10	29- 5	1- 3	4	29	3-10	12.0	0- 6	2	2-11	4	5- 6	4	30	3-10	12.0	7	29- 1	10	0-11	6	8	4	2	29- 1	6.00	349	10.6	6	18
24	1	3.1	3- 6	0- 6	0- 6	3- 6	0-10	7- 0	16- 6	1- 3	4	16	4- 6	12.0	0- 7	2	3- 9	4	6- 8	4	17	4- 2	12.0	7	16- 2	0	0- 0	2	8	4	2	16- 2	3.80	211	3.1	1	24
24	2	6.3	3- 6	0- 6	0- 6	3- 6	0-10	7- 0	20- 3	1- 3	4	19	4- 6	12.0	0- 7	2	3- 9	4	6- 8	4	21	4- 2	12.0	7	19-11	2	0-11	4	8	4	2	19-11	4.60	256	6.3	2	24
24	3	9.4	3- 6	0- 6	0- 6	3- 6	0-10	7- 0	24- 0	1- 3	4	22	4- 6	12.0	0- 7	2	3- 9	4	6- 8	4	25	4- 2	12.0	7	23- 8	4	0-11	6	8	4	2	23- 8	5.39	301	9.4	3	24
24	4	12.6	3- 6	0- 6	0- 6	3- 6	0-10	7- 0	27- 9	1- 3	4	25	4- 6	12.0	0- 7	2	3- 9	4	6- 8	4	28	4- 2	12.0	7	27- 5	6	0-11	8	8	4	2	27- 5	6.19	343	12.6	4	24
24	5	15.7	3- 6	0- 6	0- 6	3- 6	0-10	7- 0	31- 6	1- 3	4	28	4- 6	12.0	0- 7	2	3- 9	4	6- 8	4	32	4- 2	12.0	7	31- 2	8	0-11	10	8	4	2	31- 2	6.98	388	15.7	5	24
24	6	18.8	3- 6	0- 6	0- 6	3- 6	0-10	7- 0	35- 3	1- 3	4	31	4- 6	12.0	0- 7	2	3- 9	4	6- 8	4	36	4- 2	12.0	7	34-11	10	0-11	12	8	4	2	34-11	7.78	433	18.8	6	24
30	1	4.9	4- 1	0- 7	0- 6	3- 9	0-10	8- 2	19- 5	1- 3	4	20	5- 2	12.0	0- 8	2	4- 4	6	7-10	4	20	4- 6	12.0	8	19- 1	0	0- 0	2	8	4	2	19- 1	4.86	289	4.9	1	30
30	2	9.8	4- 1	0- 7	0- 6	3- 9	0-10	8- 2	23- 0	1- 3	4	23	5- 2	12.0	0- 8	2	4- 4	6	7-10	4	24	4- 6	12.0	8	23- 5	3	0-11	4	8	4	2	23- 5	5.83	343	9.8	2	30
30	3	14.7	4- 1	0- 7	0- 6	3- 9	0-10	8- 2	28- 1	1- 3	4	26	5- 2	12.0	0- 8	2	4- 4	6	7-10	4	29	4- 6	12.0	8	27- 9	6	0-11	6	8	4	2	27- 9	6.81	400	14.7	3	30
30	4	19.6	4- 1	0- 7	0- 6	3- 9	0-10	8- 2	32- 5	1- 3	4	29	5- 2	12.0	0- 8	2	4- 4	6	7-10	4	33	4- 6	12.0	8	32- 1	9	0-11	8	8	4	2	32- 1	7.78	454	19.6	4	30
30	5	24.5	4- 1	0- 7	0- 6	3- 9	0-10	8- 2	36- 9	1- 3	4	32	5- 2	12.0	0- 8	2	4- 4	6	7-10	4	37	4- 6	12.0	8	36- 5	12	0-11	10	8	4	2	36- 5	8.76	508	24.5	5	30
30	6	29.4	4- 1	0- 7	0- 6	3- 9	0-10	8- 2	41- 1	1- 3	4	35	5- 2	12.0	0- 8	2	4- 4	6	7-10	4	42	4- 6	12.0	8	40- 9	15	0-11	12	8	4	2	40- 9	9.74	565	29.4	6	30
