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04-NOV-09                                 GEORGIA DEPARTMENT OF TRANSPORTATION                                   PROB. NO. 0001
15:41:07                     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; 163' SPAN; 40' TALL; BRIDGE 7 ; PIER 11

                                                            DESIGN DATA
 DESIGN NO. NO. NO. SKEW ANG  F'C    FC     N    FY      FS      EC     ES     CONC.   Z   *  *   * CAP REINFORCING STEEL  *  *  *  CAP
OPTIONS CAN COL LLC  D  M  S  PSI    PSI         PSI     PSI     KSI    KSI    STRAIN FACT MAIN STR MAX  MAX  MIN  MIN  TOP   MIN DEPTH BOT
                                                                                    SIZE SIZ TOP  BOT SIZE  NO.  CL.  S.SP INCR. 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   R   KL   OC   OF   CM  BD1  BD2 IMPACT SOIL WT ALL.S.P.  MIN   MAX  EDGE  PILE  REBAR ALL.PILE ALL.PILE I
MIN.P MAX.P CL.SP. CLEAR MODE COEF                          %      KCF      KSF    PL SP PL SP DIST  DEPTH CLEAR CAPACITY  UPLIFT  P
 1.00  8.00  2.50  3.750   2  2.00 0.70 0.90 1.00 1.00 0.75 16.13  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   40.000  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.        WIND ON SUPERSTRUCTURE INTENSITIES       * WIND FORCE ARM  * WIND ON PIER
  TRANS.     LONG.  WIND FT1 FL1   FT2 FL2   FT3 FL3   FT4 FL4   FT5 FL5     APT     APL      PT      PL

   1828.     1828.   1    50   0    44   6    41  12    33  16    17  19    8.125   8.125    5.273  13.389

                                                          GROUP III WIND
STD. *   WIND ON SUPERSTRUCTURE INTENSITIES    *  STD. *     WIND ON LIVE LOAD INTENSITIES      *  LENGTHS OF LL * WIND ON LL ARMS
WIND FT1 FL1  FT2 FL2  FT3 FL3  FT4 FL4  FT5 FL5  WIND FT1 FL1  FT2 FL2  FT3 FL3  FT4 FL4  FT5 FL5   TRANS.  LONGI.   APT     APL

  1   50   0   44   6   41  12   33  16   17  19   1   100   0   88  12   82  24   66  32   34  38   162.5   162.5  17.084  17.084

                          MISCELLANEOUS FORCES
CENTRI.  TRACTION FORCE AND ARMS   EXPANSION   SHRINKAGE     STREAM FLOW
  FT       FL       APT     APL    COEFFICIENT COEFFICIENT    PT      PL

16.232    6.100  17.084  17.084    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  310.693  381.854    0.000    0.000  352.634  216.623

LL01   1   26.820   39.300    0.000    0.000   46.580   53.660

LL02   1   73.310   41.860    0.000    0.000   30.630    5.820

LL03   2   35.040   57.200    0.000    0.000   58.980   59.480

LL04   2   11.520   53.090    0.000    0.000   77.210   31.880

LL05   2   69.760   81.160    0.000    0.000   46.550    9.280

LL06   2  100.130   67.350    0.000    0.000   48.830   17.610
                                       COLUMN MOMENTS(KIP-FEET), SHEARS(KIPS), REACTIONS(KIPS)

                                                   TRANSVERSE                               *             LONGITUDINAL

       LOAD        COL     PC        MT         V         MB        RF        ML         MR        MT          V        MB        MF

UNIT F.AT CL.CAP   1     0.000    -6.000     1.000    40.000     0.000     0.000     0.000     6.000     1.000    40.000    40.000

DEAD LOAD TOTAL    1  1466.554 -1453.350     0.000  1453.350  1711.354  6929.252 -5475.902     0.000     0.000     0.000     0.000
                      1711.354

TRAC. FORCE 1 LN   1     0.000     0.000     0.000     0.000     0.000     0.000     0.000  -140.812    -6.100  -348.212  -348.212

CENT. FORCE 1 LN   1     0.000  -374.699    16.232   926.588     0.000     0.000     0.000     0.000     0.000     0.000     0.000

WIND ON SUBSTR.    1     0.000   -31.638     5.273   210.920     0.000     0.000     0.000   -80.334   -13.389  -535.560  -535.560

GROUP 2 WIND 1 1   1     0.000 -1322.663    96.673  4609.545     0.000     0.000     0.000   -80.334   -13.389  -535.560  -535.560

GROUP 2 WIND 1 2   1     0.000 -1322.663    96.673  4609.545     0.000     0.000     0.000    80.334    13.389   535.560   535.560

GROUP 2 WIND 2 1   1     0.000 -1167.740    85.705  4081.710     0.000     0.000     0.000  -235.257   -24.357 -1063.395 -1063.395

