Lpile Analyses Calculations
Piers 1 to 4

Bridge No. FRA-70-1321R

I-70 Eastbound over the Scioto River and Bike Path

Structure File No. 2510016

Columbus, Ohio

Submitted: 7/11/2022

GPD GROUP®

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                    LPile for Windows, Version 2019-11.001

                Analysis of Individual Piles and Drilled Shafts
               Subjected to Lateral Loading Using the p-y Method
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                            Files Used for Analysis
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Path to file locations:
\2012\2012048\FRA\77372\structures\FRA070_1321R\design\3-Final Design\Piers\L-Pile\

Name of input data file:
1321R-Pier1.lp11

Name of output report file:
1321R-Pier1.lp11

Name of plot output file:
1321R-Pier1.lp11

Name of runtime message file:
1321R-Pier1.lp11



--------------------------------------------------------------------------------
                            Date and Time of Analysis
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               Date:  June 28, 2020              Time:  21:40:01



--------------------------------------------------------------------------------
                                  Problem Title
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1321R-Pier1

Job Number: 2012048

Client: ODOT D6

Engineer: GPD GROUP

Description: Design of Pier 1




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                          Program Options and Settings
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Computational Options:
 - Use unfactored loads in computations (conventional analysis)
Engineering Units Used for Data Input and Computations:
 - US Customary System Units (pounds, feet, inches)
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Analysis Control Options:
 - Maximum number of iterations allowed = 100
 - Deflection tolerance for convergence = 1.0000E-05 in
 - Maximum allowable deflection = 100.0000 in
 - Number of pile increments = 100

Loading Type and Number of Cycles of Loading:
 - Static loading specified

 - Use of p-y modification factors for p-y curves not selected
 - Analysis uses layering correction (Method of Georgiadis)
 - No distributed lateral loads are entered
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Input of moment resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - Output files use decimal points to denote decimal symbols.
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1
 - No p-y curves to be computed and reported for user-specified depths
 - Print using wide report formats

Pile Structural Properties and Geometry

Number of pile sections defined = 2
Total length of pile = 54.100 ft
Depth of ground surface below top of pile = 16.1000 ft

Pile diameters used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile. A summary of values of pile diameter vs. depth follows.

Point No.	Depth Below Pile Head feet	Pile Diameter inches
1	0.000	72.0000
2	45.100	72.0000
3	45.100	66.0000
4	54.100	66.0000

Input Structural Properties for Pile Sections:

Pile Section No. 1:

   Section 1 is a round drilled shaft, bored pile, or CIDH pile
   Length of section = 45.100000 ft
   Shaft Diameter = 72.000000 in
   Shear capacity of section = 0.0000 lbs

Pile Section No. 2:

   Section 2 is a round drilled shaft, bored pile, or CIDH pile
   Length of section = 9.000000 ft
   Shaft Diameter = 66.000000 in
   Shear capacity of section = 0.0000 lbs

Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees

	=	0.000 radians
Pile Batter Angle	=	0.000 degrees
	=	0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	16.100000 ft
Distance from top of pile to bottom of layer	=	24.100000 ft
Effective unit weight at top of layer	=	62.600000 pcf
Effective unit weight at bottom of layer	=	62.600000 pcf
Friction angle at top of layer	=	39.000000 deg.
Friction angle at bottom of layer	=	39.000000 deg.
Subgrade k at top of layer	=	210.000000 pci
Subgrade k at bottom of layer	=	210.000000 pci

Layer 2 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	24.100000 ft
Distance from top of pile to bottom of layer	=	29.100000 ft
Effective unit weight at top of layer	=	77.600000 pcf
Effective unit weight at bottom of layer	=	77.600000 pcf
Friction angle at top of layer	=	41.000000 deg.
Friction angle at bottom of layer	=	41.000000 deg.
Subgrade k at top of layer	=	290.000000 pci
Subgrade k at bottom of layer	=	290.000000 pci

Layer 3 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	29.100000 ft
Distance from top of pile to bottom of layer	=	39.100000 ft
Effective unit weight at top of layer	=	77.600000 pcf
Effective unit weight at bottom of layer	=	77.600000 pcf
Friction angle at top of layer	=	43.000000 deg.
Friction angle at bottom of layer	=	43.000000 deg.
Subgrade k at top of layer	=	380.000000 pci
Subgrade k at bottom of layer	=	380.000000 pci

Layer 4 is sand, p-y criteria by Reese et al., 1974

Distance from top of pile to top of layer	=	39.100000 ft
Distance from top of pile to bottom of layer	=	45.100000 ft
Effective unit weight at top of layer	=	62.600000 pcf
Effective unit weight at bottom of layer	=	62.600000 pcf
Friction angle at top of layer	=	33.000000 deg.
Friction angle at bottom of layer	=	33.000000 deg.
Subgrade k at top of layer	=	70.000000 pci
Subgrade k at bottom of layer	=	70.000000 pci

Layer 5 is weak rock, p-y criteria by Reese, 1997

Distance from top of pile to top of layer	=	45.100000 ft
Distance from top of pile to bottom of layer	=	45.700000 ft
Effective unit weight at top of layer	=	87.600000 pcf
Effective unit weight at bottom of layer	=	87.600000 pcf
Uniaxial compressive strength at top of layer	=	200.000000 psi
Uniaxial compressive strength at bottom of layer	=	200.000000 psi
Initial modulus of rock at top of layer	=	20000. psi
Initial modulus of rock at bottom of layer	=	20000. psi
RQD of rock at top of layer	=	15.000000 %
RQD of rock at bottom of layer	=	15.000000 %
k rm of rock at top of layer	=	0.0005000
k rm of rock at bottom of layer	=	0.0005000

Layer 6 is strong rock (vuggy limestone)

Distance from top of pile to top of layer	=	45.700000 ft

Distance from top of pile to bottom of layer = 54.100000 ft
Effective unit weight at top of layer = 102.800000 pcf
Effective unit weight at bottom of layer = 102.800000 pcf
Uniaxial compressive strength at top of layer = 2500. psi
Uniaxial compressive strength at bottom of layer = 2500. psi

(Depth of the lowest soil layer extends 0.000 ft below the pile tip)

Summary of Input Soil Properties

Layer Num.	Soil Type Name (p-y Curve Type)	Layer Depth ft	Effective Unit Wt. pcf	Angle of Friction deg.	Uniaxial qu psi	RQD %	E50 or krm	kpy pci	Rock Mass Modulus psi
1	Sand	16.1000	62.6000	39.0000	--	--	--	210.0000	--
	(Reese, et al.)	24.1000	62.6000	39.0000	--	--	--	210.0000	--
2	Sand	24.1000	77.6000	41.0000	--	--	--	290.0000	--
	(Reese, et al.)	29.1000	77.6000	41.0000	--	--	--	290.0000	--
3	Sand	29.1000	77.6000	43.0000	--	--	--	380.0000	--
	(Reese, et al.)	39.1000	77.6000	43.0000	--	--	--	380.0000	--
4	Sand	39.1000	62.6000	33.0000	--	--	--	70.0000	--
	(Reese, et al.)	45.1000	62.6000	33.0000	--	--	--	70.0000	--
5	Weak	45.1000	87.6000	--	200.0000	15.0000	5.00E-04	--	20000.
	Rock	45.7000	87.6000	--	200.0000	15.0000	5.00E-04	--	20000.
6	Strong Rock	45.7000	102.8000	--	2500.	--	--	--	--
	(Vuggy Limestone)	54.1000	102.8000	--	2500.	--	--	--	--

Static Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 94800. lbs	M = 33516000. in-lbs	1476200.	No

V = shear force applied normal to pile axis
M = bending moment applied to pile head
y = lateral deflection normal to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applied to pile head
Values of top y vs. pile lengths can be computed only for load types with
specified shear loading (Load Types 1, 2, and 3).
Thrust force is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness
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Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	45.100000 ft
Shaft Diameter	=	72.000000 in
Concrete Cover Thickness (to edge of long. rebar)	=	9.500000 in
Number of Reinforcing Bars	=	28 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	4072. sq. in.
Total Area of Reinforcing Steel	=	43.680000 sq. in.
Area Ratio of Steel Reinforcement	=	1.07 percent
Edge-to-Edge Bar Spacing	=	4.366247 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	5.82
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	16315.402 kips
Tensile Load for Cracking of Concrete	=	-1821.352 kips
Nominal Axial Tensile Capacity	=	-2620.800 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.410000	1.560000	25.795000	0.00000
2	1.410000	1.560000	25.148265	5.739927
3	1.410000	1.560000	23.240492	11.192031
4	1.410000	1.560000	20.167343	16.082919
5	1.410000	1.560000	16.082919	20.167343
6	1.410000	1.560000	11.192031	23.240492
7	1.410000	1.560000	5.739927	25.148265
8	1.410000	1.560000	0.00000	25.795000
9	1.410000	1.560000	-5.739927	25.148265
10	1.410000	1.560000	-11.192031	23.240492
11	1.410000	1.560000	-16.082919	20.167343
12	1.410000	1.560000	-20.167343	16.082919
13	1.410000	1.560000	-23.240492	11.192031
14	1.410000	1.560000	-25.148265	5.739927
15	1.410000	1.560000	-25.795000	0.00000
16	1.410000	1.560000	-25.148265	-5.739927
17	1.410000	1.560000	-23.240492	-11.192031
18	1.410000	1.560000	-20.167343	-16.082919
19	1.410000	1.560000	-16.082919	-20.167343
20	1.410000	1.560000	-11.192031	-23.240492
21	1.410000	1.560000	-5.739927	-25.148265
22	1.410000	1.560000	0.00000	-25.795000
23	1.410000	1.560000	5.739927	-25.148265
24	1.410000	1.560000	11.192031	-23.240492
25	1.410000	1.560000	16.082919	-20.167343
26	1.410000	1.560000	20.167343	-16.082919
27	1.410000	1.560000	23.240492	-11.192031
28	1.410000	1.560000	25.148265	-5.739927

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.366 inches
between bars 24 and 25.

Ratio of bar spacing to maximum aggregate size = 5.82

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.341649 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1476.200

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1476.200 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	2381.	5714574020.	233.1066805	0.00009713	0.00006713	0.4007265	2.6992557	
8.33333E-07	4762.	5714415132.	134.6054055	0.0001122	0.00005217	0.4603951	3.0180640	
0.00000125	7143.	5714192442.	101.7947931	0.0001272	0.00003724	0.5196794	3.3377113	
0.00000167	9523.	5713890133.	85.4068482	0.0001423	0.00002234	0.5785765	3.6581977	
0.00000208	11903.	5713505028.	75.5879725	0.0001575	0.00000747	0.6370836	3.9795233	
0.00000250	14283.	5713013782.	69.0535972	0.0001726	-0.00000737	0.6951973	4.3016858	
0.00000292	16659.	5711814248.	64.3950249	0.0001878	-0.00002218	0.7529030	4.6245958	
0.00000333	19030.	5709113729.	60.9068887	0.0002030	-0.00003698	0.8101736	4.9480659	
0.00000375	21393.	5704774416.	58.1977092	0.0002182	-0.00005176	0.8669884	5.2719509	
0.00000417	23746.	5698947395.	56.0329918	0.0002335	-0.00006653	0.9233333	5.5961532	
0.00000458	26088.	5691847876.	54.2637424	0.0002487	-0.00008129	0.9791987	5.9206058	
0.00000500	28418.	5683683623.	52.7907715	0.0002640	-0.00009605	1.0345780	6.2452619	
0.00000542	30738.	5674633545.	51.5454942	0.0002792	-0.0001108	1.0894661	6.5700881	
0.00000583	30738.	5269302577.	47.5716176	0.0002775	-0.0001425	1.0827561	6.4032320	C
0.00000625	30738.	4918015739.	46.2601880	0.0002891	-0.0001609	1.1241702	6.6229090	C
0.00000667	30738.	4610639755.	45.0803646	0.0003005	-0.0001795	1.1645188	6.8363371	C
0.00000708	30738.	4339425652.	44.0099216	0.0003117	-0.0001983	1.2038434	7.0437213	C
0.00000750	30738.	4098346449.	43.0354813	0.0003228	-0.0002172	1.2422877	7.2461172	C
0.00000792	30738.	3882644004.	42.1439185	0.0003336	-0.0002364	1.2799206	7.4439913	C
0.00000833	30738.	3688511804.	41.3226112	0.0003444	-0.0002556	1.3167478	7.6372976	C
0.00000875	31124.	3557034494.	40.5645124	0.0003549	-0.0002751	1.3528709	7.8267951	C
0.00000917	31791.	3468073762.	39.8620708	0.0003654	-0.0002946	1.3883326	8.0127672	C
0.00000958	32438.	3384837007.	39.2091665	0.0003758	-0.0003142	1.4231786	8.1955309	C
0.00001000	33066.	3306617426.	38.5990217	0.0003860	-0.0003340	1.4573966	8.3749163	C
0.00001042	33678.	3233067766.	38.0276611	0.0003961	-0.0003539	1.4910351	8.5512726	C
0.00001083	34276.	3163958673.	37.4924523	0.0004062	-0.0003738	1.5241677	8.7251788	C
0.00001125	34864.	3099000669.	36.9907072	0.0004161	-0.0003939	1.5568496	8.8970683	C
0.00001167	35437.	3037488936.	36.5164206	0.0004260	-0.0004140	1.5889924	9.0661223	C
0.00001208	36001.	2979370107.	36.0688097	0.0004358	-0.0004342	1.6206839	9.2330620	C
0.00001250	36558.	2924662410.	35.6482605	0.0004456	-0.0004544	1.6520528	-9.6540055	C
0.00001292	37102.	2872402547.	35.2461236	0.0004553	-0.0004747	1.6828501	-10.1264396	C
0.00001333	37643.	2823199652.	34.8682571	0.0004649	-0.0004951	1.7134071	-10.5992072	C
0.00001375	38172.	2776117408.	34.5059928	0.0004745	-0.0005155	1.7434416	-11.0748853	C
0.00001417	38699.	2731666764.	34.1646999	0.0004840	-0.0005360	1.7732624	-11.5507024	C
0.00001458	39214.	2688976279.	33.8358206	0.0004934	-0.0005566	1.8025599	-12.0295175	C
0.00001500	39729.	2648611123.	33.5257379	0.0005029	-0.0005771	1.8316879	-12.5081040	C
0.00001542	40234.	2609781878.	33.2261941	0.0005122	-0.0005978	1.8603241	-12.9894724	C

0.00001583	40737.	2572848417.	32.9417207	0.0005216	-0.0006184	1.8887360	-13.4711599 C
0.00001625	41235.	2537563619.	32.6698533	0.0005309	-0.0006391	1.9168594	-13.9537816 C
0.00001708	42217.	2471260231.	32.1578014	0.0005494	-0.0006806	1.9721226	-14.9230392 C
0.00001792	43183.	2410215485.	31.6850971	0.0005677	-0.0007223	2.0262006	-15.8966017 C
0.00001875	44139.	2354083291.	31.2508907	0.0005860	-0.0007640	2.0793539	-16.8720781 C
0.00001958	45079.	2301901393.	30.8452238	0.0006041	-0.0008059	2.1313039	-17.8523332 C
0.00002042	46011.	2253616912.	30.4703481	0.0006221	-0.0008479	2.1824061	-18.8339647 C
0.00002125	46932.	2208573386.	30.1195298	0.0006400	-0.0008900	2.2324796	-19.8188897 C
0.00002208	47847.	2166669834.	29.7939105	0.0006579	-0.0009321	2.2817753	-20.8046331 C
0.00002292	48751.	2127311509.	29.4864157	0.0006757	-0.0009743	2.3300249	-21.7940695 C
0.00002375	49652.	2090616371.	29.2016683	0.0006935	-0.0010165	2.3776622	-22.7827009 C
0.00002458	50542.	2055928181.	28.9301049	0.0007112	-0.0010588	2.4242098	-23.7756962 C
0.00002542	51427.	2023357490.	28.6761643	0.0007289	-0.0011011	2.4700675	-24.7688272 C
0.00002625	52310.	1992766184.	28.4393780	0.0007465	-0.0011435	2.5153180	-25.7611734 C
0.00002708	53181.	1963619677.	28.2107434	0.0007640	-0.0011860	2.5594468	-26.7585619 C
0.00002792	54050.	1936133155.	27.9967397	0.0007816	-0.0012284	2.6029784	-27.7551561 C
0.00002875	54917.	1910161670.	27.7961005	0.0007991	-0.0012709	2.6459102	-28.7509512 C
0.00002958	55777.	1885412427.	27.6037773	0.0008166	-0.0013134	2.6879573	-29.7493094 C
0.00003042	56631.	1861841722.	27.4203909	0.0008340	-0.0013560	2.7292248	-30.7490801 C
0.00003125	57483.	1839457405.	27.2476698	0.0008515	-0.0013985	2.7698979	-31.7480491 C
0.00003208	58333.	1818166509.	27.0847885	0.0008690	-0.0014410	2.8099739	-32.7462112 C
0.00003292	59177.	1797794498.	26.9284984	0.0008864	-0.0014836	2.8492622	-33.7459542 C
0.00003375	60016.	1778257531.	26.7778348	0.0009038	-0.0015262	2.8877331	-34.7477441 C
0.00003458	60853.	1759598894.	26.6352443	0.0009211	-0.0015689	2.9256118	-35.7487194 C
0.00003542	61687.	1741756119.	26.5001626	0.0009385	-0.0016115	2.9628953	-36.7488746 C
0.00003625	62519.	1724672473.	26.3720772	0.0009560	-0.0016540	2.9995808	-37.7482038 C
0.00003708	63348.	1708261979.	26.2494038	0.0009734	-0.0016966	3.0355792	-38.7479036 C
0.00003792	64171.	1692412603.	26.1295542	0.0009907	-0.0017393	3.0707189	-39.7504276 C
0.00003875	64991.	1677188559.	26.0156069	0.0010081	-0.0017819	3.1052646	-40.7521117 C
0.00003958	65809.	1662549926.	25.9071945	0.0010255	-0.0018245	3.1392133	-41.7529496 C
0.00004042	66625.	1648460069.	25.8039802	0.0010429	-0.0018671	3.1725622	-42.7529348 C
0.00004125	67439.	1634885309.	25.7056544	0.0010604	-0.0019096	3.2053083	-43.7520608 C
0.00004208	68251.	1621794627.	25.6119322	0.0010778	-0.0019522	3.2374486	-44.7503210 C
0.00004292	69058.	1609122646.	25.5210721	0.0010953	-0.0019947	3.2688649	-45.7495489 C
0.00004375	69861.	1596833563.	25.4324032	0.0011127	-0.0020373	3.2995217	-46.7503883 C
0.00004458	70663.	1584953950.	25.3477365	0.0011301	-0.0020799	3.3295753	-47.7503388 C
0.00004542	71461.	1573460874.	25.2668573	0.0011475	-0.0021225	3.3590223	-48.7493932 C
0.00004625	72258.	1562333049.	25.1895665	0.0011650	-0.0021650	3.3878598	-49.7475439 C
0.00004708	73052.	1551550690.	25.1156790	0.0011825	-0.0022075	3.4160844	-50.7447831 C
0.00004792	73844.	1541095382.	25.0450231	0.0012001	-0.0022499	3.4436931	-51.7411032 C
0.00004875	74634.	1530949965.	24.9774385	0.0012177	-0.0022923	3.4706825	-52.7364961 C
0.00004958	75421.	1521098427.	24.9127761	0.0012353	-0.0023347	3.4970493	-53.7309539 C
0.00005292	78540.	1484227962.	24.6741457	0.0013057	-0.0025043	3.5957559	-57.7093179 C
0.00005625	81529.	1449409760.	24.4627784	0.0013760	-0.0026740	3.6836225	-60.0000000 CY
0.00005958	83798.	1406402599.	24.2240086	0.0014433	-0.0028467	3.7575696	-60.0000000 CY
0.00006292	85611.	1360703324.	23.9748678	0.0015084	-0.0030216	3.8196727	-60.0000000 CY
0.00006625	87108.	1314833108.	23.7262492	0.0015719	-0.0031981	3.8713692	-60.0000000 CY
0.00006958	88435.	1270918780.	23.4943012	0.0016348	-0.0033752	3.9140451	-60.0000000 CY
0.00007292	89627.	1229173416.	23.2729582	0.0016970	-0.0035530	3.9477742	-60.0000000 CY
0.00007625	90567.	1187765694.	23.0491039	0.0017575	-0.0037325	3.9725614	-60.0000000 CY
0.00007958	91477.	1149453914.	22.8484579	0.0018184	-0.0039116	3.9895170	-60.0000000 CY
0.00008292	92355.	1113824074.	22.6673106	0.0018795	-0.0040905	3.9984921	-60.0000000 CY
0.00008625	93058.	1078930058.	22.4801800	0.0019389	-0.0042711	3.9981555	-60.0000000 CY
0.00008958	93639.	1045272883.	22.3004871	0.0019978	-0.0044522	3.9972154	-60.0000000 CY
0.00009292	94201.	1013825363.	22.1386505	0.0020570	-0.0046330	3.9988937	-60.0000000 CY
0.00009625	94745.	984364812.	21.9930729	0.0021168	-0.0048132	3.9998384	-60.0000000 CY
0.00009958	95264.	956621459.	21.8553052	0.0021764	-0.0049936	3.9988128	-60.0000000 CY
0.0001029	95733.	930199154.	21.7244106	0.0022358	-0.0051742	3.9962159	-60.0000000 CY
0.0001063	96095.	904427273.	21.5931582	0.0022943	-0.0053557	3.9998173	-60.0000000 CY
0.0001096	96396.	879661967.	21.4670212	0.0023524	-0.0055376	3.9975489	-60.0000000 CY
0.0001129	96688.	856278130.	21.3513682	0.0024109	-0.0057191	3.9999838	-60.0000000 CY
0.0001163	96968.	834136109.	21.2459290	0.0024698	-0.0059002	3.9978055	-60.0000000 CY
0.0001196	97233.	813099395.	21.1415625	0.0025282	-0.0060818	3.9999834	-60.0000000 CY
0.0001229	97488.	793119074.	21.0457215	0.0025869	-0.0062631	3.9970008	-60.0000000 CY
0.0001263	97736.	774146673.	20.9571618	0.0026458	-0.0064442	3.9998077	-60.0000000 CY
0.0001296	97976.	756087096.	20.8759534	0.0027052	-0.0066248	3.9948861	-60.0000000 CY
0.0001329	98210.	738886424.	20.8010428	0.0027648	-0.0068052	3.9989463	-60.0000000 CY
0.0001363	98388.	722112227.	20.7232042	0.0028235	-0.0069865	3.9983334	-60.0000000 CY
0.0001396	98538.	705946045.	20.6480991	0.0028821	-0.0071679	3.9960346	-60.0000000 CY
0.0001429	98655.	690300176.	20.5727936	0.0029402	-0.0073498	3.9992090	-60.0000000 CY
0.0001462	98767.	675330190.	20.5008090	0.0029982	-0.0075318	3.9980178	-60.0000000 CY
0.0001496	98869.	660961150.	20.4293136	0.0030559	-0.0077141	3.9946575	-60.0000000 CYT
0.0001529	98968.	647203355.	20.3620771	0.0031137	-0.0078963	3.9983145	-60.0000000 CYT
0.0001562	99065.	634017328.	20.2988521	0.0031717	-0.0080783	3.9999221	-60.0000000 CYT
0.0001596	99158.	621354580.	20.2400943	0.0032300	-0.0082600	3.9929893	-60.0000000 CYT
0.0001629	99248.	609193369.	20.1849636	0.0032885	-0.0084415	3.9953874	-60.0000000 CYT
0.0001662	99336.	597508191.	20.1329898	0.0033471	-0.0086229	3.9985903	-60.0000000 CYT
0.0001696	99422.	586270715.	20.0840068	0.0034059	-0.0088041	3.9999509	-60.0000000 CYT
0.0001729	99504.	575443590.	20.0385396	0.0034650	-0.0089850	3.9929530	-60.0000000 CYT

0.0001762	99584.	565013689.	19.9957822	0.0035243	-0.0091657	3.9936485	-60.0000000 CYT
0.0001796	99662.	554962243.	19.9553860	0.0035837	-0.0093463	3.9973918	-60.0000000 CYT
0.0001829	99739.	545268348.	19.9172364	0.0036432	-0.0095268	3.9995030	-60.0000000 CYT
0.0002029	99739.	491525266.	19.9050764	0.0040391	-0.0105709	3.9892302	-60.0000000 CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1476.200	98770.141	0.00300000

Note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318, Section
9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding
bending stiffnesses computed for common resistance factor values used for
reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	98770.	959.530000	64201.	1.6919E+09
1	0.75	98770.	1033.	74078.	1.5381E+09
1	0.90	98770.	1107.	88893.	1.2549E+09

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	9.000000 ft
Shaft Diameter	=	66.000000 in
Concrete Cover Thickness (to edge of long. rebar)	=	6.500000 in
Number of Reinforcing Bars	=	28 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	3421. sq. in.
Total Area of Reinforcing Steel	=	43.680000 sq. in.
Area Ratio of Steel Reinforcement	=	1.28 percent
Edge-to-Edge Bar Spacing	=	4.366247 in
Maximum Concrete Aggregate Size	=	0.750000 in
Ratio of Bar Spacing to Aggregate Size	=	5.82
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	14104.349 kips
Tensile Load for Cracking of Concrete	=	-1550.882 kips
Nominal Axial Tensile Capacity	=	-2620.800 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.410000	1.560000	25.795000	0.00000
2	1.410000	1.560000	25.148265	5.739927
3	1.410000	1.560000	23.240492	11.192031

4	1.410000	1.560000	20.167343	16.082919
5	1.410000	1.560000	16.082919	20.167343
6	1.410000	1.560000	11.192031	23.240492
7	1.410000	1.560000	5.739927	25.148265
8	1.410000	1.560000	0.00000	25.795000
9	1.410000	1.560000	-5.739927	25.148265
10	1.410000	1.560000	-11.192031	23.240492
11	1.410000	1.560000	-16.082919	20.167343
12	1.410000	1.560000	-20.167343	16.082919
13	1.410000	1.560000	-23.240492	11.192031
14	1.410000	1.560000	-25.148265	5.739927
15	1.410000	1.560000	-25.795000	0.00000
16	1.410000	1.560000	-25.148265	-5.739927
17	1.410000	1.560000	-23.240492	-11.192031
18	1.410000	1.560000	-20.167343	-16.082919
19	1.410000	1.560000	-16.082919	-20.167343
20	1.410000	1.560000	-11.192031	-23.240492
21	1.410000	1.560000	-5.739927	-25.148265
22	1.410000	1.560000	0.00000	-25.795000
23	1.410000	1.560000	5.739927	-25.148265
24	1.410000	1.560000	11.192031	-23.240492
25	1.410000	1.560000	16.082919	-20.167343
26	1.410000	1.560000	20.167343	-16.082919
27	1.410000	1.560000	23.240492	-11.192031
28	1.410000	1.560000	25.148265	-5.739927

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.366 inches
between bars 24 and 25.

