05-NOV-09 GEORGIA DEPARTMENT OF TRANSPORTATION PROB. NO. 0001
10:56:08 PRECONSTUCTION DIVISION - OFFICE OF BRIDGE & STRUCTURAL DESIGN
THE ANALYSIS AND DESIGN OF PIERS FOR BRIDGES - V 4.2.07 - AASHTO SPECS 1984 INTERIM
REVISED: JUNE 30, 2008
32' CURB-CURB; 4 BEAMS; 140' SPAN; 30' TALL; BRIDGE 2A ; PIER 2

DESIGN DATA

DESIGN OPTIONS	NO. CAN	NO. COL	NO. LLC	SKEW ANG D	M	S	F'C PSI	FC PSI	N	FY PSI	FS PSI	EC KSI	ES KSI	CONC. STRAIN	Z FACT	* MAIN SIZE	* STR SIZ	* MAX TOP	* MAX BOT	* MIN SIZE	* MIN NO.	* TOP CL.	* MIN S.SP	CAP DEPTH INCR.	BOT CL.
D D D L	2	1	6	0-00-00			3500.	1400.	8.	60000.	24000.	3409.	29000.	0.0030	170.	11	5	16	16	11	2	2.00	4.00	3.00	2.00

COLUMN REINFORCING STEEL MIN.P	MAX.P	CL.SP.	CLEAR	MODE	R COEF	KL	OC	OF	CM	BD1	BD2	IMPACT %	SOIL WT KCF	ALL.S.P. KSF	MIN PL SP	MAX PL SP	EDGE DIST	PILE DEPTH	REBAR CLEAR	ALL.PILE CAPACITY	ALL.PILE UPLIFT	I P
1.00	8.00	2.50	3.750	2	2.00	0.70	0.90	1.00	1.00	0.75	16.95	0.120	0.000	3.00	9.00	1.250	1.000	3.000	235.000	-9.999		

CAP DATA

CN	C	L	A	DE	BC	BE	DH	LH	XB1	XB2	XB3	XB4	XB5	XB6	XB7	XB8
11	L	17.625	4.000	4.000	6.000	6.000	4.000	13.625	14.000	9.333	0.667					
12	2	SAME AS CANTILEVER	1													

COLUMN DATA

CN	P	I	T	S	HT	A	DT	BT	DB	BB	DL	FLEX	ND	NB	SZ	ND	NB	SZ	ND	NB	SZ	ND	NB	SZ	SLOPE	EP	AP
21	0	C	T		30.000	0.000	8.000	6.000	8.000	6.000	6.000	0.000	8	6	11	8	6	11	22	16	11	22	16	11	0.000	0.000	0.000

FOOTING DATA

CN	S/P	B	D	T	DEL.B	DEL.D	DEL.T	R.B/D	R.D/B	S.HT.	NP	SYM.	BP	DP	SET.
31	P	10.000	10.000	3.000	0.500	0.500	0.250	1.000	1.000	2.500	4	3	0.000	0.000	0.000

GROUP II WIND

SUPERSTRUCTURE AREA*STD. TRANS.	LONG.	WIND ON SUPERSTRUCTURE INTENSITIES WIND	FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* WIND FORCE ARM APT	APL	* WIND ON PIER PT	PL
1342.	1342.	1	50	0	44	6	41	12	33	16	17	19	7.292	7.292	4.071	11.726

GROUP III WIND

STD. * WIND	WIND ON SUPERSTRUCTURE INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* STD. * WIND	WIND ON LIVE LOAD INTENSITIES FT1	FL1	FT2	FL2	FT3	FL3	FT4	FL4	FT5	FL5	* LENGTHS OF LL TRANS.	LONGI.	* WIND ON LL ARMS APT	APL
1	50	0	44	6	41	12	33	16	17	19	1	100	0	88	12	82	24	66	32	34	38	140.0	140.0	15.417	15.417

MISCELLANEOUS FORCES

CENTRI. FT	TRACTION FORCE AND ARMS FL	APT	APL	EXPANSION COEFFICIENT	SHRINKAGE COEFFICIENT	STREAM FLOW PT	PL
16.592	5.380	15.417	15.417	0.00018000	0.00044000	0.000	0.000