GROUP 2 WIND 2 2   1     0.000 -1167.740    85.705  4081.710     0.000     0.000     0.000   235.257    24.357  1063.395  1063.395

GROUP 2 WIND 3 1   1     0.000 -1090.279    80.221  3817.793     0.000     0.000     0.000  -390.180   -35.325 -1591.230 -1591.230

GROUP 2 WIND 3 2   1     0.000 -1090.279    80.221  3817.793     0.000     0.000     0.000   390.180    35.325  1591.230  1591.230

GROUP 2 WIND 4 1   1     0.000  -883.715    65.597  3114.012     0.000     0.000     0.000  -493.462   -42.637 -1943.120 -1943.120

GROUP 2 WIND 4 2   1     0.000  -883.715    65.597  3114.012     0.000     0.000     0.000   493.462    42.637  1943.120  1943.120

GROUP 2 WIND 5 1   1     0.000  -470.587    36.349  1706.453     0.000     0.000     0.000  -570.923   -48.121 -2207.037 -2207.037
GROUP 2 WIND 5 2   1     0.000  -470.587    36.349  1706.453     0.000     0.000     0.000   570.923    48.121  2207.037  2207.037

GROUP 3 WIND 1 1   1     0.000  -771.914    45.252  2310.479     0.000     0.000     0.000   -24.100    -4.017  -160.668  -160.668

GROUP 3 WIND 1 2   1     0.000  -771.914    45.252  2310.479     0.000     0.000     0.000    24.100     4.017   160.668   160.668

GROUP 3 WIND 2 1   1     0.000  -680.423    40.012  2040.814     0.000     0.000     0.000  -115.591    -9.257  -430.332  -430.332

GROUP 3 WIND 2 2   1     0.000  -680.423    40.012  2040.814     0.000     0.000     0.000   115.591     9.257   430.332   430.332

GROUP 3 WIND 3 1   1     0.000  -634.678    37.391  1905.982     0.000     0.000     0.000  -207.082   -14.498  -699.997  -699.997

GROUP 3 WIND 3 2   1     0.000  -634.678    37.391  1905.982     0.000     0.000     0.000   207.082    14.498   699.997   699.997

GROUP 3 WIND 4 1   1     0.000  -512.690    30.404  1546.430     0.000     0.000     0.000  -268.075   -17.991  -879.773  -879.773

GROUP 3 WIND 4 2   1     0.000  -512.690    30.404  1546.430     0.000     0.000     0.000   268.075    17.991   879.773   879.773

GROUP 3 WIND 5 1   1     0.000  -268.715    16.430   827.325     0.000     0.000     0.000  -313.821   -20.611 -1014.605 -1014.605

GROUP 3 WIND 5 2   1     0.000  -268.715    16.430   827.325     0.000     0.000     0.000   313.821    20.611  1014.605  1014.605

LIVE LOAD LL01     1   166.360   409.736     0.000  -409.736   166.360   558.893  -968.629     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   151.620  -997.270     0.000   997.270   151.620  1221.701  -224.430     0.000     0.000     0.000     0.000

LIVE LOAD LL03     1   210.700   350.467     0.000  -350.467   210.700   757.512 -1107.980     0.000     0.000     0.000     0.000

LIVE LOAD LL04     1   173.700   397.608     0.000  -397.608   173.700   409.051  -806.659     0.000     0.000     0.000     0.000

LIVE LOAD LL05     1   206.750 -1008.245     0.000  1008.245   206.750  1355.414  -347.169     0.000     0.000     0.000     0.000

LIVE LOAD LL06     1   233.920 -1241.713     0.000  1241.713   233.920  1716.142  -474.430     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 -423.123  -19.222 -423.123  -19.222 -640.505

P 2    -4287.074 -4287.074 -6315.902 -4287.074 -4287.074 -4287.074 -5501.941   -493.382 -989.792 -493.382 -989.792 -710.764-1353.391

P 3    -4949.313 -4949.313 -7220.662 -4949.313 -4949.313 -4949.313 -6309.402   -995.959 -995.959 -995.959 -995.959-1359.558-1359.558

C 1L   -9008.028 -9008.028-12733.772 -9008.028 -9008.028 -9008.028-11239.013  -1033.399         -1033.399         -1396.998

C 1R   -7118.673 -7118.673 -9524.097 -7118.673 -7118.673 -7118.673 -8559.046            873.122          1130.298           873.122

P 4    -3701.067 -3701.067 -5077.784 -3701.067 -3701.067 -3701.067 -4525.448    835.682  835.682 1092.858 1092.858  835.682  835.682

P 5    -3145.732 -3145.732 -4350.912 -3145.732 -3145.732 -3145.732 -3867.397    829.515  371.091 1086.692  500.222  829.515  371.091