Ratio of bar spacing to maximum aggregate size = 5.82

Concrete Properties:

Compressive Strength of Concrete	=	4000. psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.341649 psi
Compression Strain at Peak Stress	=	0.001886
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.750000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1476.200

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than 0.003. See ACI 318, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1476.200 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Conc Stress ksi	Max Steel Stress ksi	Run Msg
4.16667E-07	1713.	4110797586.	265.7588721	0.0001107	0.00008323	0.4553033	3.1354905	
8.33333E-07	3426.	4110681917.	149.4227987	0.0001245	0.00006952	0.5095861	3.4595260	

0.00000125	5138.	4110544016.	110.6633863	0.0001383	0.00005583	0.5635448	3.7842603
0.00000167	6851.	4110363287.	91.2981405	0.0001522	0.00004216	0.6171772	4.1096935
0.00000208	8563.	4110135606.	79.6905629	0.0001660	0.00002852	0.6704810	4.4358257
0.00000250	10275.	4109859591.	71.9618209	0.0001799	0.00001490	0.7234540	4.7626570
0.00000292	11986.	4109534646.	66.4495582	0.0001938	0.00000131	0.7760941	5.0901876
0.00000333	13697.	4109105093.	62.3224776	0.0002077	-0.00001226	0.8283975	5.4184062
0.00000375	15406.	4108205695.	59.1179868	0.0002217	-0.00002581	0.8803499	5.7472186
0.00000417	17111.	4106549399.	56.5582841	0.0002357	-0.00003934	0.9319334	6.0765010
0.00000458	18810.	4104073610.	54.4668006	0.0002496	-0.00005286	0.9831344	6.4061581
0.00000500	20504.	4100815192.	52.7259862	0.0002636	-0.00006637	1.0339428	6.7361180
0.00000542	22191.	4096849989.	51.2545799	0.0002776	-0.00007987	1.0843509	7.0663278
0.00000583	23872.	4092262184.	49.9946163	0.0002916	-0.00009336	1.1343530	7.3967476
0.00000625	25545.	4087131965.	48.9036400	0.0003056	-0.0001069	1.1839446	7.7273473
0.00000667	25545.	3831686217.	45.9240658	0.0003062	-0.0001338	1.1852796	7.6664527 C
0.00000708	25545.	3606292910.	44.7971936	0.0003173	-0.0001502	1.2243335	7.9141276 C
0.00000750	25545.	3405943304.	43.7727090	0.0003283	-0.0001667	1.2625140	8.1568392 C
0.00000792	25545.	3226683130.	42.8345977	0.0003391	-0.0001834	1.2998380	8.3946222 C
0.00000833	25545.	3065348974.	41.9732302	0.0003498	-0.0002002	1.3364136	8.6282806 C
0.00000875	25982.	2969406587.	41.1769100	0.0003603	-0.0002172	1.3722288	8.8576283 C
0.00000917	26604.	2902251435.	40.4383672	0.0003707	-0.0002343	1.4073442	9.0830910 C
0.00000958	27206.	2838838479.	39.7517948	0.0003810	-0.0002515	1.4418252	9.3051488 C
0.00001000	27789.	2778917607.	39.1115721	0.0003911	-0.0002689	1.4757093	9.5240559 C
0.00001042	28357.	2722293805.	38.5132176	0.0004012	-0.0002863	1.5090415	9.7401387 C
0.00001083	28912.	2668774460.	37.9528817	0.0004112	-0.0003038	1.5418638	9.9537054 C
0.00001125	29451.	2617824804.	37.4243945	0.0004210	-0.0003215	1.5741095	10.1641212 C
0.00001167	29978.	2569544847.	36.9269018	0.0004308	-0.0003392	1.6058838	10.3722518 C
0.00001208	30496.	2523805295.	36.4582000	0.0004405	-0.0003570	1.6372313	10.5784484 C
0.00001250	31005.	2480377703.	36.0154729	0.0004502	-0.0003748	1.6681588	10.7827340 C
0.00001292	31501.	2438816888.	35.5938414	0.0004598	-0.0003927	1.6985722	10.9842222 C
0.00001333	31993.	2399443155.	35.1957157	0.0004693	-0.0004107	1.7286648	11.1846101 C
0.00001375	32475.	2361789324.	34.8162845	0.0004787	-0.0004288	1.7583220	11.3828310 C
0.00001417	32950.	2325877372.	34.4553266	0.0004881	-0.0004469	1.7876125	11.5794717 C
0.00001458	33419.	2291622553.	34.1118994	0.0004975	-0.0004650	1.8165690	11.7748033 C
0.00001500	33882.	2258790545.	33.7832700	0.0005067	-0.0004833	1.8451347	11.9682725 C
0.00001542	34340.	2227444079.	33.4701588	0.0005160	-0.0005015	1.8734054	12.1607377 C
0.00001583	34792.	2197394174.	33.1703352	0.0005252	-0.0005198	1.9013341	12.3517373 C
0.00001625	35239.	2168580728.	32.8832175	0.0005344	-0.0005381	1.9289458	-12.6515462 C
0.00001708	36122.	2114451365.	32.3446199	0.0005526	-0.0005749	1.9832924	-13.5671737 C
0.00001792	36990.	2064552928.	31.8490464	0.0005706	-0.0006119	2.0365398	-14.4864788 C
0.00001875	37845.	2018384600.	31.3912205	0.0005886	-0.0006489	2.0887282	-15.4092113 C
0.00001958	38684.	1975338348.	30.9638440	0.0006064	-0.0006861	2.1397314	-16.3367796 C
0.00002042	39515.	1935424128.	30.5684922	0.0006241	-0.0007234	2.1898782	-17.2660427 C
0.00002125	40335.	1898098500.	30.1985852	0.0006417	-0.0007608	2.2390071	-18.1987343 C
0.00002208	41146.	1863208399.	29.8530034	0.0006593	-0.0007982	2.2872399	-19.1337265 C
0.00002292	41949.	1830506706.	29.5293511	0.0006767	-0.0008358	2.3346021	-20.0708478 C
0.00002375	42745.	1799793041.	29.2254830	0.0006941	-0.0008734	2.3811126	-21.0099861 C
0.00002458	43533.	1770847177.	28.9390111	0.0007114	-0.0009111	2.4267548	-21.9514091 C
0.00002542	44318.	1743666354.	28.6712344	0.0007287	-0.0009488	2.4717384	-22.8928984 C
0.00002625	45093.	1717819335.	28.4150999	0.0007459	-0.0009866	2.5157061	-23.8384677 C
0.00002708	45865.	1693492443.	28.1756783	0.0007631	-0.0010244	2.5590976	-24.7832901 C
0.00002792	46632.	1670413416.	27.9484853	0.0007802	-0.0010623	2.6017008	-25.7297845 C
0.00002875	47393.	1648444245.	27.7317666	0.0007973	-0.0011002	2.6434733	-26.6785270 C
0.00002958	48151.	1627649393.	27.5281243	0.0008144	-0.0011381	2.6846747	-27.6265258 C
0.00003042	48906.	1607865985.	27.3348653	0.0008314	-0.0011761	2.7251843	-28.5752083 C
0.00003125	49654.	1588917629.	27.1487776	0.0008484	-0.0012141	2.7648293	-29.5267327 C
0.00003208	50400.	1570896104.	26.9731566	0.0008654	-0.0012521	2.8039076	-30.4775129 C
0.00003292	51144.	1553730602.	26.8072120	0.0008824	-0.0012901	2.8424166	-31.4275446 C
0.00003375	51883.	1537265887.	26.6476782	0.0008994	-0.0013281	2.8801604	-32.3793224 C
0.00003458	52617.	1521457668.	26.4942341	0.0009163	-0.0013662	2.9171567	-33.3327035 C
0.00003542	53350.	1506341738.	26.3487436	0.0009332	-0.0014043	2.9535878	-34.2853320 C
0.00003625	54080.	1491869983.	26.2106626	0.0009501	-0.0014424	2.9894512	-35.2372033 C
0.00003708	54809.	1477998610.	26.0794963	0.0009671	-0.0014804	3.0247443	-36.1883124 C
0.00003792	55531.	1464565958.	25.9508606	0.0009840	-0.0015185	3.0591578	-37.1429787 C
0.00003875	56252.	1451654649.	25.8281296	0.0010008	-0.0015567	3.0929824	-38.0972267 C
0.00003958	56970.	1439240831.	25.7112375	0.0010177	-0.0015948	3.1262404	-39.0507043 C
0.00004042	57686.	1427293405.	25.5998276	0.0010347	-0.0016328	3.1589292	-40.0034061 C
0.00004125	58401.	1415783772.	25.4935722	0.0010516	-0.0016709	3.1910462	-40.9553267 C
0.00004208	59113.	1404668927.	25.3915354	0.0010686	-0.0017089	3.2225389	-41.9072344 C
0.00004292	59820.	1393867945.	25.2912498	0.0010854	-0.0017471	3.2532324	-42.8618944 C
0.00004375	60525.	1383436638.	25.1954114	0.0011023	-0.0017852	3.2833570	-43.8157591 C
0.00004458	61229.	1373353969.	25.1037754	0.0011192	-0.0018233	3.3129100	-44.7688228 C
0.00004542	61930.	1363600439.	25.0161149	0.0011361	-0.0018614	3.3418886	-45.7210794 C
0.00004625	62630.	1354157954.	24.9322196	0.0011531	-0.0018994	3.3702900	-46.6725228 C
0.00004708	63328.	1345009694.	24.8518941	0.0011701	-0.0019374	3.3981115	-47.6231469 C
0.00004792	64023.	1336140007.	24.7749567	0.0011871	-0.0019754	3.4253502	-48.5729455 C
0.00004875	64715.	1327495636.	24.6994115	0.0012041	-0.0020134	3.4518634	-49.5244943 C
0.00004958	65405.	1319084948.	24.6260908	0.0012210	-0.0020515	3.4777266	-50.4764960 C
0.00005292	68143.	1287733052.	24.3614741	0.0012891	-0.0022034	3.5753368	-54.2759503 C
0.00005625	70849.	1259544812.	24.1368208	0.0013577	-0.0023548	3.6634540	-58.0613734 C

0.00005958	73490.	1233403714.	23.9370772	0.0014263	-0.0025062	3.7413219	-60.0000000 CY
0.00006292	75580.	1201270010.	23.7150985	0.0014921	-0.0026604	3.8064197	-60.0000000 CY
0.00006625	77204.	1165342270.	23.4800047	0.0015556	-0.0028169	3.8602426	-60.0000000 CY
0.00006958	78651.	1130312608.	23.2517278	0.0016179	-0.0029746	3.9046030	-60.0000000 CY
0.00007292	79794.	1094317887.	23.0190471	0.0016785	-0.0031340	3.9395623	-60.0000000 CY
0.00007625	80899.	1060964023.	22.8100420	0.0017393	-0.0032932	3.9666762	-60.0000000 CY
0.00007958	81862.	1028632550.	22.6036114	0.0017989	-0.0034536	3.9854760	-60.0000000 CY
0.00008292	82631.	996551323.	22.3971488	0.0018571	-0.0036154	3.9964066	-60.0000000 CY
0.00008625	83378.	966705047.	22.2106928	0.0019157	-0.0037768	3.9997056	-60.0000000 CY
0.00008958	84104.	938836230.	22.0394549	0.0019744	-0.0039381	3.9999996	-60.0000000 CY
0.00009292	84762.	912235318.	21.8749286	0.0020325	-0.0041000	3.9999443	-60.0000000 CY
0.00009625	85263.	885850178.	21.7085716	0.0020895	-0.0042630	3.9995874	-60.0000000 CY
0.00009958	85719.	860771997.	21.5533704	0.0021464	-0.0044261	3.9985690	-60.0000000 CY
0.0001029	86159.	837174159.	21.4097010	0.0022034	-0.0045891	3.9964184	-60.0000000 CY
0.0001063	86581.	814878842.	21.2729547	0.0022603	-0.0047522	3.9998459	-60.0000000 CY
0.0001096	86992.	793842179.	21.1480382	0.0023175	-0.0049150	3.9982979	-60.0000000 CY
0.0001129	87394.	773970501.	21.0334488	0.0023750	-0.0050775	3.9986382	-60.0000000 CY
0.0001163	87746.	754800746.	20.9227088	0.0024323	-0.0052402	3.9990254	-60.0000000 CY
0.0001196	88019.	736047732.	20.8100083	0.0024885	-0.0054040	3.9967639	-60.0000000 CY
0.0001229	88252.	717981444.	20.6958047	0.0025439	-0.0055686	3.9988507	-60.0000000 CY
0.0001263	88474.	700785905.	20.5874709	0.0025992	-0.0057333	3.9985469	-60.0000000 CY
0.0001296	88690.	684426223.	20.4871413	0.0026548	-0.0058977	3.9978268	-60.0000000 CY
0.0001329	88903.	668861315.	20.3933748	0.0027106	-0.0060619	3.9999081	-60.0000000 CY
0.0001363	89110.	654017494.	20.3063319	0.0027667	-0.0062258	3.9954317	-60.0000000 CY
0.0001396	89313.	639856291.	20.2249917	0.0028231	-0.0063894	3.9989534	-60.0000000 CY
0.0001429	89513.	626333317.	20.1488263	0.0028796	-0.0065529	3.9990846	-60.0000000 CY
0.0001462	89704.	613362101.	20.0737711	0.0029358	-0.0067167	3.9958824	-60.0000000 CY
0.0001496	89891.	600941555.	20.0016129	0.0029919	-0.0068806	3.9990083	-60.0000000 CY
0.0001529	90074.	589041739.	19.9337302	0.0030482	-0.0070443	3.9995952	60.0000000 CYT
0.0001562	90228.	577459113.	19.8656312	0.0031040	-0.0072085	3.9942802	60.0000000 CYT
0.0001596	90365.	566255261.	19.7983473	0.0031595	-0.0073730	3.9978876	60.0000000 CYT
0.0001629	90468.	555303429.	19.7305709	0.0032144	-0.0075381	3.9997160	60.0000000 CYT
0.0001662	90555.	544689166.	19.6658607	0.0032694	-0.0077031	3.9963581	60.0000000 CYT
0.0001696	90638.	534475776.	19.6047436	0.0033246	-0.0078679	3.9940711	60.0000000 CYT
0.0001729	90720.	524648267.	19.5466197	0.0033799	-0.0080326	3.9975143	60.0000000 CYT
0.0001762	90783.	515082247.	19.4976761	0.0034365	-0.0081960	3.9995416	60.0000000 CYT
0.0001796	90842.	505847259.	19.4498817	0.0034929	-0.0083596	3.9979570	60.0000000 CYT
0.0001829	90895.	496922941.	19.4022978	0.0035490	-0.0085235	3.9913376	60.0000000 CYT
0.0002029	90895.	447944910.	19.2514812	0.0039064	-0.0094861	3.9965169	60.0000000 CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1476.200	89917.214	0.00300000

Note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318, Section
9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding
bending stiffnesses computed for common resistance factor values used for
reinforced concrete sections.

Axial Load No.	Resist. Factor for Moment	Nominal Moment Cap in-kips	Ult. (Fac) Ax. Thrust kips	Ult. (Fac) Moment Cap in-kips	Bend. Stiff. at Ult Mom kip-in^2
1	0.65	89917.	959.530000	58446.	1.4151E+09
1	0.75	89917.	1033.	67438.	1.2958E+09
1	0.90	89917.	1107.	80925.	1.0601E+09

Layering Correction Equivalent Depths of Soil & Rock Layers

Layer No.	Top of Layer Below Pile Head ft	Equivalent Top Depth Below Grnd Surf ft	Same Layer Type As Layer Above	Layer is Rock or is Below Rock Layer	F0 Integral for Layer lbs	F1 Integral for Layer lbs
1	16.1000	0.00	N.A.	No	0.00	202352.
2	24.1000	7.5120	Yes	No	202352.	424634.
3	29.1000	11.3875	Yes	No	626986.	1720124.
4	39.1000	30.2368	Yes	No	2347111.	1272115.
5	45.1000	29.0000	No	Yes	N.A.	N.A.
6	45.7000	29.6000	No	Yes	N.A.	N.A.

Notes: The F0 integral of Layer n+1 equals the sum of the F0 and F1 integrals
for Layer n. Layering correction equivalent depths are computed only
for soil types with both shallow-depth and deep-depth expressions for
peak lateral load transfer. These soil types are soft and stiff clays,
non-liquefied sands, and cemented c-phi soil.

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 94800.0 lbs
Applied moment at pile head = 33516000.0 in-lbs
Axial thrust load on pile head = 1476200.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness in-lb^2	Soil Res. p lb/inch	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	2.5653	3.35E+07	94800.	-0.01071	0.00	3.25E+12	0.00	0.00	0.00
0.5410	2.4960	3.42E+07	94800.	-0.01064	0.00	3.25E+12	0.00	0.00	0.00
1.0820	2.4271	3.50E+07	94800.	-0.01057	0.00	3.09E+12	0.00	0.00	0.00
1.6230	2.3587	3.57E+07	94800.	-0.01050	0.00	3.01E+12	0.00	0.00	0.00
2.1640	2.2908	3.64E+07	94800.	-0.01042	0.00	2.94E+12	0.00	0.00	0.00
2.7050	2.2235	3.71E+07	94800.	-0.01033	0.00	2.87E+12	0.00	0.00	0.00
3.2460	2.1566	3.78E+07	94800.	-0.01025	0.00	2.81E+12	0.00	0.00	0.00
3.7870	2.0904	3.85E+07	94800.	-0.01016	0.00	2.75E+12	0.00	0.00	0.00
4.3280	2.0247	3.92E+07	94800.	-0.01007	0.00	2.69E+12	0.00	0.00	0.00
4.8690	1.9597	3.99E+07	94800.	-0.00997	0.00	2.63E+12	0.00	0.00	0.00
5.4100	1.8953	4.07E+07	94800.	-0.00987	0.00	2.58E+12	0.00	0.00	0.00
5.9510	1.8315	4.14E+07	94800.	-0.00977	0.00	2.53E+12	0.00	0.00	0.00
6.4920	1.7685	4.21E+07	94800.	-0.00966	0.00	2.48E+12	0.00	0.00	0.00
7.0330	1.7061	4.28E+07	94800.	-0.00955	0.00	2.43E+12	0.00	0.00	0.00
7.5740	1.6445	4.35E+07	94800.	-0.00943	0.00	2.39E+12	0.00	0.00	0.00
8.1150	1.5837	4.42E+07	94800.	-0.00931	0.00	2.35E+12	0.00	0.00	0.00
8.6560	1.5237	4.49E+07	94800.	-0.00919	0.00	2.31E+12	0.00	0.00	0.00
9.1970	1.4644	4.56E+07	94800.	-0.00906	0.00	2.27E+12	0.00	0.00	0.00
9.7380	1.4061	4.63E+07	94800.	-0.00892	0.00	2.24E+12	0.00	0.00	0.00
10.2790	1.3486	4.70E+07	94800.	-0.00879	0.00	2.21E+12	0.00	0.00	0.00
10.8200	1.2920	4.77E+07	94800.	-0.00865	0.00	2.17E+12	0.00	0.00	0.00
11.3610	1.2363	4.84E+07	94800.	-0.00850	0.00	2.14E+12	0.00	0.00	0.00
11.9020	1.1816	4.91E+07	94800.	-0.00835	0.00	2.11E+12	0.00	0.00	0.00
12.4430	1.1278	4.98E+07	94800.	-0.00820	0.00	2.08E+12	0.00	0.00	0.00
12.9840	1.0751	5.05E+07	94800.	-0.00804	0.00	2.06E+12	0.00	0.00	0.00
13.5250	1.0234	5.12E+07	94800.	-0.00788	0.00	2.03E+12	0.00	0.00	0.00
14.0660	0.9727	5.19E+07	94800.	-0.00772	0.00	2.01E+12	0.00	0.00	0.00
14.6070	0.9232	5.26E+07	94800.	-0.00755	0.00	1.98E+12	0.00	0.00	0.00
15.1480	0.8747	5.32E+07	94800.	-0.00737	0.00	1.96E+12	0.00	0.00	0.00
15.6890	0.8274	5.39E+07	94800.	-0.00720	0.00	1.94E+12	0.00	0.00	0.00
16.2300	0.7813	5.46E+07	94693.	-0.00701	0.00	1.92E+12	-32.9826	274.0644	0.00
16.7710	0.7364	5.53E+07	94010.	-0.00683	0.00	1.90E+12	-177.4938	1565.	0.00
17.3120	0.6927	5.60E+07	92358.	-0.00663	0.00	1.88E+12	-331.3781	3106.	0.00
17.8530	0.6502	5.66E+07	89687.	-0.00644	0.00	1.86E+12	-491.5545	4908.	0.00
18.3940	0.6091	5.73E+07	85965.	-0.00624	0.00	1.85E+12	-654.9834	6982.	0.00
18.9350	0.5692	5.79E+07	81182.	-0.00604	0.00	1.83E+12	-818.6760	9337.	0.00
19.4760	0.5307	5.84E+07	75333.	-0.00583	0.00	1.82E+12	-983.1901	12028.	0.00
20.0170	0.4935	5.89E+07	68421.	-0.00562	0.00	1.80E+12	-1146.	15075.	0.00

20.5580	0.4577	5.94E+07	60470.	-0.00541	0.00	1.79E+12	-1304.	18489.	0.00
21.0990	0.4233	5.98E+07	51520.	-0.00519	0.00	1.78E+12	-1454.	22294.	0.00
21.6400	0.3903	6.02E+07	41626.	-0.00497	0.00	1.77E+12	-1594.	26517.	0.00
22.1810	0.3588	6.05E+07	30853.	-0.00475	0.00	1.77E+12	-1725.	31203.	0.00
22.7220	0.3287	6.07E+07	19260.	-0.00453	0.00	1.76E+12	-1847.	36479.	0.00
23.2630	0.3000	6.08E+07	6916.	-0.00430	0.00	1.76E+12	-1956.	42321.	0.00
23.8040	0.2728	6.09E+07	-6088.	-0.00408	0.00	1.76E+12	-2050.	48780.	0.00
24.3450	0.2471	6.08E+07	-20317.	-0.00385	0.00	1.76E+12	-2334.	61315.	0.00
24.8860	0.2228	6.07E+07	-35859.	-0.00363	0.00	1.76E+12	-2454.	71512.	0.00
25.4270	0.2000	6.04E+07	-52110.	-0.00341	0.00	1.77E+12	-2552.	82863.	0.00
25.9680	0.1786	6.00E+07	-68963.	-0.00319	0.00	1.78E+12	-2639.	95963.	0.00
26.5090	0.1586	5.96E+07	-86324.	-0.00297	0.00	1.79E+12	-2709.	110895.	0.00
27.0500	0.1400	5.90E+07	-104057.	-0.00275	0.00	1.80E+12	-2754.	127707.	0.00
27.5910	0.1228	5.83E+07	-122004.	-0.00254	0.00	1.82E+12	-2775.	146654.	0.00
28.1320	0.1070	5.74E+07	-139999.	-0.00234	0.00	1.84E+12	-2769.	168037.	0.00
28.6730	0.09245	5.65E+07	-157886.	-0.00214	0.00	1.87E+12	-2741.	192501.	0.00
29.2140	0.07920	5.54E+07	-176408.	-0.00195	0.00	1.89E+12	-2965.	243014.	0.00
29.7550	0.06719	5.43E+07	-195486.	-0.00176	0.00	1.93E+12	-2912.	281412.	0.00
30.2960	0.05635	5.29E+07	-214217.	-0.00158	0.00	1.97E+12	-2858.	329286.	0.00
30.8370	0.04665	5.15E+07	-232510.	-0.00141	0.00	2.02E+12	-2777.	386442.	0.00
31.3780	0.03803	4.99E+07	-250124.	-0.00125	0.00	2.08E+12	-2649.	452283.	0.00
31.9190	0.03041	4.83E+07	-265844.	-0.00110	0.00	2.15E+12	-2194.	468298.	0.00
32.4600	0.02375	4.65E+07	-278715.	-9.59E-04	0.00	2.23E+12	-1771.	484314.	0.00
33.0010	0.01796	4.47E+07	-288958.	-8.29E-04	0.00	2.32E+12	-1384.	500329.	0.00
33.5420	0.01298	4.28E+07	-296802.	-7.10E-04	0.00	2.44E+12	-1032.	516345.	0.00
34.0830	0.00874	4.08E+07	-302481.	-6.01E-04	0.00	2.57E+12	-717.0968	532360.	0.00
34.6240	0.00518	3.89E+07	-306229.	-5.03E-04	0.00	2.72E+12	-437.4766	548376.	0.00
35.1650	0.00222	3.69E+07	-308274.	-4.15E-04	0.00	2.89E+12	-192.6548	564391.	0.00
35.7060	-2.10E-04	3.49E+07	-308838.	-3.37E-04	0.00	3.10E+12	18.7883	580407.	0.00
36.2470	-0.00216	3.29E+07	-308133.	-2.69E-04	0.00	3.33E+12	198.6316	596422.	0.00
36.7880	-0.00370	3.09E+07	-306355.	-2.09E-04	0.00	3.65E+12	348.8745	612438.	0.00
37.3290	-0.00488	2.89E+07	-303690.	-1.65E-04	0.00	5.68E+12	472.1653	628453.	0.00
37.8700	-0.00584	2.69E+07	-300275.	-1.33E-04	0.00	5.69E+12	579.9996	644469.	0.00
38.4110	-0.00661	2.50E+07	-296210.	-1.04E-04	0.00	5.69E+12	672.2957	660484.	0.00
38.9520	-0.00719	2.31E+07	-291596.	-7.63E-05	0.00	5.70E+12	749.0927	676500.	0.00
39.4930	-0.00760	2.12E+07	-288680.	-5.11E-05	0.00	5.71E+12	149.3110	127569.	0.00
40.0340	-0.00785	1.93E+07	-287683.	-2.80E-05	0.00	5.71E+12	157.8534	130519.	0.00
40.5750	-0.00796	1.75E+07	-286639.	-7.06E-06	0.00	5.71E+12	163.6902	133469.	0.00
41.1160	-0.00794	1.56E+07	-285566.	1.17E-05	0.00	5.71E+12	166.9171	136419.	0.00
41.6570	-0.00781	1.38E+07	-284480.	2.84E-05	0.00	5.71E+12	167.6531	139369.	0.00
42.1980	-0.00757	1.19E+07	-283397.	4.30E-05	0.00	5.71E+12	166.0409	142320.	0.00
42.7390	-0.00725	1.01E+07	-282331.	5.55E-05	0.00	5.71E+12	162.2463	145270.	0.00
43.2800	-0.00685	8257815.	-281297.	6.60E-05	0.00	5.71E+12	156.4589	148220.	0.00
43.8210	-0.00639	6434257.	-280306.	7.43E-05	0.00	5.71E+12	148.8916	151170.	0.00
44.3620	-0.00589	4616903.	-279369.	8.06E-05	0.00	5.71E+12	139.7808	154121.	0.00
44.9030	-0.00535	2805391.	-278495.	8.48E-05	0.00	5.71E+12	129.3861	157071.	0.00
45.4440	-0.00479	999302.	-265133.	8.72E-05	0.00	4.11E+12	3987.	5407049.	0.00
45.9850	-0.00422	-638773.	-217982.	8.75E-05	0.00	4.11E+12	10539.	1.62E+07	0.00
46.5260	-0.00365	-1832653.	-154143.	8.55E-05	0.00	4.11E+12	9128.	1.62E+07	0.00
47.0670	-0.00311	-2641811.	-99316.	8.20E-05	0.00	4.11E+12	7763.	1.62E+07	0.00
47.6080	-0.00259	-3123744.	-53127.	7.74E-05	0.00	4.11E+12	6466.	1.62E+07	0.00
48.1490	-0.00210	-3333103.	-15098.	7.23E-05	0.00	4.11E+12	5250.	1.62E+07	0.00
48.6900	-0.00165	-3321165.	15309.	6.71E-05	0.00	4.11E+12	4118.	1.62E+07	0.00
49.2310	-0.00123	-3135612.	38648.	6.20E-05	0.00	4.11E+12	3072.	1.62E+07	0.00
49.7720	-8.42E-04	-2820541.	55457.	5.73E-05	0.00	4.11E+12	2106.	1.62E+07	0.00
50.3130	-4.85E-04	-2416662.	66229.	5.31E-05	0.00	4.11E+12	1213.	1.62E+07	0.00
50.8540	-1.52E-04	-1961641.	71402.	4.97E-05	0.00	4.11E+12	380.9914	1.62E+07	0.00
51.3950	1.60E-04	-1490533.	71339.	4.70E-05	0.00	4.11E+12	-400.3241	1.62E+07	0.00
51.9360	4.57E-04	-1036275.	66328.	4.50E-05	0.00	4.11E+12	-1143.	1.62E+07	0.00
52.4770	7.44E-04	-630192.	56579.	4.37E-05	0.00	4.11E+12	-1860.	1.62E+07	0.00
53.0180	0.00102	-302491.	42230.	4.29E-05	0.00	4.11E+12	-2560.	1.62E+07	0.00
53.5590	0.00130	-82695.	23360.	4.26E-05	0.00	4.11E+12	-3253.	1.62E+07	0.00
54.1000	0.00158	0.00	0.00	4.25E-05	0.00	4.11E+12	-3944.	8115000.	0.00

* This analysis computed pile response using nonlinear moment-curvature relationships. Values of total stress due to combined axial and bending stresses are computed only for elastic sections only and do not equal the actual stresses in concrete and steel. Stresses in concrete and steel may be interpolated from the output for nonlinear bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

Pile-head deflection = 2.56528351 inches
Computed slope at pile head = -0.01070923 radians
Maximum bending moment = 60850250. inch-lbs
Maximum shear force = -308838. lbs
Depth of maximum bending moment = 23.80400000 feet below pile head

Depth of maximum shear force   =   35.70600000 feet below pile head
Number of iterations   =   84
Number of zero deflection points =   2

Summary of Pile-head Responses for Conventional Analyses

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, V, lbs, and Load 2 = Moment, M, in-lbs
Load Type 2: Load 1 = Shear, V, lbs, and Load 2 = Slope, S, radians
Load Type 3: Load 1 = Shear, V, lbs, and Load 2 = Rot. Stiffness, R, in-lbs/rad.
Load Type 4: Load 1 = Top Deflection, y, inches, and Load 2 = Moment, M, in-lbs
Load Type 5: Load 1 = Top Deflection, y, inches, and Load 2 = Slope, S, radians

Load Case No.	Load Type 1	Pile-head Load 1	Load Type 2	Pile-head Load 2	Axial Loading lbs	Pile-head Deflection inches	Pile-head Rotation radians	Max Shear in Pile lbs	Max Moment in Pile in-lbs
1	V, lb	94800.	M, in-lb	3.35E+07	1476200.	2.5653	-0.01071	-308838.	6.09E+07

Maximum pile-head deflection = 2.5652835077 inches
Maximum pile-head rotation   = -0.0107092282 radians = -0.613594 deg.