DEAD LOAD SUPERSTRUCTURE AND LIVE LOAD CASES

I.D.	NL	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12
D.L.	0	318.400	305.640	0.000	0.000	352.560	296.290						
LL01	1	23.880	54.460	0.000	0.000	83.330	102.350						
LL02	1	111.410	63.160	0.000	0.000	59.900	23.390						
LL03	2	36.740	97.090	0.000	0.000	136.660	127.730						
LL04	2	35.110	99.860	0.000	0.000	143.230	103.820						
LL05	2	116.160	117.630	0.000	0.000	98.080	31.630						
LL06	2	135.290	102.400	0.000	0.000	90.500	29.970						

COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

LOAD	COL	PC	TRANSVERSE MT	V	MB	RF	ML	MR	* LONGITUDINAL MT	V	MB	MF
UNIT F.AT CL.CAP	1	0.000	-6.000	1.000	30.000	0.000	0.000	0.000	6.000	1.000	30.000	30.000
DEAD LOAD TOTAL	1	1477.640 1650.440	-90.564	0.000	90.564	1650.440	6681.459	-6590.895	0.000	0.000	0.000	0.000
TRAC. FORCE 1 LN	1	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-115.223	-5.380	-244.343	-244.343
CENT. FORCE 1 LN	1	0.000	-355.351	16.592	753.559	0.000	0.000	0.000	0.000	0.000	0.000	0.000
WIND ON SUBSTR.	1	0.000	-24.426	4.071	122.130	0.000	0.000	0.000	-70.356	-11.726	-351.780	-351.780
GROUP 2 WIND 1 1	1	0.000	-916.319	71.171	2624.423	0.000	0.000	0.000	-70.356	-11.726	-351.780	-351.780
GROUP 2 WIND 1 2	1	0.000	-916.319	71.171	2624.423	0.000	0.000	0.000	70.356	11.726	351.780	351.780
GROUP 2 WIND 2 1	1	0.000	-809.292	63.119	2324.148	0.000	0.000	0.000	-177.383	-19.778	-652.055	-652.055
GROUP 2 WIND 2 2	1	0.000	-809.292	63.119	2324.148	0.000	0.000	0.000	177.383	19.778	652.055	652.055
GROUP 2 WIND 3 1	1	0.000	-755.779	59.093	2174.011	0.000	0.000	0.000	-284.410	-27.830	-952.330	-952.330
GROUP 2 WIND 3 2	1	0.000	-755.779	59.093	2174.011	0.000	0.000	0.000	284.410	27.830	952.330	952.330
GROUP 2 WIND 4 1	1	0.000	-613.076	48.357	1773.643	0.000	0.000	0.000	-355.762	-33.198	-1152.514	-1152.514
GROUP 2 WIND 4 2	1	0.000	-613.076	48.357	1773.643	0.000	0.000	0.000	355.762	33.198	1152.514	1152.514
GROUP 2 WIND 5 1	1	0.000	-327.670	26.885	972.910	0.000	0.000	0.000	-409.275	-37.224	-1302.651	-1302.651

GROUP 2 WIND 5 2	1	0.000	-327.670	26.885	972.910	0.000	0.000	0.000	409.275	37.224	1302.651	1302.651
GROUP 3 WIND 1 1	1	0.000	-574.734	35.351	1423.165	0.000	0.000	0.000	-21.107	-3.518	-105.534	-105.534
GROUP 3 WIND 1 2	1	0.000	-574.734	35.351	1423.165	0.000	0.000	0.000	21.107	3.518	105.534	105.534
GROUP 3 WIND 2 1	1	0.000	-506.645	31.256	1256.782	0.000	0.000	0.000	-89.196	-7.613	-271.917	-271.917
GROUP 3 WIND 2 2	1	0.000	-506.645	31.256	1256.782	0.000	0.000	0.000	89.196	7.613	271.917	271.917
GROUP 3 WIND 3 1	1	0.000	-472.601	29.208	1173.590	0.000	0.000	0.000	-157.284	-11.709	-438.300	-438.300
GROUP 3 WIND 3 2	1	0.000	-472.601	29.208	1173.590	0.000	0.000	0.000	157.284	11.709	438.300	438.300
GROUP 3 WIND 4 1	1	0.000	-381.816	23.747	951.746	0.000	0.000	0.000	-202.677	-14.439	-549.222	-549.222
GROUP 3 WIND 4 2	1	0.000	-381.816	23.747	951.746	0.000	0.000	0.000	202.677	14.439	549.222	549.222
GROUP 3 WIND 5 1	1	0.000	-200.246	12.826	508.058	0.000	0.000	0.000	-236.721	-16.487	-632.414	-632.414
GROUP 3 WIND 5 2	1	0.000	-200.246	12.826	508.058	0.000	0.000	0.000	236.721	16.487	632.414	632.414
LIVE LOAD LL01	1	264.020	1233.316	0.000	-1233.316	264.020	588.485	-1821.801	0.000	0.000	0.000	0.000

COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

		TRANSVERSE							* LONGITUDINAL			
LOAD	COL	PC	MT	V	MB	RF	ML	MR	MT	V	MB	MF
LIVE LOAD LL02	1	257.860	-1247.494	0.000	1247.494	257.860	1854.508	-607.013	0.000	0.000	0.000	0.000
LIVE LOAD LL03	1	398.220	1458.533	0.000	-1458.533	398.220	967.479	-2426.012	0.000	0.000	0.000	0.000
LIVE LOAD LL04	1	382.020	1164.348	0.000	-1164.348	382.020	957.587	-2121.934	0.000	0.000	0.000	0.000
LIVE LOAD LL05	1	363.500	-1274.660	0.000	1274.660	363.500	2175.219	-900.559	0.000	0.000	0.000	0.000
LIVE LOAD LL06	1	358.160	-1530.017	0.000	1530.017	358.160	2371.961	-841.943	0.000	0.000	0.000	0.000

CAP ANALYSIS AND DESIGN DATA

CAP MOMENTS AND SHEARS

	MOMENTS(KIP-FEET)						** SHEARS(KIPS)					
POINT	D.L.TOT.	G1 MAX.+	G1 MAX.-	G2 MAX.+	G2 MAX.-	G3 MAX.+	G3 MAX.-	DL T.LT	DL T.RT	G1 + LT	G1 + RT	G1 - LT	G1 - RT
P 1	-33.476	-33.476	-33.476	-33.476	-33.476	-33.476	-33.476	-19.222	-433.142	-19.222	-433.142	-19.222	-726.856
P 2	-4380.582	-4380.582	-7121.820	-4380.582	-4380.582	-4380.582	-6022.042	-503.401	-900.733	-503.401	-900.733	-797.115	-1416.758
P 3	-4983.419	-4983.419	-8068.846	-4983.419	-4983.419	-4983.419	-6830.980	-906.900	-906.900	-906.900	-906.900	-1422.925	-1422.925
C 1L	-8685.897	-8685.897	-13835.424	-8685.897	-8685.897	-8685.897	-11769.445	-944.340		-944.340		-1460.364	
C 1R	-8568.163	-8568.163	-13835.035	-8568.163	-8568.163	-8568.163	-11721.979		976.592		1550.583		976.592
P 4	-4736.674	-4736.674	-7707.583	-4736.674	-4736.674	-4736.674	-6515.661	939.152	939.152	1513.143	1513.143	939.152	939.152
P 5	-4112.324	-4112.324	-6700.382	-4112.324	-4112.324	-4112.324	-5662.060	932.986	474.658	1506.976	751.960	932.986	474.658
P 6	-33.477	-33.476	-33.477	-33.477	-33.477	-33.476	-33.477	404.399	19.222	681.701	19.222	404.399	19.222

CAP DESIGN DATA

PT.	M+ UNF. K-FT.	M- UNF. K-FT.	TOP REINFORCE. AS	NO.SIZE	BOT.REINFORCE. AS	NO.SIZE	LEFT STIRRUPS M.SP.	AV/IN	BAR&SPAC	RIGHT STIRRUPS M.SP.	AV/IN	BAR&SPAC	D IN.	FC PSI	PS %	FS/FF RATIO	FS/FZ RATIO
P 1	-25.751	-25.751	3.12	2 # 11	3.12	2 # 11	0.00	0.000	#5@ 0.00	24.00	0.106	#5@ 5.84	60.77		0.08	0.000	0.098
P 2	-3369.679	-4632.340	18.00	12 # 11	3.12	2 # 11	24.00	0.060	#5@10.33	24.00	0.166	D#5@ 7.49	93.65		0.30	0.642	1.053
P 3	-3833.399	-5254.600	19.91	13 # 11	3.12	2 # 11	24.00	0.159	D#5@ 7.79	24.00	0.159	D#5@ 7.79	96.00		0.33	0.661	1.048
C 1	-6590.895	-9053.420	34.99	23 # 11	3.12	2 # 11	24.00	0.168	D#5@ 7.36	24.00	0.188	D#5@ 6.61	96.00		0.57	0.662	0.938
P 4	-3643.595	-5012.047	19.00	13 # 11	3.12	2 # 11	24.00	0.178	D#5@ 6.96	24.00	0.178	D#5@ 6.96	96.00		0.31	0.618	1.000
P 5	-3163.326	-4355.431	16.91	11 # 11	3.12	2 # 11	24.00	0.185	D#5@ 6.70	24.00	0.060	#5@10.33	93.65		0.28	0.668	1.109
P 6	-25.751	-25.751	3.12	2 # 11	3.12	2 # 11	24.00	0.091	#5@ 6.83	0.00	0.000	#5@ 0.00	60.77		0.08	0.000	0.098