36	1	7.1	4- 8	0- 8	0- 6	4- 1	0-10	9- 4	22- 4	1- 3	4	30	5-10	8.0	0- 9	2	4-11	8	9- 0	4	23	4-11	12.0	8	22- 0	0	0- 0	3	8	4	2	22- 0	6.08	389	7.1	1	36
36	2	14.1	4- 8	0- 8	0- 6	4- 1	0-10	9- 4	27- 3	1- 3	4	33	5-10	8.0	0- 9	2	4-11	8	9- 0	4	28	4-11	12.0	8	26-11	4	0-11	6	8	4	2	26-11	7.26	453	14.1	2	36
36	3	21.2	4- 8	0- 8	0- 6	4- 1	0-10	9- 4	32- 2	1- 3	4	36	5-10	8.0	0- 9	2	4-11	8	9- 0	4	33	4-11	12.0	8	31-10	8	0-11	9	8	4	2	31-10	8.45	518	21.2	3	36
36	4	28.3	4- 8	0- 8	0- 6	4- 1	0-10	9- 4	37- 1	1- 3	4	39	5-10	8.0	0- 9	2	4-11	8	9- 0	4	38	4-11	12.0	8	36- 9	12	0-11	12	8	4	2	36- 9	9.62	583	28.3	4	36
36	5	35.3	4- 8	0- 8	0- 6	4- 1	0-10	9- 4	42- 0	1- 3	4	42	5-10	8.0	0- 9	2	4-11	8	9- 0	4	43	4-11	12.0	8	41- 8	16	0-11	16	8	4	2	41- 8	10.82	648	35.3	5	36
36	6	42.4	4- 8	0- 8	0- 6	4- 1	0-10	9- 4	46-11	1- 3	4	45	5-10	8.0	0- 9	2	4-11	8	9- 0	4	48	4-11	12.0	8	46- 7	20	0-11	18	8	4	2	46- 7	12.00	712	42.4	6	36
42	1	9.6	5- 3	0- 9	0- 8	4- 2	1- 0	10- 6	25- 3	1- 5	4	28	6-10	9.5	1- 0	2	5- 8	8	10- 2	4	26	5- 3	12.0	9	24-11	0	0- 0	4	8	4	2	24-11	8.84	458	9.6	1	42
42	2	19.2	5- 3	0- 9	0- 8	4- 2	1- 0	10- 6	30-11	1- 5	4	31	6-10	9.5	1- 0	2	5- 8	8	10- 2	4	32	5- 3	12.0	9	30- 7	4	1- 1	8	8	4	2	30- 7	10.56	539	19.2	2	42
42	3	28.8	5- 3	0- 9	0- 8	4- 2	1- 0	10- 6	36- 7	1- 5	4	34	6-10	9.5	1- 0	2	5- 8	8	10- 2	4	37	5- 3	12.0	9	36- 3	8	1- 1	12	8	4	2	36- 3	12.27	617	28.8	3	42
42	4	38.5	5- 3	0- 9	0- 8	4- 2	1- 0	10- 6	42- 3	1- 5	4	37	6-10	9.5	1- 0	2	5- 8	8	10- 2	4	43	5- 3	12.0	9	41-11	12	1- 1	16	8	4	2	41-11	13.99	698	38.5	4	42
42	5	48.1	5- 3	0- 9	0- 8	4- 2	1- 0	10- 6	47-11	1- 5	4	40	6-10	9.5	1- 0	2	5- 8	8	10- 2	4	49	5- 3	12.0	9	47- 7	16	1- 1	20	8	4	2	47- 7	15.70	779	48.1	5	42
42	6	57.7	5- 3	0- 9	0- 8	4- 2	1- 0	10- 6	53- 7	1- 5	4	43	6-10	9.5	1- 0	2	5- 8	8	10- 2	4	54	5- 3	12.0	9	53- 3	20	1- 1	24	8	4	2	53- 3	17.41	856	57.7	6	42