The analysis ended normally.

```
================================================================================

                  LPile Plus for Windows, Version 2013-07.007

               Analysis of Individual Piles and Drilled Shafts
              Subjected to Lateral Loading Using the p-y Method

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================================================================================

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--------------------------------------------------------------------------------
                           Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:        O:\2012\2012048\FRA\77372\structures\FRA070_1321R\design\3-Final Design\Piers\L-Pile\
Name of input data file:       1321R-Pier2.lp7d
Name of output report file:    1321R-Pier2.lp7o
Name of plot output file:      1321R-Pier2.lp7p
Name of runtime messeage file: 1321R-Pier2.lp7r


--------------------------------------------------------------------------------
                         Date and Time of Analysis
--------------------------------------------------------------------------------

               Date:  September 25, 2015     Time:  16:10:50


--------------------------------------------------------------------------------
                              Problem Title
--------------------------------------------------------------------------------

1321R-Pier2

Job Number: 2012048

Client: ODOT D6

Engineer: GPD GROUP

Description: Design of Pier 2



--------------------------------------------------------------------------------
                         Program Options and Settings
--------------------------------------------------------------------------------

Engineering Units of Input Data and Computations:
 - Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:
- Maximum number of iterations allowed                =          100
- Deflection tolerance for convergence                =   1.0000E-05 in
- Maximum allowable deflection                        =     100.0000 in
- Number of pile increments                           =          100

Loading Type and Number of Cycles of Loading:
 - Static loading specified

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
 - Compute pile response under loading and nonlinear bending properties of pile
   (only if nonlinear pile properties are input)
 - Use of p-y modification factors for p-y curves not selected
```

```
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - No p-y curves to be computed and reported for user-specified depths
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1


--------------------------------------------------------------------------------
                    Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Total number of pile sections                         =          2

Total length of pile                                  =      55.40 ft

Depth of ground surface below top of pile             =      11.70 ft

Pile diameter values used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile.

Point         Depth              Pile
                X              Diameter
                ft               in
-----       ---------        -----------
  1           0.00000         72.0000000
  2          46.400000        72.0000000
  3          46.400000        66.0000000
  4          55.400000        66.0000000


Input Structural Properties:
----------------------------

Pile Section No. 1:

   Section Type                                       = Drilled Shaft (Bored Pile)
   Section Length                                     =     46.40000 ft
   Section Diameter                                   =     72.00000 in

Pile Section No. 2:

   Section Type                                       = Drilled Shaft (Bored Pile)
   Section Length                                     =      9.00000 ft
   Section Diameter                                   =     66.00000 in


--------------------------------------------------------------------------------
                      Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                    =        0.000 degrees
                                                      =        0.000 radians

Pile Batter Angle                                     =        0.000 degrees
                                                      =        0.000 radians


--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 4 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer          =     11.70000 ft
   Distance from top of pile to bottom of layer       =     23.70000 ft
   Effective unit weight at top of layer              =     67.60000 pcf
   Effective unit weight at bottom of layer           =     67.60000 pcf
   Friction angle at top of layer                     =     40.00000 deg.
   Friction angle at bottom of layer                  =     40.00000 deg.
```

```
   Subgrade k at top of layer                          =    240.00000 pci
   Subgrade k at bottom of layer                       =    240.00000 pci


Layer 2 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     23.70000 ft
   Distance from top of pile to bottom of layer        =     46.40000 ft
   Effective unit weight at top of layer               =     77.60000 pcf
   Effective unit weight at bottom of layer            =     77.60000 pcf
   Friction angle at top of layer                      =     43.00000 deg.
   Friction angle at bottom of layer                   =     43.00000 deg.
   Subgrade k at top of layer                          =    380.00000 pci
   Subgrade k at bottom of layer                       =    380.00000 pci


Layer 3 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer           =     46.40000 ft
   Distance from top of pile to bottom of layer        =     49.10000 ft
   Effective unit weight at top of layer               =     87.60000 pcf
   Effective unit weight at bottom of layer            =     87.60000 pcf
   Uniaxial compressive strength at top of layer       =    360.00000 psi
   Uniaxial compressive strength at bottom of layer    =    360.00000 psi
   Initial modulus of rock at top of layer             =       32000. psi
   Initial modulus of rock at bottom of layer          =       32000. psi
   RQD of rock at top of layer                         =     25.00000 %
   RQD of rock at bottom of layer                      =     25.00000 %
   k rm of rock at top of layer                        =    0.0005000
   k rm of rock at bottom of layer                     =    0.0005000


Layer 4 is strong rock (vuggy limestone)

   Distance from top of pile to top of layer           =     49.10000 ft
   Distance from top of pile to bottom of layer        =     55.40000 ft
   Effective unit weight at top of layer               =    102.80000 pcf
   Effective unit weight at bottom of layer            =    102.80000 pcf
   Uniaxial compressive strength at top of layer       =   2500.00000 psi
   Uniaxial compressive strength at bottom of layer    =   2500.00000 psi


   (Depth of lowest soil layer extends    0.00 ft below pile tip)


--------------------------------------------------------------------------------
                           Summary of Soil Properties
--------------------------------------------------------------------------------

                      Layer                      Layer      Effective    Angle of      Uniaxial      RQD %                  Rock
Mass
Layer              Soil Type                    Depth       Unit Wt.    Friction        qu            or         kpy       Rock
Emass      krm
 Num.         (p-y Curve Criteria)              ft           pcf          deg.         psi          GSI         pci          psi

-----   ---------------------------------   ----------   ----------   ----------   ----------   ----------   ----------
----------   ----------
  1     Sand (Reese, et al.)                   11.700       67.600       40.000       --           --          240.000       --
        --
                                             23.700       67.600       40.000       --           --          240.000       --
        --
  2     Sand (Reese, et al.)                   23.700       77.600       43.000       --           --          380.000       --
        --
                                             46.400       77.600       43.000       --           --          380.000       --
        --
  3     Weak Rock                              46.400       87.600       --          360.000       25.000       --
32000.     5.00E-04
                                             49.100       87.600       --          360.000       25.000       --
32000.     5.00E-04
  4     Vuggy Limestone                        49.100      102.800       --         2500.000       --           --           --
        --
                                             55.400      102.800       --         2500.000       --           --           --
        --


--------------------------------------------------------------------------------
                                 Loading Type
```

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 81300. lbs	M = 32796000. in-lbs	1236700.	No

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head
Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	46.40000 ft
Shaft Diameter	=	72.00000 in
Concrete Cover Thickness	=	9.50000 in
Number of Reinforcing Bars	=	28 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	4071.50408 sq. in.
Total Area of Reinforcing Steel	=	43.68000 sq. in.
Area Ratio of Steel Reinforcement	=	1.07 percent
Edge-to-Edge Bar Spacing	=	4.36625 in
Maximum Concrete Aggregate Size	=	0.75000 in
Ratio of Bar Spacing to Aggregate Size	=	5.82
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	16315.402 kips
Tensile Load for Cracking of Concrete	=	-1821.352 kips
Nominal Axial Tensile Capacity	=	-2620.800 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	25.79500	0.00000
2	1.41000	1.56000	25.14827	5.73993
3	1.41000	1.56000	23.24049	11.19203
4	1.41000	1.56000	20.16734	16.08292
5	1.41000	1.56000	16.08292	20.16734
6	1.41000	1.56000	11.19203	23.24049
7	1.41000	1.56000	5.73993	25.14827
8	1.41000	1.56000	0.00000	25.79500
9	1.41000	1.56000	-5.73993	25.14827
10	1.41000	1.56000	-11.19203	23.24049
11	1.41000	1.56000	-16.08292	20.16734
12	1.41000	1.56000	-20.16734	16.08292
13	1.41000	1.56000	-23.24049	11.19203

14	1.41000	1.56000	-25.14827	5.73993
15	1.41000	1.56000	-25.79500	0.00000
16	1.41000	1.56000	-25.14827	-5.73993
17	1.41000	1.56000	-23.24049	-11.19203
18	1.41000	1.56000	-20.16734	-16.08292
19	1.41000	1.56000	-16.08292	-20.16734
20	1.41000	1.56000	-11.19203	-23.24049
21	1.41000	1.56000	-5.73993	-25.14827
22	1.41000	1.56000	0.00000	-25.79500
23	1.41000	1.56000	5.73993	-25.14827
24	1.41000	1.56000	11.19203	-23.24049
25	1.41000	1.56000	16.08292	-20.16734
26	1.41000	1.56000	20.16734	-16.08292
27	1.41000	1.56000	23.24049	-11.19203
28	1.41000	1.56000	25.14827	-5.73993

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.36625 inches between Bars 24 and 25

Spacing to aggregate size ratio = 5.82166

Concrete Properties:

Compressive Strength of Concrete	=	4000.00000 psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34164 psi
Compression Strain at Peak Stress	=	0.00189
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.75000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1236.700

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1236.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Run Msg
0.000000417	2397.6392060	5754334094.	200.5714958	0.0000836	0.0000536	0.3459812	2.4192222	
0.000000833	4795.1511033	5754181324.	118.3374526	0.0000986	0.0000386	0.4061025	2.8511218	
0.000001250	7192.4523111	5753961849.	90.9490904	0.0001137	0.0000237	0.4658396	3.2838545	
0.000001667	9589.4374489	5753662469.	77.2721504	0.0001288	0.000008787	0.5251897	3.7174206	
0.000002083	11986.	5753262498.	69.0797521	0.0001439	-0.000006084	0.5841497	4.1518184	
0.000002500	14380.	5752019385.	63.6283324	0.0001591	-0.0000209	0.6427040	4.5869541	
0.000002917	16768.	5748920209.	59.7406473	0.0001742	-0.0000358	0.7008215	5.0226131	
0.000003333	19146.	5743906682.	56.8286770	0.0001894	-0.0000506	0.7584800	5.4586388	
0.000003750	21515.	5737251846.	54.5662762	0.0002046	-0.0000654	0.8156651	5.8949325	
0.000004167	23872.	5729262030.	52.7580500	0.0002198	-0.0000802	0.8723678	6.3314311	
0.000004583	26218.	5720200028.	51.2798142	0.0002350	-0.0000950	0.9285819	6.7680920	
0.000005000	28551.	5710277556.	50.0488761	0.0002502	-0.0001098	0.9843033	7.2048871	
0.000005417	28551.	5271025436.	45.4915810	0.0002464	-0.0001436	0.9696228	7.0894192	C
0.000005833	28551.	4894523619.	44.1653256	0.0002576	-0.0001624	1.0103440	7.4104009	C

0.000006250	28551.	4568222045.	42.9797121	0.0002686	-0.0001814	1.0499659	7.7248228 C
0.000006667	28551.	4282708167.	41.9124126	0.0002794	-0.0002006	1.0886025	8.0334663 C
0.000007083	28551.	4030784157.	40.9463692	0.0002900	-0.0002200	1.1263656	8.3371167 C
0.000007500	28551.	3806851704.	40.0675735	0.0003005	-0.0002395	1.1633440	8.6363972 C
0.000007917	28551.	3606491088.	39.2630078	0.0003108	-0.0002592	1.1995696	8.9314822 C
0.000008333	28551.	3426166534.	38.5226318	0.0003210	-0.0002790	1.2350843	9.2226359 C
0.000008750	28551.	3263015746.	37.8384367	0.0003311	-0.0002989	1.2699331	9.5101532 C
0.000009167	29006.	3164252540.	37.2039930	0.0003410	-0.0003190	1.3041637	9.7943614 C
0.000009583	29592.	3087810118.	36.6141174	0.0003509	-0.0003391	1.3378267	10.0756234 C
0.0000100	30165.	3016521582.	36.0648383	0.0003606	-0.0003594	1.3709840	10.3544031 C
0.0000104	30729.	2949985667.	35.5528034	0.0003703	-0.0003797	1.4036950	-10.9013406 C
0.0000108	31281.	2887447815.	35.0715233	0.0003799	-0.0004001	1.4358838	-11.4885964 C
0.0000113	31823.	2828695064.	34.6191719	0.0003895	-0.0004205	1.4676166	-12.0780452 C
0.0000117	32360.	2773694354.	34.1961460	0.0003990	-0.0004410	1.4990350	-12.6685039 C
0.0000121	32884.	2721428187.	33.7927942	0.0004083	-0.0004617	1.5298747	-13.2622917 C
0.0000125	33405.	2672437656.	33.4152608	0.0004177	-0.0004823	1.5604787	-13.8564679 C
0.0000129	33917.	2625836007.	33.0548566	0.0004270	-0.0005030	1.5905847	-14.4533516 C
0.0000133	34427.	2581998387.	32.7163704	0.0004362	-0.0005238	1.6204772	-15.0504701 C
0.0000138	34927.	2540118339.	32.3913374	0.0004454	-0.0005446	1.6498675	-15.6504042 C
0.0000142	35426.	2500657794.	32.0859340	0.0004546	-0.0005654	1.6790986	-16.2501287 C
0.0000146	35917.	2462865592.	31.7916599	0.0004636	-0.0005864	1.7078507	-16.8525272 C
0.0000150	36406.	2427035093.	31.5129803	0.0004727	-0.0006073	1.7363875	-17.4552535 C
0.0000154	36891.	2392951908.	31.2477858	0.0004817	-0.0006283	1.7646684	-18.0586857 C
0.0000158	37370.	2360234364.	30.9916886	0.0004907	-0.0006493	1.7925291	-18.6643496 C
0.0000163	37849.	2329158619.	30.7491466	0.0004997	-0.0006703	1.8202365	-19.2698146 C
0.0000171	38794.	2270865491.	30.2921063	0.0005175	-0.0007125	1.8747329	-20.4844358 C
0.0000179	39732.	2217593978.	29.8750363	0.0005353	-0.0007547	1.9284003	-21.7003790 C
0.0000188	40655.	2168245310.	29.4853034	0.0005528	-0.0007972	1.9808313	-22.9216162 C
0.0000196	41574.	2122930085.	29.1291413	0.0005704	-0.0008396	2.0326138	-24.1426251 C
0.0000204	42480.	2080675596.	28.7939052	0.0005879	-0.0008821	2.0832352	-25.3684586 C
0.0000213	43385.	2041633826.	28.4861863	0.0006053	-0.0009247	2.1332722	-26.5935376 C
0.0000221	44278.	2005047767.	28.1951125	0.0006226	-0.0009674	2.1822320	-27.8228302 C
0.0000229	45168.	1970960124.	27.9249327	0.0006399	-0.0010101	2.2305235	-29.0523051 C
0.0000238	46054.	1939106644.	27.6732752	0.0006572	-0.0010528	2.2781359	-30.2820817 C
0.0000246	46930.	1909037059.	27.4332878	0.0006744	-0.0010956	2.3247353	-31.5157018 C
0.0000254	47805.	1880858526.	27.2100472	0.0006916	-0.0011384	2.3707648	-32.7485776 C
0.0000263	48678.	1854390370.	27.0019643	0.0007088	-0.0011812	2.4162221	-33.9807046 C
0.0000271	49541.	1829206802.	26.8008954	0.0007259	-0.0012241	2.4606236	-35.2173803 C
0.0000279	50402.	1805452159.	26.6126884	0.0007429	-0.0012671	2.5044559	-36.4533609 C
0.0000288	51261.	1783004104.	26.4362933	0.0007600	-0.0013100	2.5477213	-37.6885904 C
0.0000296	52118.	1761740128.	26.2703799	0.0007772	-0.0013528	2.5903923	-38.9233531 C
0.0000304	52967.	1741390701.	26.1090619	0.0007942	-0.0013958	2.6320878	-40.1620816 C
0.0000313	53814.	1722062939.	25.9571845	0.0008112	-0.0014388	2.6732212	-41.4000515 C
0.0000321	54660.	1703676783.	25.8140175	0.0008282	-0.0014818	2.7137901	-42.6372578 C
0.0000329	55503.	1686160277.	25.6789048	0.0008453	-0.0015247	2.7537918	-43.8736953 C
0.0000338	56344.	1669439052.	25.5509272	0.0008623	-0.0015677	2.7931980	-45.1096799 C
0.0000346	57178.	1653342926.	25.4256613	0.0008793	-0.0016107	2.8316972	-46.3491304 C
0.0000354	58011.	1637948188.	25.3070516	0.0008963	-0.0016537	2.8696331	-47.5877990 C
0.0000363	58841.	1623206065.	25.1946444	0.0009133	-0.0016967	2.9070030	-48.8256800 C
0.0000371	59670.	1609072162.	25.0880268	0.0009303	-0.0017397	2.9438045	-50.0627677 C
0.0000379	60496.	1595505983.	24.9868225	0.0009474	-0.0017826	2.9800347	-51.2990563 C
0.0000387	61321.	1582470510.	24.8906875	0.0009645	-0.0018255	3.0156911	-52.5345399 C
0.0000396	62142.	1569895565.	24.7977517	0.0009816	-0.0018684	3.0506437	-53.7709975 C
0.0000404	62959.	1557745886.	24.7074974	0.0009986	-0.0019114	3.0848701	-55.0088040 C
0.0000412	63774.	1546038049.	24.6215807	0.0010156	-0.0019544	3.1185248	-56.2457840 C
0.0000421	64587.	1534745442.	24.5397492	0.0010327	-0.0019973	3.1516052	-57.4819310 C
0.0000429	65398.	1523843512.	24.4617704	0.0010498	-0.0020402	3.1841085	-58.7172381 C
0.0000437	66207.	1513309572.	24.3874296	0.0010670	-0.0020830	3.2160316	-59.9516986 C
0.0000446	67014.	1503122627.	24.3165279	0.0010841	-0.0021259	3.2473719	-60.0000000 CY
0.0000454	67819.	1493263217.	24.2488816	0.0011013	-0.0021687	3.2781264	-60.0000000 CY
0.0000462	68622.	1483713282.	24.1843199	0.0011185	-0.0022115	3.3082921	-60.0000000 CY
0.0000471	69422.	1474456032.	24.1226843	0.0011358	-0.0022542	3.3378661	-60.0000000 CY
0.0000479	70219.	1465435522.	24.0614846	0.0011529	-0.0022971	3.3666558	-60.0000000 CY
0.0000487	71013.	1456678300.	24.0029073	0.0011701	-0.0023399	3.3948483	-60.0000000 CY
0.0000496	71805.	1448172576.	23.9469315	0.0011874	-0.0023826	3.4224495	-60.0000000 CY
0.0000529	74952.	1416420395.	23.7466950	0.0012566	-0.0025534	3.5268781	-60.0000000 CY
0.0000562	77739.	1382026318.	23.5496742	0.0013247	-0.0027253	3.6193932	-60.0000000 CY
0.0000596	79806.	1339396238.	23.3177430	0.0013893	-0.0029007	3.6979109	-60.0000000 CY
0.0000629	81555.	1296235163.	23.0842671	0.0014524	-0.0030776	3.7656842	-60.0000000 CY
0.0000662	82936.	1251863401.	22.8473465	0.0015136	-0.0032564	3.8232727	-60.0000000 CY
0.0000696	84264.	1210978551.	22.6338144	0.0015749	-0.0034351	3.8727891	-60.0000000 CY
0.0000729	85301.	1169836560.	22.4098961	0.0016341	-0.0036159	3.9128241	-60.0000000 CY
0.0000762	86244.	1131071127.	22.2029359	0.0016930	-0.0037970	3.9452175	-60.0000000 CY
0.0000796	87171.	1095337994.	22.0184006	0.0017523	-0.0039777	3.9702685	-60.0000000 CY
0.0000829	87968.	1060920081.	21.8351359	0.0018105	-0.0041595	3.9874576	-60.0000000 CY
0.0000862	88594.	1027176108.	21.6499502	0.0018673	-0.0043427	3.9971880	-60.0000000 CY
0.0000896	89193.	995638421.	21.4815957	0.0019244	-0.0045256	3.9981590	-60.0000000 CY
0.0000929	89775.	966188847.	21.3300119	0.0019819	-0.0047081	3.9999751	-60.0000000 CY
0.0000963	90337.	938562785.	21.1906031	0.0020396	-0.0048904	3.9995537	-60.0000000 CY

0.0000996	90845.	912250293.	21.0552838	0.0020968	-0.0050732	3.9981591	-60.0000000	CY
0.0001029	91236.	886503063.	20.9187598	0.0021529	-0.0052571	3.9977213	60.0000000	CY
0.0001063	91565.	861784486.	20.7880893	0.0022087	-0.0054413	3.9994664	60.0000000	CY
0.0001096	91882.	838471378.	20.6688513	0.0022650	-0.0056250	3.9965671	60.0000000	CY
0.0001129	92190.	816447109.	20.5598606	0.0023216	-0.0058084	3.9998416	60.0000000	CY
0.0001163	92483.	795551328.	20.4558762	0.0023780	-0.0059920	3.9969219	60.0000000	CY
0.0001196	92764.	775729928.	20.3575196	0.0024344	-0.0061756	3.9998513	60.0000000	CY
0.0001229	93037.	756908497.	20.2676101	0.0024912	-0.0063588	3.9961139	60.0000000	CY
0.0001263	93302.	739026841.	20.1848816	0.0025483	-0.0065417	3.9995646	60.0000000	CY
0.0001296	93528.	721755837.	20.1035998	0.0026051	-0.0067249	3.9940209	60.0000000	CY
0.0001329	93717.	705082819.	20.0239010	0.0026615	-0.0069085	3.9983586	60.0000000	CY
0.0001363	93855.	688844609.	19.9417429	0.0027171	-0.0070929	3.9999895	60.0000000	CY
0.0001396	93986.	673334092.	19.8659547	0.0027730	-0.0072770	3.9947917	60.0000000	CY
0.0001429	94113.	658519750.	19.7947325	0.0028290	-0.0074610	3.9986367	60.0000000	CY
0.0001462	94232.	644321842.	19.7224179	0.0028844	-0.0076456	3.9999945	60.0000000	CY
0.0001496	94345.	630719233.	19.6555710	0.0029401	-0.0078299	3.9933388	60.0000000	CY
0.0001529	94455.	617692451.	19.5928689	0.0029961	-0.0080139	3.9975958	60.0000000	CY
0.0001562	94563.	605205615.	19.5340055	0.0030522	-0.0081978	3.9997357	60.0000000	CYT
0.0001596	94667.	593215781.	19.4792425	0.0031086	-0.0083814	3.9950333	60.0000000	CYT
0.0001629	94768.	581695109.	19.4281924	0.0031652	-0.0085648	3.9944843	60.0000000	CYT
0.0001662	94866.	570624178.	19.3801602	0.0032220	-0.0087480	3.9981222	60.0000000	CYT
0.0001696	94963.	559976194.	19.3349890	0.0032789	-0.0089311	3.9998506	60.0000000	CYT
0.0001729	95055.	549717398.	19.2930691	0.0033361	-0.0091139	3.9943339	60.0000000	CYT
0.0001762	95145.	539831016.	19.2539036	0.0033935	-0.0092965	3.9929801	60.0000000	CYT
0.0001796	95233.	530302352.	19.2169934	0.0034511	-0.0094789	3.9970219	60.0000000	CYT
0.0001829	95308.	521043575.	19.1794553	0.0035082	-0.0096618	3.9993373	60.0000000	CYT
0.0002029	95526.	470766461.	18.9442414	0.0038441	-0.0107659	3.9997630	60.0000000	CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1236.700	94463.016	0.00300000

Note note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318-08, Section
9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding
bending stiffnesses computed for common resistance factor values used for
reinforced concrete sections.

Axial Load No.	Resistance Factor for Moment	Nominal Moment Capacity in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip	Bending Stiffness at Ult. Mom. Cap. kip-in^2
1	0.65	94463.016	803.855	61400.958	1581241667.285
1	0.70	94463.016	865.690	66124.110	1514392685.560
1	0.75	94463.016	927.525	70847.262	1458506354.172

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	9.00000 ft
Shaft Diameter	=	66.00000 in
Concrete Cover Thickness	=	6.50000 in
Number of Reinforcing Bars	=	28 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	3421.19440 sq. in.

Total Area of Reinforcing Steel = 43.68000 sq. in.
Area Ratio of Steel Reinforcement = 1.28 percent
Edge-to-Edge Bar Spacing = 4.36625 in
Maximum Concrete Aggregate Size = 0.75000 in
Ratio of Bar Spacing to Aggregate Size = 5.82
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 14104.349 kips
Tensile Load for Cracking of Concrete = -1550.882 kips
Nominal Axial Tensile Capacity = -2620.800 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	25.79500	0.00000
2	1.41000	1.56000	25.14827	5.73993
3	1.41000	1.56000	23.24049	11.19203
4	1.41000	1.56000	20.16734	16.08292
5	1.41000	1.56000	16.08292	20.16734
6	1.41000	1.56000	11.19203	23.24049
7	1.41000	1.56000	5.73993	25.14827
8	1.41000	1.56000	0.00000	25.79500
9	1.41000	1.56000	-5.73993	25.14827
10	1.41000	1.56000	-11.19203	23.24049
11	1.41000	1.56000	-16.08292	20.16734
12	1.41000	1.56000	-20.16734	16.08292
13	1.41000	1.56000	-23.24049	11.19203
14	1.41000	1.56000	-25.14827	5.73993
15	1.41000	1.56000	-25.79500	0.00000
16	1.41000	1.56000	-25.14827	-5.73993
17	1.41000	1.56000	-23.24049	-11.19203
18	1.41000	1.56000	-20.16734	-16.08292
19	1.41000	1.56000	-16.08292	-20.16734
20	1.41000	1.56000	-11.19203	-23.24049
21	1.41000	1.56000	-5.73993	-25.14827
22	1.41000	1.56000	0.00000	-25.79500
23	1.41000	1.56000	5.73993	-25.14827
24	1.41000	1.56000	11.19203	-23.24049
25	1.41000	1.56000	16.08292	-20.16734
26	1.41000	1.56000	20.16734	-16.08292
27	1.41000	1.56000	23.24049	-11.19203
28	1.41000	1.56000	25.14827	-5.73993

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.36625 inches between Bars 24 and 25

Spacing to aggregate size ratio = 5.82166

Concrete Properties:

Compressive Strength of Concrete = 4000.00000 psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34164 psi
Compression Strain at Peak Stress = 0.00189
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.75000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1236.700