NOTE: *** FS/FZ RATIO EXCEEDS 1.0! ***

COLUMN ANALYSIS AND DESIGN OUTPUT

CRITICAL COLUMN LOADS

CN	T B	GR	LLC	WC	R	E S	C F	S F	PF	MTF	MLF	PM	MTM	MLM	PU	MTU	MLU	PU/PM	B	D
1	T	1	LL06	0.0			C		2698.5	-4363.3	0.0	2698.5	4590.6	1760.3	9061.2	15421.2	5913.4	3.359	72.00	96.00
1	B	3	LL06	1.1			C		2611.2	5916.1	-772.5	2611.2	6188.9	1687.0	7528.4	17844.3	4864.1	2.883	72.00	96.00

COLUMN DESIGN DATA

CN	T B	B FACE 1 NO.SIZE	B FACE 2 NO.SIZE	D FACE 3 NO.SIZE	D FACE 4 NO.SIZE	AS	PS	BD12	BD	SUMPU	SUMPC	DEL.T	DEL.L	CM	R	PHIC
1	T	15 # 11	15 # 11	8 # 11	8 # 11	71.76	1.038	1.00	0.024	2811.	56765.	1.052	1.087	1.000	2	0.70
1	B	15 # 11	15 # 11	8 # 11	8 # 11	71.76	1.038	1.00	0.026	2499.	56702.	1.046	1.077	1.000	2	0.70

FOOTING 1 DESIGN LOADS

F	G	LLID	WC	ES	C	S	P	MT	VT	ML	VL	P4	P3	P2	P1	MTF	VBF	VPF	LOAD

1	1	LL06	0.0	C	1956.691	2905.948	33.184	0.000	0.000	99.525	99.525	234.863	234.863	105.420	-0.469	29.533	MAX.P1
1	1	LL06	0.0	C	2810.442	4917.232	43.139	0.000	0.000	124.663	124.663	351.079	351.079	158.885	-0.610	42.409	MAX.MT
1	3	LL06	1.1	C	2543.698	5627.847	89.096	-772.487	-18.561	102.784	64.865	331.921	369.839	158.789	-0.610	38.393	MAX.VT
1	1	LL05	0.0	C	2820.355	4443.200	43.139	0.000	0.000	135.924	135.924	341.343	341.343	154.238	-0.610	42.558	MAX.VP
1	3	LL05	5.1	C	2549.634	4154.356	59.812	-1457.431	-35.421	155.645	84.025	279.972	351.593	163.340	34.251	38.482	MAX.ML
1	3	LL05	5.1	C	2549.634	4154.356	59.812	-1457.431	-35.421	155.645	84.025	279.972	351.593	163.340	34.251	38.482	MAX.VL
1	3	LL06	3.1	C	1956.691	4079.538	62.392	-926.987	-22.469	93.391	47.850	240.997	286.538	119.215	-0.469	29.533	MAX.P3

FOOTING 1 ANALYSIS/DESIGN RESULTS

FOOTING SIZE				* BAR REINFORCEMENT STEEL				* SECTION CAPACITIES				
B	D	T	P1/PA	AS	NO.SIZE	SPAC.	PLACEMENT	MT.	VB	VP	DS	FC
15.400	15.400	4.500	0.999	0.96	25 # 7	@ 7.375	TOP TRAN	161.601	45.484	90.969	37.688	0.000
				0.96	25 # 7	@ 7.375	BOT.LONG	165.436	46.540	93.081	38.562	0.000

NUMBER OF PILES = 13 BP = 3.225 DP = 3.225