P 6      -33.476   -33.476   -33.476   -33.476   -33.476   -33.476   -33.476    300.832   19.222  429.963   19.222  300.832   19.222
                                             CAP DESIGN DATA
PT.   M+ UNF.   M- UNF.  TOP REINFORCE.  BOT.REINFORCE.    LEFT STIRRUPS        RIGHT STIRRUPS      D      FC    PS    FS/FF  FS/FZ
       K-FT.     K-FT.     AS  NO.SIZE     AS  NO.SIZE   M.SP. AV/IN BAR&SPAC  M.SP. AV/IN BAR&SPAC  IN.    PSI    %    RATIO  RATIO

P 1   -25.751   -25.751   3.12  2 # 11    3.12  2 # 11    0.00 0.000 #5@ 0.00  24.00 0.077 #5@ 8.09  60.77        0.08  0.000  0.098

P 2 -3297.749 -4232.263  15.92 11 # 11    3.12  2 # 11   24.00 0.060 #5@10.33  24.00 0.152 #5@ 4.08  93.65        0.27  0.537  1.078

P 3 -3807.164 -4853.387  17.77 12 # 11    3.12  2 # 11   24.00 0.146 #5@ 4.26  24.00 0.146 #5@ 4.26  96.00        0.29  0.549  1.075

C 1 -5475.902 -8645.395  32.04 21 # 11    3.12  2 # 11   24.00 0.155 #5@ 4.01  24.00 0.098 #5@ 6.32  96.00        0.53  0.879  0.990

P 4 -2846.974 -3481.114  12.41  8 # 11    3.12  2 # 11   24.00 0.089 #5@ 6.95  24.00 0.089 #5@ 6.95  96.00        0.20  0.533  1.309

P 5 -2419.794 -2974.921  11.70  8 # 11    3.12  2 # 11   24.00 0.094 #5@ 6.60  24.00 0.060 #5@10.33  93.65        0.18  0.435  1.149

P 6   -25.751   -25.751   3.12  2 # 11    3.12  2 # 11   24.00 0.060 #5@10.33   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
    T                      E  C  S
CN  B   GR  LLC   WC   R   S  F  F     PF      MTF      MLF      PM      MTM      MLM      PU      MTU      MLU    PU/PM    B       D

 1  T    1 LL06 0.0           C     2414.4 -5559.3     0.0  2414.4  6173.5  1658.4  7087.0 18121.9  4868.2  2.935  72.00  96.00

 1  B    3 LL06 1.1           C     2528.9  8916.3-1114.2  2528.9  9795.4  1717.4  5008.8 19435.5  3407.6  1.984  72.00  96.00



                                     COLUMN DESIGN DATA
    T  B FACE 1  B FACE 2  D FACE 3  D FACE 4
CN  B   NO.SIZE   NO.SIZE   NO.SIZE   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  0.305    2573.    25867.  1.110     1.145     1.000  2  0.70

 1  B   15 # 11   15 # 11    8 # 11    8 # 11  71.76  1.038  1.00  0.278    2370.    26407.  1.099     1.132     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
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1 3 LL06  3.1      C      1912.783 6281.750  69.855-1396.421 -26.698  71.206  21.654 242.076 291.628 189.094  -0.689  39.759  MAX.P1
1 3 LL06  1.1      C      2486.618 8692.121 101.031-1114.221 -21.082  70.521  31.019 336.746 376.248 252.979  -0.896  51.687  MAX.MT
1 3 LL06  1.1      C      2486.618 8692.121 101.031-1114.221 -21.082  70.521  31.019 336.746 376.248 252.979  -0.896  51.687  MAX.VT
1 1 LL06  0.0      C      2662.063 6619.811  42.203    0.000   0.000 102.633 102.633 329.697 329.697 232.979  -0.896  55.195  MAX.VP
1 3 LL06  5.1      C      2486.618 6764.021  63.562-2224.339 -42.655 125.405  46.454 281.861 360.812 219.762  50.352  51.687  MAX.ML
1 3 LL06  5.1      C      2486.618 6764.021  63.562-2224.339 -42.655 125.405  46.454 281.861 360.812 219.762  50.352  51.687  MAX.VL
1 3 LL06  3.1      C      1912.783 6281.750  69.855-1396.421 -26.698  71.206  21.654 242.076 291.628 189.094  -0.689  39.759  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

16.750  16.750   5.000  0.993  1.15  25 # 8 @ 8.000  TOP LONG 224.873  52.345 104.690  43.372  0.000

                               1.30  22 # 9 @ 9.125  BOT.TRAN 256.113  53.629 107.258  44.436  0.000

NUMBER OF PILES = 14  BP = 2.375  DP = 2.375
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