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1236.700 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Run Msg
0.000000417	1726.6207831	4143889879.	227.2225791	0.0000947	0.0000672	0.3909066	2.7416187	
0.000000833	3453.1513842	4143781661.	130.1542991	0.0001085	0.0000535	0.4456810	3.1374206	
0.000001250	5179.5588150	4143647052.	97.8173276	0.0001223	0.0000398	0.5001314	3.5339156	
0.000001667	6905.7814658	4143468879.	81.6631844	0.0001361	0.0000261	0.5542556	3.9311039	
0.000002083	8631.7577155	4143243703.	71.9821741	0.0001500	0.0000125	0.6080514	4.3289855	
0.000002500	10357.	4142970353.	65.5377318	0.0001638	-0.000001156	0.6615165	4.7275606	
0.000002917	12082.	4142503506.	60.9424457	0.0001777	-0.0000148	0.7146454	5.1268027	
0.000003333	13804.	4141310748.	57.5015341	0.0001917	-0.0000283	0.7674187	5.5265816	
0.000003750	15522.	4139147211.	54.8289867	0.0002056	-0.0000419	0.8198175	5.9267648	
0.000004167	17233.	4136028106.	52.6935109	0.0002196	-0.0000554	0.8718281	6.3272576	
0.000004583	18939.	4132056316.	50.9481330	0.0002335	-0.0000690	0.9234410	6.7279935	
0.000005000	20637.	4127351990.	49.4950027	0.0002475	-0.0000825	0.9746496	7.1289254	
0.000005417	22328.	4122028077.	48.2664638	0.0002614	-0.0000961	1.0254489	7.5300195	
0.000005833	24011.	4116182701.	47.2142463	0.0002754	-0.0001096	1.0758353	7.9312517	
0.000006250	24011.	3841770520.	43.7139639	0.0002732	-0.0001393	1.0673377	7.8633435	C
0.000006667	24011.	3601659863.	42.5946593	0.0002840	-0.0001560	1.1057581	8.1711675	C
0.000007083	24011.	3389797518.	41.5791733	0.0002945	-0.0001730	1.1432178	8.4732675	C
0.000007500	24011.	3201475434.	40.6564092	0.0003049	-0.0001901	1.1798964	8.7709940	C
0.000007917	24011.	3032976727.	39.8105270	0.0003152	-0.0002073	1.2157708	9.0640709	C
0.000008333	24011.	2881327890.	39.0326047	0.0003253	-0.0002247	1.2509283	9.3531295	C
0.000008750	24011.	2744121800.	38.3151829	0.0003353	-0.0002422	1.2854471	9.6387402	C
0.000009167	24492.	2671840584.	37.6508496	0.0003451	-0.0002599	1.3193617	9.9211259	C
0.000009583	25032.	2612060392.	37.0333438	0.0003549	-0.0002776	1.3527014	10.2004710	C
0.0000100	25559.	2555928479.	36.4577560	0.0003646	-0.0002954	1.3855053	10.4770493	C
0.0000104	26075.	2503182232.	35.9201124	0.0003742	-0.0003133	1.4178171	10.7511798	C
0.0000108	26578.	2453344383.	35.4148266	0.0003837	-0.0003313	1.4495979	11.0224831	C
0.0000113	27071.	2406290332.	34.9396281	0.0003931	-0.0003494	1.4809038	11.2913911	C
0.0000117	27556.	2361967669.	34.4933949	0.0004024	-0.0003676	1.5118223	11.5586153	C
0.0000121	28034.	2320038480.	34.0724341	0.0004117	-0.0003858	1.5423287	11.8239113	C
0.0000125	28502.	2280174624.	33.6729108	0.0004209	-0.0004041	1.5723734	12.0868051	C
0.0000129	28967.	2242603393.	33.2971968	0.0004301	-0.0004224	1.6021498	12.3489625	C
0.0000133	29422.	2206678818.	32.9381003	0.0004392	-0.0004408	1.6314438	-12.6563345	C
0.0000138	29875.	2172756134.	32.5996639	0.0004482	-0.0004593	1.6605086	-13.1867965	C
0.0000142	30321.	2140292564.	32.2756727	0.0004572	-0.0004778	1.6891444	-13.7195028	C
0.0000146	30765.	2109570459.	31.9696855	0.0004662	-0.0004963	1.7175801	-14.2524246	C
0.0000150	31200.	2080027172.	31.6748582	0.0004751	-0.0005149	1.7455609	-14.7878866	C
0.0000154	31636.	2052047555.	31.3964073	0.0004840	-0.0005335	1.7733906	-15.3231520	C
0.0000158	32064.	2025098874.	31.1274368	0.0004929	-0.0005521	1.8007898	-15.8607936	C
0.0000163	32491.	1999418512.	30.8715307	0.0005017	-0.0005708	1.8279823	-16.3987786	C
0.0000171	33333.	1951202861.	30.3905878	0.0005192	-0.0006083	1.8815129	-17.4780089	C
0.0000179	34166.	1906932915.	29.9493287	0.0005366	-0.0006459	1.9340996	-18.5598654	C
0.0000188	34986.	1865934112.	29.5397178	0.0005539	-0.0006836	1.9855979	-19.6458409	C
0.0000196	35798.	1827997091.	29.1605444	0.0005711	-0.0007214	2.0361888	-20.7343284	C
0.0000204	36603.	1792813787.	28.8091782	0.0005882	-0.0007593	2.0859479	-21.8246782	C
0.0000213	37399.	1759960869.	28.4800856	0.0006052	-0.0007973	2.1347433	-22.9182848	C
0.0000221	38190.	1729365864.	28.1742926	0.0006222	-0.0008353	2.1828116	-24.0128759	C
0.0000229	38974.	1700692061.	27.8871419	0.0006391	-0.0008734	2.2300198	-25.1098578	C
0.0000238	39753.	1673792164.	27.6177574	0.0006559	-0.0009116	2.2764491	-26.2084820	C
0.0000246	40528.	1648615822.	27.3669609	0.0006728	-0.0009497	2.3222832	-27.3068749	C
0.0000254	41296.	1624749731.	27.1273249	0.0006895	-0.0009880	2.3671357	-28.4091633	C
0.0000263	42061.	1602333627.	26.9038144	0.0007062	-0.0010263	2.4114443	-29.5107587	C
0.0000271	42824.	1581190959.	26.6938647	0.0007230	-0.0010645	2.4551297	-30.6125062	C
0.0000279	43579.	1561053059.	26.4922784	0.0007396	-0.0011029	2.4979033	-31.7176303	C
0.0000288	44333.	1542023954.	26.3032094	0.0007562	-0.0011413	2.5401377	-32.8220616	C
0.0000296	45085.	1524009543.	26.1256044	0.0007729	-0.0011796	2.5818306	-33.9257960	C
0.0000304	45832.	1506800559.	25.9548761	0.0007895	-0.0012180	2.6227033	-35.0320488	C
0.0000313	46575.	1490396963.	25.7923036	0.0008060	-0.0012565	2.6629056	-36.1391622	C
0.0000321	47316.	1474793522.	25.6389288	0.0008226	-0.0012949	2.7025707	-37.2455757	C
0.0000329	48056.	1459929117.	25.4940576	0.0008392	-0.0013333	2.7416964	-38.3512850	C
0.0000338	48792.	1445695004.	25.3552670	0.0008557	-0.0013718	2.7801382	-39.4580448	C

0.0000346	49524.	1432018021.	25.2211627	0.0008722	-0.0014103	2.8178240	-40.5668129	C
0.0000354	50254.	1418938012.	25.0940620	0.0008887	-0.0014488	2.8549742	-41.6748696	C
0.0000363	50982.	1406413491.	24.9734861	0.0009053	-0.0014872	2.8915864	-42.7822102	C
0.0000371	51709.	1394406695.	24.8589996	0.0009219	-0.0015256	2.9276583	-43.8888300	C
0.0000379	52434.	1382883178.	24.7502052	0.0009384	-0.0015641	2.9631875	-44.9947242	C
0.0000387	53154.	1371719619.	24.6430786	0.0009549	-0.0016026	2.9978705	-46.1040030	C
0.0000396	53872.	1360984211.	24.5410943	0.0009714	-0.0016411	3.0320156	-47.2125562	C
0.0000404	54589.	1350650330.	24.4439455	0.0009879	-0.0016796	3.0656211	-48.3203713	C
0.0000412	55304.	1340693361.	24.3513434	0.0010045	-0.0017180	3.0986845	-49.4274428	C
0.0000421	56017.	1331090630.	24.2630223	0.0010211	-0.0017564	3.1312034	-50.5337655	C
0.0000429	56728.	1321821218.	24.1787372	0.0010377	-0.0017948	3.1631753	-51.6393340	C
0.0000437	57438.	1312865800.	24.0982617	0.0010543	-0.0018332	3.1945977	-52.7441428	C
0.0000446	58144.	1304154682.	24.0188355	0.0010708	-0.0018717	3.2252557	-53.8514847	C
0.0000454	58847.	1295720161.	23.9426167	0.0010874	-0.0019101	3.2553432	-54.9584409	C
0.0000462	59549.	1287552947.	23.8697260	0.0011040	-0.0019485	3.2848831	-56.0646174	C
0.0000471	60250.	1279638583.	23.7999909	0.0011206	-0.0019869	3.3138727	-57.1700081	C
0.0000479	60948.	1271963613.	23.7332514	0.0011372	-0.0020253	3.3423095	-58.2746067	C
0.0000487	61645.	1264515498.	23.6693582	0.0011539	-0.0020636	3.3701908	-59.3784071	C
0.0000496	62340.	1257282537.	23.6081723	0.0011706	-0.0021019	3.3975139	-60.0000000	CY
0.0000529	65102.	1230268828.	23.3863725	0.0012375	-0.0022550	3.5010385	-60.0000000	CY
0.0000562	67829.	1205857441.	23.1930789	0.0013046	-0.0024079	3.5949797	-60.0000000	CY
0.0000596	70333.	1180421411.	23.0101308	0.0013710	-0.0025615	3.6783242	-60.0000000	CY
0.0000629	72214.	1147770411.	22.7958145	0.0014342	-0.0027183	3.7486952	-60.0000000	CY
0.0000662	73760.	1113351614.	22.5710252	0.0014953	-0.0028772	3.8084256	-60.0000000	CY
0.0000696	75046.	1078506638.	22.3470472	0.0015550	-0.0030375	3.8589169	-60.0000000	CY
0.0000729	76183.	1044795133.	22.1350024	0.0016140	-0.0031985	3.9012852	-60.0000000	CY
0.0000762	77257.	1013206317.	21.9343918	0.0016725	-0.0033600	3.9358177	-60.0000000	CY
0.0000796	78082.	981135012.	21.7277894	0.0017292	-0.0035233	3.9622012	-60.0000000	CY
0.0000829	78859.	951063285.	21.5382914	0.0017859	-0.0036866	3.9816526	-60.0000000	CY
0.0000862	79617.	923096099.	21.3634113	0.0018426	-0.0038499	3.9941495	-60.0000000	CY
0.0000896	80329.	896692856.	21.1980200	0.0018990	-0.0040135	3.9996810	-60.0000000	CY
0.0000929	80876.	870415030.	21.0297558	0.0019540	-0.0041785	3.9993392	-60.0000000	CY
0.0000963	81361.	845311468.	20.8710448	0.0020088	-0.0043437	3.9985231	-60.0000000	CY
0.0000996	81829.	821714065.	20.7229133	0.0020637	-0.0045088	3.9968834	-60.0000000	CY
0.0001029	82280.	799477045.	20.5835053	0.0021184	-0.0046741	3.9999645	60.0000000	CY
0.0001063	82718.	778526678.	20.4565606	0.0021735	-0.0048390	3.9990981	60.0000000	CY
0.0001096	83144.	758728582.	20.3400532	0.0022289	-0.0050036	3.9965834	60.0000000	CY
0.0001129	83506.	739536869.	20.2256546	0.0022838	-0.0051687	3.9998287	60.0000000	CY
0.0001163	83780.	720691080.	20.1079372	0.0023375	-0.0053350	3.9974703	60.0000000	CY
0.0001196	84025.	702650478.	19.9902892	0.0023905	-0.0055020	3.9999134	60.0000000	CY
0.0001229	84263.	685532515.	19.8816378	0.0024438	-0.0056687	3.9970846	60.0000000	CY
0.0001263	84497.	669280741.	19.7806821	0.0024973	-0.0058352	3.9997829	60.0000000	CY
0.0001296	84724.	653819629.	19.6871814	0.0025511	-0.0060014	3.9956641	60.0000000	CY
0.0001329	84947.	639098817.	19.6002350	0.0026052	-0.0061673	3.9991964	60.0000000	CY
0.0001363	85165.	625066803.	19.5192745	0.0026595	-0.0063330	3.9972198	60.0000000	CY
0.0001396	85376.	611652126.	19.4421176	0.0027138	-0.0064987	3.9974461	60.0000000	CY
0.0001429	85581.	598814921.	19.3660586	0.0027677	-0.0066648	3.9997595	60.0000000	CY
0.0001462	85780.	586530012.	19.2951163	0.0028219	-0.0068306	3.9941520	60.0000000	CY
0.0001496	85945.	574561325.	19.2228564	0.0028754	-0.0069971	3.9974673	60.0000000	CY
0.0001529	86095.	563018811.	19.1524043	0.0029287	-0.0071638	3.9996650	60.0000000	CY
0.0001562	86202.	551692156.	19.0784014	0.0029810	-0.0073315	3.9962638	60.0000000	CY
0.0001596	86305.	540812800.	19.0084630	0.0030334	-0.0074991	3.9953845	60.0000000	CYT
0.0001629	86405.	530366208.	18.9420301	0.0030860	-0.0076665	3.9984746	60.0000000	CYT
0.0001662	86505.	520328072.	18.8791582	0.0031387	-0.0078338	3.9998996	60.0000000	CYT
0.0001696	86601.	510669325.	18.8199746	0.0031916	-0.0080009	3.9943109	60.0000000	CYT
0.0001729	86692.	501348584.	18.7594299	0.0032438	-0.0081687	3.9946452	60.0000000	CYT
0.0001762	86779.	492362132.	18.7013748	0.0032961	-0.0083364	3.9978021	60.0000000	CYT
0.0001796	86859.	483672246.	18.6482272	0.0033489	-0.0085036	3.9995975	60.0000000	CYT
0.0001829	86939.	475290827.	18.5978531	0.0034019	-0.0086706	3.9979546	60.0000000	CYT
0.0002029	87317.	430310500.	18.3698891	0.0037276	-0.0096649	3.9895602	60.0000000	CYT
0.0002229	87317.	391703203.	18.4122891	0.0041044	-0.0106081	3.9956362	60.0000000	CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1236.700	86239.153	0.00300000

Note note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether

the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction factor to compute ultimate moment capacity according to ACI 318-08, Section 9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resistance Factor for Moment	Nominal Moment Capacity in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip	Bending Stiffness at Ult. Mom. Cap. kip-in^2
1	0.65	86239.153	803.855	56055.448	1330586175.434
1	0.70	86239.153	865.690	60367.406	1278344897.577
1	0.75	86239.153	927.525	64679.365	1234400517.483

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 81300.0 lbs
Applied moment at pile head = 32796000.0 in-lbs
Axial thrust load on pile head = 1236700.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	1.5211	32796000.	81300.	-0.007839	0.000	2.730E+12	0.000	0.000	0.000
0.554	1.4692	33400607.	81300.	-0.007759	0.000	2.730E+12	0.000	0.000	0.000
1.108	1.4179	34004544.	81300.	-0.007675	0.000	2.618E+12	0.000	0.000	0.000
1.662	1.3672	34607772.	81300.	-0.007587	0.000	2.567E+12	0.000	0.000	0.000
2.216	1.3170	35210263.	81300.	-0.007496	0.000	2.517E+12	0.000	0.000	0.000
2.770	1.2675	35811990.	81300.	-0.007401	0.000	2.471E+12	0.000	0.000	0.000
3.324	1.2186	36412924.	81300.	-0.007303	0.000	2.427E+12	0.000	0.000	0.000
3.878	1.1704	37013038.	81300.	-0.007201	0.000	2.384E+12	0.000	0.000	0.000
4.432	1.1229	37612303.	81300.	-0.007097	0.000	2.344E+12	0.000	0.000	0.000
4.986	1.0760	38210692.	81300.	-0.006988	0.000	2.306E+12	0.000	0.000	0.000
5.540	1.0299	38808175.	81300.	-0.006876	0.000	2.270E+12	0.000	0.000	0.000
6.094	0.9846	39404724.	81300.	-0.006761	0.000	2.236E+12	0.000	0.000	0.000
6.648	0.9401	40000309.	81300.	-0.006642	0.000	2.203E+12	0.000	0.000	0.000
7.202	0.8963	40594902.	81300.	-0.006519	0.000	2.171E+12	0.000	0.000	0.000
7.756	0.8534	41188473.	81300.	-0.006393	0.000	2.141E+12	0.000	0.000	0.000
8.310	0.8113	41780992.	81300.	-0.006264	0.000	2.113E+12	0.000	0.000	0.000
8.864	0.7701	42372431.	81300.	-0.006130	0.000	2.086E+12	0.000	0.000	0.000
9.418	0.7298	42962759.	81300.	-0.005993	0.000	2.059E+12	0.000	0.000	0.000
9.972	0.6904	43551947.	81300.	-0.005853	0.000	2.035E+12	0.000	0.000	0.000
10.526	0.6520	44139966.	81300.	-0.005709	0.000	2.011E+12	0.000	0.000	0.000
11.080	0.6145	44726784.	81300.	-0.005561	0.000	1.988E+12	0.000	0.000	0.000
11.634	0.5780	45312372.	81300.	-0.005410	0.000	1.966E+12	0.000	0.000	0.000
12.188	0.5426	45896700.	80857.	-0.005255	0.000	1.945E+12	-133.2212	1632.3315	0.000
12.742	0.5082	46473850.	79433.	-0.005096	0.000	1.924E+12	-295.2354	3862.4191	0.000
13.296	0.4748	47036633.	76906.	-0.004934	0.000	1.906E+12	-465.1007	6511.9732	0.000
13.850	0.4426	47577510.	73235.	-0.004768	0.000	1.888E+12	-639.1205	9600.5953	0.000
14.404	0.4114	48088764.	68406.	-0.004599	0.000	1.872E+12	-813.6726	13148.	0.000
14.958	0.3814	48562652.	62417.	-0.004426	0.000	1.858E+12	-988.1983	17224.	0.000
15.512	0.3526	48991438.	55269.	-0.004251	0.000	1.845E+12	-1162.2152	21914.	0.000
16.066	0.3249	49367407.	46983.	-0.004073	0.000	1.834E+12	-1330.3867	27222.	0.000
16.620	0.2984	49683108.	37608.	-0.003893	0.000	1.825E+12	-1490.1143	33197.	0.000
17.174	0.2731	49931463.	27207.	-0.003712	0.000	1.818E+12	-1638.9500	39892.	0.000
17.728	0.2491	50105883.	15859.	-0.003529	0.000	1.813E+12	-1774.9229	47376.	0.000
18.282	0.2262	50200348.	3635.8115	-0.003345	0.000	1.811E+12	-1902.4021	55908.	0.000
18.836	0.2046	50209220.	-9383.5152	-0.003160	0.000	1.811E+12	-2014.3629	65454.	0.000
19.390	0.1842	50127549.	-23090.	-0.002976	0.000	1.813E+12	-2109.1429	76123.	0.000
19.944	0.1650	49951152.	-37365.	-0.002793	0.000	1.818E+12	-2185.2709	88035.	0.000
20.498	0.1471	49676673.	-52079.	-0.002611	0.000	1.825E+12	-2241.4789	101327.	0.000
21.052	0.1303	49301642.	-67133.	-0.002431	0.000	1.836E+12	-2287.2733	116694.	0.000
21.606	0.1147	48824055.	-82443.	-0.002254	0.000	1.850E+12	-2318.8144	134358.	0.000
22.160	0.1003	48242544.	-97895.	-0.002081	0.000	1.867E+12	-2329.6022	154362.	0.000

22.714	0.0871	47556662.	-113347.	-0.001911	0.000	1.889E+12	-2319.0541	177069.	0.000
23.268	0.0749	46766911.	-128657.	-0.001746	0.000	1.914E+12	-2286.8101	202922.	0.000
23.822	0.0638	45874757.	-145013.	-0.001587	0.000	1.945E+12	-2633.9809	274252.	0.000
24.376	0.0538	44864903.	-162410.	-0.001433	0.000	1.982E+12	-2599.6538	321108.	0.000
24.930	0.0448	43738918.	-179217.	-0.001286	0.000	2.027E+12	-2456.6466	364597.	0.000
25.484	0.0367	42503179.	-194386.	-0.001147	0.000	2.080E+12	-2106.6316	381391.	0.000
26.038	0.0296	41173219.	-207271.	-0.001015	0.000	2.142E+12	-1769.9260	398186.	0.000
26.592	0.0232	39763985.	-217974.	-0.000891	0.000	2.216E+12	-1450.0166	414980.	0.000
27.146	0.0177	38289686.	-226616.	-0.000776	0.000	2.301E+12	-1149.6830	431775.	0.000
27.700	0.0129	36763666.	-233333.	-0.000670	0.000	2.402E+12	-871.0386	448569.	0.000
28.254	0.008793	35198312.	-238274.	-0.000573	0.000	2.518E+12	-615.5373	465363.	0.000
28.808	0.005295	33604991.	-241597.	-0.000484	0.000	2.654E+12	-384.0416	482158.	0.000
29.362	0.002357	31994005.	-243461.	-0.000404	0.000	2.811E+12	-176.8739	498952.	0.000
29.916	-7.879E-05	30374579.	-244029.	-0.000333	0.000	2.991E+12	6.1121	515747.	0.000
30.470	-0.002065	28754868.	-243458.	-0.000269	0.000	3.221E+12	165.4514	532541.	0.000
31.024	-0.003657	27141982.	-241904.	-0.000224	0.000	5.716E+12	302.2224	549336.	0.000
31.578	-0.005040	25542193.	-239473.	-0.000193	0.000	5.723E+12	429.1659	566130.	0.000
32.132	-0.006225	23961127.	-236232.	-0.000164	0.000	5.729E+12	545.7962	582925.	0.000
32.686	-0.007225	22403955.	-232251.	-0.000137	0.000	5.734E+12	651.7378	599719.	0.000
33.240	-0.008052	20875373.	-227603.	-0.000112	0.000	5.739E+12	746.7183	616513.	0.000
33.794	-0.008719	19379595.	-222360.	-8.906E-05	0.000	5.743E+12	830.5644	633308.	0.000
34.348	-0.009236	17920339.	-216597.	-6.748E-05	0.000	5.746E+12	903.1950	650102.	0.000
34.902	-0.009616	16500831.	-210388.	-4.757E-05	0.000	5.749E+12	964.6140	666897.	0.000
35.456	-0.009869	15123798.	-203808.	-2.929E-05	0.000	5.751E+12	1014.9060	683691.	0.000
36.010	-0.0100	13791475.	-196931.	-1.258E-05	0.000	5.752E+12	1054.2290	700486.	0.000
36.564	-0.0100	12505615.	-190141.	2.618E-06	0.000	5.753E+12	988.4616	654782.	0.000
37.118	-0.009970	11263321.	-183721.	1.635E-05	0.000	5.753E+12	942.7633	628609.	0.000
37.672	-0.009818	10062587.	-177429.	2.867E-05	0.000	5.754E+12	950.3181	643454.	0.000
38.226	-0.009589	8903757.	-171105.	3.963E-05	0.000	5.754E+12	952.2103	660149.	0.000
38.780	-0.009292	7786927.	-164787.	4.927E-05	0.000	5.754E+12	948.5288	678663.	0.000
39.334	-0.008934	6711943.	-158511.	5.765E-05	0.000	5.754E+12	939.3763	699007.	0.000
39.888	-0.008525	5678413.	-152315.	6.481E-05	0.000	5.754E+12	924.8741	721235.	0.000
40.442	-0.008072	4685704.	-146231.	7.079E-05	0.000	5.754E+12	905.1645	745444.	0.000
40.996	-0.007584	3732955.	-140296.	7.566E-05	0.000	5.754E+12	880.4138	771776.	0.000
41.550	-0.007067	2819081.	-134542.	7.944E-05	0.000	5.754E+12	850.8139	800426.	0.000
42.104	-0.006528	1942783.	-128999.	8.219E-05	0.000	5.754E+12	816.5846	831652.	0.000
42.658	-0.005974	1102557.	-123699.	8.395E-05	0.000	5.754E+12	777.9743	865792.	0.000
43.212	-0.005411	296703.	-118627.	8.476E-05	0.000	5.754E+12	747.8982	918813.	0.000
43.766	-0.004847	-476100.	-113874.	8.465E-05	0.000	5.754E+12	682.1075	935608.	0.000
44.320	-0.004286	-1218751.	-109565.	8.368E-05	0.000	5.754E+12	613.9881	952402.	0.000
44.874	-0.003734	-1934256.	-105715.	8.185E-05	0.000	5.754E+12	544.3990	969197.	0.000
45.428	-0.003197	-2625681.	-102329.	7.922E-05	0.000	5.754E+12	474.2264	985991.	0.000
45.982	-0.002681	-3296123.	-99408.	7.580E-05	0.000	5.754E+12	404.3838	1002786.	0.000
46.536	-0.002190	-3948662.	-80784.	7.073E-05	0.000	4.144E+12	5198.5275	15783488.	0.000
47.090	-0.001740	-4371395.	-44964.	6.405E-05	0.000	4.144E+12	5577.6070	21304482.	0.000
47.644	-0.001338	-4547563.	-7901.0036	5.690E-05	0.000	4.144E+12	5572.6507	27689202.	0.000
48.198	-0.000984	-4477382.	25650.	4.966E-05	0.000	4.144E+12	4521.0352	30546311.	0.000
48.752	-0.000678	-4207331.	51997.	4.269E-05	0.000	4.144E+12	3405.0795	33403420.	0.000
49.306	-0.000416	-3786735.	66775.	3.628E-05	0.000	4.144E+12	1040.7484	16620000.	0.000
49.860	-0.000195	-3320091.	71857.	3.058E-05	0.000	4.144E+12	488.2568	16620000.	0.000
50.414	-9.717E-06	-2831825.	73561.	2.564E-05	0.000	4.144E+12	24.2919	16620000.	0.000
50.968	0.000146	-2342447.	72431.	2.149E-05	0.000	4.144E+12	-364.1656	16620000.	0.000
51.522	0.000276	-1869134.	68927.	1.812E-05	0.000	4.144E+12	-690.1649	16620000.	0.000
52.076	0.000387	-1426298.	63420.	1.547E-05	0.000	4.144E+12	-966.3268	16620000.	0.000
52.630	0.000482	-1026151.	56205.	1.350E-05	0.000	4.144E+12	-1204.4588	16620000.	0.000
53.184	0.000566	-679223.	47497.	1.214E-05	0.000	4.144E+12	-1415.2303	16620000.	0.000
53.738	0.000643	-394833.	37448.	1.128E-05	0.000	4.144E+12	-1607.8915	16620000.	0.000
54.292	0.000716	-181500.	26153.	1.081E-05	0.000	4.144E+12	-1790.0251	16620000.	0.000
54.846	0.000787	-47277.	13664.	1.063E-05	0.000	4.144E+12	-1967.3193	16620000.	0.000
55.400	0.000857	0.000	0.000	1.059E-05	0.000	4.144E+12	-2143.3530	8310000.	0.000

* This analysis computed pile response using nonlinear moment-curvature relationships.
  Values of total stress due to combined axial and bending stresses are computed only
  for elastic sections only and do not equal the actual stresses in concrete and steel.
  Stresses in concrete and steel may be interpolated from the output for nonlinear
  bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

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Pile-head deflection             =      1.5210511 inches
Computed slope at pile head      =     -0.0078394 radians
Maximum bending moment           =      50209220. inch-lbs
Maximum shear force              =       -244029. lbs
Depth of maximum bending moment  =     18.8360000 feet below pile head
Depth of maximum shear force     =     29.9160000 feet below pile head
Number of iterations             =             69
Number of zero deflection points =              2
```

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 81300.	M = 32796000.	1236700.	1.52105110	50209220.	-244029.	-0.00783942

The analysis ended normally.

```
================================================================================

                  LPile Plus for Windows, Version 2013-07.007

               Analysis of Individual Piles and Drilled Shafts
              Subjected to Lateral Loading Using the p-y Method

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--------------------------------------------------------------------------------
                           Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:        O:\2012\2012048\FRA\77372\structures\FRA070_1321R\design\3-Final Design\Piers\L-Pile\
Name of input data file:       1321R-Pier3.lp7d
Name of output report file:    1321R-Pier3.lp7o
Name of plot output file:      1321R-Pier3.lp7p
Name of runtime messeage file: 1321R-Pier3.lp7r


--------------------------------------------------------------------------------
                         Date and Time of Analysis
--------------------------------------------------------------------------------

               Date:  September 25, 2015     Time:  16:15:51


--------------------------------------------------------------------------------
                              Problem Title
--------------------------------------------------------------------------------

1321R-Pier3

Job Number: 2012048

Client: ODOT D6

Engineer: GPD GROUP

Description: Design of Pier 3



--------------------------------------------------------------------------------
                         Program Options and Settings
--------------------------------------------------------------------------------

Engineering Units of Input Data and Computations:
 - Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:
- Maximum number of iterations allowed                =          100
- Deflection tolerance for convergence                =   1.0000E-05 in
- Maximum allowable deflection                        =     100.0000 in
- Number of pile increments                           =          100

Loading Type and Number of Cycles of Loading:
 - Static loading specified

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
 - Compute pile response under loading and nonlinear bending properties of pile
   (only if nonlinear pile properties are input)
 - Use of p-y modification factors for p-y curves not selected
```

 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - No p-y curves to be computed and reported for user-specified depths
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1

Pile Structural Properties and Geometry

Total number of pile sections = 2

Total length of pile = 53.40 ft

Depth of ground surface below top of pile = 6.40 ft

Pile diameter values used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile.

Point	Depth X ft	Pile Diameter in
1	0.00000	72.0000000
2	36.400000	72.0000000
3	36.400000	66.0000000
4	53.400000	66.0000000

Input Structural Properties:

Pile Section No. 1:

   Section Type = Drilled Shaft (Bored Pile)
   Section Length = 36.40000 ft
   Section Diameter = 72.00000 in

Pile Section No. 2:

   Section Type = Drilled Shaft (Bored Pile)
   Section Length = 17.00000 ft
   Section Diameter = 66.00000 in

Ground Slope and Pile Batter Angles

Ground Slope Angle = 0.000 degrees
= 0.000 radians

Pile Batter Angle = 0.000 degrees
= 0.000 radians

Soil and Rock Layering Information

The soil profile is modelled using 6 layers

Layer 1 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer = 6.40000 ft
   Distance from top of pile to bottom of layer = 13.40000 ft
   Effective unit weight at top of layer = 62.60000 pcf
   Effective unit weight at bottom of layer = 62.60000 pcf
   Friction angle at top of layer = 36.00000 deg.
   Friction angle at bottom of layer = 36.00000 deg.