48	1	12.6	5-10	0-10	0- 8	4- 6	1- 0	11- 8	28- 2	1- 7	4	38	7- 6	7.5	1- 1	2	6- 3	10	11- 4	4	30	5- 8	11.5	9	27-10	0	0- 0	4	8	4	2	27-10	10.64	586	12.6	1	48
48	2	25.1	5-10	0-10	0- 8	4- 6	1- 0	11- 8	34- 7	1- 7	4	41	7- 6	7.5	1- 1	2	6- 3	10	11- 4	4	37	5- 8	11.5	9	34- 3	5	1- 3	8	8	4	2	34- 3	12.72	680	25.1	2	48
48	3	37.7	5-10	0-10	0- 8	4- 6	1- 0	11- 8	41- 0	1- 7	4	44	7- 6	7.5	1- 1	2	6- 3	10	11- 4	4	43	5- 8	11.5	9	40- 8	10	1- 3	12	8	4	2	40- 8	14.80	771	37.7	3	48
48	4	50.2	5-10	0-10	0- 8	4- 6	1- 0	11- 8	47- 5	1- 7	4	47	7- 6	7.5	1- 1	2	6- 3	10	11- 4	4	50	5- 8	11.5	9	47- 1	15	1- 3	16	8	4	2	47- 1	16.87	866	50.2	4	48
48	5	62.8	5-10	0-10	0- 8	4- 6	1- 0	11- 8	53-10	1- 7	4	50	7- 6	7.5	1- 1	2	6- 3	10	11- 4	4	57	5- 8	11.5	9	53- 6	20	1- 3	20	8	4	2	53- 6	18.95	961	62.8	5	48
48	6	75.4	5-10	0-10	0- 8	4- 6	1- 0	11- 8	60- 3	1- 7	4	53	7- 6	7.5	1- 1	2	6- 3	10	11- 4	4	64	5- 8	11.5	9	59-11	25	1- 3	24	8	4	2	59-11	21.02	1055	75.4	6	48
54	1	15.9	6- 5	1- 0	0- 8	4- 9	1- 0	12-10	31- 1	1- 9	4	52	8- 3	6.0	1- 3	2	6-10	10	12- 6	4	40	6- 1	9.5	10	30- 9	0	0- 0	5	8	4	2	30- 9	12.61	781	15.9	1	54
54	2	31.8	6- 5	1- 0	0- 8	4- 9	1- 0	12-10	38- 3	1- 9	4	56	8- 3	6.0	1- 3	2	6-10	10	12- 6	4	49	6- 1	9.5	10	37-11	5	1- 5	10	8	4	2	37-11	15.07	904	31.8	2	54
54	3	47.7	6- 5	1- 0	0- 8	4- 9	1- 0	12-10	45- 5	1- 9	4	60	8- 3	6.0	1- 3	2	6-10	10	12- 6	4	58	6- 1	9.5	10	45- 1	10	1- 5	15	8	4	2	45- 1	17.54	1027	47.7	3	54
54	4	63.6	6- 5	1- 0	0- 8	4- 9	1- 0	12-10	52- 7	1- 9	4	64	8- 3	6.0	1- 3	2	6-10	10	12- 6	4	67	6- 1	9.5	10	52- 3	15	1- 5	20	8	4	2	52- 3	20.01	1150	63.6	4	54
54	5	79.5	6- 5	1- 0	0- 8	4- 9	1- 0	12-10	59- 9	1- 9	4	68	8- 3	6.0	1- 3	2	6-10	10	12- 6	4	76	6- 1	9.5	10	59- 5	20	1- 5	25	8	4	2	59- 5	22.48	1273	79.5	5	54
54	6	95.4	6- 5	1- 0	0- 8	4- 9	1- 0	12-10	66-11	1- 9	4	72	8- 3	6.0	1- 3	2	6-10	10	12- 6	4	85	6- 1	9.5	10	66- 7	25	1- 5	30	8	4	2	66- 7	24.95	1396	95.4	6	54