```
   Subgrade k at top of layer                          =    120.00000 pci
   Subgrade k at bottom of layer                       =    120.00000 pci


Layer 2 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     13.40000 ft
   Distance from top of pile to bottom of layer        =     18.40000 ft
   Effective unit weight at top of layer               =     77.60000 pcf
   Effective unit weight at bottom of layer            =     77.60000 pcf
   Friction angle at top of layer                      =     43.00000 deg.
   Friction angle at bottom of layer                   =     43.00000 deg.
   Subgrade k at top of layer                          =    380.00000 pci
   Subgrade k at bottom of layer                       =    380.00000 pci


Layer 3 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     18.40000 ft
   Distance from top of pile to bottom of layer        =     28.40000 ft
   Effective unit weight at top of layer               =     65.60000 pcf
   Effective unit weight at bottom of layer            =     65.60000 pcf
   Friction angle at top of layer                      =     36.00000 deg.
   Friction angle at bottom of layer                   =     36.00000 deg.
   Subgrade k at top of layer                          =    120.00000 pci
   Subgrade k at bottom of layer                       =    120.00000 pci


Layer 4 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     28.40000 ft
   Distance from top of pile to bottom of layer        =     36.40000 ft
   Effective unit weight at top of layer               =     77.60000 pcf
   Effective unit weight at bottom of layer            =     77.60000 pcf
   Friction angle at top of layer                      =     43.00000 deg.
   Friction angle at bottom of layer                   =     43.00000 deg.
   Subgrade k at top of layer                          =    380.00000 pci
   Subgrade k at bottom of layer                       =    380.00000 pci


Layer 5 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer           =     36.40000 ft
   Distance from top of pile to bottom of layer        =     53.30000 ft
   Effective unit weight at top of layer               =     87.60000 pcf
   Effective unit weight at bottom of layer            =     87.60000 pcf
   Uniaxial compressive strength at top of layer       =    200.00000 psi
   Uniaxial compressive strength at bottom of layer    =    200.00000 psi
   Initial modulus of rock at top of layer             =       20000. psi
   Initial modulus of rock at bottom of layer          =       20000. psi
   RQD of rock at top of layer                         =     15.00000 %
   RQD of rock at bottom of layer                      =     15.00000 %
   k rm of rock at top of layer                        =    0.0005000
   k rm of rock at bottom of layer                     =    0.0005000


Layer 6 is strong rock (vuggy limestone)

   Distance from top of pile to top of layer           =     53.30000 ft
   Distance from top of pile to bottom of layer        =     63.30000 ft
   Effective unit weight at top of layer               =    102.80000 pcf
   Effective unit weight at bottom of layer            =    102.80000 pcf
   Uniaxial compressive strength at top of layer       =   2500.00000 psi
   Uniaxial compressive strength at bottom of layer    =   2500.00000 psi


   (Depth of lowest soil layer extends    9.90 ft below pile tip)


--------------------------------------------------------------------------------
                           Summary of Soil Properties
--------------------------------------------------------------------------------

                     Layer                     Layer      Effective    Angle of      Uniaxial      RQD %                  Rock
Mass
Layer              Soil Type                   Depth       Unit Wt.    Friction        qu            or         kpy       Rock
Emass      krm
 Num.         (p-y Curve Criteria)              ft           pcf          deg.         psi          GSI         pci          psi
```

1	Sand (Reese, et al.)	6.400	62.600	36.000	--	--	120.000	--
		13.400	62.600	36.000	--	--	120.000	--
2	Sand (Reese, et al.)	13.400	77.600	43.000	--	--	380.000	--
		18.400	77.600	43.000	--	--	380.000	--
3	Sand (Reese, et al.)	18.400	65.600	36.000	--	--	120.000	--
		28.400	65.600	36.000	--	--	120.000	--
4	Sand (Reese, et al.)	28.400	77.600	43.000	--	--	380.000	--
		36.400	77.600	43.000	--	--	380.000	--
5	Weak Rock	36.400	87.600	--	200.000	15.000	--	20000. 5.00E-04
		53.300	87.600	--	200.000	15.000	--	20000. 5.00E-04
6	Vuggy Limestone	53.300	102.800	--	2500.000	--	--	--
		63.300	102.800	--	2500.000	--	--	--

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 81400. lbs	M = 32208000. in-lbs	1422200.	No

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head
Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

---

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	36.40000 ft
Shaft Diameter	=	72.00000 in
Concrete Cover Thickness	=	9.50000 in
Number of Reinforcing Bars	=	26 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	4071.50408 sq. in.
Total Area of Reinforcing Steel	=	40.56000 sq. in.

Area Ratio of Steel Reinforcement = 1.00 percent
Edge-to-Edge Bar Spacing = 4.80849 in
Maximum Concrete Aggregate Size = 0.75000 in
Ratio of Bar Spacing to Aggregate Size = 6.41
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 16138.810 kips
Tensile Load for Cracking of Concrete = -1812.211 kips
Nominal Axial Tensile Capacity = -2433.600 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	25.79500	0.00000
2	1.41000	1.56000	25.04544	6.17315
3	1.41000	1.56000	22.84034	11.98753
4	1.41000	1.56000	19.30783	17.10525
5	1.41000	1.56000	14.65323	21.22887
6	1.41000	1.56000	9.14703	24.11874
7	1.41000	1.56000	3.10924	25.60693
8	1.41000	1.56000	-3.10924	25.60693
9	1.41000	1.56000	-9.14703	24.11874
10	1.41000	1.56000	-14.65323	21.22887
11	1.41000	1.56000	-19.30783	17.10525
12	1.41000	1.56000	-22.84034	11.98753
13	1.41000	1.56000	-25.04544	6.17315
14	1.41000	1.56000	-25.79500	0.00000
15	1.41000	1.56000	-25.04544	-6.17315
16	1.41000	1.56000	-22.84034	-11.98753
17	1.41000	1.56000	-19.30783	-17.10525
18	1.41000	1.56000	-14.65323	-21.22887
19	1.41000	1.56000	-9.14703	-24.11874
20	1.41000	1.56000	-3.10924	-25.60693
21	1.41000	1.56000	3.10924	-25.60693
22	1.41000	1.56000	9.14703	-24.11874
23	1.41000	1.56000	14.65323	-21.22887
24	1.41000	1.56000	19.30783	-17.10525
25	1.41000	1.56000	22.84034	-11.98753
26	1.41000	1.56000	25.04544	-6.17315

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.80849 inches between Bars 18 and 19

Spacing to aggregate size ratio = 6.41132

Concrete Properties:

Compressive Strength of Concrete = 4000.00000 psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34164 psi
Compression Strain at Peak Stress = 0.00189
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.75000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1422.200

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in

reinforcement exceeds 0.005 while simultaneously compressive strain in
concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1422.200 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Run Msg
0.000000417	2373.6890897	5696853815.	226.5892417	0.0000944	0.0000644	0.3897931	2.7336033	
0.000000833	4747.2437229	5696692467.	131.3468843	0.0001095	0.0000495	0.4495532	3.1655164	
0.000001250	7120.5852209	5696468177.	99.6226662	0.0001245	0.0000345	0.5089297	3.5982717	
0.000001667	9493.6069779	5696164187.	83.7779850	0.0001396	0.0000196	0.5679196	4.0318693	
0.000002083	11866.	5695777135.	74.2851206	0.0001548	0.000004761	0.6265200	4.4663094	
0.000002500	14238.	5695240454.	67.9680582	0.0001699	-0.0000101	0.6847270	4.9015842	
0.000002917	16607.	5693760653.	63.4642978	0.0001851	-0.0000249	0.7425215	5.3375718	
0.000003333	18969.	5690646929.	60.0918756	0.0002003	-0.0000397	0.7998761	5.7740813	
0.000003750	21322.	5685864937.	57.4724239	0.0002155	-0.0000545	0.8567712	6.2109761	
0.000004167	23665.	5679608492.	55.3792977	0.0002307	-0.0000693	0.9131938	6.6481651	
0.000004583	25997.	5672109861.	53.6684869	0.0002460	-0.0000840	0.9691349	7.0855864	
0.000005000	28318.	5663581286.	52.2441152	0.0002612	-0.0000988	1.0245883	7.5231967	
0.000005417	30627.	5654202592.	51.0398901	0.0002765	-0.0001135	1.0795497	7.9609661	
0.000005833	30627.	5250330978.	46.8899000	0.0002735	-0.0001465	1.0683350	7.8713081	C
0.000006250	30627.	4900308913.	45.5997861	0.0002850	-0.0001650	1.1093079	8.1997112	C
0.000006667	30627.	4594039606.	44.4373202	0.0002962	-0.0001838	1.1491901	8.5216152	C
0.000007083	30627.	4323801982.	43.3837667	0.0003073	-0.0002027	1.1880939	8.8377986	C
0.000007500	30627.	4083590761.	42.4231537	0.0003182	-0.0002218	1.2260915	9.1487359	C
0.000007917	30627.	3868664931.	41.5446241	0.0003289	-0.0002411	1.2633021	9.4553033	C
0.000008333	30627.	3675231685.	40.7365935	0.0003395	-0.0002605	1.2997574	9.7576767	C
0.000008750	30627.	3500220652.	39.9896757	0.0003499	-0.0002801	1.3354885	10.0560301	C
0.000009167	30954.	3376829721.	39.2965439	0.0003602	-0.0002998	1.3705367	10.3506312	C
0.000009583	31569.	3294150816.	38.6512790	0.0003704	-0.0003196	1.4049468	10.6417846	C
0.0000100	32167.	3216657797.	38.0490638	0.0003805	-0.0003395	1.4387663	10.9298285	C
0.0000104	32750.	3143965339.	37.4859723	0.0003905	-0.0003595	1.4720461	11.2151375	C
0.0000108	33320.	3075736199.	36.9588090	0.0004004	-0.0003796	1.5048402	11.4981259	C
0.0000113	33878.	3011376429.	36.4624586	0.0004102	-0.0003998	1.5371119	11.7784271	C
0.0000117	34423.	2950551038.	35.9937588	0.0004199	-0.0004201	1.5688724	-12.0603117	C
0.0000121	34962.	2893367289.	35.5537504	0.0004296	-0.0004404	1.6002827	-12.6452233	C
0.0000125	35488.	2839049522.	35.1356619	0.0004392	-0.0004608	1.6311863	-13.2328225	C
0.0000129	36008.	2787713112.	34.7406533	0.0004487	-0.0004813	1.6617266	-13.8218803	C
0.0000133	36520.	2738992340.	34.3656986	0.0004582	-0.0005018	1.6918696	-14.4127299	C
0.0000138	37025.	2692695251.	34.0090974	0.0004676	-0.0005224	1.7216247	-15.0053224	C
0.0000142	37523.	2648672911.	33.6698742	0.0004770	-0.0005430	1.7510246	-15.5993933	C
0.0000146	38016.	2606800527.	33.3470273	0.0004863	-0.0005637	1.7800950	-16.1947363	C
0.0000150	38502.	2566768084.	33.0377197	0.0004956	-0.0005844	1.8087693	-16.7919919	C
0.0000154	38986.	2528824050.	32.7452206	0.0005048	-0.0006052	1.8372615	-17.3892076	C
0.0000158	39460.	2492214777.	32.4611916	0.0005140	-0.0006260	1.8652276	-17.9896028	C
0.0000163	39933.	2457444912.	32.1921833	0.0005231	-0.0006469	1.8930344	-18.5897836	C
0.0000171	40865.	2392104876.	31.6848180	0.0005413	-0.0006887	1.9476488	-19.7944632	C
0.0000179	41785.	2332187447.	31.2193523	0.0005593	-0.0007307	2.0012617	-21.0018948	C
0.0000188	42689.	2276757960.	30.7868812	0.0005773	-0.0007727	2.0537001	-22.2138833	C
0.0000196	43583.	2225509411.	30.3863368	0.0005951	-0.0008149	2.1051625	-23.4286429	C
0.0000204	44467.	2177988342.	30.0146259	0.0006128	-0.0008572	2.1557083	-24.6456902	C
0.0000213	45341.	2133707723.	29.6670684	0.0006304	-0.0008996	2.2052688	-25.8658191	C
0.0000221	46208.	2092440748.	29.3431850	0.0006480	-0.0009420	2.2539962	-27.0875852	C
0.0000229	47068.	2053874215.	29.0403072	0.0006655	-0.0009845	2.3018915	-28.3110458	C
0.0000238	47919.	2017623533.	28.7543382	0.0006829	-0.0010271	2.3488395	-29.5374995	C
0.0000246	48767.	1983743420.	28.4888476	0.0007004	-0.0010696	2.3952014	-30.7631757	C
0.0000254	49605.	1951670608.	28.2351179	0.0007176	-0.0011124	2.4405230	-31.9930153	C
0.0000263	50439.	1921478809.	27.9969648	0.0007349	-0.0011551	2.4851588	-33.2232605	C
0.0000271	51271.	1893067604.	27.7744516	0.0007522	-0.0011978	2.5292152	-34.4527327	C
0.0000279	52094.	1866041407.	27.5607890	0.0007694	-0.0012406	2.5723077	-35.6857946	C
0.0000288	52912.	1840432461.	27.3586409	0.0007866	-0.0012834	2.6146971	-36.9195831	C
0.0000296	53729.	1816196988.	27.1687816	0.0008037	-0.0013263	2.6565130	-38.1525994	C
0.0000304	54543.	1793207917.	26.9898504	0.0008209	-0.0013691	2.6977268	-39.3851527	C
0.0000313	55349.	1771157175.	26.8155268	0.0008380	-0.0014120	2.7379311	-40.6221788	C
0.0000321	56152.	1750189390.	26.6510923	0.0008551	-0.0014549	2.7775678	-41.8584295	C
0.0000329	56953.	1730221854.	26.4958011	0.0008722	-0.0014978	2.8166341	-43.0938998	C
0.0000338	57752.	1711180021.	26.3489810	0.0008893	-0.0015407	2.8551275	-44.3285847	C
0.0000346	58546.	1692909110.	26.2073704	0.0009063	-0.0015837	2.8928404	-45.5651414	C
0.0000354	59336.	1675359580.	26.0707066	0.0009233	-0.0016267	2.9297883	-46.8034617	C
0.0000363	60123.	1658561825.	25.9410814	0.0009404	-0.0016696	2.9661682	-48.0409880	C

0.0000371	60908.	1642464759.	25.8180256	0.0009574	-0.0017126	3.0019775	-49.2777148	C
0.0000379	61691.	1627021781.	25.7011111	0.0009745	-0.0017555	3.0372134	-50.5136365	C
0.0000387	62472.	1612190291.	25.5899468	0.0009916	-0.0017984	3.0718731	-51.7487472	C
0.0000396	63248.	1597848628.	25.4811590	0.0010086	-0.0018414	3.1057146	-52.9865029	C
0.0000404	64021.	1584017597.	25.3764194	0.0010256	-0.0018844	3.1388929	-54.2247716	C
0.0000412	64791.	1570696685.	25.2766027	0.0010427	-0.0019273	3.1714990	-55.4622139	C
0.0000421	65560.	1557855224.	25.1814216	0.0010597	-0.0019703	3.2035301	-56.6988233	C
0.0000429	66326.	1545464920.	25.0906112	0.0010768	-0.0020132	3.2349835	-57.9345934	C
0.0000437	67091.	1533499627.	25.0039269	0.0010939	-0.0020561	3.2658562	-59.1695176	C
0.0000446	67853.	1521935151.	24.9211426	0.0011111	-0.0020989	3.2961454	-60.0000000	CY
0.0000454	68613.	1510749067.	24.8420486	0.0011282	-0.0021418	3.3258481	-60.0000000	CY
0.0000462	69368.	1499854083.	24.7633814	0.0011453	-0.0021847	3.3547196	-60.0000000	CY
0.0000471	70121.	1489299492.	24.6880595	0.0011624	-0.0022276	3.3830033	-60.0000000	CY
0.0000479	70872.	1479068930.	24.6159946	0.0011795	-0.0022705	3.4107028	-60.0000000	CY
0.0000487	71621.	1469145445.	24.5470249	0.0011967	-0.0023133	3.4378151	-60.0000000	CY
0.0000496	72368.	1459513212.	24.4809998	0.0012138	-0.0023562	3.4643371	-60.0000000	CY
0.0000529	75333.	1423614995.	24.2436664	0.0012829	-0.0025271	3.5644595	-60.0000000	CY
0.0000562	78091.	1388282380.	24.0244292	0.0013514	-0.0026986	3.6535285	-60.0000000	CY
0.0000596	80120.	1344675857.	23.7700906	0.0014163	-0.0028737	3.7285080	-60.0000000	CY
0.0000629	81803.	1300176351.	23.5200357	0.0014798	-0.0030502	3.7929827	-60.0000000	CY
0.0000662	83193.	1255737173.	23.2712442	0.0015417	-0.0032283	3.8474214	-60.0000000	CY
0.0000696	84469.	1213930226.	23.0382625	0.0016031	-0.0034069	3.8931843	-60.0000000	CY
0.0000729	85453.	1171920306.	22.8046836	0.0016628	-0.0035872	3.9299162	-60.0000000	CY
0.0000762	86404.	1133161763.	22.5914143	0.0017226	-0.0037674	3.9589333	-60.0000000	CY
0.0000796	87315.	1097153236.	22.3934559	0.0017821	-0.0039479	3.9801809	-60.0000000	CY
0.0000829	88042.	1061814377.	22.1976711	0.0018406	-0.0041294	3.9935808	-60.0000000	CY
0.0000862	88655.	1027885953.	22.0108979	0.0018984	-0.0043116	3.9995992	-60.0000000	CY
0.0000896	89241.	996181517.	21.8354154	0.0019561	-0.0044939	3.9991846	-60.0000000	CY
0.0000929	89806.	966525829.	21.6745000	0.0020139	-0.0046761	3.9982372	-60.0000000	CY
0.0000963	90355.	938753002.	21.5295422	0.0020722	-0.0048578	3.9963982	-60.0000000	CY
0.0000996	90852.	912323998.	21.3943351	0.0021305	-0.0050395	3.9999495	60.0000000	CY
0.0001029	91216.	886307912.	21.2568037	0.0021877	-0.0052223	3.9988458	60.0000000	CY
0.0001063	91525.	861413852.	21.1188757	0.0022439	-0.0054061	3.9958114	60.0000000	CY
0.0001096	91822.	837920642.	20.9918417	0.0023004	-0.0055896	3.9995564	60.0000000	CY
0.0001129	92109.	815725845.	20.8757063	0.0023572	-0.0057728	3.9962823	60.0000000	CY
0.0001163	92387.	794726928.	20.7692905	0.0024144	-0.0059556	3.9997161	60.0000000	CY
0.0001196	92655.	774819337.	20.6719704	0.0024720	-0.0061380	3.9959531	60.0000000	CY
0.0001229	92916.	755928060.	20.5826040	0.0025299	-0.0063201	3.9995469	60.0000000	CY
0.0001263	93167.	737956791.	20.4990630	0.0025880	-0.0065020	3.9943465	60.0000000	CY
0.0001296	93406.	720816598.	20.4173841	0.0026458	-0.0066842	3.9987332	60.0000000	CY
0.0001329	93587.	704101396.	20.3327039	0.0027026	-0.0068674	3.9991114	60.0000000	CY
0.0001363	93734.	687959364.	20.2502185	0.0027591	-0.0070509	3.9960695	60.0000000	CY
0.0001396	93850.	672354686.	20.1680262	0.0028151	-0.0072349	3.9992458	60.0000000	CY
0.0001429	93961.	657450254.	20.0913762	0.0028714	-0.0074186	3.9976261	60.0000000	CY
0.0001462	94066.	643188832.	20.0203361	0.0029280	-0.0076020	3.9954028	60.0000000	CY
0.0001496	94169.	629545127.	19.9537113	0.0029847	-0.0077853	3.9988214	60.0000000	CY
0.0001529	94270.	616478306.	19.8912407	0.0030417	-0.0079683	3.9999996	60.0000000	CYT
0.0001562	94365.	603933879.	19.8335546	0.0030990	-0.0081510	3.9926189	60.0000000	CYT
0.0001596	94455.	591887880.	19.7771386	0.0031561	-0.0083339	3.9970161	60.0000000	CYT
0.0001629	94541.	580304448.	19.7206759	0.0032128	-0.0085172	3.9994362	60.0000000	CYT
0.0001662	94624.	569169325.	19.6677572	0.0032698	-0.0087002	3.9978230	60.0000000	CYT
0.0001696	94704.	558449500.	19.6185953	0.0033270	-0.0088830	3.9917751	60.0000000	CYT
0.0001729	94781.	548133554.	19.5721890	0.0033844	-0.0090656	3.9961968	60.0000000	CYT
0.0001762	94857.	538198366.	19.5284007	0.0034419	-0.0092481	3.9989445	60.0000000	CYT
0.0001796	94932.	528622524.	19.4871037	0.0034996	-0.0094304	3.9999901	60.0000000	CYT
0.0001829	95002.	519374961.	19.4489552	0.0035575	-0.0096125	3.9921565	60.0000000	CYT
0.0002029	95002.	468184000.	19.3108208	0.0039185	-0.0106915	3.9916400	60.0000000	CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1422.200	94196.338	0.00300000

Note note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318-08, Section

9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resistance Factor for Moment	Nominal Moment Capacity in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip	Bending Stiffness at Ult. Mom. Cap. kip-in^2
1	0.65	94196.338	924.430	61227.618	1636163739.262
1	0.70	94196.338	995.540	65937.436	1551749564.261
1	0.75	94196.338	1066.650	70647.254	1482131810.524

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	17.00000 ft
Shaft Diameter	=	66.00000 in
Concrete Cover Thickness	=	6.50000 in
Number of Reinforcing Bars	=	26 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	3421.19440 sq. in.
Total Area of Reinforcing Steel	=	40.56000 sq. in.
Area Ratio of Steel Reinforcement	=	1.19 percent
Edge-to-Edge Bar Spacing	=	4.80849 in
Maximum Concrete Aggregate Size	=	0.75000 in
Ratio of Bar Spacing to Aggregate Size	=	6.41
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	13927.757 kips
Tensile Load for Cracking of Concrete	=	-1541.741 kips
Nominal Axial Tensile Capacity	=	-2433.600 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	25.79500	0.00000
2	1.41000	1.56000	25.04544	6.17315
3	1.41000	1.56000	22.84034	11.98753
4	1.41000	1.56000	19.30783	17.10525
5	1.41000	1.56000	14.65323	21.22887
6	1.41000	1.56000	9.14703	24.11874
7	1.41000	1.56000	3.10924	25.60693
8	1.41000	1.56000	-3.10924	25.60693
9	1.41000	1.56000	-9.14703	24.11874
10	1.41000	1.56000	-14.65323	21.22887
11	1.41000	1.56000	-19.30783	17.10525
12	1.41000	1.56000	-22.84034	11.98753
13	1.41000	1.56000	-25.04544	6.17315
14	1.41000	1.56000	-25.79500	0.00000
15	1.41000	1.56000	-25.04544	-6.17315
16	1.41000	1.56000	-22.84034	-11.98753
17	1.41000	1.56000	-19.30783	-17.10525
18	1.41000	1.56000	-14.65323	-21.22887
19	1.41000	1.56000	-9.14703	-24.11874
20	1.41000	1.56000	-3.10924	-25.60693
21	1.41000	1.56000	3.10924	-25.60693
22	1.41000	1.56000	9.14703	-24.11874
23	1.41000	1.56000	14.65323	-21.22887
24	1.41000	1.56000	19.30783	-17.10525
25	1.41000	1.56000	22.84034	-11.98753
26	1.41000	1.56000	25.04544	-6.17315

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.80849 inches between Bars 18 and 19

Spacing to aggregate size ratio = 6.41132

Concrete Properties:

Compressive Strength of Concrete = 4000.00000 psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34164 psi
Compression Strain at Peak Stress = 0.00189
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.75000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1422.200

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1422.200 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Run Msg
0.000000417	1704.7558332	4091414000.	258.2166942	0.0001076	0.0000801	0.4427454	3.1161309	
0.000000833	3409.4187271	4091302473.	145.6519182	0.0001214	0.0000664	0.4971254	3.5119464	
0.000001250	5113.9567021	4091165362.	108.1496972	0.0001352	0.0000527	0.5511818	3.9084640	
0.000001667	6818.3072745	4090984365.	89.4131163	0.0001490	0.0000390	0.6049125	4.3056840	
0.000002083	8522.4079492	4090755816.	78.1827930	0.0001629	0.0000254	0.6583153	4.7036062	
0.000002500	10226.	4090478486.	70.7056001	0.0001768	0.0000118	0.7113879	5.1022310	
0.000002917	11930.	4090151735.	65.3730546	0.0001907	-0.000001829	0.7641280	5.5015584	
0.000003333	13632.	4089654462.	61.3806521	0.0002046	-0.0000154	0.8165302	5.9015630	
0.000003750	15332.	4088565423.	58.2806126	0.0002186	-0.0000289	0.8685773	6.3021291	
0.000004167	17028.	4086656859.	55.8042225	0.0002325	-0.0000425	0.9202519	6.7031352	
0.000004583	18718.	4083905470.	53.7807127	0.0002465	-0.0000560	0.9715410	7.1044906	
0.000005000	20402.	4080370317.	52.0963997	0.0002605	-0.0000695	1.0224350	7.5061280	
0.000005417	22079.	4076137784.	50.6726915	0.0002745	-0.0000830	1.0729268	7.9079978	
0.000005833	23749.	4071297084.	49.4535262	0.0002885	-0.0000965	1.1230111	8.3100632	
0.000006250	25412.	4065931488.	48.3978459	0.0003025	-0.0001100	1.1726839	8.7122971	
0.000006667	25412.	3811810770.	45.2758791	0.0003018	-0.0001382	1.1698847	8.6895366	C
0.000007083	25412.	3587586607.	44.1678301	0.0003129	-0.0001546	1.2085612	9.0050208	C
0.000007500	25412.	3388276240.	43.1603919	0.0003237	-0.0001713	1.2463776	9.3156102	C
0.000007917	25412.	3209945911.	42.2362612	0.0003344	-0.0001881	1.2833069	9.6209792	C
0.000008333	25412.	3049448616.	41.3874379	0.0003449	-0.0002051	1.3194920	9.9222142	C
0.000008750	25412.	2904236777.	40.6037849	0.0003553	-0.0002222	1.3549617	10.2194729	C
0.000009167	25940.	2829865163.	39.8760799	0.0003655	-0.0002395	1.3897149	10.5126662	C
0.000009583	26513.	2766624140.	39.1994715	0.0003757	-0.0002568	1.4238409	10.8024740	C
0.0000100	27070.	2707010716.	38.5689683	0.0003857	-0.0002743	1.4573948	11.0893008	C
0.0000104	27611.	2650672390.	37.9791406	0.0003956	-0.0002919	1.4903870	11.3731779	C
0.0000108	28137.	2597251918.	37.4249201	0.0004054	-0.0003096	1.5228108	11.6539874	C
0.0000113	28650.	2546689303.	36.9040057	0.0004152	-0.0003273	1.5547347	11.9322694	C
0.0000117	29153.	2498833406.	36.4138232	0.0004248	-0.0003452	1.5862027	12.2083602	C
0.0000121	29647.	2453546933.	35.9522498	0.0004344	-0.0003631	1.6172614	12.4826301	C
0.0000125	30128.	2410224775.	35.5129344	0.0004439	-0.0003811	1.6477728	12.7538138	C
0.0000129	30602.	2369161488.	35.0978802	0.0004533	-0.0003992	1.6779173	13.0234685	C
0.0000133	31069.	2330171823.	34.7050447	0.0004627	-0.0004173	1.7077080	13.2916840	C

0.0000138	31526.	2292785742.	34.3292791	0.0004720	-0.0004355	1.7370108	13.5572125	C
0.0000142	31980.	2257406860.	33.9745992	0.0004813	-0.0004537	1.7660794	13.8223229	C
0.0000146	32423.	2223304480.	33.6330692	0.0004905	-0.0004720	1.7946333	14.0844231	C
0.0000150	32865.	2191020575.	33.3105677	0.0004997	-0.0004903	1.8230060	14.3465470	C
0.0000154	33298.	2159856528.	32.9992011	0.0005087	-0.0005088	1.8508933	-14.6065696	C
0.0000158	33730.	2130298571.	32.7046866	0.0005178	-0.0005272	1.8786234	-15.1365730	C
0.0000163	34153.	2101739192.	32.4197898	0.0005268	-0.0005457	1.9059000	-15.6691616	C
0.0000171	34993.	2048346366.	31.8883205	0.0005448	-0.0005827	1.9597494	-16.7360070	C
0.0000179	35817.	1999073553.	31.3982754	0.0005626	-0.0006199	2.0124681	-17.8070169	C
0.0000188	36625.	1953321793.	30.9427156	0.0005802	-0.0006573	2.0639947	-18.8829610	C
0.0000196	37423.	1910983125.	30.5216666	0.0005977	-0.0006948	2.1146018	-19.9613243	C
0.0000204	38212.	1871587122.	30.1299679	0.0006152	-0.0007323	2.1642440	-21.0426606	C
0.0000213	38988.	1834743795.	29.7629321	0.0006325	-0.0007700	2.2128591	-22.1277307	C
0.0000221	39760.	1800437239.	29.4221822	0.0006497	-0.0008078	2.2607343	-23.2137066	C
0.0000229	40519.	1768115987.	29.0997380	0.0006669	-0.0008456	2.3075502	-24.3039868	C
0.0000238	41275.	1737906839.	28.7995949	0.0006840	-0.0008835	2.3537063	-25.3944914	C
0.0000246	42022.	1709380591.	28.5151939	0.0007010	-0.0009215	2.3989204	-26.4882806	C
0.0000254	42764.	1682526181.	28.2479393	0.0007180	-0.0009595	2.4434038	-27.5831771	C
0.0000263	43502.	1657234398.	27.9970345	0.0007349	-0.0009976	2.4872183	-28.6785449	C
0.0000271	44232.	1633167071.	27.7567890	0.0007517	-0.0010358	2.5300744	-29.7776677	C
0.0000279	44959.	1610473952.	27.5317803	0.0007686	-0.0010739	2.5723779	-30.8760670	C
0.0000288	45682.	1588944288.	27.3185306	0.0007854	-0.0011121	2.6139715	-31.9755375	C
0.0000296	46398.	1568394287.	27.1139806	0.0008021	-0.0011504	2.6547090	-33.0778516	C
0.0000304	47113.	1548913881.	26.9214562	0.0008189	-0.0011886	2.6948992	-34.1794446	C
0.0000313	47826.	1530417095.	26.7399997	0.0008356	-0.0012269	2.7345395	-35.2803127	C
0.0000321	48530.	1512636640.	26.5636587	0.0008523	-0.0012652	2.7732437	-36.3851918	C
0.0000329	49233.	1495694021.	26.3967034	0.0008689	-0.0013036	2.8113815	-37.4896343	C
0.0000338	49934.	1479537728.	26.2387346	0.0008856	-0.0013419	2.8489741	-38.5933509	C
0.0000346	50634.	1464110569.	26.0891068	0.0009022	-0.0013803	2.8860190	-39.6963373	C
0.0000354	51327.	1449224516.	25.9430808	0.0009188	-0.0014187	2.9221897	-40.8028567	C
0.0000363	52017.	1434956581.	25.8038483	0.0009354	-0.0014571	2.9577698	-41.9092919	C
0.0000371	52706.	1421284578.	25.6715566	0.0009520	-0.0014955	2.9928066	-43.0149926	C
0.0000379	53393.	1408168900.	25.5457524	0.0009686	-0.0015339	3.0272978	-44.1199538	C
0.0000387	54078.	1395573335.	25.4260213	0.0009853	-0.0015722	3.0612407	-45.2241709	C
0.0000396	54758.	1383366322.	25.3084925	0.0010018	-0.0016107	3.0943541	-46.3316472	C
0.0000404	55436.	1371606043.	25.1959033	0.0010183	-0.0016492	3.1268803	-47.4390140	C
0.0000412	56112.	1360280278.	25.0884930	0.0010349	-0.0016876	3.1588623	-48.5456276	C
0.0000421	56786.	1349362928.	24.9859582	0.0010515	-0.0017260	3.1902975	-49.6514826	C
0.0000429	57458.	1338829913.	24.8880191	0.0010681	-0.0017644	3.2211833	-50.7565736	C
0.0000437	58129.	1328658982.	24.7944173	0.0010848	-0.0018027	3.2515173	-51.8608955	C
0.0000446	58796.	1318789971.	24.7032339	0.0011014	-0.0018411	3.2811620	-52.9666145	C
0.0000454	59460.	1309208435.	24.6143997	0.0011179	-0.0018796	3.3101281	-54.0736468	C
0.0000462	60122.	1299935643.	24.5293518	0.0011345	-0.0019180	3.3385451	-55.1798942	C
0.0000471	60782.	1290954933.	24.4478936	0.0011511	-0.0019564	3.3664105	-56.2853509	C
0.0000479	61441.	1282250796.	24.3698421	0.0011677	-0.0019948	3.3937217	-57.3900110	C
0.0000487	62098.	1273808782.	24.2950269	0.0011844	-0.0020331	3.4204758	-58.4938681	C
0.0000496	62753.	1265615409.	24.2232890	0.0012011	-0.0020714	3.4466703	-59.5969163	C
0.0000529	65352.	1234997208.	23.9593130	0.0012678	-0.0022247	3.5454193	-60.0000000	CY
0.0000562	67917.	1207421770.	23.7303512	0.0013348	-0.0023777	3.6347390	-60.0000000	CY
0.0000596	70371.	1181053898.	23.5269336	0.0014018	-0.0025307	3.7142934	-60.0000000	CY
0.0000629	72228.	1148001958.	23.2927407	0.0014655	-0.0026870	3.7808326	-60.0000000	CY
0.0000662	73789.	1113796963.	23.0579862	0.0015276	-0.0028449	3.8371991	-60.0000000	CY
0.0000696	75015.	1078054955.	22.8192629	0.0015878	-0.0030047	3.8838752	-60.0000000	CY
0.0000729	76169.	1044609567.	22.5954430	0.0016476	-0.0031649	3.9223871	-60.0000000	CY
0.0000762	77170.	1012062147.	22.3791127	0.0017064	-0.0033261	3.9527426	-60.0000000	CY
0.0000796	77974.	979773026.	22.1658682	0.0017640	-0.0034885	3.9752085	-60.0000000	CY
0.0000829	78751.	949759236.	21.9668628	0.0018214	-0.0036511	3.9904402	-60.0000000	CY
0.0000862	79509.	921841584.	21.7849078	0.0018789	-0.0038136	3.9985603	-60.0000000	CY
0.0000896	80178.	895006266.	21.6118580	0.0019361	-0.0039764	3.9982992	-60.0000000	CY
0.0000929	80685.	868360664.	21.4370499	0.0019919	-0.0041406	3.9974395	-60.0000000	CY
0.0000963	81153.	843152945.	21.2681273	0.0020471	-0.0043054	3.9993812	-60.0000000	CY
0.0000996	81609.	819502818.	21.1147055	0.0021027	-0.0044698	3.9997910	60.0000000	CY
0.0001029	82052.	797268952.	20.9750974	0.0021587	-0.0046338	3.9987574	60.0000000	CY
0.0001063	82485.	776327818.	20.8478016	0.0022151	-0.0047974	3.9963628	60.0000000	CY
0.0001096	82892.	756429468.	20.7264598	0.0022713	-0.0049612	3.9998163	60.0000000	CY
0.0001129	83229.	737080336.	20.6035012	0.0023265	-0.0051260	3.9978032	60.0000000	CY
0.0001163	83492.	718214445.	20.4801423	0.0023808	-0.0052917	3.9999805	60.0000000	CY
0.0001196	83727.	700157145.	20.3633576	0.0024351	-0.0054574	3.9979126	60.0000000	CY
0.0001229	83957.	683039840.	20.2549304	0.0024897	-0.0056228	3.9999714	60.0000000	CY
0.0001263	84180.	666770505.	20.1548479	0.0025445	-0.0057880	3.9971913	60.0000000	CY
0.0001296	84392.	651260168.	20.0564545	0.0025990	-0.0059535	3.9997717	60.0000000	CY
0.0001329	84598.	636472456.	19.9633697	0.0026535	-0.0061190	3.9950741	60.0000000	CY
0.0001363	84799.	622377023.	19.8766501	0.0027082	-0.0062843	3.9988224	60.0000000	CY
0.0001396	84997.	608931516.	19.7955425	0.0027631	-0.0064494	3.9994766	60.0000000	CY
0.0001429	85189.	596074667.	19.7203803	0.0028184	-0.0066141	3.9961773	60.0000000	CY
0.0001462	85378.	583783190.	19.6497857	0.0028738	-0.0067787	3.9992399	60.0000000	CY
0.0001496	85564.	572015471.	19.5836360	0.0029294	-0.0069431	3.9979614	60.0000000	CY
0.0001529	85713.	560523676.	19.5160426	0.0029843	-0.0071082	3.9955972	60.0000000	CY
0.0001562	85850.	549438161.	19.4487460	0.0030389	-0.0072736	3.9987502	60.0000000	CYT

0.0001596	85942.	538538220.	19.3731931	0.0030916	-0.0074409	3.9999613	60.0000000	CYT
0.0001629	86029.	528052709.	19.3016709	0.0031446	-0.0076079	3.9931791	60.0000000	CYT
0.0001662	86113.	517974263.	19.2337374	0.0031976	-0.0077749	3.9959224	60.0000000	CYT
0.0001696	86195.	508273113.	19.1699572	0.0032509	-0.0079416	3.9986675	60.0000000	CYT
0.0001729	86267.	498895803.	19.1120890	0.0033048	-0.0081077	3.9999274	60.0000000	CYT
0.0001762	86338.	489859070.	19.0576683	0.0033589	-0.0082736	3.9941745	60.0000000	CYT
0.0001796	86406.	481149168.	19.0061222	0.0034132	-0.0084393	3.9939802	60.0000000	CYT
0.0001829	86470.	472726297.	18.9587749	0.0034679	-0.0086046	3.9973901	60.0000000	CYT
0.0002029	86749.	427510946.	18.7371610	0.0038021	-0.0095904	3.9992341	60.0000000	CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1422.200	85752.579	0.00300000

Note note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318-08, Section
9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding
bending stiffnesses computed for common resistance factor values used for
reinforced concrete sections.

Axial Load No.	Resistance Factor for Moment	Nominal Moment Capacity in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip	Bending Stiffness at Ult. Mom. Cap. kip-in^2
1	0.65	85752.579	924.430	55739.174	1366520976.765
1	0.70	85752.579	995.540	60026.804	1301269122.304
1	0.75	85752.579	1066.650	64314.434	1247222096.938

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 81400.0 lbs
Applied moment at pile head = 32208000.0 in-lbs
Axial thrust load on pile head = 1422200.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.8349	32208000.	81400.	-0.005086	0.000	3.211E+12	0.000	0.000	0.000
0.534	0.8025	32775672.	81400.	-0.005021	0.000	3.211E+12	0.000	0.000	0.000
1.068	0.7706	33342747.	81400.	-0.004954	0.000	3.073E+12	0.000	0.000	0.000
1.602	0.7390	33909189.	81400.	-0.004883	0.000	3.008E+12	0.000	0.000	0.000
2.136	0.7080	34474973.	81400.	-0.004809	0.000	2.945E+12	0.000	0.000	0.000
2.670	0.6774	35040073.	81400.	-0.004733	0.000	2.885E+12	0.000	0.000	0.000
3.204	0.6473	35604463.	81400.	-0.004654	0.000	2.827E+12	0.000	0.000	0.000
3.738	0.6178	36168118.	81400.	-0.004572	0.000	2.772E+12	0.000	0.000	0.000
4.272	0.5887	36731012.	81400.	-0.004487	0.000	2.719E+12	0.000	0.000	0.000
4.806	0.5603	37293116.	81400.	-0.004398	0.000	2.669E+12	0.000	0.000	0.000
5.340	0.5324	37854404.	81400.	-0.004307	0.000	2.620E+12	0.000	0.000	0.000
5.874	0.5051	38414849.	81400.	-0.004213	0.000	2.574E+12	0.000	0.000	0.000
6.408	0.4784	38974422.	81395.	-0.004116	0.000	2.530E+12	-1.5196	20.3555	0.000
6.942	0.4523	39533033.	81049.	-0.004016	0.000	2.487E+12	-106.3643	1506.9148	0.000

7.476	0.4269	40086348.	80015.	-0.003912	0.000	2.446E+12	-216.5521	3250.5908	0.000
8.010	0.4022	40629813.	78264.	-0.003806	0.000	2.408E+12	-330.0451	5258.8920	0.000
8.544	0.3781	41158741.	75781.	-0.003696	0.000	2.372E+12	-444.8426	7538.7214	0.000
9.078	0.3548	41668390.	72565.	-0.003583	0.000	2.339E+12	-558.9877	10096.	0.000
9.612	0.3322	42154044.	68619.	-0.003468	0.000	2.309E+12	-672.3710	12970.	0.000
10.146	0.3103	42611024.	63948.	-0.003350	0.000	2.281E+12	-785.6373	16222.	0.000
10.680	0.2893	43034652.	58562.	-0.003229	0.000	2.256E+12	-895.2080	19831.	0.000
11.214	0.2690	43420408.	52491.	-0.003105	0.000	2.235E+12	-999.6965	23817.	0.000
11.748	0.2495	43763978.	45771.	-0.002980	0.000	2.215E+12	-1097.7962	28199.	0.000
12.282	0.2308	44061317.	38446.	-0.002852	0.000	2.199E+12	-1188.2865	32995.	0.000
12.816	0.2129	44308691.	30558.	-0.002723	0.000	2.186E+12	-1273.5991	38331.	0.000
13.350	0.1959	44502585.	22149.	-0.002593	0.000	2.176E+12	-1351.1009	44199.	0.000
13.884	0.1797	44639805.	11719.	-0.002461	0.000	2.169E+12	-1904.2021	67907.	0.000
14.418	0.1643	44697632.	-1012.1025	-0.002329	0.000	2.166E+12	-2069.2118	80684.	0.000
14.952	0.1498	44669287.	-14752.	-0.002197	0.000	2.167E+12	-2219.0849	94902.	0.000
15.486	0.1362	44548618.	-29397.	-0.002065	0.000	2.174E+12	-2351.7511	110661.	0.000
16.020	0.1234	44330182.	-44831.	-0.001935	0.000	2.185E+12	-2465.4077	128058.	0.000
16.554	0.1114	44009326.	-60928.	-0.001806	0.000	2.202E+12	-2558.5253	147189.	0.000
17.088	0.1002	43582244.	-77585.	-0.001679	0.000	2.226E+12	-2640.3191	168807.	0.000
17.622	0.0899	43045600.	-94725.	-0.001555	0.000	2.256E+12	-2709.1925	193169.	0.000
18.156	0.0803	42396596.	-112238.	-0.001435	0.000	2.294E+12	-2756.9641	220008.	0.000
18.690	0.0715	41633305.	-125429.	-0.001318	0.000	2.342E+12	-1360.1478	121923.	0.000
19.224	0.0634	40813124.	-133809.	-0.001207	0.000	2.396E+12	-1255.1031	126850.	0.000
19.758	0.0560	39940411.	-141521.	-0.001100	0.000	2.457E+12	-1152.0132	131778.	0.000
20.292	0.0493	39019444.	-148582.	-0.000999	0.000	2.526E+12	-1051.8080	136705.	0.000
20.826	0.0432	38054385.	-155013.	-0.000902	0.000	2.604E+12	-955.2923	141633.	0.000
21.360	0.0377	37049246.	-160839.	-0.000811	0.000	2.690E+12	-863.1499	146560.	0.000
21.894	0.0328	36007860.	-166091.	-0.000726	0.000	2.788E+12	-775.9444	151488.	0.000
22.428	0.0284	34933857.	-170801.	-0.000646	0.000	2.896E+12	-694.1243	156415.	0.000
22.962	0.0245	33830647.	-175005.	-0.000571	0.000	3.017E+12	-618.0294	161343.	0.000
23.496	0.0211	32701405.	-178741.	-0.000502	0.000	3.150E+12	-547.8996	166270.	0.000
24.030	0.0181	31549058.	-182046.	-0.000438	0.000	3.298E+12	-483.8840	171198.	0.000
24.564	0.0155	30376283.	-184962.	-0.000390	0.000	5.655E+12	-426.0447	176125.	0.000
25.098	0.0131	29185700.	-187514.	-0.000357	0.000	5.660E+12	-370.4216	181053.	0.000
25.632	0.0109	27979605.	-189717.	-0.000324	0.000	5.665E+12	-317.2675	185980.	0.000
26.166	0.008956	26760194.	-191588.	-0.000293	0.000	5.669E+12	-266.8049	190908.	0.000
26.700	0.007173	25529552.	-193146.	-0.000264	0.000	5.674E+12	-219.2270	195835.	0.000
27.234	0.005576	24289645.	-194408.	-0.000236	0.000	5.677E+12	-174.6973	200763.	0.000
27.768	0.004154	23042315.	-195395.	-0.000209	0.000	5.681E+12	-133.3499	205690.	0.000
28.302	0.002899	21789272.	-196127.	-0.000184	0.000	5.685E+12	-95.2901	210618.	0.000
28.836	0.001801	20532092.	-196906.	-0.000160	0.000	5.687E+12	-147.7371	525528.	0.000
29.370	0.000852	19268635.	-197610.	-0.000137	0.000	5.690E+12	-71.9404	541132.	0.000
29.904	4.144E-05	18002027.	-197852.	-0.000116	0.000	5.692E+12	-3.6008	556736.	0.000
30.438	-0.000639	16735085.	-197681.	-9.679E-05	0.000	5.694E+12	57.0862	572340.	0.000
30.972	-0.001199	15470317.	-197145.	-7.867E-05	0.000	5.694E+12	110.0137	587943.	0.000
31.506	-0.001647	14209907.	-196296.	-6.197E-05	0.000	5.695E+12	155.1609	603547.	0.000
32.040	-0.001993	12955722.	-195181.	-4.669E-05	0.000	5.696E+12	192.5924	619151.	0.000
32.574	-0.002246	11709313.	-193852.	-3.281E-05	0.000	5.696E+12	222.4559	634755.	0.000
33.108	-0.002414	10471919.	-192354.	-2.034E-05	0.000	5.696E+12	244.9816	650358.	0.000
33.642	-0.002506	9244477.	-190734.	-9.247E-06	0.000	5.696E+12	260.4800	665962.	0.000
34.176	-0.002532	8027636.	-189037.	4.686E-07	0.000	5.696E+12	269.3413	681566.	0.000
34.710	-0.002500	6821772.	-187302.	8.821E-06	0.000	5.696E+12	272.0330	697170.	0.000
35.244	-0.002419	5627009.	-185568.	1.582E-05	0.000	5.697E+12	269.0994	712773.	0.000
35.778	-0.002298	4443238.	-183870.	2.149E-05	0.000	5.697E+12	261.1604	728377.	0.000
36.312	-0.002144	3270145.	-182235.	2.582E-05	0.000	5.697E+12	248.9104	743981.	0.000
36.846	-0.001967	2107240.	-170967.	2.931E-05	0.000	4.091E+12	3268.0639	10648566.	0.000
37.380	-0.001768	1078499.	-149055.	3.181E-05	0.000	4.091E+12	3570.7787	12940535.	0.000
37.914	-0.001559	196369.	-125322.	3.281E-05	0.000	4.091E+12	3836.5217	15769721.	0.000
38.448	-0.001348	-528228.	-100106.	3.255E-05	0.000	4.091E+12	4033.7755	19178950.	0.000
38.982	-0.001142	-1087181.	-75285.	3.128E-05	0.000	4.091E+12	3713.1174	20838039.	0.000
39.516	-0.000947	-1493648.	-52737.	2.926E-05	0.000	4.091E+12	3324.1410	22497129.	0.000
40.050	-0.000767	-1763596.	-32825.	2.671E-05	0.000	4.091E+12	2890.6994	24156218.	0.000
40.584	-0.000605	-1914820.	-15760.	2.383E-05	0.000	4.091E+12	2435.3510	25815308.	0.000
41.118	-0.000461	-1966016.	-1618.8663	2.079E-05	0.000	4.091E+12	1978.3515	27474397.	0.000
41.652	-0.000338	-1935947.	9644.2038	1.774E-05	0.000	4.091E+12	1536.9638	29133487.	0.000
42.186	-0.000234	-1842739.	18173.	1.478E-05	0.000	4.091E+12	1125.0638	30792576.	0.000
42.720	-0.000149	-1703307.	24191.	1.200E-05	0.000	4.091E+12	753.0056	32451665.	0.000
43.254	-8.035E-05	-1532930.	27974.	9.465E-06	0.000	4.091E+12	427.7045	34110755.	0.000
43.788	-2.739E-05	-1344968.	29834.	7.211E-06	0.000	4.091E+12	152.8936	35769844.	0.000
44.322	1.207E-05	-1150710.	30098.	5.257E-06	0.000	4.091E+12	-70.4958	37428934.	0.000
44.856	3.998E-05	-959329.	29091.	3.604E-06	0.000	4.091E+12	-243.8716	39088023.	0.000
45.390	5.826E-05	-777949.	27122.	2.244E-06	0.000	4.091E+12	-370.4771	40747113.	0.000
45.924	6.874E-05	-611771.	24478.	1.156E-06	0.000	4.091E+12	-454.8806	42406202.	0.000
46.458	7.307E-05	-464262.	21410.	3.129E-07	0.000	4.091E+12	-502.4866	44065292.	0.000
46.992	7.275E-05	-337380.	18137.	-3.149E-07	0.000	4.091E+12	-519.0897	45724381.	0.000
47.526	6.904E-05	-231809.	14839.	-7.606E-07	0.000	4.091E+12	-510.4869	47383471.	0.000
48.060	6.300E-05	-147195.	11658.	-1.057E-06	0.000	4.091E+12	-482.1573	49042560.	0.000
48.594	5.549E-05	-82379.	8706.6973	-1.237E-06	0.000	4.091E+12	-439.0129	50701649.	0.000
49.128	4.714E-05	-35588.	6065.8493	-1.330E-06	0.000	4.091E+12	-385.2218	52360739.	0.000

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    49.662  3.845E-05 -4614.6315  3793.1808 -1.361E-06      0.000  4.091E+12  -324.1005  54019828.      0.000
    50.196  2.970E-05     13050.  1927.8984 -1.354E-06      0.000  4.091E+12  -258.0726  55678918.      0.000
    50.730  2.109E-05     20118.   496.4757 -1.328E-06      0.000  4.091E+12  -188.6885  57338007.      0.000
    51.264  1.268E-05     19437.  -481.9992 -1.297E-06      0.000  4.091E+12  -116.7031  58997097.      0.000
    51.798  4.459E-06     13964.  -991.1521 -1.271E-06      0.000  4.091E+12   -42.2085  60656186.      0.000
    52.332 -3.617E-06  6757.9397 -1013.6779 -1.255E-06      0.000  4.091E+12    35.1780  62315276.      0.000
    52.866 -1.163E-05   995.9280  -529.0813 -1.249E-06      0.000  4.091E+12   116.0695  63974365.      0.000
    53.400 -1.962E-05      0.000      0.000 -1.248E-06      0.000  4.091E+12    49.0620   8010000.      0.000

* This analysis computed pile response using nonlinear moment-curvature relationships.
  Values of total stress due to combined axial and bending stresses are computed only
  for elastic sections only and do not equal the actual stresses in concrete and steel.
  Stresses in concrete and steel may be interpolated from the output for nonlinear
  bending properties relative to the magnitude of bending moment developed in the pile.


Output Summary for Load Case No. 1:

Pile-head deflection             =      0.8349144 inches
Computed slope at pile head      =     -0.0050862 radians
Maximum bending moment           =      44697632. inch-lbs
Maximum shear force              =       -197852. lbs
Depth of maximum bending moment  =     14.4180000 feet below pile head
Depth of maximum shear force     =     29.9040000 feet below pile head
Number of iterations             =             28
Number of zero deflection points =              3



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                          Summary of Pile Response(s)
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Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians


              Pile-head      Pile-head                                    Maximum        Maximum
Load  Load    Condition 1    Condition 2        Axial        Pile-head       Moment          Shear        Pile-head
Case  Type    V(lbs) or     in-lb, rad.,       Loading      Deflection       in Pile        in Pile       Rotation
 No.   No.    y(inches)     or in-lb/rad.        lbs          inches         in-lbs           lbs          radians
----  ----  --------------  --------------  -------------  -------------  -------------  -------------  -------------
  1     1   V =     81400.  M =  32208000.       1422200.     0.83491440      44697632.       -197852.    -0.00508624

The analysis ended normally.
```

```
================================================================================

                  LPile Plus for Windows, Version 2013-07.007

               Analysis of Individual Piles and Drilled Shafts
              Subjected to Lateral Loading Using the p-y Method

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================================================================================

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--------------------------------------------------------------------------------
                           Files Used for Analysis
--------------------------------------------------------------------------------

Path to file locations:        O:\2012\2012048\FRA\77372\structures\FRA070_1321R\design\3-Final Design\Piers\L-Pile\
Name of input data file:       1321R-Pier4.lp7d
Name of output report file:    1321R-Pier4.lp7o
Name of plot output file:      1321R-Pier4.lp7p
Name of runtime messeage file: 1321R-Pier4.lp7r


--------------------------------------------------------------------------------
                         Date and Time of Analysis
--------------------------------------------------------------------------------

               Date:  September 25, 2015     Time:  16:21:29


--------------------------------------------------------------------------------
                              Problem Title
--------------------------------------------------------------------------------

1321R-Pier4

Job Number: 2012048

Client: ODOT D6

Engineer: GPD GROUP

Description: Design of Pier 4



--------------------------------------------------------------------------------
                         Program Options and Settings
--------------------------------------------------------------------------------

Engineering Units of Input Data and Computations:
 - Engineering units are US Customary Units (pounds, feet, inches)

Analysis Control Options:
- Maximum number of iterations allowed                =          200
- Deflection tolerance for convergence                =   1.0000E-05 in
- Maximum allowable deflection                        =     100.0000 in
- Number of pile increments                           =          100

Loading Type and Number of Cycles of Loading:
 - Static loading specified

Computational Options:
 - Use unfactored loads in computations (conventional analysis)
 - Compute pile response under loading and nonlinear bending properties of pile
   (only if nonlinear pile properties are input)
 - Use of p-y modification factors for p-y curves not selected
```

```
 - Loading by lateral soil movements acting on pile not selected
 - Input of shear resistance at the pile tip not selected
 - Computation of pile-head foundation stiffness matrix not selected
 - Push-over analysis of pile not selected
 - Buckling analysis of pile not selected

Output Options:
 - No p-y curves to be computed and reported for user-specified depths
 - Values of pile-head deflection, bending moment, shear force, and
   soil reaction are printed for full length of pile.
 - Printing Increment (nodal spacing of output points) = 1


--------------------------------------------------------------------------------
                    Pile Structural Properties and Geometry
--------------------------------------------------------------------------------

Total number of pile sections                          =          2

Total length of pile                                   =      62.60 ft

Depth of ground surface below top of pile              =       2.00 ft

Pile diameter values used for p-y curve computations are defined using 4 points.

p-y curves are computed using pile diameter values interpolated with depth over
the length of the pile.

Point         Depth              Pile
                X              Diameter
                ft               in
-----       ---------        -----------
  1           0.00000         72.0000000
  2          50.100000        72.0000000
  3          50.100000        66.0000000
  4          62.600000        66.0000000


Input Structural Properties:
----------------------------

Pile Section No. 1:

   Section Type                                        = Drilled Shaft (Bored Pile)
   Section Length                                      =     50.10000 ft
   Section Diameter                                    =     72.00000 in

Pile Section No. 2:

   Section Type                                        = Drilled Shaft (Bored Pile)
   Section Length                                      =     12.50000 ft
   Section Diameter                                    =     66.00000 in


--------------------------------------------------------------------------------
                      Ground Slope and Pile Batter Angles
--------------------------------------------------------------------------------

Ground Slope Angle                                     =        0.000 degrees
                                                       =        0.000 radians

Pile Batter Angle                                      =        0.000 degrees
                                                       =        0.000 radians


--------------------------------------------------------------------------------
                       Soil and Rock Layering Information
--------------------------------------------------------------------------------

The soil profile is modelled using 9 layers

Layer 1 is stiff clay without free water

   Distance from top of pile to top of layer           =      2.00000 ft
   Distance from top of pile to bottom of layer        =      6.60000 ft
   Effective unit weight at top of layer               =    125.00000 pcf
   Effective unit weight at bottom of layer            =    125.00000 pcf
   Undrained cohesion at top of layer                  =   2625.00000 psf
   Undrained cohesion at bottom of layer               =   2625.00000 psf
```

```
   Epsilon-50 at top of layer                          =      0.00540
   Epsilon-50 at bottom of layer                       =      0.00540


Layer 2 is stiff clay without free water

   Distance from top of pile to top of layer           =      6.60000 ft
   Distance from top of pile to bottom of layer        =     11.50000 ft
   Effective unit weight at top of layer               =    122.00000 pcf
   Effective unit weight at bottom of layer            =    122.00000 pcf
   Undrained cohesion at top of layer                  =   1875.00000 psf
   Undrained cohesion at bottom of layer               =   1875.00000 psf
   Epsilon-50 at top of layer                          =      0.00650
   Epsilon-50 at bottom of layer                       =      0.00650


Layer 3 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     11.50000 ft
   Distance from top of pile to bottom of layer        =     21.60000 ft
   Effective unit weight at top of layer               =     62.60000 pcf
   Effective unit weight at bottom of layer            =     62.60000 pcf
   Friction angle at top of layer                      =     35.00000 deg.
   Friction angle at bottom of layer                   =     35.00000 deg.
   Subgrade k at top of layer                          =    100.00000 pci
   Subgrade k at bottom of layer                       =    100.00000 pci


Layer 4 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     21.60000 ft
   Distance from top of pile to bottom of layer        =     24.20000 ft
   Effective unit weight at top of layer               =     77.60000 pcf
   Effective unit weight at bottom of layer            =     77.60000 pcf
   Friction angle at top of layer                      =     43.00000 deg.
   Friction angle at bottom of layer                   =     43.00000 deg.
   Subgrade k at top of layer                          =    380.00000 pci
   Subgrade k at bottom of layer                       =    380.00000 pci


Layer 5 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     24.20000 ft
   Distance from top of pile to bottom of layer        =     29.20000 ft
   Effective unit weight at top of layer               =     77.60000 pcf
   Effective unit weight at bottom of layer            =     77.60000 pcf
   Friction angle at top of layer                      =     43.00000 deg.
   Friction angle at bottom of layer                   =     43.00000 deg.
   Subgrade k at top of layer                          =    380.00000 pci
   Subgrade k at bottom of layer                       =    380.00000 pci


Layer 6 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     29.20000 ft
   Distance from top of pile to bottom of layer        =     39.20000 ft
   Effective unit weight at top of layer               =     65.60000 pcf
   Effective unit weight at bottom of layer            =     65.60000 pcf
   Friction angle at top of layer                      =     35.00000 deg.
   Friction angle at bottom of layer                   =     35.00000 deg.
   Subgrade k at top of layer                          =    100.00000 pci
   Subgrade k at bottom of layer                       =    100.00000 pci


Layer 7 is sand, p-y criteria by Reese et al., 1974

   Distance from top of pile to top of layer           =     39.20000 ft
   Distance from top of pile to bottom of layer        =     50.10000 ft
   Effective unit weight at top of layer               =     77.60000 pcf
   Effective unit weight at bottom of layer            =     77.60000 pcf
   Friction angle at top of layer                      =     43.00000 deg.
   Friction angle at bottom of layer                   =     43.00000 deg.
   Subgrade k at top of layer                          =    380.00000 pci
   Subgrade k at bottom of layer                       =    380.00000 pci


Layer 8 is weak rock, p-y criteria by Reese, 1997

   Distance from top of pile to top of layer           =     50.10000 ft
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   Distance from top of pile to bottom of layer        =     62.60000 ft
   Effective unit weight at top of layer               =     87.60000 pcf
   Effective unit weight at bottom of layer            =     87.60000 pcf
   Uniaxial compressive strength at top of layer       =    200.00000 psi
   Uniaxial compressive strength at bottom of layer    =    200.00000 psi
   Initial modulus of rock at top of layer             =       20000. psi
   Initial modulus of rock at bottom of layer          =       20000. psi
   RQD of rock at top of layer                         =     15.00000 %
   RQD of rock at bottom of layer                      =     15.00000 %
   k rm of rock at top of layer                        =    0.0005000
   k rm of rock at bottom of layer                     =    0.0005000


Layer 9 is strong rock (vuggy limestone)

   Distance from top of pile to top of layer           =     62.60000 ft
   Distance from top of pile to bottom of layer        =     72.60000 ft
   Effective unit weight at top of layer               =    102.80000 pcf
   Effective unit weight at bottom of layer            =    102.80000 pcf
   Uniaxial compressive strength at top of layer       =   2500.00000 psi
   Uniaxial compressive strength at bottom of layer    =   2500.00000 psi


   (Depth of lowest soil layer extends   10.00 ft below pile tip)
```