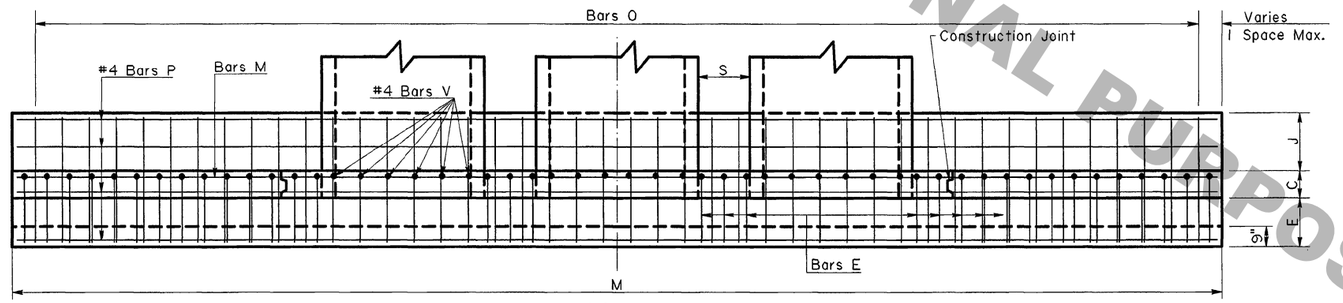
BARS E



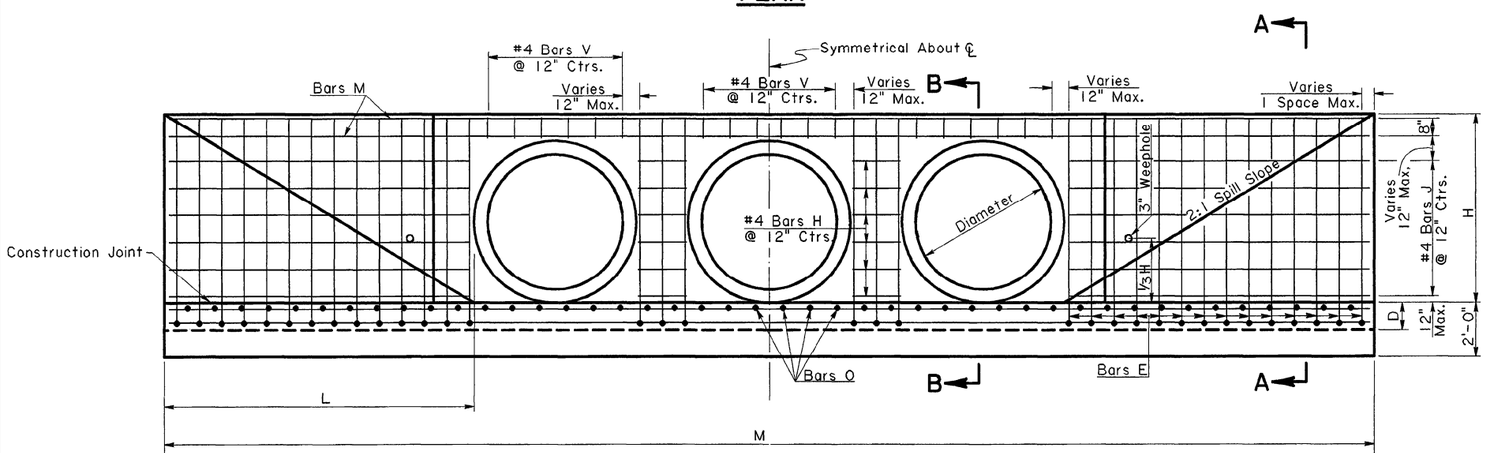
SECTION A-A



SECTION B-B



PLAN



ELEVATION

GENERAL NOTES

DESIGN: Method- Headwalls are designed as retaining walls according to current AASHTO working stress procedures. Walls are designed for a lateral earth pressure of 40 psf with 2.0 feet of surcharge. Overturning- A minimum safety factor of 2.0 is provided against overturning. The resultant of loads is within the middle third of the footing. Sliding - A minimum safety factor of 1.5 is provided against sliding. The coefficient of friction between the footing and soil is 0.5. Foundation - The design soil bearing pressure is 1800 psf. When strength of the soil at the site is less than 1800 psf, bedding material shall be added under the footing as directed.

MATERIALS: Concrete- All concrete shall be class A. All exposed edges shall be ¾ inch chamfered. Reinforcing Steel - Reinforcement shall be Grade 60. Bar spacing dimensions are to bar centers. Steel required for lap splices not detailed shall not be measured for payment. Reinforcing steel shall have 2" cover unless otherwise specified. Steel and concrete quantities shown in table are for one headwall.

A 1'-6" square of geotextile fabric (see Section 1019 of the LA DOTD Standard Specifications) shall be placed in contact with concrete behind each weephole in addition to approximately 2 cu.ft. of concrete sand (see Section 1003.02 of the LA DOTD Standard Specifications).

CONSTRUCTION JOINTS: All construction joints shown are optional. For details of keyed construction joints see Standard Plan CM-49. For construction joints without key, the joint surface shall be roughened. Hardened surface shall be cleaned. Immediately before new concrete is placed, joint surface shall be saturated with water.

STATE OF LOUISIANA
WILLIAM M. RAY
REG. No. 24936
REGISTERED PROFESSIONAL ENGINEER IN CIVIL ENGINEERING
6-28-01

ORIGINAL PLANS FOR INFORMATIONAL PURPOSES ONLY

SHEET NUMBER

PARISH | FEDERAL PROJECT | STATE PROJECT

DESIGNED PAA | DETAILED KAJ | DATE 1-6-93
CHECKED PAA | CHECKED JCM | SHEET 1 OF 1

NO.	DATE	REVISION DESCRIPTION	BY
2	7-24-00	New Sheet Added, Minor Drafting Revisions	JCM
1	11-14-97	Revised General Notes And Added Name HW-90RCP1	JCM

STRAIGHT HEADWALL FOR RCP
ON A 90° CROSSING
15" THRU 54"

SPECIAL DETAIL | HW-90RCP1

HYDRAULICS SECTION

25-APR-2008 15:16

IP_PWP:dms09539\HW-90RCP1.dgn