Summary of Soil Properties

Layer Num.	Layer Soil Type / Rock Mass Rock Emass (p-y Curve Criteria)	kpy pci	krm psi	Layer Depth ft	Effective Unit Wt. pcf	Undrained Cohesion psf	Angle of Friction deg.	Uniaxial qu psi	RQD % or GSI	Strain Factor Epsilon	p50
1	Stiff Clay w/o Free Water	--	--	2.000	125.000	2625.000	--	--	--		0.00540
		--	--	6.600	125.000	2625.000	--	--	--		0.00540
2	Stiff Clay w/o Free Water	--	--	6.600	122.000	1875.000	--	--	--		0.00650
		--	--	11.500	122.000	1875.000	--	--	--		0.00650
3	Sand (Reese, et al.)	100.000	--	11.500	62.600	--	35.000	--	--	--	
		100.000	--	21.600	62.600	--	35.000	--	--	--	
4	Sand (Reese, et al.)	380.000	--	21.600	77.600	--	43.000	--	--	--	
		380.000	--	24.200	77.600	--	43.000	--	--	--	
5	Sand (Reese, et al.)	380.000	--	24.200	77.600	--	43.000	--	--	--	
		380.000	--	29.200	77.600	--	43.000	--	--	--	
6	Sand (Reese, et al.)	100.000	--	29.200	65.600	--	35.000	--	--	--	
		100.000	--	39.200	65.600	--	35.000	--	--	--	
7	Sand (Reese, et al.)	380.000	--	39.200	77.600	--	43.000	--	--	--	
		380.000	--	50.100	77.600	--	43.000	--	--	--	
8	Weak Rock	--	20000. 5.00E-04	50.100	87.600	--	--	200.000	15.000	--	
		--	20000. 5.00E-04	62.600	87.600	--	--	200.000	15.000	--	
9	Vuggy Limestone	--	--	62.600	102.800	--	--	2500.000	--	--	
		--	--	72.600	102.800	--	--	2500.000	--	--	

Loading Type

Static loading criteria were used when computing p-y curves for all analyses.

Pile-head Loading and Pile-head Fixity Conditions

Number of loads specified = 1

Load No.	Load Type	Condition 1	Condition 2	Axial Thrust Force, lbs	Compute Top y vs. Pile Length
1	1	V = 90200. lbs	M = 30252000. in-lbs	1547800.	No

V = perpendicular shear force applied to pile head
M = bending moment applied to pile head
y = lateral deflection relative to pile axis
S = pile slope relative to original pile batter angle
R = rotational stiffness applie to pile head
Axial thrust is assumed to be acting axially for all pile batter angles.

Computations of Nominal Moment Capacity and Nonlinear Bending Stiffness

Axial thrust force values were determined from pile-head loading conditions

Number of Pile Sections Analyzed = 2

Pile Section No. 1:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	50.10000 ft
Shaft Diameter	=	72.00000 in
Concrete Cover Thickness	=	9.50000 in
Number of Reinforcing Bars	=	26 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	4071.50408 sq. in.
Total Area of Reinforcing Steel	=	40.56000 sq. in.
Area Ratio of Steel Reinforcement	=	1.00 percent
Edge-to-Edge Bar Spacing	=	4.80849 in
Maximum Concrete Aggregate Size	=	0.75000 in
Ratio of Bar Spacing to Aggregate Size	=	6.41
Offset of Center of Rebar Cage from Center of Pile	=	0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As	=	16138.810 kips
Tensile Load for Cracking of Concrete	=	-1812.211 kips
Nominal Axial Tensile Capacity	=	-2433.600 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	25.79500	0.00000
2	1.41000	1.56000	25.04544	6.17315
3	1.41000	1.56000	22.84034	11.98753
4	1.41000	1.56000	19.30783	17.10525
5	1.41000	1.56000	14.65323	21.22887
6	1.41000	1.56000	9.14703	24.11874
7	1.41000	1.56000	3.10924	25.60693
8	1.41000	1.56000	-3.10924	25.60693
9	1.41000	1.56000	-9.14703	24.11874
10	1.41000	1.56000	-14.65323	21.22887
11	1.41000	1.56000	-19.30783	17.10525
12	1.41000	1.56000	-22.84034	11.98753

13	1.41000	1.56000	-25.04544	6.17315
14	1.41000	1.56000	-25.79500	0.00000
15	1.41000	1.56000	-25.04544	-6.17315
16	1.41000	1.56000	-22.84034	-11.98753
17	1.41000	1.56000	-19.30783	-17.10525
18	1.41000	1.56000	-14.65323	-21.22887
19	1.41000	1.56000	-9.14703	-24.11874
20	1.41000	1.56000	-3.10924	-25.60693
21	1.41000	1.56000	3.10924	-25.60693
22	1.41000	1.56000	9.14703	-24.11874
23	1.41000	1.56000	14.65323	-21.22887
24	1.41000	1.56000	19.30783	-17.10525
25	1.41000	1.56000	22.84034	-11.98753
26	1.41000	1.56000	25.04544	-6.17315

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.80849 inches between Bars 18 and 19

Spacing to aggregate size ratio = 6.41132

Concrete Properties:

Compressive Strength of Concrete	=	4000.00000 psi
Modulus of Elasticity of Concrete	=	3604997. psi
Modulus of Rupture of Concrete	=	-474.34164 psi
Compression Strain at Peak Stress	=	0.00189
Tensile Strain at Fracture of Concrete	=	-0.0001154
Maximum Coarse Aggregate Size	=	0.75000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1547.800

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in reinforcement exceeds 0.005 while simultaneously compressive strain in concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1547.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Run Msg
0.000000417	2364.9214176	5675811402.	243.7947795	0.0001016	0.0000716	0.4186207	2.9415036	
0.000000833	4729.7054527	5675646543.	139.9498474	0.0001166	0.0000566	0.4781415	3.3734213	
0.000001250	7094.2755607	5675420449.	105.3581907	0.0001317	0.0000417	0.5372785	3.8061844	
0.000001667	9458.5247395	5675114844.	88.0798550	0.0001468	0.0000268	0.5960288	4.2397930	
0.000002083	11822.	5674726062.	77.7268498	0.0001619	0.0000119	0.6543896	4.6742472	
0.000002500	14186.	5674251971.	70.8365108	0.0001771	-0.000002909	0.7123579	5.1095470	
0.000002917	16547.	5673383820.	65.9243136	0.0001923	-0.0000177	0.7699250	5.5456482	
0.000003333	18904.	5671280345.	62.2467036	0.0002075	-0.0000325	0.8270658	5.9823813	
0.000003750	21254.	5667619999.	59.3906846	0.0002227	-0.0000473	0.8837577	6.4195870	
0.000004167	23594.	5662467569.	57.1088688	0.0002380	-0.0000620	0.9399850	6.8571550	
0.000004583	25923.	5656002051.	55.2440785	0.0002532	-0.0000768	0.9957365	7.2950088	
0.000005000	28242.	5648418963.	53.6916870	0.0002685	-0.0000915	1.0510047	7.7330946	
0.000005417	30549.	5639895203.	52.3793553	0.0002837	-0.0001063	1.1057837	8.1713737	
0.000005833	30549.	5237045545.	48.6212110	0.0002836	-0.0001364	1.1048898	8.1641882	C
0.000006250	30549.	4887909176.	47.2658966	0.0002954	-0.0001546	1.1467300	8.5016938	C

0.000006667	30549.	4582414852.	46.0458753	0.0003070	-0.0001730	1.1874567	8.8326024	C
0.000007083	30549.	4312861037.	44.9419482	0.0003183	-0.0001917	1.2272045	9.1578752	C
0.000007500	30549.	4073257646.	43.9334031	0.0003295	-0.0002105	1.2659521	9.4772152	C
0.000007917	30549.	3858875665.	43.0108708	0.0003405	-0.0002295	1.3038716	9.7919291	C
0.000008333	30978.	3717396968.	42.1624336	0.0003514	-0.0002486	1.3410031	10.1022547	C
0.000008750	31675.	3620001179.	41.3783671	0.0003621	-0.0002679	1.3773834	10.4084106	C
0.000009167	32347.	3528737549.	40.6510786	0.0003726	-0.0002874	1.4130598	10.7107118	C
0.000009583	32997.	3443148906.	39.9745176	0.0003831	-0.0003069	1.4480856	11.0095347	C
0.0000100	33626.	3362597478.	39.3421059	0.0003934	-0.0003266	1.4824611	11.3048106	C
0.0000104	34238.	3286814813.	38.7501885	0.0004036	-0.0003464	1.5162519	11.5970361	C
0.0000108	34834.	3215481917.	38.1952740	0.0004138	-0.0003662	1.5495078	11.8865819	C
0.0000113	35419.	3148316549.	37.6745080	0.0004238	-0.0003862	1.5822814	12.1738582	C
0.0000117	35989.	3084760825.	37.1830718	0.0004338	-0.0004062	1.6145338	12.4584727	C
0.0000121	36546.	3024475968.	36.7177062	0.0004437	-0.0004263	1.6462622	12.7403462	C
0.0000125	37096.	2967647005.	36.2798638	0.0004535	-0.0004465	1.6776367	13.0209507	C
0.0000129	37633.	2913497990.	35.8628869	0.0004632	-0.0004668	1.7084946	-13.4015103	C
0.0000133	38163.	2862229056.	35.4684808	0.0004729	-0.0004871	1.7389977	-13.9863207	C
0.0000138	38685.	2813453993.	35.0934192	0.0004825	-0.0005075	1.7690980	-14.5729490	C
0.0000142	39199.	2767020524.	34.7363252	0.0004921	-0.0005279	1.7988140	-15.1612597	C
0.0000146	39707.	2722757245.	34.3959203	0.0005016	-0.0005484	1.8281614	-15.7511420	C
0.0000150	40209.	2680586301.	34.0716072	0.0005111	-0.0005689	1.8571805	-16.3422508	C
0.0000154	40703.	2640176550.	33.7603599	0.0005205	-0.0005895	1.8857923	-16.9353557	C
0.0000158	41195.	2601816508.	33.4656095	0.0005299	-0.0006101	1.9142173	-17.5284076	C
0.0000163	41677.	2564730095.	33.1791071	0.0005392	-0.0006308	1.9421105	-18.1246957	C
0.0000171	42633.	2495609805.	32.6462393	0.0005577	-0.0006723	1.9972419	-19.3181589	C
0.0000179	43571.	2431884842.	32.1538385	0.0005761	-0.0007139	2.0511419	-20.5163513	C
0.0000188	44493.	2372943069.	31.6970347	0.0005943	-0.0007557	2.1038593	-21.7189875	C
0.0000196	45405.	2318568650.	31.2762821	0.0006125	-0.0007975	2.1556946	-22.9232281	C
0.0000204	46301.	2267779732.	30.8808711	0.0006305	-0.0008395	2.2062893	-24.1328009	C
0.0000213	47190.	2220698117.	30.5152939	0.0006484	-0.0008816	2.2561102	-25.3431001	C
0.0000221	48065.	2176547717.	30.1706028	0.0006663	-0.0009237	2.3048206	-26.5576930	C
0.0000229	48938.	2135456305.	29.8513565	0.0006841	-0.0009659	2.3528646	-27.7720359	C
0.0000238	49796.	2096662403.	29.5473716	0.0007018	-0.0010082	2.3997630	-28.9912977	C
0.0000246	50652.	2060406557.	29.2651287	0.0007194	-0.0010506	2.4460576	-30.2097519	C
0.0000254	51498.	2026165035.	28.9973400	0.0007370	-0.0010930	2.4914043	-31.4311940	C
0.0000263	52338.	1993842619.	28.7443906	0.0007545	-0.0011355	2.5359340	-32.6542825	C
0.0000271	53176.	1963427443.	28.5080284	0.0007721	-0.0011779	2.5798664	-33.8765693	C
0.0000279	54005.	1934498127.	28.2815033	0.0007895	-0.0012205	2.6228326	-35.1023163	C
0.0000288	54828.	1907066262.	28.0668669	0.0008069	-0.0012631	2.6650514	-36.3290997	C
0.0000296	55649.	1881106548.	27.8652543	0.0008243	-0.0013057	2.7066793	-37.5550838	C
0.0000304	56466.	1856430899.	27.6740182	0.0008418	-0.0013482	2.7475994	-38.7816597	C
0.0000313	57275.	1832797163.	27.4889761	0.0008590	-0.0013910	2.7875695	-40.0118653	C
0.0000321	58081.	1810325000.	27.3144069	0.0008763	-0.0014337	2.8269548	-41.2412704	C
0.0000329	58885.	1788925691.	27.1495205	0.0008937	-0.0014763	2.8657525	-42.4698701	C
0.0000338	59687.	1768510587.	26.9933679	0.0009110	-0.0015190	2.9039421	-43.6978911	C
0.0000346	60480.	1748825274.	26.8402872	0.0009282	-0.0015618	2.9411417	-44.9303786	C
0.0000354	61271.	1730007150.	26.6952003	0.0009455	-0.0016045	2.9777590	-46.1620546	C
0.0000363	62060.	1711995963.	26.5575612	0.0009627	-0.0016473	3.0137913	-47.3929137	C
0.0000371	62846.	1694736868.	26.4268731	0.0009800	-0.0016900	3.0492358	-48.6229501	C
0.0000379	63631.	1678179838.	26.3026829	0.0009973	-0.0017327	3.0840896	-49.8521582	C
0.0000387	64409.	1662164602.	26.1808672	0.0010145	-0.0017755	3.1180637	-51.0847005	C
0.0000396	65184.	1646744706.	26.0640664	0.0010317	-0.0018183	3.1513868	-52.3173737	C
0.0000404	65956.	1631908554.	25.9527994	0.0010489	-0.0018611	3.1841238	-53.5492062	C
0.0000412	66727.	1617620378.	25.8467363	0.0010662	-0.0019038	3.2162716	-54.7801915	C
0.0000421	67495.	1603847225.	25.7455732	0.0010835	-0.0019465	3.2478275	-56.0103233	C
0.0000429	68261.	1590558699.	25.6490298	0.0011008	-0.0019892	3.2787883	-57.2395949	C
0.0000437	69025.	1577723445.	25.5567187	0.0011181	-0.0020319	3.3091413	-58.4681630	C
0.0000446	69783.	1565231344.	25.4650522	0.0011353	-0.0020747	3.3386260	-59.7003594	C
0.0000454	70539.	1553150876.	25.3774185	0.0011526	-0.0021174	3.3675189	-60.0000000	CY
0.0000462	71292.	1541459419.	25.2936049	0.0011698	-0.0021602	3.3958171	-60.0000000	CY
0.0000471	72044.	1530135945.	25.2134140	0.0011871	-0.0022029	3.4235173	-60.0000000	CY
0.0000479	72793.	1519160888.	25.1366622	0.0012045	-0.0022455	3.4506165	-60.0000000	CY
0.0000487	73540.	1508516012.	25.0631786	0.0012218	-0.0022882	3.4771115	-60.0000000	CY
0.0000496	74285.	1498184301.	24.9928036	0.0012392	-0.0023308	3.5029990	-60.0000000	CY
0.0000529	77237.	1459603603.	24.7352027	0.0013089	-0.0025011	3.6001003	-60.0000000	CY
0.0000562	80065.	1423383607.	24.5043436	0.0013784	-0.0026716	3.6864051	-60.0000000	CY
0.0000596	82204.	1379645914.	24.2497120	0.0014449	-0.0028451	3.7591660	-60.0000000	CY
0.0000629	83963.	1334512215.	23.9932965	0.0015096	-0.0030204	3.8207152	-60.0000000	CY
0.0000662	85360.	1288449706.	23.7329127	0.0015723	-0.0031977	3.8717047	-60.0000000	CY
0.0000696	86688.	1245819725.	23.4994345	0.0016352	-0.0033748	3.9142670	-60.0000000	CY
0.0000729	87711.	1202888442.	23.2591498	0.0016960	-0.0035540	3.9472851	-60.0000000	CY
0.0000762	88652.	1162647729.	23.0352076	0.0017564	-0.0037336	3.9721879	-60.0000000	CY
0.0000796	89574.	1125536761.	22.8355935	0.0018173	-0.0039127	3.9892935	-60.0000000	CY
0.0000829	90373.	1089921373.	22.6443017	0.0018776	-0.0040924	3.9983309	-60.0000000	CY
0.0000862	90980.	1054839982.	22.4461059	0.0019360	-0.0042740	3.9978781	-60.0000000	CY
0.0000896	91559.	1022049711.	22.2666577	0.0019947	-0.0044553	3.9968659	-60.0000000	CY
0.0000929	92119.	991419180.	22.1052006	0.0020539	-0.0046361	3.9998681	-60.0000000	CY
0.0000963	92661.	962716412.	21.9600829	0.0021137	-0.0048163	3.9997415	60.0000000	CY
0.0000996	93163.	935527111.	21.8186673	0.0021728	-0.0049972	3.9985312	60.0000000	CY

0.0001029	93572.	909200749.	21.6800769	0.0022312	-0.0051788	3.9963881	60.0000000	CY
0.0001063	93889.	883663111.	21.5436431	0.0022890	-0.0053610	3.9996354	60.0000000	CY
0.0001096	94182.	859459723.	21.4174312	0.0023470	-0.0055430	3.9969452	60.0000000	CY
0.0001129	94466.	836600862.	21.3018587	0.0024053	-0.0057247	3.9999010	60.0000000	CY
0.0001163	94735.	814924908.	21.1929016	0.0024637	-0.0059063	3.9971504	60.0000000	CY
0.0001196	94991.	794351163.	21.0880555	0.0025218	-0.0060882	3.9998821	60.0000000	CY
0.0001229	95238.	774818270.	20.9920746	0.0025803	-0.0062697	3.9961861	60.0000000	CY
0.0001263	95478.	756264943.	20.9035702	0.0026391	-0.0064509	3.9995572	60.0000000	CY
0.0001296	95711.	738608500.	20.8222533	0.0026982	-0.0066318	3.9940756	60.0000000	CY
0.0001329	95932.	721745680.	20.7465530	0.0027576	-0.0068124	3.9983887	60.0000000	CY
0.0001363	96101.	705328454.	20.6684280	0.0028161	-0.0069939	3.9999948	60.0000000	CY
0.0001396	96237.	689459172.	20.5921772	0.0028743	-0.0071757	3.9949238	60.0000000	CY
0.0001429	96345.	674135960.	20.5165202	0.0029322	-0.0073578	3.9986566	60.0000000	CY
0.0001462	96444.	659444606.	20.4389697	0.0029892	-0.0075408	3.9999917	60.0000000	CY
0.0001496	96537.	645372064.	20.3671193	0.0030466	-0.0077234	3.9931182	60.0000000	CYT
0.0001529	96628.	631896604.	20.2996284	0.0031042	-0.0079058	3.9973806	60.0000000	CYT
0.0001562	96716.	618981351.	20.2361553	0.0031619	-0.0080881	3.9996308	60.0000000	CYT
0.0001596	96801.	606583887.	20.1768679	0.0032199	-0.0082701	3.9961528	60.0000000	CYT
0.0001629	96882.	594671283.	20.1215824	0.0032781	-0.0084519	3.9937804	60.0000000	CYT
0.0001662	96961.	583225111.	20.0694562	0.0033365	-0.0086335	3.9976239	60.0000000	CYT
0.0001696	97039.	572217612.	20.0203229	0.0033951	-0.0088149	3.9996593	60.0000000	CYT
0.0001729	97113.	561617293.	19.9743931	0.0034539	-0.0089961	3.9964307	60.0000000	CYT
0.0001762	97184.	551399732.	19.9315737	0.0035129	-0.0091771	3.9915920	60.0000000	CYT
0.0001796	97254.	541553015.	19.8911150	0.0035721	-0.0093579	3.9959921	60.0000000	CYT
0.0001829	97322.	532056692.	19.8529034	0.0036314	-0.0095386	3.9987910	60.0000000	CYT
0.0002029	97322.	479615786.	19.8525324	0.0040284	-0.0105816	3.9925730	60.0000000	CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 1

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1547.800	96461.303	0.00300000

Note note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318-08, Section
9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding
bending stiffnesses computed for common resistance factor values used for
reinforced concrete sections.

Axial Load No.	Resistance Factor for Moment	Nominal Moment Capacity in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip	Bending Stiffness at Ult. Mom. Cap. kip-in^2
1	0.65	96461.303	1006.070	62699.845	1697954358.324
1	0.70	96461.303	1083.460	67522.911	1603367294.257
1	0.75	96461.303	1160.850	72345.977	1525710963.589

Pile Section No. 2:

Dimensions and Properties of Drilled Shaft (Bored Pile):

Length of Section	=	12.50000 ft
Shaft Diameter	=	66.00000 in
Concrete Cover Thickness	=	6.50000 in
Number of Reinforcing Bars	=	26 bars
Yield Stress of Reinforcing Bars	=	60000. psi
Modulus of Elasticity of Reinforcing Bars	=	29000000. psi
Gross Area of Shaft	=	3421.19440 sq. in.
Total Area of Reinforcing Steel	=	40.56000 sq. in.

Area Ratio of Steel Reinforcement = 1.19 percent
Edge-to-Edge Bar Spacing = 4.80849 in
Maximum Concrete Aggregate Size = 0.75000 in
Ratio of Bar Spacing to Aggregate Size = 6.41
Offset of Center of Rebar Cage from Center of Pile = 0.0000 in

Axial Structural Capacities:

Nom. Axial Structural Capacity = 0.85 Fc Ac + Fy As = 13927.757 kips
Tensile Load for Cracking of Concrete = -1541.741 kips
Nominal Axial Tensile Capacity = -2433.600 kips

Reinforcing Bar Dimensions and Positions Used in Computations:

Bar Number	Bar Diam. inches	Bar Area sq. in.	X inches	Y inches
1	1.41000	1.56000	25.79500	0.00000
2	1.41000	1.56000	25.04544	6.17315
3	1.41000	1.56000	22.84034	11.98753
4	1.41000	1.56000	19.30783	17.10525
5	1.41000	1.56000	14.65323	21.22887
6	1.41000	1.56000	9.14703	24.11874
7	1.41000	1.56000	3.10924	25.60693
8	1.41000	1.56000	-3.10924	25.60693
9	1.41000	1.56000	-9.14703	24.11874
10	1.41000	1.56000	-14.65323	21.22887
11	1.41000	1.56000	-19.30783	17.10525
12	1.41000	1.56000	-22.84034	11.98753
13	1.41000	1.56000	-25.04544	6.17315
14	1.41000	1.56000	-25.79500	0.00000
15	1.41000	1.56000	-25.04544	-6.17315
16	1.41000	1.56000	-22.84034	-11.98753
17	1.41000	1.56000	-19.30783	-17.10525
18	1.41000	1.56000	-14.65323	-21.22887
19	1.41000	1.56000	-9.14703	-24.11874
20	1.41000	1.56000	-3.10924	-25.60693
21	1.41000	1.56000	3.10924	-25.60693
22	1.41000	1.56000	9.14703	-24.11874
23	1.41000	1.56000	14.65323	-21.22887
24	1.41000	1.56000	19.30783	-17.10525
25	1.41000	1.56000	22.84034	-11.98753
26	1.41000	1.56000	25.04544	-6.17315

NOTE: The positions of the above rebars were computed by LPile

Minimum spacing between any two bars not equal to zero = 4.80849 inches between Bars 18 and 19

Spacing to aggregate size ratio = 6.41132

Concrete Properties:

Compressive Strength of Concrete = 4000.00000 psi
Modulus of Elasticity of Concrete = 3604997. psi
Modulus of Rupture of Concrete = -474.34164 psi
Compression Strain at Peak Stress = 0.00189
Tensile Strain at Fracture of Concrete = -0.0001154
Maximum Coarse Aggregate Size = 0.75000 in

Number of Axial Thrust Force Values Determined from Pile-head Loadings = 1

Number	Axial Thrust Force kips
1	1547.800

Definitions of Run Messages and Notes:

C = concrete in section has cracked in tension.
Y = stress in reinforcing steel has reached yield stress.
T = ACI 318-08 criteria for tension-controlled section met, tensile strain in

reinforcement exceeds 0.005 while simultaneously compressive strain in
concrete more than than 0.003. See ACI 318-08, Section 10.3.4.
Z = depth of tensile zone in concrete section is less than 10 percent of section depth.

Bending Stiffness (EI) = Computed Bending Moment / Curvature.
Position of neutral axis is measured from edge of compression side of pile.
Compressive stresses and strains are positive in sign.
Tensile stresses and strains are negative in sign.

Axial Thrust Force = 1547.800 kips

Bending Curvature rad/in.	Bending Moment in-kip	Bending Stiffness kip-in2	Depth to N Axis in	Max Comp Strain in/in	Max Tens Strain in/in	Max Concrete Stress ksi	Max Steel Stress ksi	Run Msg
0.000000417	1697.4441566	4073865976.	278.6277385	0.0001161	0.0000886	0.4766789	3.3627643	
0.000000833	3394.7923229	4073750788.	155.8576314	0.0001299	0.0000749	0.5307984	3.7585844	
0.000001250	5092.0150223	4073612018.	114.9537184	0.0001437	0.0000612	0.5845945	4.1551098	
0.000001667	6789.0494968	4073429698.	94.5163553	0.0001575	0.0000475	0.6380647	4.5523405	
0.000002083	8485.8329770	4073199829.	82.2656137	0.0001714	0.0000339	0.6912069	4.9502767	
0.000002500	10182.	4072921071.	74.1081845	0.0001853	0.0000203	0.7440188	5.3489184	
0.000002917	11878.	4072592843.	68.2897926	0.0001992	0.000006679	0.7964982	5.7482658	
0.000003333	13574.	4072207199.	63.9332846	0.0002131	-0.000006889	0.8486427	6.1483175	
0.000003750	15268.	4071547381.	60.5508810	0.0002271	-0.0000204	0.9004432	6.5490208	
0.000004167	16959.	4070263747.	57.8493575	0.0002410	-0.0000340	0.9518823	6.9502557	
0.000004583	18646.	4068215899.	55.6422282	0.0002550	-0.0000475	1.0029450	7.3519170	
0.000005000	20327.	4065398673.	53.8053422	0.0002690	-0.0000610	1.0536198	7.7539246	
0.000005417	22002.	4061864841.	52.2528748	0.0002830	-0.0000745	1.1038981	8.1562183	
0.000005833	23670.	4057686766.	50.9236079	0.0002971	-0.0000879	1.1537733	8.5587520	
0.000006250	25331.	4052939567.	49.7727084	0.0003111	-0.0001014	1.2032405	8.9614909	
0.000006667	26985.	4047694661.	48.7665968	0.0003251	-0.0001149	1.2522957	9.3644087	
0.000007083	26985.	3809594975.	45.8066734	0.0003245	-0.0001430	1.2495384	9.3416667	C
0.000007500	26985.	3597950810.	44.7461285	0.0003356	-0.0001594	1.2880690	9.6605080	C
0.000007917	26985.	3408584978.	43.7767645	0.0003466	-0.0001759	1.3257663	9.9746530	C
0.000008333	26985.	3238155729.	42.8842263	0.0003574	-0.0001926	1.3626227	10.2839380	C
0.000008750	26985.	3083957837.	42.0607411	0.0003680	-0.0002095	1.3987460	10.5891756	C
0.000009167	26985.	2943777936.	41.2974837	0.0003786	-0.0002264	1.4341645	10.8905227	C
0.000009583	27583.	2878188198.	40.5871858	0.0003890	-0.0002435	1.4689067	11.1881429	C
0.0000100	28171.	2817121789.	39.9239527	0.0003992	-0.0002608	1.5030057	11.4822463	C
0.0000104	28742.	2759192580.	39.3031824	0.0004094	-0.0002781	1.5365061	11.7731489	C
0.0000108	29296.	2704234434.	38.7208346	0.0004195	-0.0002955	1.5694461	12.0611205	C
0.0000113	29836.	2652079751.	38.1733914	0.0004295	-0.0003130	1.6018604	12.3464064	C
0.0000117	30363.	2602571708.	37.6578622	0.0004393	-0.0003307	1.6337834	12.6292600	C
0.0000121	30880.	2555582516.	37.1718593	0.0004492	-0.0003483	1.6652566	12.9100015	C
0.0000125	31385.	2510797157.	36.7116633	0.0004589	-0.0003661	1.6962538	13.1883530	C
0.0000129	31878.	2467984939.	36.2742305	0.0004685	-0.0003840	1.7267577	13.4641097	C
0.0000133	32365.	2427352170.	35.8607188	0.0004781	-0.0004019	1.7569137	13.7385446	C
0.0000138	32841.	2388446420.	35.4664869	0.0004877	-0.0004198	1.7866175	14.0106742	C
0.0000142	33310.	2351283654.	35.0911182	0.0004971	-0.0004379	1.8159311	14.2810261	C
0.0000146	33773.	2315857203.	34.7343713	0.0005065	-0.0004560	1.8449210	14.5501821	C
0.0000150	34227.	2281786050.	34.3920416	0.0005159	-0.0004741	1.8734667	14.8169881	C
0.0000154	34677.	2249337301.	34.0668494	0.0005252	-0.0004923	1.9017573	15.0831831	C
0.0000158	35119.	2218052765.	33.7536910	0.0005344	-0.0005106	1.9296130	15.3470448	C
0.0000163	35558.	2188177506.	33.4553040	0.0005436	-0.0005289	1.9572190	15.6102995	C
0.0000171	36419.	2131827323.	32.8933162	0.0005619	-0.0005656	2.0114217	-16.2381156	C
0.0000179	37263.	2079798063.	32.3754906	0.0005801	-0.0006024	2.0644667	-17.2992722	C
0.0000188	38094.	2031664098.	31.8973939	0.0005981	-0.0006394	2.1164508	-18.3638545	C
0.0000196	38909.	1986865981.	31.4527262	0.0006159	-0.0006766	2.1673191	-19.4325600	C
0.0000204	39711.	1945052430.	31.0375560	0.0006337	-0.0007138	2.2170979	-20.5052930	C
0.0000213	40506.	1906180174.	30.6527099	0.0006514	-0.0007511	2.2660585	-21.5794050	C
0.0000221	41287.	1869577733.	30.2892820	0.0006689	-0.0007886	2.3138737	-22.6584014	C
0.0000229	42062.	1835420378.	29.9512927	0.0006864	-0.0008261	2.3609587	-23.7380575	C
0.0000238	42825.	1803169262.	29.6312985	0.0007037	-0.0008638	2.4070131	-24.8216556	C
0.0000246	43585.	1772967861.	29.3330317	0.0007211	-0.0009014	2.4524133	-25.9052302	C
0.0000254	44334.	1744280321.	29.0482124	0.0007383	-0.0009392	2.4967534	-26.9933092	C
0.0000263	45080.	1717342011.	28.7824781	0.0007555	-0.0009770	2.5405164	-28.0806260	C
0.0000271	45818.	1691725400.	28.5287336	0.0007727	-0.0010148	2.5833346	-29.1713697	C
0.0000279	46550.	1667469019.	28.2890059	0.0007897	-0.0010528	2.6254368	-30.2630297	C
0.0000288	47281.	1644554100.	28.0640817	0.0008068	-0.0010907	2.6669677	-31.3539343	C
0.0000296	48002.	1622588560.	27.8465242	0.0008238	-0.0011287	2.7074832	-32.4493904	C
0.0000304	48720.	1601748321.	27.6413188	0.0008408	-0.0011667	2.7474046	-33.5444658	C
0.0000313	49436.	1581961170.	27.4478871	0.0008577	-0.0012048	2.7867602	-34.6387897	C
0.0000321	50146.	1562985016.	27.2613586	0.0008746	-0.0012429	2.8252558	-35.7360401	C
0.0000329	50851.	1544845161.	27.0833185	0.0008915	-0.0012810	2.8630597	-36.8342030	C
0.0000338	51555.	1527548034.	26.9148376	0.0009084	-0.0013191	2.9003028	-37.9316151	C
0.0000346	52257.	1511032331.	26.7552294	0.0009253	-0.0013572	2.9369827	-39.0282719	C
0.0000354	52951.	1495097626.	26.5998071	0.0009421	-0.0013954	2.9727874	-40.1283440	C
0.0000363	53643.	1479819269.	26.4514748	0.0009589	-0.0014336	3.0079744	-41.2284745	C

0.0000371	54334.	1465179743.	26.3105144	0.0009757	-0.0014718	3.0426025	-42.3278467	C
0.0000379	55022.	1451136583.	26.1764442	0.0009925	-0.0015100	3.0766690	-43.4264556	C
0.0000387	55708.	1437628198.	26.0480928	0.0010094	-0.0015481	3.1101148	-44.5251181	C
0.0000396	56388.	1424534478.	25.9223033	0.0010261	-0.0015864	3.1427227	-45.6270434	C
0.0000404	57066.	1411937244.	25.8023584	0.0010428	-0.0016247	3.1747731	-46.7281982	C
0.0000412	57742.	1399806085.	25.6879082	0.0010596	-0.0016629	3.2062635	-47.8285772	C
0.0000421	58416.	1388112997.	25.5786307	0.0010764	-0.0017011	3.2371912	-48.9281752	C
0.0000429	59089.	1376832146.	25.4742288	0.0010933	-0.0017392	3.2675535	-50.0269867	C
0.0000437	59758.	1365905450.	25.3731298	0.0011101	-0.0017774	3.2972468	-51.1266539	C
0.0000446	60423.	1355288084.	25.2741752	0.0011268	-0.0018157	3.3261988	-52.2284350	C
0.0000454	61086.	1345021391.	25.1794590	0.0011436	-0.0018539	3.3545888	-53.3294165	C
0.0000462	61748.	1335086122.	25.0887566	0.0011604	-0.0018921	3.3824141	-54.4295926	C
0.0000471	62407.	1325464390.	25.0018590	0.0011772	-0.0019303	3.4096718	-55.5289573	C
0.0000479	63065.	1316139546.	24.9185724	0.0011940	-0.0019685	3.4363592	-56.6275045	C
0.0000487	63721.	1307096078.	24.8387158	0.0012109	-0.0020066	3.4624736	-57.7252279	C
0.0000496	64375.	1298319511.	24.7621207	0.0012278	-0.0020447	3.4880119	-58.8221213	C
0.0000529	66961.	1265411698.	24.4750558	0.0012951	-0.0021974	3.5836019	-60.0000000	CY
0.0000562	69518.	1235869930.	24.2300979	0.0013629	-0.0023496	3.6698777	-60.0000000	CY
0.0000596	72015.	1208636309.	24.0153709	0.0014309	-0.0025016	3.7463288	-60.0000000	CY
0.0000629	74000.	1176159329.	23.7797533	0.0014961	-0.0026564	3.8101965	-60.0000000	CY
0.0000662	75591.	1141000182.	23.5390410	0.0015595	-0.0028130	3.8633260	-60.0000000	CY
0.0000696	76888.	1104973227.	23.2949031	0.0016209	-0.0029716	3.9065605	-60.0000000	CY
0.0000729	78037.	1070227925.	23.0618468	0.0016816	-0.0031309	3.9411783	-60.0000000	CY
0.0000762	79118.	1037615501.	22.8490977	0.0017422	-0.0032903	3.9678190	-60.0000000	CY
0.0000796	79934.	1004409289.	22.6266859	0.0018007	-0.0034518	3.9859414	-60.0000000	CY
0.0000829	80706.	973340777.	22.4207024	0.0018590	-0.0036135	3.9966505	-60.0000000	CY
0.0000862	81463.	944492996.	22.2354443	0.0019178	-0.0037747	3.9990363	-60.0000000	CY
0.0000896	82183.	917392437.	22.0647117	0.0019766	-0.0039359	3.9994758	-60.0000000	CY
0.0000929	82717.	890226180.	21.8842006	0.0020334	-0.0040991	3.9999571	-60.0000000	CY
0.0000963	83181.	864223178.	21.7137337	0.0020899	-0.0042626	3.9996085	-60.0000000	CY
0.0000996	83633.	839831449.	21.5588214	0.0021469	-0.0044256	3.9986123	60.0000000	CY
0.0001029	84070.	816879260.	21.4158002	0.0022040	-0.0045885	3.9964976	60.0000000	CY
0.0001063	84488.	795185057.	21.2792768	0.0022609	-0.0047516	3.9998631	60.0000000	CY
0.0001096	84896.	774712041.	21.1546571	0.0023182	-0.0049143	3.9983607	60.0000000	CY
0.0001129	85276.	755208317.	21.0376925	0.0023755	-0.0050770	3.9984880	60.0000000	CY
0.0001163	85570.	736086093.	20.9193457	0.0024319	-0.0052406	3.9989993	60.0000000	CY
0.0001196	85812.	717588276.	20.8029767	0.0024877	-0.0054048	3.9970275	60.0000000	CY
0.0001229	86031.	699910529.	20.6876616	0.0025429	-0.0055696	3.9987776	60.0000000	CY
0.0001263	86244.	683123503.	20.5794669	0.0025982	-0.0057343	3.9988637	60.0000000	CY
0.0001296	86452.	667150467.	20.4793468	0.0026538	-0.0058987	3.9977258	60.0000000	CY
0.0001329	86655.	651952739.	20.3858103	0.0027096	-0.0060629	3.9998866	60.0000000	CY
0.0001363	86854.	637458521.	20.2990087	0.0027657	-0.0062268	3.9952876	60.0000000	CY
0.0001396	87048.	623629469.	20.2179587	0.0028221	-0.0063904	3.9988850	60.0000000	CY
0.0001429	87240.	610423600.	20.1420751	0.0028786	-0.0065539	3.9993871	60.0000000	CY
0.0001462	87421.	597750993.	20.0667446	0.0029348	-0.0067177	3.9957414	60.0000000	CY
0.0001496	87599.	585619197.	19.9948640	0.0029909	-0.0068816	3.9989397	60.0000000	CY
0.0001529	87774.	573998039.	19.9271578	0.0030472	-0.0070453	3.9999103	60.0000000	CYT
0.0001562	87918.	562677844.	19.8590018	0.0031030	-0.0072095	3.9941129	60.0000000	CYT
0.0001596	88047.	551730128.	19.7917667	0.0031584	-0.0073741	3.9977840	60.0000000	CYT
0.0001629	88140.	541014048.	19.7241051	0.0032134	-0.0075391	3.9996771	60.0000000	CYT
0.0001662	88216.	530622056.	19.6601579	0.0032685	-0.0077040	3.9966554	60.0000000	CYT
0.0001696	88289.	520621401.	19.5998448	0.0033238	-0.0078687	3.9939347	60.0000000	CYT
0.0001729	88360.	510998395.	19.5425189	0.0033792	-0.0080333	3.9974387	60.0000000	CYT
0.0001762	88417.	501659038.	19.4926428	0.0034356	-0.0081969	3.9995004	60.0000000	CYT
0.0001796	88470.	492639793.	19.4432540	0.0034917	-0.0083608	3.9983302	60.0000000	CYT
0.0001829	88518.	483925567.	19.3946221	0.0035476	-0.0085249	3.9910582	60.0000000	CYT
0.0002029	88518.	436228591.	19.2372495	0.0039036	-0.0094889	3.9961461	60.0000000	CYT

Summary of Results for Nominal (Unfactored) Moment Capacity for Section 2

Moment values interpolated at maximum compressive strain = 0.003
or maximum developed moment if pile fails at smaller strains.

Load No.	Axial Thrust kips	Nominal Mom. Cap. in-kip	Max. Comp. Strain
1	1547.800	87627.164	0.00300000

Note note that the values of moment capacity in the table above are not
factored by a strength reduction factor (phi-factor).

In ACI 318-08, the value of the strength reduction factor depends on whether
the transverse reinforcing steel bars are tied hoops (0.65) or spirals (0.70).

The above values should be multiplied by the appropriate strength reduction
factor to compute ultimate moment capacity according to ACI 318-08, Section

9.3.2.2 or the value required by the design standard being followed.

The following table presents factored moment capacities and corresponding bending stiffnesses computed for common resistance factor values used for reinforced concrete sections.

Axial Load No.	Resistance Factor for Moment	Nominal Moment Capacity in-kip	Ultimate (Factored) Axial Thrust kips	Ultimate (Factored) Moment Capacity in-kip	Bending Stiffness at Ult. Mom. Cap. kip-in^2
1	0.65	87627.164	1006.070	56957.654	1413946610.523
1	0.70	87627.164	1083.460	61339.014	1341226244.544
1	0.75	87627.164	1160.850	65720.373	1281201640.374

Computed Values of Pile Loading and Deflection
for Lateral Loading for Load Case Number 1

Pile-head conditions are Shear and Moment (Loading Type 1)

Shear force at pile head = 90200.0 lbs
Applied moment at pile head = 30252000.0 in-lbs
Axial thrust load on pile head = 1547800.0 lbs

Depth X feet	Deflect. y inches	Bending Moment in-lbs	Shear Force lbs	Slope S radians	Total Stress psi*	Bending Stiffness lb-in^2	Soil Res. p lb/in	Soil Spr. Es*h lb/inch	Distrib. Lat. Load lb/inch
0.00	0.3475	30252000.	90200.	-0.002553	0.000	5.641E+12	0.000	0.000	0.000
0.626	0.3285	30959032.	90200.	-0.002512	0.000	5.641E+12	0.000	0.000	0.000
1.252	0.3098	31665584.	90200.	-0.002459	0.000	3.621E+12	0.000	0.000	0.000
1.878	0.2915	32371373.	90200.	-0.002391	0.000	3.525E+12	0.000	0.000	0.000
2.504	0.2738	33076359.	84694.	-0.002321	0.000	3.433E+12	-1465.8902	40215.	0.000
3.130	0.2567	33697784.	73626.	-0.002247	0.000	3.353E+12	-1480.9268	43344.	0.000
3.756	0.2401	34234761.	62451.	-0.002170	0.000	3.287E+12	-1494.3124	46759.	0.000
4.382	0.2241	34686505.	51182.	-0.002091	0.000	3.233E+12	-1506.0330	50492.	0.000
5.008	0.2087	35052327.	39831.	-0.002009	0.000	3.190E+12	-1516.0776	54581.	0.000
5.634	0.1939	35331635.	28410.	-0.001926	0.000	3.158E+12	-1524.4375	59066.	0.000
6.260	0.1797	35523943.	16934.	-0.001841	0.000	3.136E+12	-1531.1062	63994.	0.000
6.886	0.1662	35628860.	6988.0820	-0.001756	0.000	3.124E+12	-1116.8304	50473.	0.000
7.512	0.1534	35669759.	-1416.1336	-0.001670	0.000	3.120E+12	-1120.7138	54899.	0.000
8.138	0.1411	35646417.	-9844.6874	-0.001584	0.000	3.122E+12	-1123.3101	59791.	0.000
8.764	0.1296	35558689.	-18288.	-0.001499	0.000	3.132E+12	-1124.6181	65210.	0.000
9.390	0.1186	35406508.	-26736.	-0.001414	0.000	3.150E+12	-1124.6397	71224.	0.000
10.016	0.1083	35189881.	-35180.	-0.001330	0.000	3.174E+12	-1123.3805	77912.	0.000
10.642	0.0986	34908893.	-43609.	-0.001247	0.000	3.207E+12	-1120.8490	85363.	0.000
11.268	0.0896	34563704.	-52015.	-0.001166	0.000	3.247E+12	-1117.0563	93682.	0.000
11.894	0.0811	34154551.	-59819.	-0.001088	0.000	3.297E+12	-960.7445	88979.	0.000
12.520	0.0732	33690277.	-66892.	-0.001011	0.000	3.354E+12	-922.4503	94622.	0.000
13.146	0.0659	33173072.	-73662.	-0.000937	0.000	3.420E+12	-879.8860	100265.	0.000
13.772	0.0592	32605368.	-80099.	-0.000865	0.000	3.494E+12	-834.0553	105908.	0.000
14.398	0.0529	31989783.	-86184.	-0.000797	0.000	3.576E+12	-785.8838	111551.	0.000
15.024	0.0472	31329069.	-91901.	-0.000731	0.000	3.667E+12	-736.2174	117194.	0.000
15.650	0.0419	30626063.	-97242.	-0.000669	0.000	3.841E+12	-685.8226	122837.	0.000
16.276	0.0371	29883661.	-102204.	-0.000619	0.000	5.642E+12	-635.2354	128480.	0.000
16.902	0.0326	29104949.	-106779.	-0.000580	0.000	5.645E+12	-582.7732	134123.	0.000
17.528	0.0284	28292902.	-110954.	-0.000542	0.000	5.648E+12	-528.9620	139766.	0.000
18.154	0.0245	27450567.	-114723.	-0.000505	0.000	5.651E+12	-474.2971	145409.	0.000
18.780	0.0208	26581043.	-118079.	-0.000469	0.000	5.654E+12	-419.2439	151052.	0.000
19.406	0.0175	25687451.	-121021.	-0.000434	0.000	5.657E+12	-364.2361	156695.	0.000
20.032	0.0143	24772908.	-123553.	-0.000400	0.000	5.659E+12	-309.6762	162338.	0.000
20.658	0.0114	23840508.	-125677.	-0.000368	0.000	5.662E+12	-255.9352	167981.	0.000
21.284	0.008798	22893297.	-127402.	-0.000337	0.000	5.664E+12	-203.3523	173624.	0.000
21.910	0.006379	21934258.	-129886.	-0.000307	0.000	5.666E+12	-457.8543	539152.	0.000
22.536	0.004179	20949045.	-132777.	-0.000279	0.000	5.668E+12	-311.8488	560595.	0.000
23.162	0.002187	19945911.	-134584.	-0.000252	0.000	5.670E+12	-169.4403	582039.	0.000
23.788	0.000393	18932908.	-135340.	-0.000226	0.000	5.671E+12	-31.6083	603482.	0.000
24.414	-0.001212	17917829.	-135083.	-0.000202	0.000	5.672E+12	100.0209	620154.	0.000
25.040	-0.002638	16908119.	-133861.	-0.000179	0.000	5.673E+12	225.3382	641597.	0.000
25.666	-0.003897	15910865.	-131722.	-0.000157	0.000	5.674E+12	343.9562	663041.	0.000
26.292	-0.004997	14932775.	-128720.	-0.000137	0.000	5.674E+12	455.3399	684484.	0.000
26.918	-0.005949	13980150.	-124910.	-0.000117	0.000	5.674E+12	559.0491	705928.	0.000
27.544	-0.006762	13058858.	-120351.	-9.955E-05	0.000	5.674E+12	654.7302	727371.	0.000

28.170	-0.007445	12174310.	-115105.	-8.285E-05	0.000	5.675E+12	742.1063	748815.	0.000
28.796	-0.008007	11331453.	-109234.	-6.729E-05	0.000	5.675E+12	820.9676	770258.	0.000
29.422	-0.008456	10534748.	-104976.	-5.282E-05	0.000	5.675E+12	312.4739	277600.	0.000
30.048	-0.008800	9755515.	-102557.	-3.939E-05	0.000	5.675E+12	331.8119	283243.	0.000
30.674	-0.009048	8994855.	-100003.	-2.698E-05	0.000	5.675E+12	347.9369	288886.	0.000
31.300	-0.009205	8253691.	-97341.	-1.557E-05	0.000	5.675E+12	360.9269	294529.	0.000
31.926	-0.009281	7532767.	-94592.	-5.118E-06	0.000	5.675E+12	370.8749	300172.	0.000
32.552	-0.009282	6832656.	-91780.	4.389E-06	0.000	5.675E+12	377.8878	305815.	0.000
33.178	-0.009215	6153764.	-88925.	1.298E-05	0.000	5.675E+12	382.0855	311458.	0.000
33.804	-0.009087	5496338.	-86050.	2.069E-05	0.000	5.676E+12	383.5998	317101.	0.000
34.430	-0.008905	4860474.	-83172.	2.755E-05	0.000	5.676E+12	382.5737	322744.	0.000
35.056	-0.008673	4246124.	-80311.	3.357E-05	0.000	5.676E+12	379.1605	328387.	0.000
35.682	-0.008400	3653105.	-77484.	3.880E-05	0.000	5.676E+12	373.5228	334030.	0.000
36.308	-0.008091	3081108.	-74707.	4.326E-05	0.000	5.676E+12	365.8322	339673.	0.000
36.934	-0.007750	2529707.	-71994.	4.697E-05	0.000	5.676E+12	356.2682	345316.	0.000
37.560	-0.007385	1998372.	-69360.	4.997E-05	0.000	5.676E+12	345.0180	350959.	0.000
38.186	-0.007000	1486475.	-66816.	5.227E-05	0.000	5.676E+12	332.2756	356602.	0.000
38.812	-0.006599	993306.	-64373.	5.391E-05	0.000	5.676E+12	318.2416	362245.	0.000
39.438	-0.006190	518079.	-59774.	5.491E-05	0.000	5.676E+12	906.1531	1099761.	0.000
40.064	-0.005774	93979.	-53134.	5.532E-05	0.000	5.676E+12	861.8670	1121204.	0.000
40.690	-0.005358	-281486.	-46835.	5.520E-05	0.000	5.676E+12	815.0690	1142648.	0.000
41.316	-0.004945	-610954.	-40895.	5.460E-05	0.000	5.676E+12	766.3296	1164091.	0.000
41.942	-0.004538	-897167.	-35327.	5.361E-05	0.000	5.676E+12	716.1896	1185535.	0.000
42.568	-0.004140	-1142953.	-30139.	5.226E-05	0.000	5.676E+12	665.1583	1206978.	0.000
43.194	-0.003753	-1351185.	-25335.	5.061E-05	0.000	5.676E+12	613.7117	1228422.	0.000
43.820	-0.003380	-1524765.	-20918.	4.870E-05	0.000	5.676E+12	562.2915	1249865.	0.000
44.446	-0.003021	-1666592.	-16886.	4.659E-05	0.000	5.676E+12	511.3050	1271309.	0.000
45.072	-0.002680	-1779539.	-13233.	4.431E-05	0.000	5.676E+12	461.1244	1292752.	0.000
45.698	-0.002356	-1866438.	-9953.4593	4.190E-05	0.000	5.676E+12	412.0883	1314195.	0.000
46.324	-0.002050	-1930054.	-7036.5871	3.939E-05	0.000	5.676E+12	364.5017	1335639.	0.000
46.950	-0.001764	-1973072.	-4470.7149	3.680E-05	0.000	5.676E+12	318.6378	1357082.	0.000
47.576	-0.001497	-1998078.	-2241.9898	3.417E-05	0.000	5.676E+12	274.7395	1378526.	0.000
48.202	-0.001250	-2007550.	-334.8418	3.152E-05	0.000	5.676E+12	233.0209	1399969.	0.000
48.828	-0.001024	-2003842.	1267.8100	2.887E-05	0.000	5.676E+12	193.6702	1421413.	0.000
49.454	-0.000817	-1989174.	2584.3678	2.623E-05	0.000	5.676E+12	156.8511	1442856.	0.000
50.080	-0.000629	-1965624.	3634.3832	2.361E-05	0.000	5.676E+12	122.7057	1464300.	0.000
50.706	-0.000462	-1935120.	8074.8687	2.052E-05	0.000	4.074E+12	1059.5321	17231162.	0.000
51.332	-0.000321	-1844785.	15187.	1.704E-05	0.000	4.074E+12	834.0759	19511168.	0.000
51.958	-0.000206	-1707343.	20563.	1.376E-05	0.000	4.074E+12	597.2891	21791174.	0.000
52.584	-0.000114	-1536159.	24183.	1.077E-05	0.000	4.074E+12	366.3386	24071180.	0.000
53.210	-4.403E-05	-1344270.	26139.	8.119E-06	0.000	4.074E+12	154.4407	26351185.	0.000
53.836	7.651E-06	-1143637.	26609.	5.825E-06	0.000	4.074E+12	-29.1602	28631191.	0.000
54.462	4.349E-05	-944625.	25828.	3.900E-06	0.000	4.074E+12	-178.9452	30911197.	0.000
55.088	6.624E-05	-755691.	24056.	2.332E-06	0.000	4.074E+12	-292.6702	33191203.	0.000
55.714	7.852E-05	-583256.	21565.	1.097E-06	0.000	4.074E+12	-370.7784	35471209.	0.000
56.340	8.273E-05	-431731.	18610.	1.617E-07	0.000	4.074E+12	-415.7422	37751215.	0.000
56.966	8.095E-05	-303658.	15429.	-5.163E-07	0.000	4.074E+12	-431.3900	40031220.	0.000
57.592	7.497E-05	-199921.	12222.	-9.806E-07	0.000	4.074E+12	-422.2687	42311226.	0.000
58.218	6.622E-05	-120009.	9159.7249	-1.276E-06	0.000	4.074E+12	-393.0780	44591232.	0.000
58.844	5.581E-05	-62276.	6375.4728	-1.444E-06	0.000	4.074E+12	-348.2031	46871238.	0.000
59.470	4.453E-05	-24191.	3973.2627	-1.523E-06	0.000	4.074E+12	-291.3629	49151244.	0.000
60.096	3.292E-05	-2546.2413	2032.3622	-1.548E-06	0.000	4.074E+12	-225.3837	51431249.	0.000
60.722	2.127E-05	6379.6711	614.5174	-1.544E-06	0.000	4.074E+12	-152.1042	53711255.	0.000
61.348	9.715E-06	6722.1841	-228.7720	-1.532E-06	0.000	4.074E+12	-72.4137	55991261.	0.000
61.974	-1.749E-06	2978.2348	-449.7877	-1.523E-06	0.000	4.074E+12	13.5704	58271267.	0.000
62.600	-1.317E-05	0.000	0.000	-1.521E-06	0.000	4.074E+12	106.1814	30275636.	0.000

* This analysis computed pile response using nonlinear moment-curvature relationships.
  Values of total stress due to combined axial and bending stresses are computed only
  for elastic sections only and do not equal the actual stresses in concrete and steel.
  Stresses in concrete and steel may be interpolated from the output for nonlinear
  bending properties relative to the magnitude of bending moment developed in the pile.

Output Summary for Load Case No. 1:

```
Pile-head deflection             =      0.3474957 inches
Computed slope at pile head      =     -0.0025530 radians
Maximum bending moment           =      35669759. inch-lbs
Maximum shear force              =       -135340. lbs
Depth of maximum bending moment  =      7.5120000 feet below pile head
Depth of maximum shear force     =     23.7880000 feet below pile head
Number of iterations             =            136
Number of zero deflection points =              3
```

Summary of Pile Response(s)

Definitions of Pile-head Loading Conditions:

Load Type 1: Load 1 = Shear, lbs, and Load 2 = Moment, in-lbs
Load Type 2: Load 1 = Shear, lbs, and Load 2 = Slope, radians
Load Type 3: Load 1 = Shear, lbs, and Load 2 = Rotational Stiffness, in-lbs/radian
Load Type 4: Load 1 = Top Deflection, inches, and Load 2 = Moment, in-lbs
Load Type 5: Load 1 = Top Deflection, inches, and Load 2 = Slope, radians

Load Case No.	Load Type No.	Pile-head Condition 1 V(lbs) or y(inches)	Pile-head Condition 2 in-lb, rad., or in-lb/rad.	Axial Loading lbs	Pile-head Deflection inches	Maximum Moment in Pile in-lbs	Maximum Shear in Pile lbs	Pile-head Rotation radians
1	1	V = 90200.	M = 30252000.	1547800.	0.34749573	35669759.	-135340.	-0.00255296

The analysis ended normally.